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*The **END** of the
LINE?*

*global
threats to
sharks*

WildAid

The End of the Line?

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About WildAid

WildAid's Shark Conservation Program aims to:

- ✦ Raise awareness globally about threats to sharks
- ✦ Promote sustainable management of shark populations
- ✦ End the practice of finning globally
- ✦ Reduce excess demand for shark fin

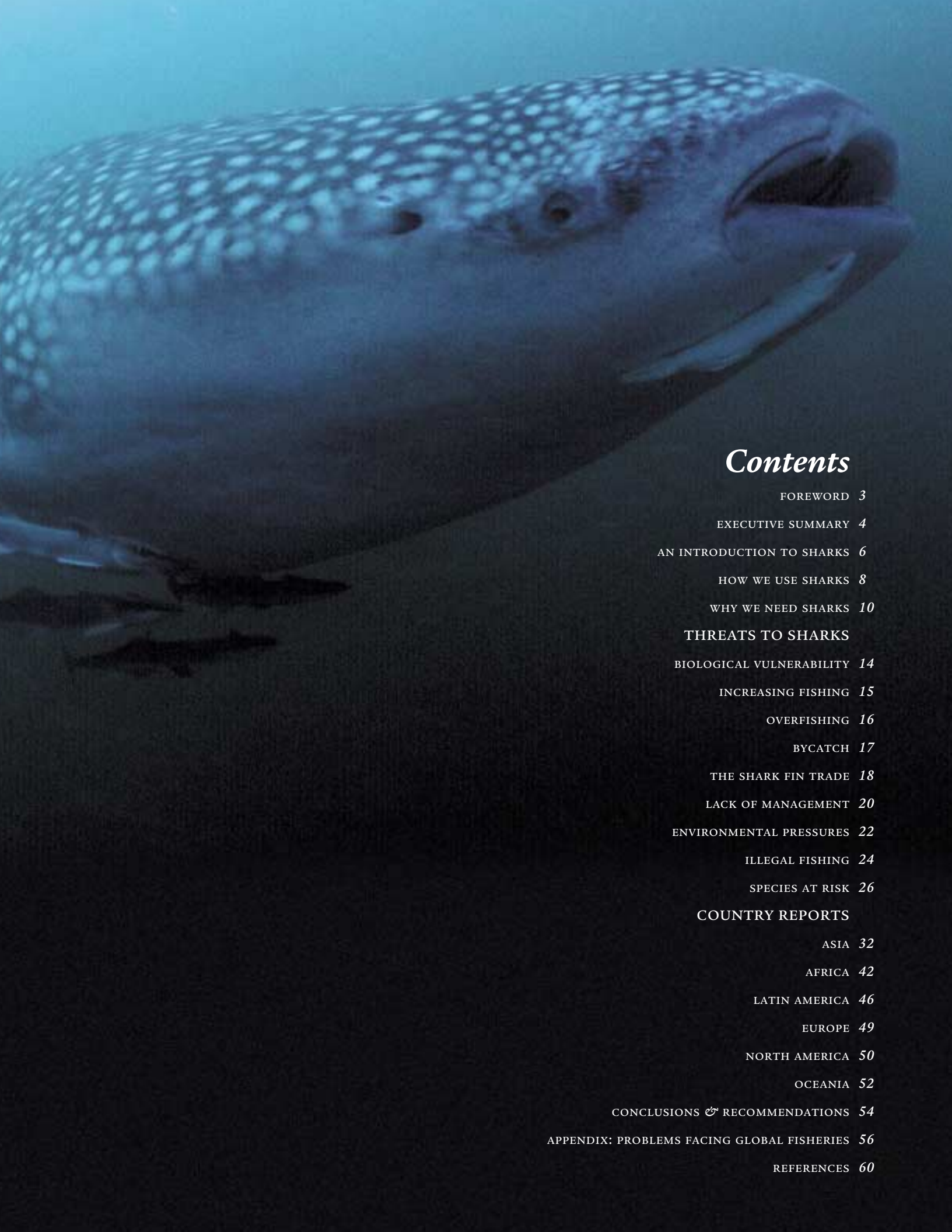
In addition, WildAid is providing financial and technical support to the Galapagos and Cocos Island for patrolling and enforcing the Marine Reserves.

Through the WildAid 100% Direct Fund all public donations can go straight to field protection with no administrative or overhead deductions.

WildAid is a US registered public charity with offices in San Francisco, Bangkok, London, Washington DC and Vladivostok.

WildAid provides direct protection to endangered wildlife. We train and equip wildlife law enforcement teams in the field. We campaign nationally and internationally for truly effective wildlife protection. We enlist local communities in wildlife programs and help local conservation groups grow stronger. We launch innovative programs to educate the public about the importance of wildlife and healthy ecosystems. We use investigative research and mass publicity to expose illegal trafficking and to reduce the market for wildlife products. We help to preserve and expand wildlife habitat, so protected species can flourish once again.

To learn more visit www.wildaid.org



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Hammerhead
sharks in the
Galapagos

Save Our Sharks

Since earliest times, human beings have relied on wild resources. For most of our history, we were just another link in the food chain, another predator.

Increasingly our ever-expanding populations, our technology and organization mean we have become a superpredator with few of nature's checks and balances. We now farm resources to produce them on the scale we desire—and fisheries are one of the world's last great wild harvests. Yet, in the last fifty years humanity has proven beyond a doubt that the oceans are not infinite. What seemed to be an inexhaustible supply as recently as twenty years ago has, in many areas, been taken to its limits and beyond. Leading marine biologists recently warned that we had been wrong to suppose that we could not cause the extinction of a marine fish species—we are already doing this.

Sharks are likely to be in the first round of marine extinctions caused by human activity. As top predators they are naturally relatively scarce, but also highly vulnerable. Some have gestation periods longer than an elephant, produce only a handful of young and take up to 25 years to mature. When they have faced directed fishing pressure, some populations have crashed, taking decades for a stock to recover, if ever.

Though they have swum the oceans since before the dinosaurs, they have never faced a predator as voracious as industrialized humanity. Traditionally they have been seen as more of a nuisance by fishermen than a saleable commodity and so were relatively little impacted on a global scale. Many of the poorest fishing communities consume shark meat themselves as it has so little market value.

But in the last few decades the situation has dramatically changed. As other fisheries have been depleted, fishermen have compensated with sharks. A relatively obscure custom of the wealthy from southern China—using the needles of shark fins in soup as an ingredient to add texture, but not flavor—has burgeoned to the point where shark fin soup has become an almost ubiquitous dish at weddings, banquets and business dinners throughout the Chinese world. What was once eaten on a special occasion by the privileged few is now regularly eaten by hundreds of millions of people.

The word has gone out to fishermen far and wide that shark fins mean money, regardless of whether the rest of the body is dumped overboard. The shark fin trade has gone global.

Fisheries management for sharks has been left at the starting block. Remarkably, no species of sharks is yet protected internationally. There are few data and little monitoring of catches to alert us to population crashes. Only a handful of countries have any management of shark fisheries at all. The consequences are easy to predict, but hard to document, as so little reliable data is available.

This report is not a scientific study or a systematic global trade review. Rather it is an attempt to assemble a broad overview in lay terms of the factors likely to affect the survival of sharks. And it is a call to action.

Using sharks sustainably is not just an option for the poor fishing communities that depend on shark meat as a protein source, it is a necessity. Nor is it an option for those who wish to continue eating shark fin soup. No sharks, no shark fin soup. It is sadly ironic that in countries such as Kenya and Brazil people are losing their subsistence food to supply one of the world's most expensive culinary items.

As well as being a food security issue, it is likely that removing sharks will have serious repercussions for many other species, which may ultimately disrupt fisheries with far greater economic value. We may only discover this when it is too late.

What hope then for sharks, and ultimately the oceans?

The United Nations Food and Agriculture Organization (FAO) has recognized the crisis and asked its 190 members to devise management plans by February 2001. However, the response of member states has been poor to date and other international bodies have been slow to play their role in conserving shark stocks.

Solutions will come only from a combination of actions: learning more about sharks, reducing fishing pressure, stopping unnecessary bycatch, monitoring shark fishing and trade, and more effective enforcement of regulations. However, none of these measures will be effective if the demand for shark products—and in particular the fins—is not reduced to sustainable levels.

This requires a truly global effort, but also strong leadership from Asia, where a dramatic leap in awareness, concern and self-restraint among consumers is needed. There is nothing wrong with eating shark fin soup, there are just too many of us doing it. The industry needs regulating to prevent stock depletions and the wastage of “finning”. Those who wish to maintain the tradition of shark fin soup should be the loudest voices calling for regulation.

We still have an irrational fear of sharks which may explain our lack of will to conserve them. Perhaps because we fear the unknown and so much about sharks is still a mystery. Yet increasingly the well-informed are developing a respect for these magnificent predators, some of nature's most successful designs. Divers now cherish encounters with sharks, as terrestrial tourists do with elephants and gorillas, suggesting new ways for us to profit from sharks without destroying them.

Peter Knights
Executive Director, WILDAID

“Sharks are likely to be in the first round of marine extinctions”



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Executive Summary

Sharks have inhabited the world's oceans for over 400 million years. They have widespread global distribution and they play a vital role in maintaining the health of ocean ecosystems. We utilize them for a number of products, such as meat, cartilage and fins. They are a critical food source for many in developing countries. They are an increasingly important revenue source for dive tourism around the world.

Sharks are highly vulnerable to overexploitation due to their longevity, late maturity and slow reproduction rates. Shark fisheries have often followed a “boom and bust” pattern.

Sharks are being overfished in many parts of the world. Some shark populations have declined by 90%. As bony (teleost) fish have declined due to overfishing and demand for fins has expanded sharks are increasingly targeted. Reported world

catches rose from 622,908mt in 1985, to over 800,000mt in 1998. A number of species are now considered endangered, threatened or vulnerable.

No sharks are protected internationally. Only a handful of countries manage shark fisheries.

Artisanal fishermen in the developing world are losing their catches to modern technology. In many areas, shark abundance has declined due to the arrival of modern longliners and trawlers, many of which are foreign-owned and fish illegally. With human populations increasing and shark stocks decreasing, poor countries are being deprived of an essential source of protein.

An estimated 50% of all sharks taken are caught unintentionally as bycatch in other fisheries. Each year, up to 800,000mt of sharks may be caught due to the indiscriminate



fishing technology of other fisheries. Data are unreliable as bycatch is largely unmonitored and unrecorded.

Marine Reserves are the new target of illegal fisheries. Many of the world's marine protected areas, such as the Galapagos Islands and Cocos Island, are now regularly fished illegally for increasingly valuable shark fins.

The demand for shark fin soup is at an all-time high. As affluence has grown in Asia, and in China particularly, so has the market for luxury items. Reported trade in fins more than doubled from 3,011mt in 1985, to 7,048mt in 1997.

Shark fin is one of the most expensive seafood products. At up to US\$100 per bowl for shark fin soup, demand—and profit—have greatly increased pressure on shark populations. Now sharks in all regions of the globe are sought solely for their fins, wasting as much as 99% of the animal.

Consumers are largely unaware of the origins of shark fin.

Studies in Hong Kong and Taiwan show that consumers have little understanding of where shark fin soup comes from, of overfishing, of illegal shark fishing or of the practice of finning.

Heavy metals, chemicals and discarded plastics pollute the water—and the sharks in it.

As more of the world uses the oceans as dumping grounds, toxicity to sharks increases. Marine and coastal degradation exacerbate this ominous threat to sharks, and those who eat them.

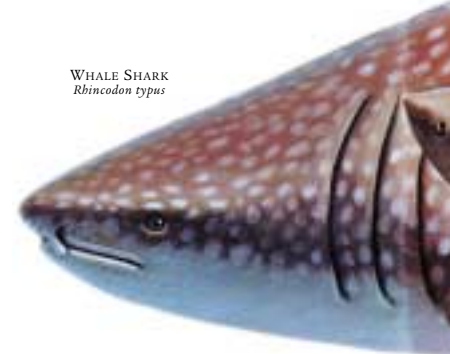
Lack of research and knowledge may signal the end of the line for sharks.

Effective conservation and management are hindered by meager insight into the biology, life history, distribution, migration and exploitation of most shark species. The prospect of a food chain minus its apex predators may mean the end of the line for many more species.

An Introduction to Sharks



© M. ERMANN



WHALE SHARK
Rhincodon typus

ILLUSTRATION © BARBARA HOOPES/WILDLIFE EDUCATION LTD.

Note on terminology

In this report, “shark” refers to all chondrichthyans except in citations or verbatim quotations. The term “fishermen” refers to individuals of either gender engaged in fishing activity. For the most part, only secondary citations are given in the reference list.

All weights have been converted into metric tons (mt) and all values to US dollars.

WHAT IS A SHARK?

Sharks comprise about seven percent of living fish species. They inhabit almost every marine ecosystem on earth and are found in all the world’s oceans, as well as in many inland waterways. Unlike bony fish, shark skeletons (with the exception of jaws and vertebrae) are composed of cartilage.¹

Sharks and their close relatives, skates, rays and chimaeras—known collectively as *Chondrichthyans*—fall into two main groups. *Elasmobranchs* include the 490 or so species which

people would generally recognize as “sharks,” along with around 630 species of skates and rays. *Chimaeras*, such as elephant fish and ghost sharks, are thought to comprise 50 species.²

EVOLUTIONARY SUCCESS

In evolutionary terms, sharks are one of the most successful families of animals, having existed in the world’s oceans for hundreds of millions of years. The earliest shark species predate the first dinosaurs by 100 million years. They have survived extinction events with their diversity relatively intact and may therefore make excellent indicator species in gauging the effects of human activity on marine ecosystems.

ECOLOGICAL IMPORTANCE

Since they are often the “apex,” or top predators in their ecosystems, the depletion or removal of sharks is likely to affect marine ecosystems and the abundance of other fish species in ways that cannot currently be predicted. Many marine experts believe that sharks are vital in maintaining marine biodiversity and concern has been raised that some species may become extinct before their ecological role is fully understood.

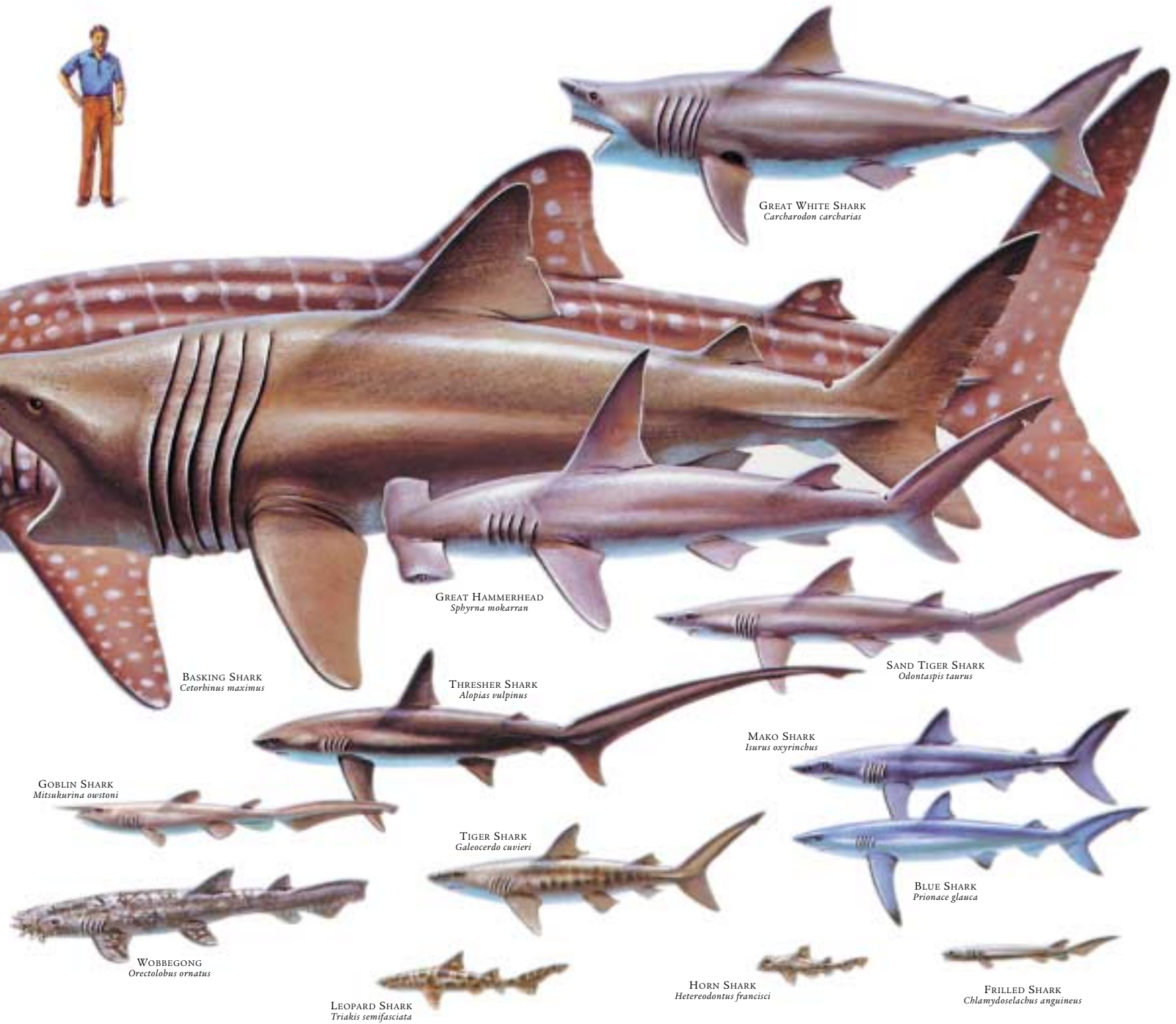
LEARNING FROM SHARKS

Scientists are still discovering the unique characteristics of shark biology. It is known that they have extra senses and that some species can generate body heat for greater muscle efficiency. The hydrodynamics of their skin has provided inspiration for the swimwear industry. A new product—Fastskin—replicates the microscopic toothlike structures on shark skin and is intended to help swimmers increase their speed. It is thought that, by reducing drag, swimming speeds could be increased by up to three percent.³ The US Navy is reported to have studied shark skin and propulsion in considering a new generation of submarines. NASA is reported to have considered using shark skin as a model for the hull of the Space Shuttle.

MIGRATION

Some shark species migrate vast distances to find food or to reproduce.

- In 2000, a blue shark, *Prionace glauca*, tagged off Tasmania was caught off the coast of southwest Africa, 9,500 kilometers (km) away.⁴
- A spiny dogfish, *Squalus acanthias*, tagged off Washington state, US, appeared in Japan seven years later, a journey of 6,000km.⁵
- Sharks tagged and released in Cornwall, UK, have been caught in the waters of New York state, US.⁶
- Nine tags attached to sharks in 1998 by UK anglers were returned from Portugal and Spain in 1999. All the sharks had been caught by longliners.⁵



SHARK FACTS

● Sharks diverged from bony fish 400 million years ago, evolving without swim bladders or lungs, and with teeth not in sockets but attached to the jaw by soft tissue and continually replaced. Sharks have no gill covers, bony fin spines or prominent scales. Shark skin consists of tiny scales or denticles which channel water to reduce friction.¹

● Sharks range from the world's largest fish, the plankton-eating whale shark, *Rhincodon typus*, which can reach 14m in length, to the 15cm spined pygmy shark, *Squaliolus laticaudus*.

● Most shark species are small and harmless to humans. Half of them reach less than 1m in length and are 80% smaller than an adult human.¹

● Some shark species lay eggs and others give birth to live pups, sometimes after lengthy gestation periods.

● Sharks have seven senses: hearing, sight, touch, smell (which can range for several miles), taste, electrosense (which picks up weak electrical fields), and lateral line and pit organs (which pick up weak vibrations).¹

● Sharks have been shown to be capable of learning and can display complex social behavior that is not fully understood. They have brain-to-body ratios well within the ranges for birds and mammals.⁴

How We Use Sharks

MEAT

Shark meat is eaten in most, if not all, countries of the world, although consumption is much lower than that of bony fish species. Unless quickly processed, the high urea content can render some shark meat inedible. In some countries in the developing world, such as Sri Lanka, Mexico and parts of Africa, shark meat is a significant part of the human diet and provides much of the protein requirements of poorer communities.

In the West, shark meat has traditionally been viewed as inferior. To make it more appealing the spiny dogfish, a widely eaten shark species, is marketed under names like rock salmon in the UK, saumonette (“little salmon”) in France and Schillerlocken (“locks of Schiller”) and seeaal (“sea eel”) in Germany.⁷ Recently, mako (*Isurus oxyrinchus*) and thresher (*Alopias vulpinus*) meat has begun to increase in popularity.

In Asia many types of shark are eaten. In Japan, meat from the shortfin mako shark is considered highly palatable and is reported to be comparable in price to swordfish.⁸ The meat is processed into “*hanpe*”, a type of fish cake. Shark meat is often ground into a paste called “*surimi*”. Both blue shark and spiny dogfish meat are eaten in Japan, although the former needs to be processed quickly to avoid deterioration.⁸



© M. ERDMANN



© B. MCCOUBREY/WILDAID

Top: Shark meat is an important source of protein in many developing countries

Above: “Rock salmon” in British “fish and chips” is spiny dogfish, a species of shark

RECREATIONAL FISHING

Recreational shark fishing is a popular pastime whose proponents have often sounded the alarm on declining catches and lobbied for protective measures. However, recreational fisheries can contribute significantly to shark mortality in some regions.⁹ Parts of the US East Coast may well host more recreational fishing for large sharks than anywhere else in the world. In the southern states of the US, recreational fishermen catch large numbers of small coastal sharks.⁹ In the past, sharks were viewed as pests which ate target fish, such as marlin and swordfish, off the hook. Now there are so few big sharks that this is less of a problem, but with recreational fishing for billfish itself in decline, sharks have become target species.⁹

Increasingly, recreational fishermen are moving towards a catch-and-release policy for most large species. However, this practice is not without problems, as recreational fishermen usually allow sharks to “run with the bait” before hooking them, which results in more gut-hooked animals. Virtually all recreational releases of large fishes involve cutting the leader, leaving animals with hooks in the gut, throat, or moving mouth parts. Hooks embedded in this way can cause serious injury or death. This could be solved by the use of de-hooking tools, allowing even gut-hook removal.⁹

Discards from a fishing tournament.



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SPIRITUAL ASPECT OF SHARKS

Sharks retain a spiritual importance in numerous beliefs around the world:

- In Hawaii, the shark is an animal deity still revered today as the greatest *Aumakua* (guardian angel). Stories exist of canoe paddlers getting into difficulties at sea, only to be guided to a safe place by a shark.¹⁰
- In Vietnam, the whale shark was known as *Lord Fish*. Its remains were given sacred burials.
- In Fiji, the shark god was known as *Dakuwaqa*, from whom the high chiefs of *Cakaudrove* were believed to be direct descendants.
- In Japan, the shark was an important mythological figure and was paid homage as the God of the Storms.
- In parts of Senegal, sharks are believed to be harmless to humans. If a shark does attack, it is considered to have been “invaded” by an evil spirit. In the village of *Ngor*, there is a sage who removes evil spirits from invaded sharks and renders them harmless.¹¹

SHARKS FOR SALE

Sharks provide a wide variety of products, some of which are still sought-after commercially. Shark liver was a major source of vitamin A until other sources were obtained.

Meat: Human food, animal feed, fertilizer



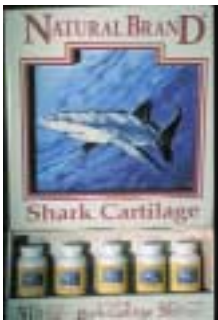
Liver oil: Tanning and textile industries, manufacture of lubricants, paint, cosmetics,

vitamin A and pharmaceutical products

Squalene from liver: Medicinal

Blood: Medicinal (anticoagulants)

Corneas: Medicinal (human transplants)



Cartilage/cartilage extracts: Medicinal (used to treat arthritis, rheumatism and cancer), artificial skin, burn treatments

Teeth: Traditionally used by Maoris to make weapons/jewelry, by Inuit to make knives, sold as tourist souvenirs



© SUE WATTS



Skin: Food delicacy, abrasive, tanned to make tough leather products, imitated in manufacture of swimwear¹

SHARK FIN SOUP

The custom of using shark fin in cooking is said to date back to the second century BC. Originally a southern Chinese dish, it spread throughout Chinese communities in Asia and the rest of the world only relatively recently.¹²

Consumption of fins was largely confined to the privileged classes, owing to the difficulty of obtaining fins and the complex processes for preparing them. The processing has eight stages. Frozen shark fin is defrosted overnight. Both defrosted and fresh fins are blanched in very hot water and the denticles scraped off. Then the fins are placed in ice water, making it easier to remove the cartilage. The fins are sun-dried on racks and then transferred to a cool drying room to prevent softening. Finally, they are refrigerated. At the cooking stage, the fins are soaked again, this time to remove the odor. After they have softened, further preparation is up to the chef.¹³

The social standing of Chinese families is said to have depended upon their chefs' ability prepare shark fin dishes. Chefs were occasionally known to have lost their heads for sub-standard preparations of fins.¹²

Because of its association with privilege and social rank, shark fin soup is served to celebrate important events such as weddings, birthdays, or even business functions. During Chinese New Year celebrations, the consumption of shark fin soup has an important cultural symbolism.

There is also the issue of "face" (respect), which is of paramount importance in the Chinese culture. As a leading chef in Singapore explained, "If you don't serve shark fin soup at weddings, or at important dinners, the host will look very cheap and that is

not giving face to your guests."¹⁴ This display of wealth and generosity is measured by the cost of the food and reflects on the efforts of hosts to provide their best hospitality to guests.

For many superstitious Chinese, even the words for shark fin have a bounteous ring. In the famous Chinese saying *Nian nian you yu*, meaning "yearly prosperity", *yu* means "plentiful" (in terms of material wealth) and because it has the same tone as *yu* (fish), it is important that a fish dish is served at Chinese New Year meals, to represent and welcome prosperity. Although steamed fish is commonly used as the symbol, consumers now often have *yu chi* (shark fins) as well.¹⁵

Shark fin soup can be very expensive. Depending on the amount of shark fin in the soup, the price can range from US\$10 to as high as US\$100 per bowl. Although the quality and texture of shark fin is important in



© D. PERRINE/INNERSPACE VISIONS

making the soup (the longer and thicker the strands, the better and costlier they are), the fins are essentially tasteless. The flavor of shark fin soup lies entirely on the preparation of the broth, which is usually chicken soup. The broth is prepared separately from the fins; they are combined just before serving. A leading chef in Singapore explained, "The fins with their noodle-like cartilaginous tissues have no taste in themselves and are used only as a soup thickener"¹⁴.

Even though it is widely known that shark fin do not have any taste, the demand for shark fin soup continues to escalate. In recent years, restaurants are rumored to put fewer and fewer shark fins into the soup, or in some cases, to mix real shark fin fibers with artificial fibers.¹⁶ Far from turning their backs on shark fins, consumers are opting for an emerging new dish, which consists of whole unbroken fin, evidence that it is the authentic product.¹⁴

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Why We Need Sharks

A MAJOR SOURCE OF PROTEIN FOR POOR COASTAL COMMUNITIES

Many coastal communities in the developing world depend on shark meat as an important source of protein. The meat is often sun-dried or salted to preserve it. For some communities in India, Africa, Mexico and Sri Lanka, for example, shark meat is the primary—and sometimes only—source of protein. The reliance on sharks has increased as overfishing has depleted stocks of other fish.

WildAid’s research has shown that shark catches in a number of traditional shark fisheries have declined—sometimes drastically. The declines have often coincided with the arrival of industrial (and often foreign) fishing vessels in the area, which frequently operate in flagrant breach of local fishing regulations. Such declines are poorly documented at local or national level, as few developing countries have active fisheries management or systems for collecting even basic data.

“Depleting sharks in certain ecosystems and under certain conditions could lead to unforeseen and devastating consequences”

RAMON BONFIL,

BIOLOGIST, SHARKS 2000 CONFERENCE, HAWAII

INDIA

Research conducted by WildAid has revealed the extent of shark catch declines and their impact on artisanal fishermen. Coastal communities in Andhra Pradesh and Tamil Nadu have reported a significant decline in shark catches over the past six years. In 1999, WildAid visited 15 fishing communities on the east coast and interviewed a number of traditional fishermen. Although unable to make assessments of individual species’ declines, locals suggested that overall shark catches had declined between 50%–70% over the previous five years.¹⁷

In 1999, fishermen in Chennai (Madras) reported that commercial vessels operating within India’s EEZ were posing a serious threat to artisanal catches. Shark finning on these commercial vessels is viewed as a major reason for the apparent declines.¹⁷

KENYA

Fishermen and fish dealers in Kenya have reported serious declines in shark catches and, without exception, they blame this on the appearance of industrial longliners and shrimp trawlers over the past decade.¹⁸ In July 1999, a spokesman for the shark-fishing village of Ngomeni in northern Kenya reported that, before the arrival of the longliners, a night’s catch would feed the village and provide enough meat for sale outside the village. Now it does not provide enough for the village.¹⁹

At least 20 trawlers were reported to be in the immediate vicinity of Ngomeni, each using three to five centimeter mesh nets, which were “sweeping the sea clean” and leaving virtually nothing for the shark fishermen of Ngomeni (who have always used 20-23 cm mesh nets “for conservation reasons”).¹⁹ Malindi, a traditional fishing village for generations, has experienced severely reduced landings and now sharks and other fish for general consumption are trucked in from Mombasa, 90-minutes away.²⁰



Left: Declines in many fisheries in the developing world have coincided with the arrival of industrial fishing either local or foreign.

Opposite page: Computer modelling suggests that the removal of sharks, like this tiger shark, may have counter-intuitive effects on other marine species.

MEXICO

Sharks are described as a resource vital to the Mexican economy.²¹ Many poor Mexicans subsist on a diet of shark meat.²² The bull shark, *Carcharhinus leucas*, is widely eaten in Mexico and is probably the most important from a commercial point of view.²¹ An estimated 80% of Mexico’s shark catches are accounted for by the artisanal fleet.²³

GUARDIANS OF OUR OCEANS' HEALTH

Although research on the ecological role of sharks is still scarce, it is known that some shark species play vital roles in marine ecosystems and are therefore crucial indicators of marine health. The depletion or removal of sharks may lead to increases or declines in other species, with unpredictable consequences for ecosystems. Sharks maintain the “genetic fitness” of their prey by removing the sick and the weak and help to keep their population sizes in check.²⁴ It is likely that the removal of significant numbers of sharks will affect numerous species below them in the food chain.

Dynamic simulation models have been used to predict ecosystem changes (over a 100-year period) resulting from a rapid depletion of sharks due to overfishing. Some of the results were unpredictable and suggest that shark depletion manifests itself in the food chain in complex ways;²⁵

- The Venezuelan shelf model revealed that two major prey species for sharks actually decreased in abundance after the removal of sharks, while there were significant increases in minor prey species;²⁵
- The Alaska Gyre model produced unexpected results in which many species underwent a rapid initial increase in biomass, followed by a slow and sustained decline. Towards the end of the 100 year period most species returned to baseline levels, while a few (mostly unimportant prey) species decreased further²⁵; and
- The Hawaiian Reef model revealed that the removal of tiger sharks, unsurprisingly, caused reef sharks, turtles, bottom fish, seabirds and other aquatic species to increase. However, an unexpected outcome was “a total and rapid crash in the abundance of tuna and jacks.” This was explained by the proliferation of seabirds following the removal of the tiger shark (their main predator); tunas and jacks are major prey for seabirds. Likewise, the tunas are the bottom fishes’ main predators and their removal caused the increase in bottom fish as a “third degree” effect of the tiger shark removal.²⁵



SHARK ATTACKS: FACTS & FICTION

Sharks have always had a bad press. They have been seen as monsters of the deep, waiting to pounce on any human who dares to venture into the water. Books and films, such as *Jaws*, are often blamed for this myth, but sharks have been people’s worst nightmares for centuries. Lurid headlines reinforce this on the rare occasions that an attack takes place.

Resort developers have been known to employ shark experts to remove any possible predators from the area.²⁶ Hawaii maintained a shark eradication program for decades after the death of a schoolchild in 1959. In some parts of the world concern for shark attacks is so great that swimming areas are cordoned off by massive shark nets.²⁶

Very few of the more than 400 species of shark have been known to attack humans and when they do, it is likely that they have mistaken humans for their normal prey. It is believed that many shark “attacks” are actually attempts by the shark to identify whether or not an object in the water is edible. There are numerous examples of sharks taking a bite out of a human and then, realising its mistake, swimming away.

Recently there have been press reports that shark attacks were diminishing,^{27a,27b} followed by reports that they were increasing. George Burgess, Director of the International Shark Attack File, points out that the apparent increase in attacks is “a reflection of human population growth and increased interest in aquatic recreation rather than a rise in the rate of attacks.” In fact, all other factors being equal, there are likely to be more attacks each year as human population grows and we spend increased leisure time in the sea. However, “the attack rate is not increasing—in fact it is likely decreasing as a result of diminished shark stocks and large increases in human utilization of our nearshore waters.”²⁸

Worldwide, there were nine reported shark fatalities in 2000, higher than the 5.4 average for the 1990s. However, during the 1990s there were years when 14, 12, 11 and 9 fatalities occurred. The numbers fluctuate from year to year. Last year there were four fatalities, so the average for the last two years is 6.5, not far off the ten-year average of 5.4. In 1998 there was only one fatal shark attack in Australia and in 1999 only two. There were no fatalities at all in 1994, 1996 and 1997.²⁸

In late 2000, three fatal attacks in Australia within a 6-week period prompted local speculation about a possible upward trend in shark attacks. Theories ranged from global warming to a lack of other “prey” species. After the third of these attacks, which took place off a Perth beach (the first in this area for 75 years), it was announced that the shark would be tracked down and killed. The fisheries headquarters switchboard was reported to be jammed with calls, 75% of which were made by people opposed to the killing of the shark.²⁹

However, the Australian total of six attacks this year (three non-fatal) was, in fact, consistent with the Australian yearly average of 5.3 recorded in the 1990s.²⁸ Shark attacks sometimes occur in clusters within a given calendar year and then do not occur at all for lengthy periods.

The fact remains that it is statistically more dangerous to get into a car and drive to the beach than it is to get into the water. More people are killed each year by lightning, by bee stings, by dog bites or by slipping in the bath than are killed by sharks.

SHARK TOURISM

Sharks are rapidly becoming the stars of diving tourism and in some cases are far more valuable alive than dead.²⁶ There are an estimated 200 shark dive-sites worldwide.³⁰ Shark feeding is now a well-established activity and in great demand from diving tourists. Shark tourism is also a very important factor in supporting policies and legislation in favor of shark conservation.³¹

In some parts of the Philippines, the whale shark has become the focus of tourism. Traditionally the warm seas sparked the peak shark hunting seasons, but today tourists are able to view whale sharks either from boats or in the water. A code of conduct has been developed to ensure that the sharks are not unduly disturbed. Local fishermen are learning how to become tour operators and spotters. Many local people have come to view the species as more valuable alive than dead.³²



THE BAHAMAS

Longlining was completely outlawed in the Bahamas in the mid-1990s, although the reasons for this are unconfirmed. A coalition of tour dive operators, under the leadership of the Bahamas National Trust, had been campaigning for this goal.³³ This

followed an incident when a large number of sharks, believed to be regular visitors at the shark feeding sites, were finned and discarded.³⁴ Dive operators in the Bahamas cater to 2,000 visitors a year and dive tourism on the islands is heavily marketed, using sharks as the main attraction. The number of visitors is

increasing 20% a year.

In some areas of the world, white shark populations are zealously protected by communities that regard them as an important source of tourist revenue.²⁶ South Africa has become one of the world's most popular countries for shark cage diving and it has developed into a multi-million rand industry.³⁵



Cage diving with a great white is billed as the ultimate thrill and is a growing industry.

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A Personal Perspective

Ecosystem implications for shark populations resulting from the effects of fishing

By John Stevens,

CSIRO MARINE RESEARCH, HOBART, AUSTRALIA

In recent times, there has been a growing realization that fisheries management needs to consider factors additional to whether catches of the target species are sustainable or not. A more holistic approach is required which includes, for example, effects on non-target (bycatch) species, damage caused to the habitat by gear and the effects of discards on populations which scavenge them. These objectives have been encompassed by the UN Convention on the Law of the Sea, the FAO Code of Conduct for Responsible Fisheries and several other recent policy documents from around the world. While these objectives are necessary, our understanding of ecosystem functioning and interactions are still poor. Even in the terrestrial environment where impacts such as deforestation, damming rivers and urban sprawl are readily apparent, our knowledge of community ecology in terms of predicting changes in abundance of interacting species is poor.³⁶ In the marine environment, difficulties are orders of magnitude greater because of the problems in observing what is happening.

The effects of fishing are generally divided into direct and indirect effects. Direct effects through the capture of individual species can result in changes in abundance, size structure and population parameters (density dependent change), and at the extreme can lead to extinction. This can affect community structure through changes in species composition and diversity. Indirect effects involve trophic interactions at the community level. These act through selective removal of predator or prey species, removal of competitors, replacement of one species by another, habitat damage and enhancement of food supply through discards. Trophic effects are difficult to determine, against a background of natural variation, often poor knowledge at the species level, difficulties in measuring change and usually incomplete knowledge of what the original system looked like.

Overfishing one species can have unpredictable effects on other species



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Among sharks and rays the direct effects of fishing, certainly in terms of general consequences, are fairly well known due to a considerable amount of recent international attention. However, there is relatively little hard evidence for the indirect effects of fishing on this group. Since many sharks and rays are predators at or near the top of marine food chains the obvious question to ask is what happens when large numbers of sharks are removed? Conversely, what is the effect on these predators of removal of large quantities of their prey species by industrial fisheries? In South Africa, an increase in catches of small sharks was blamed on the removal of large sharks in the beach protection program. It was suggested that small sharks were important in the diet of large sharks, and with removal of the latter, small sharks had increased due to reduced predation. However, as is often the case with such hypotheses, this is not the whole story and there are other explanations. Spiny dogfish have long been considered to have a major impact on more desirable commercial species through their predation. In the NE Pacific, estimates of the consumption of herring by spiny dogfish ranged from 80-250,000t per year. A pest-control fishing program was actually introduced to reduce their numbers in that region. However, as noted by Ketchen³⁷ there was no apparent increase in herring stocks when spiny dogfish were fished down in the 1940s and 1950s.

Following three fatal shark attacks in Australia in the year 2000, a popular view held by a number of people is that it is a consequence of the natural food of sharks being reduced through fishing. This seems unlikely

given that seals are an important item in the diet of large white sharks in southern Australia and most seal numbers are increasing, and that shark populations are more likely to be decreasing faster than their fish prey. However, there is virtually no information in the literature on the effects of prey removal on shark populations. The removal of competitors has been implicated in a shift from a teleost dominated community to one dominated by skates and dogfish on Georges Bank in the NW Atlantic. Initially, fishing in the area was highly selective targeting gadoids and flounder, this was followed by a period of foreign fleets taking a wider range of species including dogfish and skates, and then a reversal to more selective fishing for gadoids and flounder. Survey data showed a significant increase in the catch rate of dogfish and skate over time. The period of selective fishing removed many of the gadoids and flounders. It has been suggested that dogfish and skates increased in abundance to exploit available food resources since the dietary overlap between dogfish and gadoids and skates and flounder is high. However, again there are different interpretations of these data and it has been stated by others that there is little convincing evidence to suggest that fishing has ever caused compensatory replacement of one fish stock for another.

Models are one way of exploring possible ecosystem effects of fishing. While the majority of models are currently relatively simplistic, they do illustrate that responses to shark removal may be difficult to predict but may be ecologically and economically significant.

John Stevens is one of the world's leading shark biologists.

Threats to Sharks

Biological Vulnerability

As apex predators, sharks are not designed for heavy predation, either by other marine species or by humans. Whether caught in directed fisheries or as bycatch, most shark species are unable to withstand protracted periods of heavy exploitation.

Shark species are generally slow-growing and long-lived, maturing late and with long reproductive cycles. They produce very limited numbers of live young or eggs. This makes them inherently vulnerable to overexploitation and slow to recover from decline.

Unlike most fish, sharks invest heavily in a small number of well-developed young. Most sharks feed their young inside their bodies with a yolk, while others provide embryonic nutrition through a placenta. Shark mothers often give birth in nursery areas which are separated from the rest of the population.

Unlike sharks, most bony fish species are adapted to a fluctuating environment and are referred to as “r-selected” species. They are usually small, mature quickly, mate early, and produce large numbers of small offspring which receive little or no parental care but which experience a major reproductive effort and higher natural mortality.³⁸

NOT DESIGNED FOR HEAVY PREDATION

Sharks are generally described as “k-selected” species. That is, they grow slowly to a large size, mature late in life, reproduce seasonally (year after year), produce a few large offspring—either as eggs or as live young—and experience a correspondingly lower natural

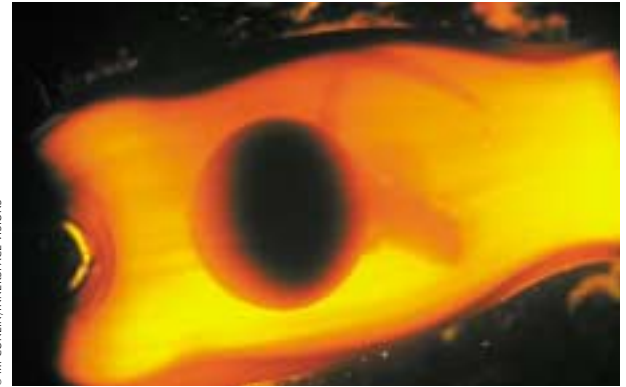
mortality rate. They may have been the first vertebrate group to evolve a k-selected life history. While predation levels on sharks were low the k strategy served sharks well.³⁸

The spiny dogfish is perhaps the most extreme example of the k-selected life history. Living up to 70 years, the female does not breed until she is over twelve years of age. Gestation can be up to two years and she will produce a maximum of 20 live pups.

Lemon shark (*Negaprion brevirostris*) pups develop over a twelve-month period, and their mothers require another year before mating again. Thus, a mating pair of lemon sharks barely reproduce themselves over the 24-month reproductive cycle. Typically 8–12 pups are born every other year, with a first year mortality approaching 50%. At birth, a lemon shark pup averages 60cm in length and weighs around one kilo. It grows less than 10cm in its first year of life and requires 13–15 years to become sexually active.³⁸

SEGREGATING BY AGE AND SEX

A further characteristic makes sharks vulnerable to overfishing. Most sharks segregate by sex and size. This means there are groups consisting solely of mature females, and if such a group is targeted by fishermen, the effect on breeding can be devastating.



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Above: Some sharks produce elaborate egg cases

Below: Many sharks, like this lemon shark, give birth to small numbers of live young

FEWER SHARKS CAN MEAN LOWER BREEDING RATES

If overfished most species of fish can compensate by increasing egg production to take advantage of decreased competition for food. Because sharks produce relatively few eggs or pups, there is less capacity to increase reproductive output and it is unlikely to have much effect in increasing population growth rate. Increased growth rate and juvenile survival may provide some compensatory mechanisms. Classical models of fisheries management have assumed that recruitment rate is virtually independent of stock size. These models are less applicable to sharks because generally recruitment rate and stock size are positively related.³⁹ That is, the larger the stock, the higher the birth rate. Conversely, reduction of stocks causes a reduction in recruitment.



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Increasing Fishing

Global exploitation of sharks is very difficult to quantify, since reporting of catches is unreliable and can be misleading. Member countries of the FAO report their shark landings in different ways and with varying degrees of detail and vast amounts of shark catch are not recorded at all.

From the data that exist it is clear that the commercial exploitation of sharks and related species has increased dramatically since the 1940s.⁴⁰ According to current FAO data, over 800,000mt of sharks were caught in 1998. The total reported world catch of shark and shark-like fish rose from around

622,908mt in 1985 to 730,784mt in 1994.⁴⁰ During this period, the reported nominal catch averaged 678,249mt per year.²³ However, it was estimated in 1994 that the total world catch was actually more than twice that, at 1.5 million mt, taking into consideration unreported bycatch.⁴¹

Over this period notable increases in catch occurred in the Northwest Atlantic, the Indian Ocean, and the western Central Pacific regions. The major shark fishing nations of the world include Argentina, Brazil, France, India, Indonesia, Italy, Japan, Malaysia, Maldives, Mexico, New Zealand, Pakistan, Portugal, South Korea, Spain, Sri

Lanka, Taiwan, the UK and the United States. These nations each reported nominal catches of more than 10,000mt annually.²³

The FAO reported a considerable increase in the overall production of shark meat and fins worldwide. Reported world production of shark meat (fresh, chilled, frozen, salted, in brine) rose from 35,541mt in 1984 to 57,340mt in 1993, an average of almost 44,425mt per year.⁴⁰ The United States, a major exporter of shark meat, reported soaring exports of fresh and frozen sharks from 474mt in 1989 to 8,339mt in 1995.²³

HOW MANY SHARKS ARE CAUGHT EVERY YEAR ?

The short answer is nobody knows. Shark catches are so poorly recorded (even less by species) that global shark catches can only be estimated. These numbers vary widely, depending on many unknowns and generally categorize sharks, skates, rays and chimaeras together.

In the late 1990s catches reported to the FAO amounted to around 730,000mt worldwide. Actual catches have been estimated to be double the reported catch. On this basis and assuming that the average weight was 10kg, one leading shark scientist estimated that 146 million individuals may be caught per year.² At the Sharks 2000 Conference in Hawaii, leading scientists postulated that from 55-100 million may be a more realistic figure.

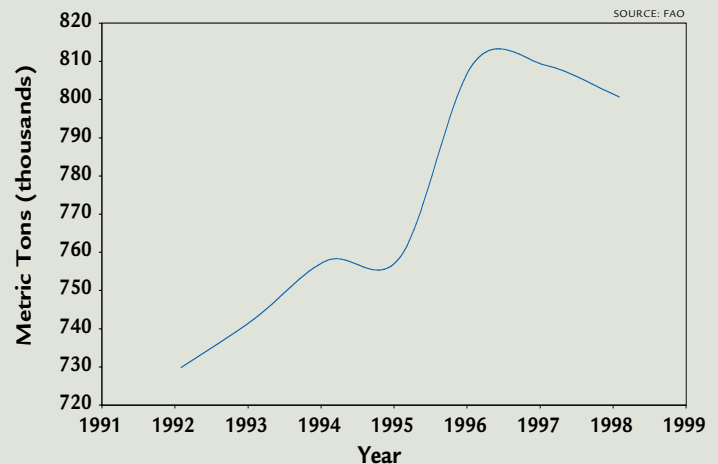
Based on an estimated 250 million consumers, if each consumed two shark fins per year, and there are assumed to be five usable fins per average shark (pectorals, first dorsal and caudal fin), they would consume 100 million sharks per year.

Clearly the capacity for the human populace to consume sharks is far greater than the shark's reproductive surplus, which is adjusted to lower levels of natural predation.



Shark carcasses at Puntarenas, Costa Rica, where fishing for sharks has expanded dramatically

Right: Nominal global catches of sharks, rays and chimaeras



Overfishing

BOOM AND BUST SHARK FISHERIES

Shark populations have generally proved to be fragile when subjected to unregulated directed fisheries⁴² resulting in a pattern of “boom and bust.” Rising catches are followed by rapid declines and very slow recoveries—when stocks are protected. Industrial shark fisheries have grown steadily since the 1920s and have frequently involved the targeting of unutilized stocks as catches from established shark fisheries have declined.⁴¹

● The collapse of the soupfin shark (*Galeorhinus galeus*) fishery in the US Pacific is typical. The fishery expanded spectacularly in 1938 with the discovery that liver oil was rich in vitamin A. The catch peaked at 4,000mt in 1940, crashed in 1942 and by 1944 was down to only 300mt. The severe catch decline continued even under unrelenting fishing effort. Only about 40mt are now caught annually.⁴²

● Catches of porbeagle sharks (*Lamna nasus*) in the north-eastern Atlantic peaked in 1947 then declined; catches temporarily rose again during the 1960s as the fishery spread to the northwestern Atlantic, but then declined to a low level in the mid 1980s.⁴³

● During the 1960s the Norwegians and Danes began fishing for porbeagle in the northwest Atlantic; between 1961 and 1964 their catch rose from 1,800mt to 9,300mt and then declined to less than 200mt.⁴⁴

● A harpoon fishery for the basking shark (*Cetorhinus maximus*) off the west coast of Ireland began in 1770 and lasted until the 1830s, when the species became scarce. The stocks subsequently recovered and the fishery was revived in the 1940s but



© S. WATTS/WILD AID

the catch quickly peaked and declined by the end of the 1950s.⁴⁵

● US Pacific angel shark (*Squatina californica*) catches peaked in 1985–86 at 560mt but decreased quickly to 120mt three years later. A ban in 1994 “likely averted population collapse”.⁴³

● In the early 1980s a fishery for sevengill sharks (*Notorhynchus cepedianus*) in San Francisco Bay, USA, crashed within a few years.

● A fishery for bluntnose sixgill sharks (*Hexanchus griseus*) began in the Maldives in 1980, peaked in 1982–84 and collapsed by 1996. Other fisheries for this species, in Australia, New Zealand, France, Brazil and possibly Argentina, are all reported to have declined.⁴⁶

● The common skate (*Dipturus batis*) in the Irish sea is considered by some to be commercially extinct as a result of short-term overexploitation.⁴⁷

● In the Chagos Islands, 500 km south of the Maldives, an abundance of sharks was noted during three major diving expeditions in the 1970s. In 1996 an expedition reported very few shark sightings. It was estimated that shark numbers had been reduced to approximately 14% of 1970s levels by overfishing.⁴⁸

Many more shark fisheries are likely to have declined severely, but have

Above: Fishermen in many parts of India have seen catches of sharks decline rapidly

never been formally documented. However, anecdotal reports from artisanal fishermen, divers, researchers and recreational fishermen in many parts of the world reveal that areas where sharks were once abundant have become depleted. WildAid research in Kenya, Senegal, India, and Costa Rica confirms this.

FISHING PRESSURE

“When sharks are overfished, the stocks can remain in a depleted state for decades after fishing has ceased, simply because it takes that long for these animals to grow and produce a new generation. Sometimes, shark stocks do not appear to recover at all”

—ROBERT HEUTER, PHD, TESTIMONY TO US CONGRESS, 1999

Declines in diversity associated with increasing fishing pressure, particularly among large predators, have also been reported. High in the food chain, sharks and their relatives tend to be more vulnerable and therefore the first to decline as a result of fishing. This may have serious implications for shark reproduction, since productivity tends to increase with body size.²⁵

Large-scale exploitation has led to changes in fish community structure. The largest fish tend to be taken first and then fishermen move down the food chain to catch the smaller species.²⁵ Decreases in the size of some sharks have, for a number of species, been attributed to exploitation. As a result, changes in species composition of fished communities may be expected, with small, faster-growing and earlier-maturing species dominating. This pattern has also been reported in ray communities.²⁵

Bycatch

Bycatch is a term used to refer to any species which are caught accidentally while fishing for other “target” species. It is responsible for mortality in a wide range of species: non-target fish, seabirds, whales, dolphins, turtles and sharks. A great deal of bycatch is discarded at sea and never appears in the records. Where bycatch must be reported, it is often under-reported.

CAUGHT BY MISTAKE

According to the FAO, there are few fisheries which do not result in bycatch of sharks, skates and rays. An estimated 50% of the world catch of sharks is believed to be taken as bycatch.⁵⁰ Other estimates are lower at 400,000mt.⁵¹ Based on a much debated average weight of 15kg per shark across the range of species, this suggests that a bycatch of more than 26 million sharks goes unrecorded annually.

Where recorded, the numbers are significant, sometimes even greater than the targeted catch. Previously, in many of these fisheries the sharks would have been thrown back, often still living, or the lines cut. Now sharks caught as bycatch are invariably finned. Shark bycatch reduction methods are likely to be rejected by fishermen wishing to profit from the fins.

Rates of shark bycatch depend to a great extent on the fishing gear used. The most indiscriminate gear is towed (trawl and seine) nets. In coastal areas, bottom trawl fisheries are thought to be responsible for the largest bycatch of sharks and rays, amounting to hundreds of thousands of metric tons annually.⁵¹ Tuna purse-seine nets occasionally result in large-scale shark bycatch and gillnets are also considered to be the cause of heavy shark bycatch.³⁵ However, while less indiscriminate than some other



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fishing methods, the widespread use of longlines, combined with the sheer length of lines and number of hooks, means that more sharks are caught as bycatch in longline fisheries than in any other fisheries on the high seas.⁵¹

- In 1990, it was estimated that Japanese longliners in Tasmanian waters were catching 34,000 blue sharks per year, finning and discarding them. However, the Japanese logbooks for the period 1979-88 recorded an annual average combined catch of only 3,421 sharks, skipjack and other species, which suggests severe underreporting of bycatch.⁵²

- In 1990, the global Japanese bycatch of sharks, skates and rays was estimated to be 115,441mt.⁵³

- In Brazil, a survey found that sharks and rays made up 68.9% of the total catch and the target species only 31.1%. The blue shark represented 50.4% of the total catch. It is estimated that 68,318 sharks are caught this way annually in Brazil.⁵⁴

- In the Gulf of Mexico, shrimp fisheries discard some 2,800mt of sharks annually.⁵⁵

“For sharks, bycatch is a devastating problem—an estimated 50% of the world catch is believed to be taken as bycatch”

Above: Sharks are caught as bycatch in most of the world’s fisheries

UNNECESSARY WASTE

Some shark species are able to survive for long periods on hooks. Recent research in Brazil found that from a total of 508 sharks of different species observed in longline fisheries, 88% arrived alive on deck.⁵⁴ In Hawaii, it has been estimated that 86% of blue sharks are alive when landed on deck as bycatch.⁵⁶ Allowing for some post-release mortality, a very large proportion of blue sharks would have survived if they had been released rather than finned.

This huge volume of shark bycatch could be reduced significantly. There are fisheries which result in minimal bycatch by using selective fishing gear or appropriate fishing techniques. For example, the western Pacific pole and line fishery for tuna limits bycatch to less than 1% of total catch, and harpoon fisheries for swordfish and giant tunas have almost no recorded bycatch.⁵⁷

The Shark Fin Trade

Of all shark products, the fins have by far the highest commercial value by weight. Demand for shark fin has expanded dramatically in the last 15 years. The rise of a number of Asian economies is well-documented, as is the dramatic opening and expansion of China's economy.

After 1949, the consumption of shark fin had been officially discouraged, since it was associated with wealth and privilege, but in 1987 there was a relaxation of attitudes. This, combined with

growing wealth, created an enormous number of consumers.¹² The growing middle class in China, currently estimated at 250 million, are all potential shark fin soup consumers. They are likely to dwarf the previous major markets in Hong Kong, Taiwan, Singapore and among Chinese communities around the world.

This has led to a sudden escalation in the price of fins. In 1987, ex-vessel prices for shark fin

“The reported volume of trade has more than doubled in the last 20 years, while prices have more than tripled”

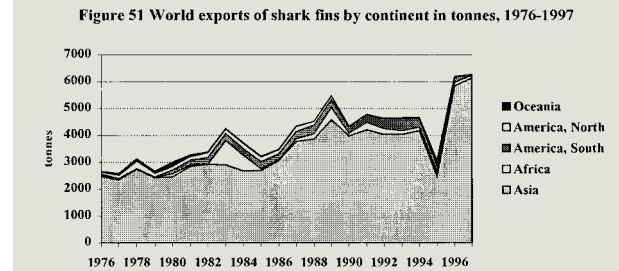
in the US rose rapidly. By the first quarter of 1987, prices reached 131% of the 1984 price and by early 1988 they stood at 262%.¹² One company reported receiving a request in the summer of 1987 from a multinational firm to source 45.4mt of 50% crude dried fins per month, equivalent to 300% of the entire US output for the previous year.¹² Government data show that between 1991 and 1998 the number of blue sharks finned in US fisheries rose from 0 to 60,083.⁴²

Trade data suggest that the global trade in shark fin has escalated enormously in the past two decades. In 1980 a total of 3,011mt of dried fins, valued at US\$28,304,000 were in

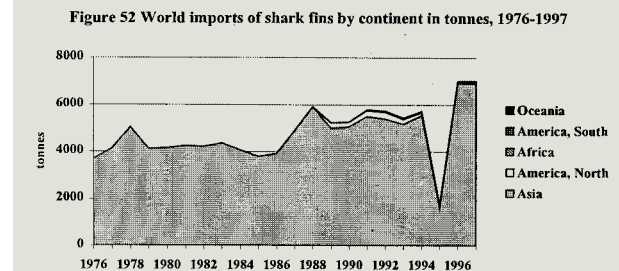
Opposite right: Shark finning wastes 95-99% of the animal. It is now a common practice

Below left: The results of a finning operation in Costa Rica

Note: In 1995 China did not report any imports to the FAO



Source: FAO-FIDI.



Source: FAO-FIDI.

A GROWING RECOGNITION OF THE SHARK FIN SOUP PROBLEM

Singapore Airlines announced in 1999 that it would no longer serve shark fin soup to its Business Class passengers. In June 2000, Thai Airways announced that it would no longer serve shark fin soup in First Class. Both airlines stated that consumer pressure had prompted them to take this step.⁵⁹



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international trade. By 1989 that had risen to 5,910mt (up 96%) valued at US\$94,256,000—a 333% increase in the total value.⁴⁰ In 1997, reported world trade peaked at 7,048mt.

As some indication of how unreliable data are in 1998 total world trade reported to the FAO fell to 4,630mt with Hong Kong reporting only 13mt.⁵⁸ In the same year Hong Kong Trade Development Board reported imports of 5,997mt and re-exports of 3,813mt!¹⁰²

A NEW GLOBAL TRADE

While sharks have undoubtedly been targeted for their fins in Asia for some time, in the last 15 years the dramatic increase in demand for fins has alerted fishermen worldwide to the commercial value of sharks. An industry previously

limited to one region and certain species has grown to be totally global in nature and to involve virtually all shark species. In addition refrigeration, and transportation advances have meant that containers of fins can be shipped across the globe.

This expanded industry is still largely conducted in the “gray market”. Fins change hands for cash in many cases and many transactions are not recorded.

FINNING

Increase in demand has led to greater targeting of sharks and the practice of finning sharks at sea. The shark is hauled up on deck, the fins sliced off, and the shark—often still alive—thrown back into the sea. This conserves space in the hold for high-value food species such as tuna and swordfish.

FINNING BECOMES UNACCEPTABLE

- Finning was banned in Canada in 1994, but this was not fully implemented until the Management Plan of 1997–99.⁶⁰
- In 1998 the Brazilian government issued a federal regulation (Portaria IBAMA n° 121 of August 24th, 1998), prohibiting shark finning on all vessels licensed to fish in Brazilian waters.⁵⁴
- The Sultanate of Oman has also prohibited shark finning in its waters.
- In June 2000 the governor of Hawaii signed a law banning the landing of fins without carcasses.
- In December 2000 the US adopted legislation to prohibit shark finning in all US waters. Finning had been banned on the Atlantic coast and in Californian waters earlier.
- In Australia, finning is banned in all Commonwealth (federal) tuna fisheries, (which cover the area from 3–200 nautical miles from the shore) and in all fisheries in New South Wales (NSW), Victoria and Western Australia. The ban does not apply within the state/territorial waters (out to 3 n.m.) of South Australia, Queensland or the Northern Territory, nor does it apply to non-tuna Commonwealth fisheries.⁶¹

Lack of Management

UNCONTROLLED FISHERIES

Shark fisheries were perceived as lacking commercial value in the past, so comparatively little is known about many species' abundance, range, distribution, life history, reproductive behavior and response to external stresses. Records of shark catches are vague and few countries record their shark catch by species.

To date, there are no binding international agreements for the protection of sharks and only a few countries (Australia, New Zealand, Canada & US) have developed specific shark management programs. In other areas, such as South Africa, Namibia, Malta and west Africa, there are prohibitions on the catching of specific species and/or the closure of shark fisheries during certain periods of the year. Other countries, such as Mexico, have some limited regulations.

In 1998 the FAO agreed to an International Plan of Action for the conservation of sharks, and its member countries were encouraged to devise and implement national plans of action. At the time of writing, only Australia and the US are known to have begun preparing their plans of action.

LACK OF CATCH, BYCATCH AND TRADE DATA

Much shark catch goes unrecorded and, even when it is recorded, species-specific information is sparse or non-existent and shark species are frequently categorized together.⁴⁰

The only source of global catch and landings data is the FAO. However, since FAO figures are based upon reports from individual nations, they are also restricted to the same limitations in terms of information on specific species. National agencies often provide only summary information to the FAO. If countries do not provide recent data, the FAO extrapolates from previous years.⁴⁰

The recording of such data is fundamental to the management of sharks. In a multi-authored report published by the FAO in 1999, it was stated that, "The theme that dominates all papers is the dissatisfaction of the authors with the quality of elasmobranch catch data, both in identifying the species that are caught, and the amount of catch and landings."⁵⁰

International trade in shark products is also poorly documented. Standard six-digit customs' tariff headings are not specific for meat, and very often the categories will simply be "dogfish" with "other sharks" combined into a single category.⁴⁰ Some countries

"Most shark fisheries and bycatch is totally unmanaged and no shark species yet benefits from international protection"

Despite the low reproduction rates of sharks, few shark fisheries are managed. Fifteen pups were the entire litter for this bonnethead

have a separate category for shark fin (although not by species) but customs' records for shark skin and oil are virtually non-existent, while cartilage does not appear at all.⁴⁰

Accurately assessing the volume of international trade in shark products in general, let alone by species, is virtually impossible.

UNMANAGED FISHERIES

At the national level, only Australia, Canada, New Zealand and the United States manage sharks within their coastal waters. Some shark fishing restrictions currently exist in South Africa, the UK, Mauritania, Brazil, Mexico, Malta, Namibia, Oman, the Philippines and Israel. These restrictions range from closure of directed shark fisheries during certain seasons, to a ban on finning in national waters to a prohibition on the catching of specific species.

According to the FAO, while there may be valid reasons for the poorer nations to have neglected shark stocks in their waters, there is no excuse for the richer nations, "It is the unequivocal documentation of the sad neglect that management of elasmobranchs receives, not only in regions where the competition for management resources can be expected to be fierce, but also in many areas where levels of economic prosperity are such that little, or no, valid reasons exist for the neglect of the husbandry of resources which so many states have claimed under the aegis of the Law of the Sea and extension of natural jurisdictions."⁵⁰

Ironically, while large areas of the jurisdictional waters of developing countries are heavily exploited by fishing vessels from developed countries, it is the poorer countries which have to find the funds for fisheries management.



INTERNATIONAL AGREEMENTS

At the international or multilateral level, there are numerous agreements which could provide much greater protection for sharks, if the political will were there.

Convention on International Trade in Endangered Species (CITES)

In November 1994, CITES adopted a Resolution (Conf. 9.17) on trade in sharks and their products, directing its Animals Committee to compile and review data on the biological status and factors influencing the status of shark species subject to international trade. It also requested FAO and other international fisheries management organizations to establish programs to provide biological and trade data and to assist states to collect species-specific data. The Committee recommended a number of actions, including initiatives to improve identification, recording and reporting at species level of landings, bycatch and trade, and for new research and management efforts.⁶²

However, at the 2000 CITES Conference, Conf 9.17 was repealed, leaving only two actions: that the Chair of the Animals Committee would liaise with the FAO to monitor progress of the International Plan of Action and report back to CITES and that the Secretariat would liaise with the World Customs Organisation to promote the establishment and use of specific headings in trade data, in order to discriminate between shark meat, fins, leather, cartilage and other products.

At that same conference Australia proposed the white shark and, along with the US, also proposed the whale shark for CITES Appendix I listings, which would have prohibited all commercial trade in the species or its products. The UK proposed the basking shark for Appendix II, which would have required import and export permits and non-detriment findings.

All three proposals were defeated after strenuous lobbying by Japan and Singapore, among others. Some major fishing nations have fiercely opposed any regulation of international trade in shark products and, indeed, Japan has exempted itself from the UK's listing of basking sharks in CITES Appendix III, a move that would simply have required Japan to keep records of international trade in basking shark products through its borders.



“To date international bodies and individual governments have failed to address the threats to sharks”

UN Agreement On Straddling Fish Stocks And Highly Migratory Fish Stocks

Oceanic sharks defined as highly migratory species, or which may qualify as a straddling stock, include the basking, thresher, hammerhead and mako sharks and could therefore be covered under this agreement.

Coordinated management and assessment of the entire populations of these sharks would promote an understanding of the cumulative impacts of fishing effort on their status.⁶²

The Bonn Convention

The Bonn Convention on the Conservation of Migratory Species of Wild Animals (CMS) recognizes the need for countries to cooperate in the conservation of animals that migrate across national boundaries or between areas of national jurisdiction and the high seas. The whale shark is listed on Appendix II of this Convention.⁶³

Inter-American Tropical Tuna Commission (IATTC)

In June 2000, the IATTC adopted a resolution on bycatch which, if implemented, will have a direct effect on sharks.

Paragraph 3 requires fishermen on purse-seine vessels “to promptly release unharmed, to the extent practicable, all sea turtles, sharks, billfishes, rays, mahimahi and other non target species.”

Paragraph 4 encourages fishermen “to develop and use techniques and equipment to facilitate the rapid and safe release of any such animals.” Paragraph 8 provides for the collection of data, before the end of 2000, on bycatches by purse-seine vessels not covered by the current observer programme and by longline and other tuna fishing vessels. Paragraph 10 encourages the development and implementation of additional measures to reduce “to the maximum extent practicable” the bycatch of juvenile tunas and other non-target species.⁴⁹

Other agreements and bodies which could provide assist in the conservation of sharks are the Commission for Sustainable Development, the International Commission for the Conservation of Atlantic Tunas, which deals with species that prey on tuna, and the Convention on Biological Diversity.

For the most part, those agreements which contain—or could contain—specific provision for sharks are not mandatory or have yet to be fully ratified. Those which are mandatory and in force, such as CITES, have so far failed to protect shark species.

Environmental Pressures

The range of environmental factors, both natural and human-induced, which can affect sharks include: chemical pollution, thermal pollution, marine debris, habitat loss or degradation, changes to patterns of ocean circulation (e.g. El Nino), geological events, meteorological events and global climate change.⁶⁴

DEATH IN SMALL DOSES: CHEMICAL POLLUTION

The European Environment Agency and UN Environment Program

estimate that 100,000 manufactured chemicals are dispersed into the environment without being monitored.⁶⁵ Heavy metals, such as cadmium, mercury and lead, are highly toxic in animal tissues even at low concentrations. Research carried out on heavy metal pollution in sharks shows that they can inhibit DNA synthesis, alter heart function, disrupt sperm production and alter blood parameters.⁶⁴

Among the heavy metals found in sharks, mercury is particularly pernicious. Mercury concentrations in four shark embryos were found to be equivalent to 9 - 27% of the mother's muscle tissue.⁶⁶

Persistent organic pollutants such as PCBs and DDT are known

to have been at least partly responsible for reproductive and immunological abnormalities in marine mammals; one individual out of three thresher sharks tested for PCB contamination was found to contain twice the maximum tolerance level.⁶⁷

Concentrations of Tributyltin (TBT), a compound used in anti-fouling paints on boats, have been detected in the kidneys of blue sharks caught off the Italian coast.⁶⁷ Cadmium and lead have been found in tissue samples of six shark species in the eastern Mediterranean, while the effects on sharks of these substances are not fully known, they are likely to cause severe damage to basic biological functions.

Below: Debris on a Belize beach



EFFECTS OF CHEMICAL POLLUTION

Some of the effects pollutants have in our marine ecosystems are:

- Suppression of photosynthesis in phytoplankton resulting in loss of primary production
- Changes in species composition and species diversity of zooplankton
- Reduction in fish-egg hatching
- Increase in mortality and malformation in fish larvae
- Reduction in fish recruitment
- Reduction in fish growth rates
- Induction of carcinogenic effects
- Diseases of the immune system
- Damage to central and peripheral nervous systems

It is important to note that direct up-take by humans of these highly toxic substances may be facilitated by eating contaminated food or products, including fish and fish products. Both heavy metals and POPs have been detected in tissue samples taken from sharks.⁶⁷

Some of the effects these substances may have on human health are:

- Diseases of the blood
- Disruption of the immune, reproductive and nervous systems
- Respiratory impairment
- Mutagenic and carcinogenic effects
- Kidney and liver failure

MARINE LITTER AND DEBRIS

Despite international agreements controlling the dumping of plastics at sea, discarded plastics and other materials constitute a serious source of threat to sharks. Plastic bait straps, used to hold cartons of fishing bait together and often discarded at sea, are known to cause mortality from a variety of effects from the severing of fins and destruction of gills to vertebral deformation and asphyxiation. Numerous sharks in the US, India, South Africa and Western Australia have been affected in this way.⁶⁴

A model of an Australian dusky shark fishery showed that targeting of the stock reduced the population increase to about half the size that it would have been without exploitation. Adding the effect of bait straps to the model showed that a less than three percent increase in mortality caused by bait straps resulted in a decline of the size group, showing that environmental factors combined with fishing can make the difference between a sustainable and a declining population.⁶⁴

An estimated 6.5 million metric tons of plastics are discarded every year by ships. Much of this is discarded or lost fishing equipment that results in widespread damage to fish and other marine life as it continues to “ghost fish”. One 1500m section of net recovered from the Pacific Ocean contained 99 seabirds, 2 sharks and 75 salmon after an estimated month adrift. In Kuwait, lost fish traps were estimated to catch between 3-13.5% of the total Kuwait landings.⁶⁸

EFFECTS ON HUMANS

Research on shark fin from Hong Kong sold by wholesalers and tested in the US were found to contain up to 5.84parts per million (ppm) of mercury. Hong Kong’s maximum permitted level of mercury



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contamination in foodstuffs is 0.5 ppm.⁶⁹

Recently, warnings have been issued by both the US Food and Drug Administration (FDA) and the Hong Kong Consumer Council, relating to levels of contamination in shark products.

The FDA warned pregnant women that mercury levels in shark meat could be high enough to harm the nervous systems of human foetuses.⁷⁰ In January 2001, a report by the Hong Kong Consumer Council revealed that at least five brands of shark liver oil capsules were contaminated with PCBs. The report warned that the tests carried out on the capsules examined only 25 out of 209 congeners of PCBs and that the Council could not guarantee that further samples did not contain PCBs.⁷¹

GLOBAL CLIMATE CHANGE

Predicted climate change scenarios are expected to displace and alter marine ecosystems significantly. Shark distribution and fitness is likely to be affected as populations shift to obtain an optimum environment.

Above: In total marine transport has been estimated to account for around 12% of contaminants entering the worlds’ oceans⁷²

OZONE DEPLETION

Loss of stratospheric ozone is increasingly evident in both hemispheres, resulting in a strong, selective increase in ultraviolet-B radiation. Although little or no specific research has been conducted on the impact of this on shark species, UV radiation has been shown to damage DNA and have other effects on aquatic organism, which may in the longer term impact sharks.

OZONE

In April 1998, NASA scientists revised the peak period for ozone depletion from 2000–2005 to around 2020 and noted the likely development of a severe Arctic ozone hole over the Northern Hemisphere. At the same time, an ozone hole three times the size of Australia was identified, leaving more than 27 million square kilometers of the planet temporarily unprotected from ultraviolet radiation.

“With shark fin going for \$50/pound, the only thing this can be compared to in terms of profitability is the drugs trade.”

—R. JACOME,
PRESIDENT OF
CIVIC COMMITTEE
IN THE GALAPAGOS

Illegal Fishing

MARINE RESERVES UNDER SIEGE

Although there is yet no international protection for any shark species and only a few countries have shark management regulations, some sharks are protected in marine reserves, which are usually “no take” or restricted fishing areas.

Because of the difficulty and expense of patrolling large areas of ocean, marine reserves are often poorly protected in developing countries. WildAid found that they are increasingly under pressure from illegal fishing, shark fin being one of the most lucrative targets. In some protected areas, illegal fishing now threatens the tourism diving industry as divers report reductions in shark numbers.⁷³

To maximize profits while fishing illegally, fishermen will often take only fins, dumping carcasses overboard. In this way, a relatively small boat can catch literally thousands of sharks in a short period, effectively fishing out an entire area. There have been a number of high-profile raids on marine reserves specifically targeting sharks.

GALAPAGOS UNDER SIEGE

The Galapagos Marine Reserve is a World Heritage Site which is famed for providing opportunities to dive with large groups of hammerhead sharks and the 42 other species of shark which occur there. According to a local scientist, “Diving here depends on sharks. If you reduce their numbers or make them aggressive, you have ruined dive tourism.”⁷⁴

Since the expansion of the Reserve, the poorly funded Galapagos National Park Service has fought running battles with longliners from the Ecuador mainland and Costa Rica, which come to target sharks, tuna and other valuable species inside the Reserve. Since 1998, four such boats have been intercepted. The Park Service has seized thousands of shark fins and divers have discovered illegal nets and longlines. In 1999, one small boat was found with 8,000 shark fins and boxes of sea cucumbers taken illegally for the Asian market.⁷⁵ In November 2000, WildAid investigators were told by fishermen in Costa Rica that Costa Rican boats continue to fish illegally in the Marine Reserve for sharks. “With shark fins going for \$50 a

pound, the only thing this can be compared to in terms of its profitability is drug trafficking,” said Rodrigo Jacome, president of a non-partisan civic committee in the Galapagos. “It’s big money, quick and easy money for fishermen. So long as the government permits the export, it’s not going to change.”⁷⁶

The Director of the Galapagos National Park, Eliecer Cruz stated, “The trade in shark fins, sea cucumbers and other marine resources are in the hands of a mafia on the mainland. The high prices paid for our local resources (US\$50 a pound for shark fins and up to US\$1 per sea cucumber) the fierce encouragement of the trade by middlemen (often Asian) and the buying power of the Far East, are driving an illegal trade, in these animals. This leads to social disorder, greed, and a total disrespect for nature and the ecosystems of the Galapagos. Moreover, it makes a farce out of management procedures which aim at preserving the stocks into the future.”⁷⁷

MORE FISHING

Fishermen are now pushing for longlining in the Galapagos. In the longlining process, sea turtles, sea lions and other bycatch are

frequently caught. Pablo Guerrero, Director of Marine Resources, stated that the sharks “serve as regulators for the entire marine ecosystem” and that removing them would “create an imbalance in certain marine populations with unforeseeable consequences.”⁷⁸

Below: Divers remove a shark from an illegally-set net in the Galapagos Marine Reserve



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REVILLAGIGEDO ISLANDS
MARINE RESERVE

The Revillagigedo Islands, southwest of Cabo San Lucas, Mexico, became a Marine Reserve six years ago. They are home to the world’s largest Giant Pacific Mantas and tourists spend over US\$2,000,000 each year to dive with these amazing animals.

However, in April 2000, a fleet of seven large drift gillnet boats, carrying two miles of net each, surrounded one of the Islands and decimated the shark populations in five days of intensive fishing. Even then, their nets were still getting from 100 to 200 sharks per boat per day. It is estimated that they killed between 2,000 and 4,000 sharks, plus mantas, turtles, tuna, and other marine animals. After the gillnet boats were gone, no live sharks were observed in two days of diving, where previously hundreds would have been seen.⁷⁷

The Los Angeles Times reported that the sharks were finned and the carcasses discarded in most cases. In 1994 a tourist video aired throughout Mexico had contributed to pressure to establish the Reserve. It showed gillnets and longline gear catching dozens of sharks, which were finned and discarded alive.⁷³

COCOS ISLAND MARINE
RESERVE

Cocos Island is famed as one of the world’s top dive sites and is billed as “The Island of Sharks.” This World Heritage Site is frequently fished illegally for sharks and other species at night, according to authorities. A dozen boats fishing illegally, many targeting sharks for their fins, were arrested last year.⁷⁸ A film crew found three miles of illegal line, with 16 sharks, of which only four were still alive.⁷⁹ *Jaws* author, Peter Benchley, witnessed a shark graveyard of dozens of finned sharks while diving in the islands.⁸⁰



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Marine Reserves in developing countries seldom have resources to enforce their regulations. The main patrol vessel for the Galapagos has only been kept in service with outside support

In November 2000, fishermen in Costa Rica told WildAid that they fish illegally in Cocos for sharks. The Park Service and Coast Guard are aware of the situation, but currently lack the resources to combat the illegal fishing effectively. Local dive operators are very concerned that the illegal fishing will impact their operations.

BANC D’ARGUIN NATIONAL
PARK

Banc D’Arguin, off the coast of Mauritania in northwest Africa is the largest marine reserve in Africa and the country’s most important reproduction and nursery area for fish and crustaceans. The reserve was originally established at the request of local fishermen, the Imraguen, who were given exclusive fishing rights using traditional, non-motorized methods. However, the Imraguen were soon approached for shark fin by middlemen for Asian traders and a new fishery developed within the reserve. Some species, such as sawfish, have already disappeared. In 1999, the Reserve was reported to be threatened by incursions from small-scale fishermen from Mauritania and Senegal, and industrial fishing, often from Europe.⁸¹ Recent moves to regulate shark fisheries in the reserve may put an end to this.

BREAKING OTHER COUNTRIES’ LAWS

Although very few countries have direct protection for sharks, many have fishing regulations designed to protect artisanal and domestic fisheries. However, developing countries rarely have the resources to enforce these regulations.

For example, in the state of Orissa, India, mechanized shrimp trawlers are not supposed to operate within ten nautical miles of the coastline. Yet, as WildAid witnessed, they can routinely be seen trawling 500m or so off the coast. Similar transgressions are reported in Senegal and Kenya.

Most countries suffer from illegal fishing activities within their waters, which greatly undermine management efforts.

FLAGS OF CONVENIENCE

To evade internationally agreed-upon fishing regulations, some boats are registered under countries, which are not signatories. This practice is known as fishing under “Flags of Convenience” (FOCs). In this way, a boat from Taiwan may be registered in Panama. Most of these vessels are owned and operated by Taiwanese interests, with almost all of their products being exported to Japan.⁸² Singapore companies are also involved. In December 1996, FOCs accounted for over 20% of vessels and 46% of gross tonnage.⁸³

ICCAT has a list of 300 vessels, which are believed to be involved in “illegal, unregulated, and unreported fishing activities.”⁸⁴ These vessels are registered in Taiwan, Singapore, Belize, Equatorial Guinea, Cambodia, Guinea, Honduras, the Philippines, the Seychelles and St. Vincent among others.

Such vessels compound reporting problems. ICCAT stated, “The degree of under-reporting...is difficult to assess, but can be up to 75%. On the high seas...the degree of non-reporting with respect to these stocks may be well 100%.”⁸²

Species at Risk

Sharks in Decline

There is growing evidence that many shark stocks are declining and indeed that several species are facing commercial or even biological extinction owing to overfishing as well as a number of factors:

- continual advances in fishing technology and effort
- the collapse of other fisheries
- the globalization of the fishing industry and shark fin trade
- a rapidly increasing human population
- the rising popularity and affordability of shark fin soup
- the pollution of oceans and coastal habitats

The FAO has become increasingly concerned about the effects of overfishing on shark populations:

“For centuries artisanal fishermen have conducted fishing for sharks sustainably in coastal waters, and some still do. However, during recent decades modern technology in combination with access to distant markets have caused an increase in effort and yield of shark catches, as well as an expansion of the areas fished....There is concern over the increase of shark catches and the consequences which this has for the populations of some shark species in several areas of the world’s oceans....The prevailing view is that it is necessary to better manage directed shark catches and certain multi-species fisheries in which sharks constitute a significant bycatch. In some cases the need for management may be urgent.”⁸⁵

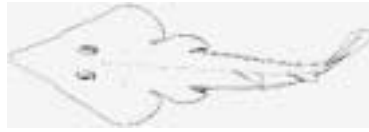
According to the FAO, the foremost conservation priority is for freshwater elasmobranchs⁴, such as the spartooth sharks, *Glyphis spp.*, and freshwater sawfish, *Pristis microdon*. New species are still being described and the ranges of known species extended. Few or no catch data are collected, much less reported.⁵⁰

The second priority is the deepwater elasmobranchs, which are now particularly threatened because of their often limited distribution, the absence of biological knowledge and lack of species catch data.⁵⁰ A rapid expansion of fisheries for deepwater species has resulted in an increase in shark bycatch.

The International Union for the Conservation of Nature’s (IUCN) Red List of Threatened Species 2000, classifies 39 species as “Critically Endangered,” “Endangered” or “Vulnerable.”⁸⁶ Some sub-populations of Vulnerable or Endangered species are listed in a higher risk category.

BRAZILIAN GUITARFISH

Rhinobatos horkeli



IUCN Classification: Critically Endangered

Max. size: 1.4m

Distribution: Western Atlantic: Lesser Antilles to southern Brazil

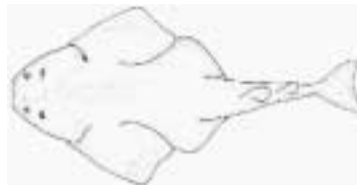
Reproduction: Not known

Threats: Overfishing

Notes: Extremely vulnerable to overfishing; mating and nursery areas are heavily fished. Abundance decreased by 96% in southern Brazil from 1984-94

PACIFIC ANGEL SHARK

Squatina californica



IUCN Classification: Lower Risk/Near Threatened

Max. size: 0.9m

Distribution: Eastern Pacific, from Alaska to Mexico and from Ecuador to southern Chile

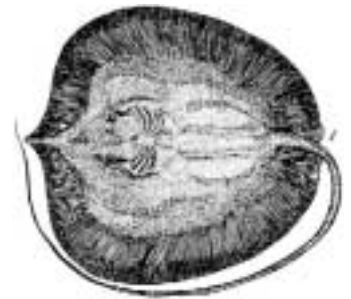
Reproduction: Gestation unknown, litter size 8-13 annually

Threats: Overfishing

Notes: In ten years went from being “trash fish” to highly sought-after food in California. Landings peaked in 1985 and 1986. Then declined rapidly. California banned fishing in 1993

GIANT FRESHWATER STINGRAY

Himantura chaophraya



IUCN Classification: Vulnerable; Thailand sub-population Critically Endangered

Max. size: 2.4m

Distribution: Southeast Asia and Oceania

Reproduction: Not known

Threats: Habitat alteration and destruction; overfishing

Notes: Possibility of extinction for some populations extremely high; status in Australia probably favorable

BLUE SHARK

Prionace glauca



IUCN Classification: Lower Risk/Near Threatened

Max. size: 3.8m

Distribution: Worldwide in open ocean

Reproduction: Gestation 9-12 months, litter size 40 average (largest recorded litter 135)

Threats: Bycatch and finning

Notes: Estimates for annual catch range from 433,447 to 6.2–6.5 million. A possible 4 million taken annually as bycatch

GANGES SHARK

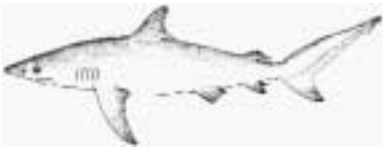
Glyphis gangeticus



IUCN Classification: Critically Endangered
Max. size: 2m
Distribution: Indo-West Pacific: India, Pakistan, reported from Taiwan
Reproduction: Not known
Threats: Overfishing
Notes: Originally known only from three museum specimens, collected in the 19th century. Recently re-reported from coast of India but identifications require confirmation

DUSKY SHARK

Carcharhinus obscurus



IUCN Classification: Lower Risk/Near Threatened; Northwest Atlantic/Gulf of Mexico sub-population Vulnerable
Max. size: 4m
Distribution: West, East & North Atlantic; Western Indian Ocean; Western & Eastern Pacific
Reproduction: Gestation 16 months, litter size 10
Threats: Overfishing in Western Atlantic
Notes: Now protected in US Atlantic after serious declines

PORBEAGLE SHARK

Lamna nasus



IUCN Classification: Lower Risk/Near Threatened; Northeast Atlantic sub-population Vulnerable; Northwest Atlantic sub-population Lower Risk/Conservation Dependent
Max. size: 3.7m
Distribution: Cold waters of North and South Atlantic, South Pacific
Reproduction: Gestation unknown, litter size 1-5
Threats: Targeted for meat and fins
Notes: Heavily overfished in North Atlantic

PONDICHERY SHARK

Carcharhinus hemiodon



IUCN Classification: Vulnerable
Max. size: 2m
Distribution: Indo-West Pacific
Reproduction: Not known
Threats: Fishing for meat
Notes: Only two specimens found since 1970s. Last was seen in India in 1982.

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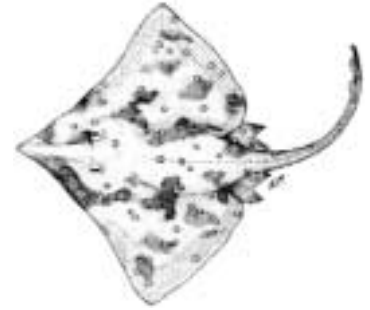
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www.fishbase.org

COMMON SKATE

Dipturus batis



IUCN Classification: Endangered
Max. size: 2.5m
Distribution: Eastern Atlantic: Norway, Iceland, the Faeroes to Senegal, including Western Mediterranean and Western Baltic
Reproduction: Not known
Threats: Overfishing
Notes: Once abundant in Northwest Europe, now extirpated from much of former range. Populations around UK extremely depleted

SMALLTOOTH SAWFISH

Pristis pectinata



IUCN Classification: Endangered; North and Southwest Atlantic sub-population Critically Endangered
Max. size: 7.6m
Distribution: Western & Eastern Atlantic; Indo-West Pacific; possibly Mediterranean and Eastern Pacific
Reproduction: Not known
Threats: Targeted for food, sport; saws sold as tourist souvenirs
Notes: Reduced or extirpated from large areas of north and southwest Atlantic

GREY NURSE SHARK

Carcharias taurus

Also known as the **sandtiger shark** or **spotted ragged-tooth shark**

IUCN classification: Vulnerable

Max. size: 4.3m

Distribution: Widespread in inshore waters around the main continental landmasses in sub-tropical and cool temperate areas

Reproduction: Gestation 9 months, litter size 2

Threats: In Australia, incidental catch in other shark fisheries and beach meshing. Elsewhere unknown

Protection: Protected in New South Wales (NSW), Queensland and Tasmania, Australia, since 1984. Listed as Vulnerable in Australia, recently proposed for Endangered. Fully protected in South Africa, Namibia, Florida and California and the Maldives⁸⁷

Notes:

1. Bycatch No directed fishery since 1984, but bycatch in other fisheries has caused concern, although full impact is unknown. Accidentally caught on baited lines targeting wobbegong sharks (*Orectolobus spp*).⁸⁸

2. Recreational fishing Between 1961 and 1980, 405 *Carcharias taurus* recorded landed by fishing clubs on NSW coast. Recreational fishermen noted a decline during 1960s and 1970s and implemented a voluntary fishing ban in 1979. Current figures indicate no subsequent recovery. Until 1980s, was perceived as “maneater” owing to fierce appearance; many killed by spear-fishers and scuba divers. Also caught live to sell to aquaria. Today, with protection and increased public awareness, very few reports of kills by divers.⁸⁸

Below: The grey nurse shark which reproduces very slowly has been depleted in Australian waters

3. Beach Meshing Queensland and NSW have introduced shark nets to protect bathing beaches. Nets in NSW cover approximately 200 km of coastline.⁸⁸

In NSW during early 1950s, up to 36 individuals were meshed per year; by 1980s, figure had decreased to maximum of three or fewer per year and in last decade only three caught.

In Queensland, 90 individuals captured between 1962 and 1972 but 21 caught in past decade.⁸⁸

4. Shark finning Shark finning is recognized as threat by Australian Fisheries Scientific Committee: divers in NSW have reported individuals surviving finning process.⁸⁸ Finning regulations in place in many parts of Australia.

5. Ecotourism Australian Fisheries Scientific Committee considers increase in ecotourism a potential threat, possibly requiring regulation.⁸⁸





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BASKING SHARK

Cetorhinus maximus

IUCN Classification: Endangered

Max. size: 10m

Distribution: Western & eastern Atlantic, western Indian Ocean, western & eastern Pacific

Reproduction: Unknown

Threats: Targeted for liver oil, fins, skin and meat

Protection: Listed on Appendix II of Bonn Convention; listed on Appendix III of CITES by UK

Notes: Second largest fish after whale shark. Plankton feeder, prefers temperate water

1. Overfishing Historically meat consumed, fins used in soup or as displays in restaurants to advertise shark fin soup; liver oil extracted for leather tanning, lamp oil and vitamin A; skin processed for leather and carcass rendered for fishmeal.⁴¹

Basking shark was target of coastal harpoon fisheries off Norway, Ireland, Scotland, Iceland,

California, Peru, Ecuador, China and Japan. Also taken in nets, including bottom gillnets and even bottom and pelagic trawls.⁹⁰

Norwegian fishery dates from 16th century but expanded in 1960s owing to increased demand for livers. Annual catches 1,266-4,266 sharks recorded for 1959-80.⁴¹

Today targeted for fins for export to Japan, primarily by Norway: exports increased from 96kg in 1992 to 26,859kg in 1994.⁴¹

In recent years, FAO only received reports of catches in northeast Atlantic from Norway and occasional catches from Portugal. Norwegian catches peaked in 1970 and 1975 at around 18,000mt. Since then general decrease to only 413mt in 1996.⁴¹

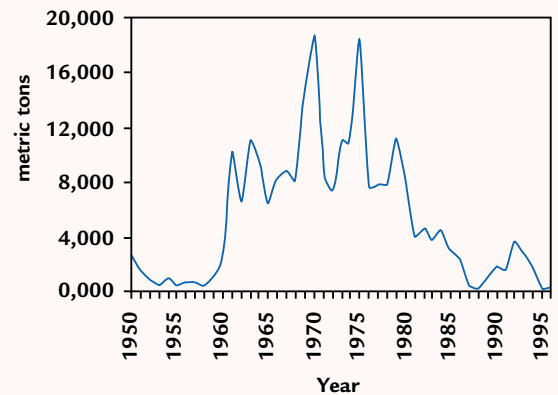
From 1947 to 1975, basking sharks were netted and harpooned off the west coast of Ireland with peak annual catches reaching over 1,000 animals. Decline of fishery was attributed to overfishing.⁴¹

Above: A number of fisheries for the second largest fish in the world, the basking shark, have collapsed

2. Protecting salmon fisheries During 1950s, Department of Fisheries and Oceans of Canada conducted eradication program off west coast of Vancouver Island, after salmon fishermen lost nets and catches to basking sharks. Local populations not yet recovered to original levels after 110 basking sharks killed from 1955-56.⁴¹

3. Lack of trade regulation In 2000, UK proposed listing species on CITES Appendix II. Proposal defeated.

Basking shark total catches 1950-96



SOURCE: FAO WEBSITE (90)

WHITE SHARK

Carcharodon carcharias

Also known as **great white shark**

IUCN Classification: Vulnerable.

Max. size: 6m

Distribution: Worldwide, along continental margins of all temperate seas and entering tropics

Reproduction: Gestation unknown, litter size 7-9

Threats: Sport fishing; trade in jaws

Protection: Protected in South Africa, Namibia, Maldives, Malta, Florida and California, US, and Australia (except beach meshing)

Notes: Most famous (and feared) of all sharks, gained global notoriety from blockbuster movie and book *Jaws*. Perceived as unstoppable “killing machine” but in reality, this supreme predator is highly vulnerable. Naturally scarce, it is long-lived with relatively low natural mortality. Females do not reproduce until in excess of 4.5m. Owing to low reproductive potential, would recover slowly if numbers reduced.⁹¹

1. Trophy fishing and trade in jaws In aftermath of *Jaws*, white sharks sought by trophy fishermen as “ultimate catch” with jaws coveted as trophies and sold to tourists. Authorities in a number of countries have now stepped in to protect white shark. Lucrative “shark cage diving” industry has developed around species.

In 2000, a joint US/Australian proposal for CITES Appendix I listing (to ban international commercial trade in body parts) defeated.

SPINY DOGFISH

Squalus acanthias

IUCN

Classification:

Lower Risk/Near Threatened

Max. size: 1.5m

Distribution:

Atlantic and Pacific Oceans; southwest Australia; tip of Africa

Reproduction:

Gestation two years. Litter size 2-20 (average 6-8).

Threats: Overfishing

Protection: None

Notes: Possibly most abundant shark, supporting fishing industry of global importance, but highly vulnerable to overfishing. Female only matures in teens or early twenties. Tend to segregate by age and sex, with mature females often targeted, thus threatening two generations.

1. Overfishing US encouraged targeting of spiny dogfish—marketed as “cape sharks”—in attempt to reduce pressures on overfished fish stocks off east coast. Formerly regarded as “trash” fish with no commercial value, annual landings off Atlantic coast rocketed from annual average of 4,500mt in 1990 to 20,400mt in 1993. By 1996 scientists warned stocks on point of collapse.⁹² By 1998 landings had risen to 28,000mt.⁹³



Above: The spiny dogfish is sold as “rock salmon” in fish and chip shops. With a gestation period longer than an elephant, it is vulnerable to overfishing

Below left: The great white shark has been targeted as a trophy and for its jaws

Mature females reduced by 50% since 1990 and average body lengths rapidly declined.⁹⁴ Scientists and fishermen estimate catch-per-unit-effort (CPUE) decreased by 30-50% since 1993. Gillnetters now use two to three times more net and smaller mesh size but still unable to catch same volume as previously.⁹⁵

Scientists warned that US Atlantic stocks may never recover without management plan.⁹³ Management plan for 2000 included very low catch quotas—1,800mt for entire coast. However, Massachusetts, main dogfishing state, set quota for own state waters of 3,100mt, a move that would undermine federal efforts.⁹³

In UK waters, no current assessments of stock levels and no laws or quotas governing catch levels. However, both commercial and recreational fishermen report dramatically reduced catch: one of UK’s major fishing companies reports decline of around 50% over past five years. UK importers now say they are being forced to import smaller fish.⁹⁶ During 1930s and 1940s, tens of thousands of dogfish landed at Plymouth every day. This fishery also quickly collapsed and yet to recover.⁹⁷ Late 1970s - early 1980s saw introduction of monofilament nets resulting in decimation of stocks off Cornwall: fishery collapsed within two years and has not recovered.⁹⁸



WHALE SHARK

Rhincodon typus

IUCN Classification: Vulnerable

Max. size: 14m

Distribution: Worldwide in tropical and subtropical waters

Reproduction: Gestation unknown, litter size up to 300

Threats: Targeted for meat and fins

Protection: Appendix II of Bonn Convention in 1999 identifying species as one whose conservation status would benefit from implementation of international co-operative agreements⁶³

Notes: World's largest fish

1. Overfishing Targeted for fins—sometimes fetching thousands of dollars a set—for use in soup and as displays to advertise shark fin soup and for meat, consumed either locally or in Taiwan. IUCN projects 20-50% population reduction over ten-year or three-generation period, whichever is longer. Whale shark generation period conservatively estimated as 24 years.⁶³

Small harpoon and entanglement fisheries for whale sharks are reported in India, Pakistan, Taiwan, the Philippines (banned in 1998), the Maldives (prior to protection in 1995)⁶³ and the Andaman Islands. Targeted by harpoon fishery at Veraval on Gujarat coast of India. Elsewhere in India targeted for liver and fins.⁹⁹

Indian press reports suggest 800-1,000 whale sharks killed annually.¹⁰⁰ Landings increased markedly in late 1990s, but fell significantly (despite market demand and possible increase in fishing activity) in 2000 season.⁶³ Fishermen said to harpoon animals, drag them for eight to ten hours until exhausted, then tow into shallow water and cut up, sometimes still living. Value in Veraval of landed whale sharks increased steeply in 1990s, particularly when meat began to be utilized in 1994. Prices particularly high since 1997.⁶³ Occasionally



shark fins smuggled out in personal baggage, mainly to Singapore.⁹⁹

Meat from Veraval is frozen and exported to Taiwan, where it is a popular delicacy known as “Tofu meat” because of pale color. The exporters buy meat from fishermen for US10 cents/kg and export it for at least US\$1/kg.⁹⁹

In 1995-96 India's exports of dried fins were valued at US\$3,700,000.⁹⁹ Press reports state that a set of four dried fins fetches around Rs22,000 (US\$500). However, the fishermen are said to earn only Rs6,500 per shark, Rs1,500 of which is used to cover the fishing trip.¹⁰⁰ An average of 300mt of meat are exported annually.¹⁰⁰

Fishermen in the Maldives used to take 20-30 whale sharks a year, using liver oil to treat boats, but reported declining catches during 1980s to early 1990s.⁶³ Fishing now banned and whale sharks viewed as potentially major attraction for tourists.¹⁰¹

Filipino fishermen in Talisayan, on the Bohol Sea, caught 100 sharks in 1994, 80 in 1995 and 30 in 1996.⁴⁶ High demand resulted in increased fishing effort and falling catches in the Philippines fishery, culminating in 1998 fishery ban. Poaching and smuggling said to continue on small scale.⁶³

Above: Whale sharks offer more revenue from tourism than fishing which appears to be unsustainable in many cases

Declining landings reported at one Taiwanese site from 50-60 per year in mid-1980s to ten in 1990s. Not known whether this result of overfishing, environmental changes or changes in catch effort. Fishermen on southern coast used to catch 30-100 whale sharks in a season but, by late 1980s catch down to fewer than ten.⁴⁶ Fishermen at An-Ping harbour caught more than 70 individuals in 1992, but only two in 1993 and 14 in 1994.⁴⁶ Anecdotal information suggests total Taiwanese landings formerly 250-300 sharks per year. While this appears to have fallen steeply, market size remains unchanged. Although Taiwanese customs do not record imports of whale shark products specifically, this indicates increased volumes of imports.⁶³

Whale shark fisheries expanded significantly within past ten years, mainly for booming Taiwanese fin and meat market. Limited fisheries data on whale sharks suggests that even relatively low catches of the species from a small population may not be sustainable.⁶³

The US proposed listing the whale shark on CITES Appendix II which would have required import and export permits and a non-detriment finding. Proposal defeated.



Asia

Hong Kong

THE GLOBAL HUB

Hong Kong, as the gateway to China and with its international trading status, naturally evolved as the center of the global shark fin trade. Just as it had been for the global ivory trade (both legal and illegal) prior to 1989, Hong Kong acts as an entrepôt, with some fins consumed domestically but a great deal re-exported to other parts of the Chinese-speaking world. Hong Kong's biggest customer is mainland China, where shark fin products were politically "rehabilitated" in 1987.

Both the volume and value of the shark fin trade have increased dramatically in recent years.

Hong Kong saw its reported imports rise from 2,420mt in 1972 to 4,105mt in 1991.⁷ By 1995, this had risen to 6,121mt.⁴⁰ In 1998, there was a slight fall to 5,997mt,¹⁰² but imports rose again to 6,427mt in 1999. In the first five months of 2000, 2,900mt were imported.¹⁰²

Re-exports of shark fin from Hong Kong totalled 150mt in 1972.¹⁰³ By 1991, this had risen to 1,844mt.⁷ In 1998, re-exports were recorded as 3,813mt, rising sharply to 6,854mt in 1999. In the first five months of 2000, 3,412mt were re-exported.¹⁰²

Average prices for fins rose from US\$11.20/kg in 1980 to US\$41.00/kg in 1992.⁴⁰

Country Reports

The following section is not intended to be a detailed analysis of shark fisheries, utilization or consumer markets. Instead it focuses on a number of dominant themes which have been addressed earlier in this report and which are now revisited in light of information gathered from selected regions of the world.

"From 1972-99 imports of shark fin to Hong Kong rose from 2,420mt to 6,427mt. Average prices have risen fourfold since 1980"^{103,40}

According to one of Hong Kong's major shark fin dealers, Mr. K.H. Kwong, in 1981 the booming economies of many east Asian nations had resulted in a rapid increase in demand for shark fin and an escalation in prices in Hong Kong. However, an economic downturn in Hong Kong in the mid-1990s resulted in a 50% fall in local demand and led dealers to increase their exports to Taiwan and elsewhere in the region. This



situation still prevails and Mr. Kwong believes that Hong Kong is now responsible for only 1/10th of world consumption.¹⁰⁴

Mainland China is the major importer, with around 3,000mt of frozen fins and large quantities of dried fins imported annually. While mainland China accounts for around 60% of fins from Hong Kong, other destinations are Taiwan, Singapore, Malaysia and Korea.¹⁰⁴

A sizeable proportion of the frozen fins are sent back to Hong Kong from mainland China after drying and processing, as labor is cheaper there. Furthermore, Chinese dealers are obliged by law to export 40% of their fins after processing.¹⁰⁴

This constant flow of exports and re-exports makes the task of quantifying trade and consumption levels in the region very difficult.

SOURCES OF FINS

Mr. Kwong obtains most of his fins from India, South Africa, Yemen, the United Arab Emirates (UAE) and Kenya. In the past, large quantities of fins were imported from Japan. Japanese fishermen froze the fins, took them back to Japan for drying and then exported them to Hong Kong. However, Japanese imports have diminished considerably since 1997.¹⁰⁴

In 1999, Hong Kong imported 5,830mt of dried shark fin. Of this, 903mt came from Mainland China. Other major sources were Taiwan (384mt), Singapore (375mt), UAE (350mt), Japan (250mt), India (237mt), Yemen (220mt), Indonesia (169mt) and South Africa (89mt).¹⁰²

In the same year, Hong Kong re-exported 6,218mt of dried shark fin.

Above: Hong Kong is the center of the world's shark fin trade.

China was the main recipient of fins from Hong Kong, importing 616mt. Other major destinations for Hong Kong fins were Japan (134mt), Singapore (125mt), Taiwan (78mt), Canada (45mt), Korea (44mt) and the US (41mt).¹⁰²



Left: A worker trims dried shark fins in Hong Kong

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THE HONG KONG SURVEY

In January 2000 WildAid and Earthcare, Hong Kong, commissioned a telephone survey of consumer attitudes about sharks and shark fin soup. The survey was conducted by the Chinese University of Hong Kong. Only those people who regularly eat shark fin soup (372 out of 1006 respondents) were asked the questions relating directly to soup. A brief summary follows:

Most important reason for eating shark fin soup?
208—social habit; 93—delicious; 36—healthy

Would you eat shark fin alone or in company?
343—in company; 5—alone; 21—either

Do you eat as much as you did five years ago? More? less?
208—the same; 104—more

If you knew shark species were declining owing to the demand for shark fins would you still eat it?
165—no; 123—yes; 82—unable/unwilling to answer

All 1006 respondents were asked the following questions:

With which of the following statements do you agree?

“Sharks are important in keeping the balance of marine life”
643—agree

“Sharks are dangerous to people and should be killed”
57—agree

“It is not important what happens to shark populations”
175—agree

“Would you agree that it is wrong to kill a shark just for its fins?”
707—no; 110—yes; 169—could not answer



A Personal Perspective

Fish Fin Alert

By Wai Yee Ng
EARTHCARE, HONG KONG

Consumer Ignorance

There is no word in Chinese for shark fin. In Cantonese we use the term “fish fin,” and it is used in a number of contexts. “Fish Fin Stir with Rice” is a congratulatory expression to someone who has achieved wealth and success. We also talk of “rinsing one’s mouth with Fish Fin,” to emphasize that mere water is no longer all one can afford.

When I was a child, I was told by adults that shark fin soup is tasty. During the 1960s and 70s, my family would gather every Sunday for dinner and I had the chance to eat shark fin soup nearly every week. After I went to University, I seldom ate shark fin soup again, except at wedding banquets.

Shark fin soup is a dish associated with happy events like weddings and important social functions. As it is expensive, it also enhances the feeling of importance of the social group. It is associated with well-being, wealth and social status. Now it has become an important part of business luncheons.

I was never told about the source of “fish fin,” that it is actually cut from sharks, sometimes when they are still alive. People never associated this “fish” with sharks, which are relatively scarce.

I was never told by adults about the cruelty behind shark fin soup, because they didn’t know the truth either. Sadly, they do not have the time, curiosity or interest to know, and neither do they have access to information about sharks.

How Can We Change Consumer Behavior?

It is of paramount importance to reduce excess demand for shark fin and other shark products by educating consumers and changing their consumption patterns through mass media campaigns. In cities like Hong Kong and Singapore, which are very tiny areas with huge populations, the most important pastime is watching TV, reading newspapers and watching movies. Therefore, it is important to publicize the shark conservation message, using the media, so that these busy city consumers are educated about the issues. It is the only effective way, especially in the absence of international management and regulation.

At the end of the day, it all goes back to square one—when the buying stops, the killing can, too. The fate of sharks and many other species will depend on the choices and decisions of individual consumers.

Wai Yee Ng directs Earthcare Hong Kong working to raise awareness of wildlife consumption and animal welfare.



Left: Jaws author, Peter Benchley, and Taiwanese celebrity, Ms. Shui, hosting a press conference to raise awareness of shark conservation issues in Taipei, Taiwan.

China

Until 1987, China was a relatively small player in the international trade in shark fins. In that year, the Chinese authorities relaxed the long-held official attitude to shark fin soup as an unacceptable symbol of wealth and privilege, thereby opening the door to a vast new market. Rapid economic development, especially in southern China and the cities of Beijing and Shanghai, led to huge increases in disposable income and the creation of a new middle class. New-found affluence could be demonstrated to friends and business associates by serving shark fin soup.

FISHING

China does not report the volume or species composition of its shark landings.⁷ It is known, however, that China's fishing industry has grown rapidly since 1987. The distant-water fleet grew from one vessel of capacity greater than 500 GRT in 1975 to 26 vessels in 1992. By 1996, the Shanghai industry alone was reported to have 64 vessels operating in the north Pacific, Atlantic and Indian oceans.⁷

From the scant information available, researchers have concluded that Chinese shark landings may be increasing, that the small size of some sharks caught may be of concern, and that coastal fisheries may have reduced the populations of some species.⁷

SHARK FIN CONSUMPTION

Mainland China has become the world's largest consumer of shark fin. With an estimated 250 million-strong middle-class, the number of potential consumers of shark fin soup in mainland China exceeds the populations of all the other markets in the world combined.

Imports of shark fins (dried, salted or in brine) mt.		
1980	31	3
1981	48	9
1982	48	40
1983	102	40
1984	85	31
1985	133	35
1986	334	91
1987	575	235
1988	902	463
1989	1,066	563
1990	1,335	809

Source: Adapted from FAO in TRAFFIC Network Report 1996

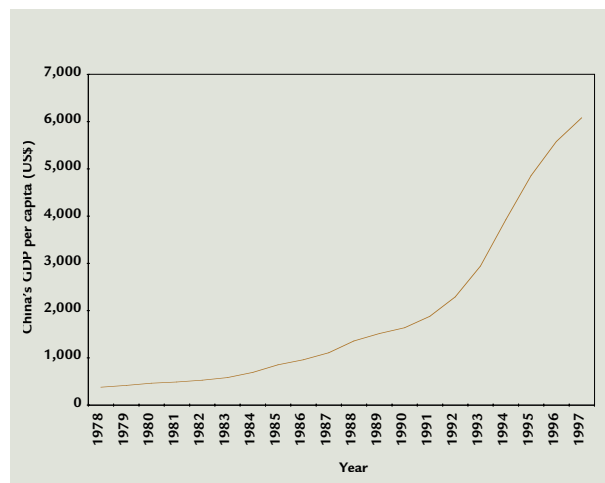
Exports of shark fins (dried, salted or in brine) mt.		
1992	9,429	-
1993	3,079	-
1994	3,375	-
1995	Not reported	Not reported

Source: Adapted from China Customs Statistics 1992-94 in TRAFFIC Network Report 1996.

Existing FAO records show that mainland China's shark fin imports (dried, salted and in brine) rose from 31mt in 1980 to 1,335mt in 1990, a 43-fold increase in the ten-year period. During the same period, its exports rose from three metric tons in 1980 to 808mt.

During this period, China imported a total of 4,659mt of shark fins, and exported 2,284mt, a difference of 2,375mt which may indicate the volume of fins consumed in the country during that decade.

China's GDP per capita



Above: As China has opened to international trade it has become the no.1 market for shark fin with demand likely to increase.

In subsequent years, reported trade increased. While FAO figures show that world imports of shark fin in 1992 totalled almost 6,000mt, mainland China's own 1992 figures show imports of 9,429mt. Data are undoubtedly flawed as Burma alone was reported to export 5,397mt to China in that year!

In 1995, China and Singapore did not report their trade figures to the FAO. This failure to report is reflected in the steep decline in world shark fin trade reported by the FAO in that year. Had they reported, one would have expected to see world import figures for 1995 standing at around 7,300mt.

Taking into account mainland China's own import figures for 1993-1994, one can estimate that its imports stood at around 3,700mt in 1995, which equates to half of the FAO's total estimated world trade for that year.

Singapore

Singapore is reported to be the second largest shark fin trading nation after Hong Kong¹⁰³ and acts as an entrepôt as well as having a domestic market for shark fin.

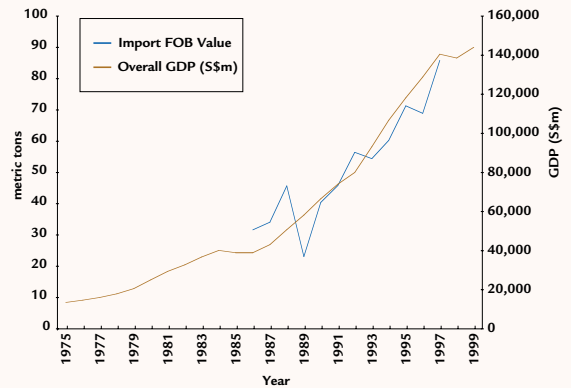
According to Singapore Trade Development Board figures, Singapore imported a total of 820mt of dried shark fin in 1997, 538mt in 1998, 692mt in 1999 and 279mt in the first five months of 2000. The five largest exporters to Singapore during the period were Hong Kong (417mt), India (241mt), Pakistan (204mt), Taiwan (191mt) and Japan (127mt).¹⁰⁵

The total amount of dried shark fin exported between January 1997 and May 2000 was 1,837mt. The top three countries importing from Singapore during that time were Hong Kong (1,269mt), Malaysia (397mt) and Taiwan (46mt). Tracking the fin trade is made complicated by the fact that Singapore imports much of its fin from Hong Kong and exports most of it to Hong Kong. Malaysia is the second major export market for Singapore.

Traders remember the time when eight to ten auctions were held daily and an inexpensive supply of fins was readily available. Since 1987, when China became a significant



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Singapore's GDP and shark fin import values

player, prices have increased by about ten percent per year.¹⁰⁵

It is impossible to estimate how much shark fin is actually being consumed annually in Singapore but focusing on one restaurant chain in Singapore gives an alarming indication of the scale of the retail trade.

In April 2000, Thai Village Holdings Ltd, a company that owns a chain of shark fin restaurants, underwent a highly successful initial public offering (IPO) in Singapore.

The company comprises five restaurants in Singapore, one in Shanghai and another planned elsewhere in China. It receives fins from Singapore-based suppliers who

source them from Spain and South Africa. The chain currently serves an average of 3.5mt of shark fin per month. The company also manages shark fin operations in Indonesia, and is in the process of expanding its shark fin processing capacity in both Singapore and China.¹⁰⁶

Left: Dealers often specialize in a large number of marine products

Below: Fins on sale in Singapore



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INDONESIA

Statistics on the fin trade with Indonesia are “classified” in Singapore and are not available to the public.⁷ In addition, official statistics state that fishery products offloaded directly from vessels in Singapore are not included in trade figures. The figures shown here should therefore be regarded as showing the minimum volume of fin imports

into Singapore. Indonesian export figures show exports to Singapore of 369mt in 1997, 93mt in 1998 and 155mt in 1999.¹⁰⁷

Total exports of dried shark fin from Indonesia amounted to 676mt in 1997, fell to 231mt in 1998 and rose again to 614mt in 1999. Figures for January to August 2000 show record exports of 918mt.¹⁰⁷

A Personal Perspective

Foot Binding, Slavery, Racism and Shark Fin

By Tony Wu
SINGAPORE

Beginnings

As an experienced diver, it had always seemed odd to me that in nearly 1,000 dives in some of the world's most biologically rich waters, I could practically count on a single hand the number of sharks I had ever come across.

It wasn't until I received a mailing from my favourite airline that the proverbial light bulb went on in my head. One of the featured items was shark fin soup. My heart sank with the sudden realization that shark fin soup might be linked to the dearth of sharks.

Shark Fin Today

People in Asia love good food. The preparation, serving and consumption of gourmet dishes is an integral part of most Asian cultures. There are few large gatherings or functions that do not revolve around a spectacular feast. Shark fin soup is one of the main dishes served. It has always been expensive, at least for what it is—essentially chicken soup with a bit of boiled collagen fiber thrown in.

Shark fin has never been about practicality or nutrition. Perhaps more than any other dish, it has been a symbol of extravagance and wealth. It is a way of honoring one's guests, while demonstrating that one has "made it."

This was all fine and good when only a relatively small proportion of people in Asia could actually afford such luxuries, but the combined purchasing power of people in Asia has grown exponentially. The demand for all luxury goods, including shark fin, has increased dramatically. The dish is now a prerequisite for most weddings in Asian urban areas. Nearly every major corporate function features shark fin, and virtually all large family gatherings, too. There are now \$8.99 all-you-can-eat shark fin buffets. Shark fin is available on the street, in cans on grocery shelves, and yes, even as in-flight meals on Asian airlines.

So once I started to look around, it became obvious to me that the demand for shark fin has exploded during my lifetime.



Divers in many parts of the world report fewer sightings of sharks

Understanding the Motives

If there's one message I'd like to ensure gets through, it is this: people in Asia order, serve and consume shark fin for the same reasons that people buy multiple Rolex watches, wear excessive amounts of gold jewelry, buy bottles of cognac and destroy them in front of friends or drive Ferraris in places like Singapore where the urban speed limit is 80 kph. It is for ego, pride, exhibitionism, hubris...call it what you will.

Paper Tigers and Red Herrings

There are certainly some in Asia who would argue otherwise. There are those who attribute medicinal or regenerative properties to shark fin, just as they do to tiger penises and rhinoceros horns. There are those who argue that serving shark fin is integral to Asian culture, and that efforts to control shark finning are really just attempts at cultural imperialism by extremists.

However, most of us realize that shark fin has no magical properties and that there is nothing imperialist about seeking to prevent overfishing or the obliteration of marine species. The assertion about "extreme" groups leading a campaign to stop airlines offering shark fin soup, for instance, was published without question by a leading Singapore newspaper when, in fact, there were no extreme groups involved. I know, because I *was* the campaign! I wrote a polite letter to the

airlines in question, encouraged others to do the same, and the airlines responded in a responsible and positive manner.

The Bottom Line

This issue is about more than having a bowl of shark fin soup. It is about the age-old struggle of change, of learning to adapt to new circumstances and to act in a responsible manner. It is about changing practices like foot binding, slavery and racism to leave future generations a better world. In Asia, as much as anywhere else, we need not just to face change, but to bring it about in a proactive manner, and demonstrate that we are responsible enough not to follow a deadend path.

Those who make the decisions about shark conservation and finning should understand that there are many people in Asia who are concerned about this issue and who are working to educate friends, relatives and others in the hope that the senseless, ego-driven desire to serve shark fin will abate.

It is a long and difficult task, however, as we are working to overcome personal insecurities, pride, ignorance and those who have become attached to the huge profits they make from shark fin.

We could use your help.

Tony Wu is a private individual working to raise awareness of threats to sharks.

Taiwan

TAIWANESE FISHERIES

Taiwan is not only a major player in the international fin trade, it is also one of the foremost shark fishing nations, with an annual catch of sharks which has shown a gradual upward trend over the past half-century.¹³

Reported Taiwanese shark catches were approximately 10,700mt in 1953 and rose to 32,700mt in 1969, with a mean of 19,300mt in the period.³⁹ In 1999, this figure rose to 39,779mt. By far the largest proportion of these catches—33,637mt—were taken in Taiwan’s far seas fisheries, with offshore fisheries and coastal fisheries accounting for only 5,710mt and 432mt, respectively.¹⁰⁸ These figures represent the catch levels recorded by Taiwanese-registered fishing vessels alone and do not include those made by Taiwan-owned vessels registered to other countries under Flags Of Convenience (FOCs).

OFFSHORE SHARK FISHERY

Unlike China, which operates a closed season for two months of the year, Taiwanese vessels never stop fishing. In 1998, Taiwan had 2,325 longliners, 1,520 gillnetters, 2,161 “otter trawls,” 56 “bull trawls” and an unknown quantity of drag nets.¹⁰⁸ Sharks taken in local fisheries are utilized, while in the “Far Seas” fishery they may be finned.

FAR SEAS FISHERY

The sea-going vessels, most of which are longliners, go as far afield as Mauritius, Las Palmas and the waters of mainland Spain. They return with container-loads of sharks. According to one of



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Taiwan’s major shark fin dealers, sharks are never regarded as bycatch. The Taiwanese fish for tuna and sharks equally.¹³ When sharks are caught by the Taiwanese fleet, those regarded as having a high value are kept, while others are finned and thrown back.¹³

AT THE PORT

Locally-caught sharks have their fins left on, but those caught in far seas fishery have their fins cut off at sea and dried out on deck, to save freezer space. These are called “sea-dried”, while the locally-caught ones are called “mountain-dried”. According to the dealer, there is no price difference between the two. What differentiates price is species and condition¹⁰⁵.

There are still large quantities of fins-only landings from sharks which are bycaught in the Taiwanese tuna longline fleet, but that is reported to be gradually changing¹⁰⁷.

At the ports, landed sharks are lined up and the hooks removed. Many dealers go to the ports to bid for the sharks, which are auctioned at the quayside along with other valuable fish, such as tuna. Prospective buyers dig sticks into the sharks, to test the quality of the meat. Once bought, the sharks are cleaned, gutted and, if locally caught, their fins removed.

Above: Wet fins arrive for processing

TAIWAN SURVEY

In July 2000, WildAid commissioned a survey of 1,015 people on attitudes about shark and shark fin soup. It found that:

- 30% of respondents had never eaten shark fin soup
- 7% had stopped eating it because of a concern for the environment
- 43% knew that shark fin soup is made from sharks; 29% knew only that it was made from fish
- 60% of respondents agreed with the statement that shark fin soup is not a special dish; 16% strongly agreed; 21% disagreed and only 3% strongly disagreed
- 79% said that social events were the most common occasion for eating the soup; 25% ate it at family dinners; 1% ate it alone
- 33% believed shark fin soup to be irreplaceable; 15% thought any soup would be equally acceptable
- 69% said they would be prepared to pay US\$100 for a serving of soup and 27% would not
- 80% agreed that shark fin soup had caused overfishing
- 13% believed that fins grow back after being removed
- 52% agreed that it was wasteful to fin and discard sharks, while 19% strongly agreed; 24% disagreed and 5% strongly disagreed
- 70% believed that sharks are important to ocean ecology and 18% strongly agreed; 11% disagreed and 1% strongly disagreed

THE FIN TRADE

Demand for fins in Taiwan is growing, both for local consumption and for export. But supply is diminishing, down by 30% in 1999, and prices have gone up as a result. In 1999, fin prices were reported to be at their highest in ten years.¹³ The owner of a soup canning factory told WildAid that he believed someone was trying to monopolize the fin market.¹⁰⁹ Sharks are getting smaller as well as scarcer. For example, “black” shark fins used to average 40cm in length but are now averaging 35cm.¹³ A major fin dealer informed WildAid that when the sharks had all gone, he would move on to other products, such as scallops and abalone.¹³ More and more shark fin soup restaurants are opening in Taiwan, and more families can now afford to eat it.

According to the manager of a shark trading company in Australia, all seafood that comes into Taiwan must be landed from a Taiwanese vessel, either fishing or transport. If not, it attracts a 42% import tax. This means that it is not profitable for fin to be imported directly from other countries and Taiwanese vessels trans-ship fins from the vessels of other nations on the high seas.¹¹⁰



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THE WORKINGS OF THE TRADE

The “Brothers” are reported to be a private cartel of fin dealers, whose objectives are control of the industry and the maintenance of a buying and selling price balance between Singapore and Taiwan. They are said to control all the fin that comes off Taiwanese longliners in Taiwan and Singapore.¹¹⁰

The dealer reported that all transactions are carried out in cash.

Above: Fins drying in Taiwan

Below: Taiwan is a major shark fishing nation and a major consumer

Taiwanese dealers buy from local fishing companies as well as importing shark fin. The day before WildAid’s interview with the dealer, he had received a container of fins from Spain, which he had bought directly from the Spanish vessel.¹³ Five years ago, the local shark catch was sufficient to supply the market, but because there are fewer sharks locally and a larger market, imports have increased.¹³

Most of Taiwan’s fins are exported to Hong Kong, for later export to China. The dealer said that Spain was the biggest exporter of fins to Taiwan and that he owned a company in Las Palmas, in the Spanish Canary Islands, which was a center for fin collection.¹³

The dealer exports more than 100mt of dried fin per year from his Taiwan-based company and estimates that 60% of them come from blue sharks. There are a number of fin processing factories in Taiwan. Once the fins have been sorted, a decision is made as to which should be used for local consumption and which should be exported.¹³



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Asia — The Producers

DECLINING CATCHES

RSGA In the Red Sea/Gulf of Aden (RSGA) region, artisanal fishermen are responsible for most of the shark and ray landings, using longlines and gillnets. Despite increased effort, the total landings of sharks and rays by artisanal fishermen in Yemeni waters in the RSGA demonstrate a decline.¹¹¹

UAE Arabs do not consume a great deal of fish, but the large—and growing—populations of Indians, Bangladeshis and Pakistanis do. This has stimulated both the local and export markets for fish. The United Arab Emirates (UAE) has experienced a decline in shark catches in recent years and there are growing concerns about overexploitation.¹⁷

INDIA The annual average landings of sharks and rays in India during 1987-96 was 56,000mt, of which sharks were 62.5% or 35,000mt.⁹⁹ By 1997, India was by far the world's leading shark fishing country, landing nearly 131,000mt, or 16% of the world total.¹⁰³ The fishery has increased over the years, with steady decreases in the length



of the sharks caught. Overexploitation is a clear trend, similar to the previous collapse of shark fisheries in Pakistan.⁹⁹

In 1999, fishermen in many villages in Andhra Pradesh and Tamil Nadu reported that they had to travel farther and farther afield to find sharks. Most of the 20 fishermen interviewed by WildAid reported that shark catches had decreased significantly over the past ten years. Fishermen arrested for illegal fishing in the Gahirmata Marine National Park in Orissa told WildAid, “We used to catch sharks regularly, but now they are extinct here.”¹¹²

Above: India is the largest shark fishing nation in the world—yet there is no management of shark fisheries

At the present rate of fishing and with the increase in effort in the inshore waters, sustainability of the resource there appears to be threatened.⁹⁹

THE FIN TRADE

“My family’s protein lies at the bottom of the sea.”

AN INDIAN FISHERMAN COMPLAINS ABOUT FINNING BY INDUSTRIAL LONGLINERS, 1999

UAE The UAE exports significant quantities of fins to Hong Kong. The Caribbean Trading Company, based in Sharjah Emirate, claimed a few years ago to be exporting ten metric tons of fin to Hong Kong each week.¹¹³ Hong Kong import statistics reveal annual imports from the UAE averaging 340mt since 1998.¹⁰²

In 1999, a new company, Al Mansoor, was established in Ajman Emirate just prior to WildAid’s visit. Local fishermen were delighted that the owner was offering ten times more for fins than is paid for meat. They stated that they would begin strenuously targeting sharks in order to supply the new company. Al Mansoor had also offered to buy shark skin and meat from local fishermen.¹⁷

Left: Fins drying in the UAE



© SHARLES ALEX/COBBIS SYGMA

RSGA In the RSGA region, increased demand for dried fins has led to greater fishing effort on the larger offshore species, since larger

shark fins fetch higher prices. Sharks are often finned.¹¹¹

INDIA In 1999, fishermen along the coast of Tamil Nadu and Andhra Pradesh reported receiving far higher prices for their fins than they had even three years ago.¹⁷

Apart from the east and west coasts of mainland India, it is generally believed that sharks are being finned in large numbers by mostly foreign trawlers off the Andaman Islands.

Numerous longliners operating just outside the Indian Economic Exclusion Zone (EEZ) are reputed by local fishermen to be finning sharks off both the west and east coasts.¹⁷

A shark meat dealer in Mumbai (Bombay) reported in 1999 that very few large sharks remain in local waters because fishermen had been targeting more sharks for fins.¹⁷

There are about a dozen companies in Chennai (Madras) exporting shark fins to east and southeast Asia.¹⁷ One of the companies, Marine Mercantile, had four metric tons of fins stockpiled in February 1999; the day before WildAid's visit, two metric tons had been sold to a company run by the owner's brother in Singapore. Exports from this one company average 40mt per year and fins are exported mainly to Hong Kong, Singapore and Taiwan.

A fin dealer in Mumbai admitted that he had noted a dramatic decline in the availability of fins. Some years ago he could gather three metric tons by making one visit to each of twelve fishing villages. Now he has to make 300 separate trips in order to buy the same amount. He sells an average of

50-60mt of large dried fins per year, mostly to Singapore, Taiwan, China and Japan. At the time of WildAid's visit, 3.5mt of fins were in stock and there was an outstanding order from mainland China for 6.5mt. Most of the fins sold by this company are from blacktip and hammerhead sharks from Gujarat. They occasionally obtain whale shark fins from the same area. The company can sell as much as 100mt of baby shark fins per year, if there are advance orders lined up. However the demand for these fins is very sporadic. In 1997, 100mt were exported; only two metric tons in 1998.

As part of a drive to help local exporters capture the added value of marine products, the Marine Export Development Authority of Mumbai ran a training workshop on fin processing in 1997. The intention was to teach Indian dealers to process fins in a way acceptable to importers. However, buyers from Singapore and Hong Kong rejected the quality of fins processed in India, and the project was canceled.¹¹⁴

Above: Juvenile sharks are considered a delicacy in the UAE

According to the Indian Centre for Marine Fisheries Research, the quantity of fins exported fluctuated from 96mt in 1985 up to 192mt in 1989 and, after a brief drop, rose to 185mt in 1994.⁹⁹ India exported 241mt of dried fins to Singapore between January 1997 and May 2000¹⁰⁵ and 340mt to Hong Kong during the same period.¹⁰²

LACK OF DATA AND MANAGEMENT

RSGA Surveillance and monitoring are inadequate in the RSGA region, making it very difficult to estimate total catches with reasonable accuracy.¹¹¹ There is a serious lack of data on catch effort and composition, but a preliminary study in April 1999 showed that the present catch probably exceeds the estimated Maximum Sustainable Yield (MSY) of the fisheries in Socotra Island.¹¹¹

INDIA There is no explicit management of Indian shark fisheries and no fishing vessels complete log sheets.⁹⁹



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Africa

OVERVIEW

From field investigations in Tanzania, South Africa, Kenya, Mauritania, Gambia and Senegal, and data from previous studies, WildAid has found that shark meat remains an important source of protein for Africa. For centuries, shark meat was obtained by traditional fishing in non-motorized boats. However, in the last 15 years, African fishing effort has dramatically increased owing to expanding human populations, mechanization, technical innovations such as nylon nets and longlines, and demand for shark fins. While effort has increased in many places, the resulting catch very often has not. In many countries, shark catch declines have been attributed to foreign industrial fisheries—often conducted illegally—which have proliferated in African waters. With the exception of South Africa, management and enforcement of fisheries law have been scarce.



DECLINING CATCHES

THE GAMBIA In The Gambia, sharks are rarely eaten and shark stocks remained virtually unexploited, except for bycatch, until in the 1970s. At that time a group of immigrant Ghanaians began an artisanal, directed shark fishery. Since then, the shark fishermen of “Ghanatown” have witnessed significant declines in shark catches. They must travel increasingly farther afield to catch sharks.¹¹⁵ Ray catches are still relatively high, but the people of Ghanatown fear that they, too, will decline if fishing pressure does not diminish. In recognition of the problem of overfishing, the fishermen of Ghanatown are seeking alternative sources of income.¹¹⁵ In the Brufut region of The Gambia, local artisanal fishermen measure the decline of the fishery by their fuel use: a few years ago 60 liters of fuel was required to catch a certain volume of sharks. Today, 600 liters are necessary to obtain the same volume.¹¹⁶

SENEGAL The shark fishing effort increased in Senegal in the 1970s, due to the export market provided

by the resident Ghanaian fishermen.¹¹⁷ A further surge in effort occurred in 1994 when the devaluation of the Senegalese currency led to a boom in prices for fins.¹¹⁸ In October 2000, fishermen in the villages of Mbour and Ngor reported that shark catches were decreasing despite increased fishing effort.¹¹⁹ A 30-year-old fisherman in Ngor reported that, as a child, he had frequently encountered sharks while swimming. He had not seen a single shark in the area for 15 years.¹¹ Declines had also been noted by recreational fishermen at a Dakar club, who now very rarely see, let alone catch, a shark.

MAURITANIA Shark fishing by the Imraguen people in the north of Mauritania is known to have existed since the early 1900s. Always a minor fishery, it disappeared in the 1970s, but began again in earnest in 1988. Sharks were abundant at that time but catches have rapidly diminished.¹²⁰

KENYA Coastal fishermen expressed concerns about overexploitation as early as 1989.⁷ In 1995, recreational fishermen noted

“Certain once-abundant species have declined, become rare or even commercially extinct.”

AMADOU SAINE,
GOVERNMENT OF
THE GAMBIA

an alarming drop in both the number and size of sharks caught during the previous five years.⁷ In 1999, fishermen and fish dealers reported seeing a precipitous decline in shark catches along the northern Kenyan coast for the past decade. In Malindi, a local fishmonger estimated that shark catches had gone down by 50% in ten years. Ironically, although Malindi is a traditional fishing village, the trader must make a three-hour round trip to Mombasa to buy fish for the people of Malindi.¹²¹ Local fishermen said that they can fish all night and come back with only 5kg of shark, despite increased effort and a variety of gear. The size of individual fish is also declining. No sawfish have been caught for five years.¹²¹ Fresh fish shops in the Mombasa and Malindi areas have noted similar problems. One market vendor reported that a few years ago he was able to buy ten sharks a day on average. Now, he would be surprised to see one every three months.

WildAid visited a huge warehouse in the city of Mombasa containing approximately 80mt of

dried shark meat almost entirely from Somalia. The warehouse owner stated that this was because “sharks are finished in Kenya”. Reports show that at least 30mt of shark meat is imported every month from Somalia.¹²²

TANZANIA In 1995, artisanal fishing was thought to be the greatest source of pressure on sharks. It accounted for 96% of fishing effort at that time, landing 1,103mt of sharks.⁷ More than 25.4% were immature, a possible indication of overexploitation. In May 1999, gillnet fishermen in Zanzibar told WildAid that shark catches are declining markedly, while large sharks were seldom caught.

SOUTH AFRICA It is highly likely that most stocks in South African waters have already been exploited beyond sustainable levels. As stocks of bony fish species decline in South African waters, more fishermen are targeting sharks.¹²³ Correspondingly, dive operators on the east coast observed a marked decline in sharks between 1997 and 1999.¹²⁴ The long history of shark exploitation, and its low management profile, does not bode well for the future and it is likely that stricter control and stock rebuilding will be needed.¹²⁵ Recreational fishermen are also reported to be taking their toll on South Africa’s sharks. Some are selling their catches commercially. Catch and release practices often result in sharks being so badly injured that they are effectively dead.¹²³

SOMALIA In 1996, the annual shark catch in Somalia was estimated to be 6,700mt, more than four times the catch twenty years earlier. In 1995, there was concern in Somalia regarding the overfishing of sharks in the northeast region, where sharks were directly targeted. There were also fears that shark stocks were declining in the Gulf of Aden of

South Yemen. Sharks comprise 40% of landings in some areas.⁷

THE SEYCHELLES The shark fishing industry in the Seychelles dates back to the early 1920s. By the end of the 1950s increased demand led to a larger number of vessels entering the fishery. Shark stocks on the Seychelles plateau and nearby banks showed clear signs of overexploitation. It was reported that, after just two years of shark fishing, the most accessible areas had been cleared of large sharks, resulting in the need to fish farther afield.¹²⁶ Shark catches rose to 37.4mt in 1985, peaked at 116.5mt in 1995 and had dropped to 83.9mt by 1996.¹²⁶

THE FIN TRADE

THE GAMBIA In The Gambia, all the sharks and some rays have their fins removed. These are sold to the Guinean traders who regularly visit Ghanatown. The Guinean traders finance the Ghanaian fishing boats from the profits they make from fins.¹¹⁵ In a very direct way, the shark fin market is financing the overexploitation of sharks in the region. In 1990, the average price paid to the fishermen for one kilo of fins was 4,000 CFA (US\$5.60). In 2000, the price had escalated to 50-60,000 CFA (US\$70-85). As a result, fishermen in Ghanatown increased their efforts to catch sharks.¹¹⁵

MAURITANIA The international fin trade sparked the revival of the directed shark fishery in 1988. At first, only fins were utilized.¹²⁰ Since then, Ghanaian traders in the capital, Nouakchott, have begun exporting dried shark meat from



Above: Fins left to dry in Cape Town docks

the north and from one of Africa’s largest Marine Reserves, the Banc d’Arguin National Park.¹²⁷

SENEGAL The fin trade has provided an added incentive to catch sharks in Senegal. After landing, fins are removed, dried, and sold to Guinean traders.¹¹⁹

At a west African regional workshop in April 2000, it was generally agreed that the profits accruing from the fin trade were realized by the fin dealers and not the fishermen.¹¹⁷ However, it is not easy for the fishermen to extricate themselves from the business, since they are caught in a debt trap. As in The Gambia, the dealers supplied the financing for their boats and equipment, so the fishermen are committed to providing fins for the dealers.¹²⁸

A Personal Perspective

Shark Fisheries in
The Gambia

by Amadou Saine
SENIOR FISHERIES OFFICER,
GOVERNMENT OF THE GAMBIA

Sharks and rays have been exploited in The Gambia for more than three decades, mainly by the Ghanaians who export the dried meat to Ghana. The export of shark fins from The Gambia to Asia was initiated in the early 1960s by Hong Kong businessmen in collaboration with a Guinean. Shark fin exporters offer local middlemen and fishermen up to US\$50 per kg of quality dry fins, while the exporters gain hundreds of US\$ per kilo in Asian markets. Is it not obvious who benefits from the shark fin trade? Presently, both Gambian and foreign entrepreneurs export shark fins to South East Asia.. It is estimated that industrial vessels harvest a substantial amount of sharks as bycatch on the Gambian coast. The fins are cut and the living animals thrown back into the water...a terribly unsustainable and cruel way to fish! The livelihood of an entire community, the Ghanaian community, is dependent on the shark fishery. Although there are no official records of the biomass and status of shark stocks, it is evident that production has been declining despite increased fishing effort and capital investment. Stakeholders in the shark exploitation chain admit that certain once-abundant species have declined, become rare or even commercially extinct. The tiger shark, (*Galeocerdo cuvier*) and others such as the barbeled houndshark (*Leptocharias smithii*), the scalloped hammerhead shark (*Sphyrna lewini*), the smooth hammerhead shark (*Sphyrna zygaena*), the nurse shark (*Ginglymostoma cirratum*), the bull ray (*Pteromylaeus bovinus*), the greater guinean mobula (*Mobula coilloti*), and the common sawfish (*Pristis pristis*) are rare and threatened. The shark resources, not just of The Gambia, but of the entire world, must be properly managed and conserved for the benefit of present and future generations. This will require the adoption of sustainable exploitation strategies, reduction of threats to habitats, establishment of protected areas and rational management and utilization.

A six-month survey of the status of Gambian shark stocks, co-ordinated by the author, has just been completed.

KENYA In 1999, a Kenyan fishmonger reported that, just a few years before, local fishermen were unaware of the value of fins. Now they were trying harder to catch sharks.¹²¹ Mombasa's main shark fin dealer is Mr. Kim, a Korean. One of Mr. Kim's staff confirmed that he sends large containers of shark fins to Korea each month.¹⁸ It is likely that, by using Korean and other foreign vessels, large volumes of fins can leave Kenya without being recorded in any way. Officially Kenya exported 15mt of dried fins to Singapore between January 1997 and May 2000.¹⁰⁵

TANZANIA The price of fins in Tanzania was said to have increased by 70% from 1994-99 accompanied by a dramatic reduction in shark catch and leading to a decline in fin exports. To avoid duties in Tanzania, fin traders have declared shark fins as "fish offal" with a value of US\$2/kg.⁷ Researchers concluded that because of this, the real catch was more than double the reported figures. In Mafia Marine Park, fin traders from Zanzibar have encouraged and financed the adoption of longline technology, catches from which are dominated by larger sharks.⁷

SOUTH AFRICA South Africa is a major center for shark fin trade. Fins are landed from fishing vessels and loaded into containers for export. Fin exports peaked in 1995 at 95mt, valued at 4.1 million rand (US\$907,000). This fell to 55mt by 1998.¹²⁵ However, Hong Kong customs data show that South Africa exported 90mt of dried fins to Hong Kong in 1998 and 89mt in 1999.¹⁰² Between January 1997 and May 2000, South Africa exported 28mt to Singapore.¹⁰⁵

WildAid was told by a confidential source that South African trade figures are very likely to be fudged, probably because of import/export tariffs.

THE SEYCHELLES In the Seychelles, the largest fishery by far is the purse seine fishery, with landings of nearly 273,000mt of tuna.¹²⁶ All shark bycatch is reported to be finned.¹²⁶ Officially, the Seychelles exports of dried fins to Singapore amounted to 27mt between January 1997 and May 2000.¹⁰⁵

FOREIGN FISHING

It is impossible to establish the extent of damage being done to artisanal fisheries by foreign industrial vessels. Every artisanal fishery which WildAid visited in Africa attributed catch declines to the presence of numerous foreign fishing fleets.

SENEGAL Drought in Senegal has forced many people to migrate to the coast to seek a living increasing local pressure on marine resources. Additionally, there is no control over foreign vessels, which are believed to be responsible not only for uncontrolled fishing of a wide variety of fish species, but also for large amounts of shark bycatch.¹¹⁹ The poor of Senegal must compete with well-financed foreign fleets for the last of the nation's meager food supply.

KENYA A spokesman for Ngomeni said that the village depends entirely on the sea. They eat shark meat and sell the fins.¹⁹ One retired fisherman from there reported a steep decline in shark catches, which he attributed to the longliners and trawlers. The decline began ten years ago, when the trawlers arrived. It has continued ever since. In the mid-1980s, the fishermen sold a daily average of 150kg of shark fin. In the 1990s, it had fallen 2kg per day.¹⁹

It also has been reported that small-scale fishermen off the Malindi coast lose nets worth up to US\$5,000 every month to

trawlers.¹²⁹ A fish trader in Mombasa told WildAid that trawlers in Kenyan waters were using illegal nets with fine mesh. He said that trawler owners produce large-mesh nets for Fisheries Department inspections, then switch the nets at sea.¹³⁰ By law the trawlers are supposed to stay at least five nautical miles out to sea, but they have been known to come to within 200 meters of the shore at night.¹³¹ Environmentalists and fishing communities recently claimed that at least five trawlers had been fishing less than five nautical miles off the Malindi, Watamu, Mayungu and Ngomeni coast for two weeks, despite government threats to withdraw licenses.¹²⁹

There are also more than ten longliners in the area which are supposed to respect the 200 mile EEZ. They reportedly catch species that the local fishermen used to catch: tuna, sharks, sailfish and marlin. Some years ago, members of a local angling club reported seeing longliners operating only 16 miles offshore, in the marlin fishing grounds. This was stopped, but now they take huge numbers of sharks.¹³²

There are at least two private ports in Mombasa, both with security guards and both reputedly are reluctant to allow even Fisheries Department officials to visit. One such port belongs to Southern Engineering, a company owned by Mr. Abdul Haman. WildAid saw one container with approximately two metric tons of frozen sharks inside, all finned. A company manager reported that these were from Korean vessels and that they were always delivered minus their fins.

Another private port, Waininchi Marine, is owned by a Mr. “Mahmood”, whose original name was Tung. A local conservationist claimed that Fisheries Department officials needed permits to inspect the premises and that at least one had been ejected.¹³³ Korean



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longliners have been known to sail directly into Wanainchi Marine. Kenyan fishermen believe that by offloading their shark catch (minus the fins) in Waininchi and Southern Engineering, these vessels were able to avoid paying Kenyan taxes.¹³³

SOUTH AFRICA In South Africa there are reports of illegal fishing inside the EEZ, but a lack of patrol vessels has hampered prosecution.¹³⁴ South Africa permits 85 Japanese and 24 Taiwanese longliners to fish tuna inside its EEZ.¹³⁵ A further 100 or more Taiwanese vessels have used Cape Town for re-supply and repair. Permit conditions state that bycatch should not exceed five percent of total catch and that fins from sharks caught in the EEZ should be accompanied by the relevant carcasses. Often fishermen can claim the fins were obtained in international waters.¹³⁶ Taiwanese longliners are reported to ply the oceans between Kwazulu-Natal and Mozambique.¹²⁴ Japanese and Taiwanese longliners catch oceanic shark species such as mako, blue, silky, oceanic white tip, thresher and porbeagle sharks. Discard ratios are estimated to be high when compared with known catch rates in other parts of the world.¹²⁵

Above: Artisanal fishermen have experienced dramatic decline in shark catches in west Africa

THE SEYCHELLES In the Seychelles, foreign tuna longliners capture sharks as bycatch and often land them in the Seychelles. The main species landed is the mako shark; other species are discarded at sea but records of bycatch and discards are not kept.¹²⁶

ILLEGAL FISHING

SENEGAL There is a conflict in Senegal between law-abiding resident fishermen and those entering the Bijagos Archipelago, a Biosphere Reserve, for illegal shark and ray fishing. Reports refer to “mountains of finless shark carcasses”¹³⁷ indicating that this is a serious problem, but as in many parts of the world there is no information as to the number of sharks and rays that are being caught in illegal fisheries.

INDIAN OCEAN There is reportedly widespread illegal fishing in the Indian Ocean generally. There are numerous commercial—and often illegal—longline fishing vessels operating in the EEZs of the region. Many of them are operating out of the Seychelles. Some of them are EU-registered. These commercial fleets have all been

documented as dealing in shark fin. Sharks are caught as bycatch and finned. The potential offtake is immense, but to date is more or less unknown and unrecorded.¹²²

POOR REPORTING

Across Africa, the rate of reporting shark catches is extremely low. Artisanal fishermen do not record catches at all and knowledge of the activities of foreign vessels is scant.

SOUTH AFRICA The shark fishery in South Africa has been perceived as wasteful by experts, with significant misreporting and no requirement to record bycatch. Shark landings are difficult to quantify; authorities rely on “returns” submitted by commercial fishermen, but are sceptical about their accuracy.¹²³ Records of catches are sometimes made long after the event, often when the crew has come ashore, allowing for a great deal of error. It is also suspected that numbers are simply invented, so there is something to put on record. In South Africa, a record of catching a certain species is a prerequisite for permit renewal.¹²³

THE SEYCHELLES In the Seychelles, shark landings are grossly under-reported. When converted to wet weight, the 1997 dried fin export data indicate that the quantity of sharks caught is about 700 times higher than recorded landings.¹²⁶

HOPE FOR THE FUTURE?

Local authorities in west Africa, Kenya and South Africa have recently made some encouraging moves to increase active shark management. However, these countries have few resources to combat illegal fishing activities by foreign companies with no long-term interest in the health of the fishery.

WEST AFRICAN REGION The west African Sub-Regional Fisheries Commission (SRFC) was created in March 1985. Its members are the Cape Verde Islands, The Gambia, Guinea, Guinea-Bissau, Mauritania and Senegal. It encompasses 1,273,700 km² of sea and 3,000km of coastline.¹³⁸ The coalition seeks to harmonize policies on preservation, conservation and exploitation of marine resources. A common policy on shark exploitation was announced in 2000. It is currently being refined after in-depth discussion between fisheries managers and fishing communities, almost all of whom have recognized that sharks are seriously depleted in many parts of the region.¹¹⁹ Local fisheries authorities believe that this policy will result in far better management of shark fisheries in the region.

SENEGAL Fishermen in Senegal believe that the new government, elected by popular vote in March 2000, may not renew foreign fishing licenses. Some believed that even current licenses would be withdrawn. At the time of WildAid’s visit, the government was in discussion about future policy on foreign fishing licenses,¹³⁹ but the outcome of those discussions has not been established.

MAURITANIA The Imraguen of Mauritania are collaborating with the Banc d’Arguin Marine Reserve managers to devise a series of shark conservation measures. These include closing the waters of the Park to shark fishing during the migration season and collecting data on shark landings by species and size. In some villages in the Park, the Imraguen have expressed a desire to stop shark fishing altogether.¹²⁸ An Imraguen representative said that his people are proud to be among the first fishing communities to be actively involved in conserving sharks and

“As a child I would often see sharks as I swam.... I haven’t seen one in 15 years.”

FISHERMAN, NGOR,
SENEGAL

rays. They wished that the Park would become a sanctuary for sharks, having for so long been an area of shark extermination. He hoped their actions would serve as an example to others in the sub-region.¹²⁰

KENYA The government of Kenya has imposed a temporary ban on trawling, effective the end of November 2000. A task force has been set up to carry out research but a preliminary study has shown that bycatch, consisting of fish, sharks, turtles and other marine animals, comprises 70-80% of the total catch.¹⁴⁰

Below: This is part of a 80mt stockpile of dried shark meat imported from Somalia as local sharks stocks have collapsed in Kenya

THE SEYCHELLES In the Seychelles, legislation was passed in August 1998, banning the fishing of sharks with nets.¹²⁶



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Latin America

DECLINING CATCHES

BRAZIL In Brazil, a two-year study, completed in December 1998, showed a decrease of 14cm in the average total length of blue sharks caught by longliners and landed in Itajai. "This considerable decline could be explained by increasing fishing pressure on the blue shark stock not only caused by national fleets but also by foreign high seas vessels.... (it) could be a first indication of overfishing."⁵⁴

COSTA RICA Pelagic fishery resources were evaluated in 1992 in Costa Rica's EEZ and sharks, among other fish, were found to be abundant. Recently, however, longlining activity in the Costa Rican EEZ has resulted in the depletion of fish stocks. This has led to further expansion into international waters, with some boats traveling as far as Chile. Fishermen admit that they must go either to the Cocos Island or the Galapagos Islands to catch sharks.¹⁴¹

Despite this, the Costa Rican fisheries authority, Instituto Costarricense de Pesca y Acuicultura (INCOPECA), is currently considering increasing its fleet size¹⁴² and fishermen are converting their shrimping vessels into longliners.¹⁴¹

A recent study has shown that both CPUE and the average size of sharks has diminished significantly in the last seven years. A study in 2000 compared current catch data to data collected in 1993. Bearing in mind that the 1993 study measured only to the tail fork, while the later study measured total length, the average size for a grey shark was 43.4% smaller in the later study. For thresher, blue and hammerhead sharks, the average sizes were 47.55%, 15.4% and 37.5% smaller, respectively.¹⁴²

Blue and hammerhead sharks have apparently suffered the



© INNERSPACE VISIONS

greatest effects of overfishing, with CPUE rates down more than 90%. CPUE for grey and thresher sharks fell by more than 65%.¹⁴²

Costa Rican fishermen told WildAid that they were catching fewer and smaller sharks. They also spoke of routinely targeting sharks illegally around the Cocos and the Galapagos. One fisherman explained that they fish at night in order to avoid detection.

MEXICO The Mexican artisanal fishery accounts for 80% of the national shark catch.²³ However, studies have concluded that the main species have been heavily fished for the last ten years in coastal areas, leading to a high proportion of immature sharks being caught. The few described shark nursery areas in the Mexican Gulf are also under intense fishing pressure.¹⁴³

CUBA Earlier this century, the Cuban shark fishery relied heavily on the night shark, which made up between 65-70% of the total shark catch. From 1937-41, the average annual catch was 12,000 sharks. By 1971, a steep decline had begun. The mean weight of sharks CPUE dropped from 53.34kg in 1971 to 21.11kg in 1973.⁴⁶

Above: Blue sharks are frequently finned as their meat has little value in many regions of the world

Below: A blue shark is finned on a Costa Rican longliner. Boats travel to the Cocos Island and Galapagos now to fish for sharks

THE FIN TRADE

BRAZIL Longliners in Santos, Brazil, target tuna, with incidental catches of sharks. Initially sharks had little commercial value, but in 1977 the market for shark meat began to develop, followed by a rise in the price of fins in the 1980s. From 1984-94, when tuna catches declined, blue shark became the target species.¹⁴⁴ By 1993 sharks comprised 60% of the total longline catch. About 30% of the total catch were blue sharks.¹⁴⁴ Between 1990 and 1994, the average number of blue sharks caught per year by the national fleet is estimated to have been 68,318 sharks.⁵⁴

In 1998, on-board observers monitored three fishing trips taken by tuna longliners. The combined



© R. VARGAS



Left: Costa Rican fishermen now consider even juvenile sharks as “large”

FOREIGN FISHING

BRAZIL Many Taiwanese longliners operate in Brazilian waters and finning continues on a large scale.⁵⁴

COSTA RICA A number of foreign vessels—mainly Taiwanese—fish in Costa Rican waters. Coastal resource depletion led to the development of a high seas fishery in the early 1980s, with technological and financial assistance from Taiwan.¹⁴¹ According to Alvaro Moreno, president of the Puntarenas Fishermen’s Association, “Even though some Costa Ricans are marketing fins, the Taiwanese are definitely the larger buyers and exporters. We are concerned because they are extremely efficient. Even vessels with foreign flags land their shark fins in Costa Rica, usually the Taiwanese.” It is believed that some foreigners are developing their own private ports in Costa Rica.¹⁴¹

LACK OF DATA AND MANAGEMENT

BRAZIL For Brazil as a whole, data on sharks caught by different fishing gear (longlines and gillnets) is not broken down by species. A further problem is a lack of information on the number of vessels and type of gear being used in shark fisheries. Even the exact size of the gillnet fleet operating along the Brazilian coast is unknown.⁵⁴

COSTA RICA There is currently no control over either legal fisheries or the high volume of illegal fishing in Costa Rican waters.¹⁴⁵ Fishermen are so concerned that they are calling on the government to start regulate fishing. According to Alvaro Moreno, there should be a quota system for sharks, as there is for tuna, as well as legislation preventing the taking of fins if they are not associated with the correct proportion of trunks.

“Right now, there is no regulation and finning has become a big problem. It is lack of awareness that allows sharks to be caught so irresponsibly.”

ALVARO MORENO,
PRESIDENT OF
PUNTARENAS
FISHERMEN’S
ASSOCIATION

catch of the three trips was 1,247 sharks, skates and rays (68.9% of the total catch), and just 563 bony fish (31.1% of the total). The blue shark represented 50.4% of the total catch, hammerheads 8.2%, night sharks 6.2% and shortfin mako 4%.⁵⁴

Off the Brazilian coast as a whole, there was a marked increase from the mid-1980s to the mid-1990s in shark, skate and ray catches, mainly by drift gillnets. In Santa Catarina state, sharks represented 98% of the total gillnet catch, with the hammerhead alone representing 76%.¹⁴⁴

COSTA RICA Vessels in Costa Rica are landing tons of shark fins with very few trunks, a cause of great concern to local people worried about the future availability of shark meat.¹⁴⁵ In Playas del Coco the local shark fin dealer sells to Productos del Mar Tico in San Jose, whose publicity says that “Costa Rica’s privileged geographic position allows the harvesting of species best suited to the particular uses our clients desire.” The company has been in operation for more than ten years, claiming as their regular clients “some of the most prestigious in Hong Kong, China and Singapore.”¹⁴⁶

Europe

Europe is both a producer and a major consumer of shark products. It is also now responsible for widespread fishing in the waters of other countries—at times in violation of local laws. The northeast Atlantic and surrounding seas are some of the most heavily fished areas in the world. The major shark fishing nations of the region are France, the UK, Norway, Portugal and Spain.⁷ There are also fleets from Russia, Japan and South Korea.⁶² Shark catches are comparatively higher in this part of the Atlantic than in others.⁷ However, compared with commercially important teleost species, such as herring and cod, sharks were lightly exploited until recently.⁶²

DECLINING CATCHES

There has been an overall decline in the total declared landings of sharks, skates and rays from the majority of grounds in the northeast Atlantic.⁶² In 1969, the total landings of all non-teleost fish from the northeast Atlantic was 127,000mt, out of total landings of all fin fish of over 9 million mt. The respective figures in 1982 were around 77,000mt of a total of almost ten million metric tons, suggesting that the relative abundance of sharks, skates and rays has decreased significantly.⁶² This decline continued, dropping to just over 60,000mt in 1994.⁷

There are many examples where, following years of good fishing, the target species disappeared or was so depleted that the fishery was no longer worthwhile.⁶² One recent example is the spiny dogfish fishery in the Irish Sea. In 1981, 835mt were landed by English and Welsh vessels. The fishery peaked at 3,574mt in 1987 and fell to 1,028mt in 1996.⁶²

BYCATCH

Approximately 23,000 blue sharks are taken annually in the northeast Atlantic, mainly as bycatch of the non-European fleets. Up to 82% of these are thought to be discarded because of their low value. However, as with fisheries elsewhere, the rising price of fins means that the distinction between target and bycatch is eroding.⁶²

SHARK CONSUMPTION

Europeans have a large appetite for shark, skate and ray species. Among the commonly eaten species are spiny dogfish, small-spotted catshark, smooth-hound species, porbeagle and shortfin mako.⁷ International and domestic trade in shark and dogfish meat grew steadily within the EU in the decade up to 1996. Italy is the most important importer of dogfish and other sharks, while Germany is the most significant exporter.⁷

While Europe as a whole is not one of the bigger sources of shark fins for international trade, Spain exported 118mt to Hong Kong between 1992 and 1994.¹⁰² Spain also shipped 21mt to Singapore in 1998 and 1999 combined. It has also been reported that Spanish vessels sell fins directly to Taiwan, but the volume of such “exports” from European vessels is largely undocumented.¹³

The UK exported three metric tons to Singapore in 1999, and Norway exported five metric tons in the same year.¹⁰⁵

Between March 1998 and March 2000, 90% (3,905mt) of US spiny dogfish exports went to Europe. France and Germany, the major destinations, imported 1,364mt and 1,048mt respectively while lesser amounts were imported by Italy, Belgium, the UK and the Netherlands. The UK's imports of 401mt were earmarked for the fish and chips trade. While an Asian culinary tradition may threaten some shark species, a British one may threaten the spiny dogfish.



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Above: Europe is a major consumer of shark meat

FOREIGN FISHERIES

The general decline in European fisheries has led a number of EU countries to begin fishing elsewhere, particularly in the developing world. One thousand three hundred European boats are permitted to fish in the waters of developing

countries, for which they pay an annual fee of around US\$100 million.¹⁴⁷

Seventy-eight EU boats are licensed to fish in Senegal alone, in an agreement worth US\$10.5 million/year to Senegal. In addition, 22 trawlers of unlimited capacity may fish in Mauritanian waters.¹⁴⁸

The main beneficiary of the agreement is the Dutch pelagic fleet and its new breed of “super trawler.” These vessels, with a range of 50,000 km, are 144 meters long and can carry 7,000mt of fish. The Dutch boats are the biggest trawlers ever made. Equipped with state-of-the-art fish-finding technology, they can deploy more than 4km of net into the ocean.¹⁴⁸

Trawlers from France, Spain and Italy (as well as Japan and Korea) have also targeted these waters.¹⁴⁸

Senegalese fishermen have reported that some of these vessels fish illegally inside areas reserved for artisanal fishermen. With their lights switched off at night, they cannot be seen from shore. Local fish catches have declined dramatically.¹⁴⁸

WildAid's research among shark fishermen in Senegal, Mauritania, Kenya and India has consistently found that declines in shark catches have coincided with the arrival of industrial vessels, both trawlers and longliners, and that these vessels are often from the EU.

North America

NORTH AMERICAN FISHERIES

US Historically, the US has been a major shark fishing nation. The commercial shark fishery in the US Atlantic peaked at 6,350mt in 1989. Since then, it has been subject to a 3,266mt quota in 1993 and to a 1,633mt quota in 1997.⁴⁴

CANADA Canada's fishery has been minor. Most Canadian commercial landings have consisted of spiny dogfish, while other species tended generally to be bycatch in tuna and swordfish fisheries.²³ In recent years, a small directed fishery for porbeagle, shortfin mako and blue sharks has developed in the Canadian Atlantic. These are subject to a management plan

consisting of species-specific quotas.²³ The porbeagle fishery had existed prior to 1970, but was then terminated because of the high mercury content in the muscle tissue. It was reinstated in 1991 and landings increased from 300mt in the first year to 1,545mt in 1994.²³

The only significant Canadian Pacific fishery is for spiny dogfish, a fishery which has existed since the 1870s.²³ Landings from this fishery have undergone a series of declines and rebounds but are now considered to be well below the low-risk yield estimate.²³ In 1996, high landings of spiny dogfish fins prompted speculation that the specimens under commercial weight were being finned and discarded.²³ While it is legal to trade fins from the commercial fishery, they must be in correct proportion to carcasses sold.⁶⁰

Authorities estimate it will take 39 years to rebuild populations of sandbar sharks in US waters

DECLINING FISHERIES

US In the US Pacific, major directed fisheries are carried out for only two species, the spiny dogfish and the common thresher shark.¹⁴⁹ The fishery for the common thresher shark in California has shown a marked decline in recent years. Catches peaked early at around 1,000mt in 1982, declined sharply in 1986, and now stand at around 200mt.⁴² In the US Atlantic, the status of pelagic sharks as a group is currently unknown, but large coastal sharks are considered to be overfished.⁴² Stocks are estimated to have declined by 40-85% from former levels, the exception being the blacktip shark, *Carcharhinus limbatus*.⁴⁴

The dusky shark has undergone a severe decline. The CPUE decreased in the Chesapeake Bight



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region of the mid-Atlantic coast from 1.73 sharks per 100 hooks between 1974 and 1979, down to 0.0011 sharks per 100 hooks in 1991. There was also a decline in CPUE for stocks in the Gulf of Mexico in 1990. Declines in CPUE for the sandbar shark occurred in the Chesapeake Bay area and off South Carolina. A 39-year rebuilding timeframe was established for the species. A 30-year rebuilding program was also established for the blacktip shark.⁴²

RECREATIONAL FISHING

US The total catch of large sharks (all but dogfish) rose from just over 1,800mt in 1965 to over 9,000mt in 1986. For the period 1970-1986, this catch fluctuated around an average of 7,400mt/year.⁴⁴

Recreational landings from 1980-89 were approximately 3,600mt and discard mortality equaled, or exceeded, this value.⁴⁴ There are conflicting figures for recreational fishing after this, but recent reports suggest that catches have declined from approximately 5,440mt during the 1980s to about 2,100mt in the 1990s.⁴⁴

BYCATCH

US Blue sharks caught in the US drift gillnet fishery are not marketed, as there is rapid spoilage after death. They were usually discarded at sea. An estimated 6,706 to 16,743 blue sharks were caught annually from 1990-94, down from an estimated annual catch of 20,000 from 1980-83. A decreasing trend in their length over the period 1990-94 was reported. Catches of the species are unknown because of their low market value.¹⁴⁹

CANADA Blue shark catches in the Canadian Atlantic fishery are said to be under-reported. The most significant bycatch occurs in



Above: A fishmonger in the Caribbean prepares shark meat

the pelagic longline fisheries, where it often exceeds that of the target species.

THE FIN TRADE

US In 1991, the US pelagic longline fleet in Hawaii released around 65,481 blue sharks and kept none. In 1998, 91,228 blue sharks were caught by commercial longliners originating from Hawaii alone. About one-third of these were released, while over 55,400 were finned.¹⁵⁰ By 1999, annual shark catches were estimated to have risen to around 150,000 in Hawaii.¹⁵¹ US fishing vessels based in Honolulu transhipped thousands of kilos of fins from foreign fishing vessels. The estimated weight of trans-shipped fins in 1998 was 132mt.¹⁵¹ In January 1999, an eleven metric ton consignment of shark fins was landed at Honolulu Harbor worth US\$200,000, despite having no trans-shipment or entry permit.¹⁵¹ The US mainland has probably been an important market for fins landed in Hawaii.⁴²

In American Samoa, 72% of sharks caught by the longline fleet

were retained for finning. The catch comprises blue, mako and thresher sharks.⁴² In June 2000, the governor of Hawaii signed a law banning the landing of fins without carcasses. The recent signing of the US legislation means that finning is now banned in this region.

The US exported 319mt to Hong Kong in 1998 and a further 155mt in the first five months of 2000.¹⁰² US fin exports to Singapore amounted to 84mt between 1997 and May 2000.¹⁰⁵

CANADA Finning was banned in the Canadian Atlantic by a 1994 management plan, although the ban was not fully implemented until the 1997-99 management plan.⁶⁰

MANAGEMENT

The US and Canada are among the handful of countries in the world that have management plans for sharks. The US is also one of the very few which has prepared a national Plan of Action in line with the FAO's International Plan of Action for Sharks.

Oceania

DECLINING CATCHES

AUSTRALIA CPUE statistics suggest that the Taiwanese fishery reduced the Northern Territory/Arafura Sea stock by about 60-70% and in August 1978, the Gulf of Carpentaria was closed to foreign fishing.¹⁵² There have been indications of continuing stock decline in recent years, despite the elimination of the legal foreign fishing that was mainly responsible for the initial decline.

In western Australia there are strict regulations relating to fishing gear and fishing effort.¹⁵³ However, after an increase in the number of vessels fishing for sharks in the late 1970s and early 1980s, some fishermen reported declining catch rates and financial difficulties.¹⁵³ Total catch peaked at 1,996mt in 1987-88, declining to 1,248mt in 1996-97 after the introduction of a management plan.¹⁵³

Shark fisheries in southern Australia mainly target gummy and

school sharks.¹⁵⁴ From 1970-97, these two species comprised 88% of the shark catch.¹⁵⁰ The school shark fishery has operated since the 1930s. As far back as the 1940s, there was evidence of steep catch declines in some areas.¹⁵⁴

Recent assessments indicate that by 1973 the biomass of school sharks had dropped to about 50% of its 1930 level. By 1993 it had dropped to about 25%.¹⁵⁴ It was concluded that rebuilding the stock to 30-40% of initial biomass within 15 years would require reductions in fishing effort to below half the current level.¹⁵⁰ Similar recommendations were made for gummy sharks, where a reduction of 40% across the fishery was considered sustainable.¹⁵⁴

It is now thought that the current gummy shark fishery is sustainable, while the fishery for the less productive school shark is not.⁴ It is not possible to catch one without the other, so fisheries managers are faced with a dilemma: how to manage a fishery for the most susceptible species

without making the fishery unprofitable.⁴

NEW ZEALAND Before 1980, total shark landings in New Zealand were usually lower than 4,500mt per year. They increased rapidly in the early 1980s, peaking at 13,154mt in 1984, mainly as a result of the expansion of the school shark and spiny dogfish fisheries. Landings peaked again at between 15,422 - 17,236mt from 1993/4 to 1996/7.¹⁵⁵ Large numbers of school sharks were caught, but only the livers were retained and total weights were not recorded. From 1979-84, school shark landings increased dramatically, from 454mt to 5,080mt.¹⁵⁵

By the 1970s and early 1980s, landings of rigs (*Mustelus lenticulatus*) rose rapidly, peaking at 3,447mt in 1983. Eighty percent were taken as bycatch in trawl fisheries.¹⁵⁵

Sold in the fish and chips trade as “silver fish” and “silver trumpeter,” elephantfish were considered severely overfished by 1986.¹⁵⁵ Since then, fisheries for school shark, rig

Below: This grey nurse shark survived the finning process



and elephantfish (*Callorhynchus milii*) have all been managed through the allocation of Individual Transferable Quotas (ITQs).¹⁵⁵

BYCATCH

AUSTRALIA In western Australia, the two directed shark fisheries target a number of species. However some species, such as the Port Jackson shark, are discarded.¹⁵³

NEW ZEALAND In New Zealand several pelagic sharks (blue shark, mako and porbeagle) are regularly caught by tuna longliners. This catch has expanded along with the domestic fishery. Most blue sharks and porbeagles are finned, whereas makos are retained for their flesh and fins, providing they do not compete with tuna for freezer space. In 1992, a number of species were protected in specific areas, although fishermen were allowed to take unlimited quantities as bycatch in other fisheries.¹⁵⁵

THE FIN TRADE

AUSTRALIA In Australia as a whole, sharks have been finned in nearly all fisheries where they were taken as bycatch. A 2000 report on finning in Australian waters describes the process as both wasteful and sometimes cruel.⁸⁷ In 1998-99, approximately 6,078mt of landed shark catch was reported from target shark fisheries. It is estimated that a further 4,082mt of sharks were caught, with only the fins utilized.⁸⁷ Extrapolating, using average weights of 15-40kg per

shark, this would mean that anywhere from 112,500-300,000 sharks are likely to have been finned in Australian waters in just two years. Trade figures for 1998-99 show significant shark fin exports of 83.5mt of dried shark fin, valued at US\$2.86 million.⁸⁷

The major source of fins from Australian waters is from the tuna fisheries, which produced an estimated 20mt of dry shark fins in 1999, predominantly from blue sharks. More than 50,000 individuals were caught in that year.¹⁵⁶ Domestic tuna fishermen are reportedly earning up to US\$37/kg for wet fins. One member of a Tuna Association is reported to be landing US\$260,000 worth of shark fins each year.¹⁵⁶

In Australia's northern prawn fishery, bycatch was estimated in 1998 to be 2,370mt and included shovelnose and shark rays. The retention of bycatch, particularly for the fin market, has increased over recent years and much of it has gone unrecorded. Revenue from fins now approaches that from meat.¹⁵²

There has been a series of finning bans introduced in some states/territories and in some fisheries.

FOREIGN FISHING

AUSTRALIA A significant proportion of shark fishing in northern Australian waters in recent years has been carried out by foreign vessels, many of them Japanese and Taiwanese. Large areas of Australia's waters are now closed to foreign fisheries.

“Australian shark fisheries are generally among the best managed in the world”

From 1974-86 a Taiwanese gillnet fishery operated in the offshore waters of northern Australia.¹⁵² Sharks, tuna and mackerel comprised about 63%, 26%, and six percent, respectively of the catch in the Australian Fishing Zone (AFZ).¹⁵²

Total shark catch in the Taiwanese gillnet fishery from 1979-86 amounted to a minimum of 22,488mt.¹⁵² Most sharks were retained for their meat; fins of all but the smallest sharks were retained.¹⁵²

Indonesian vessels also fished for shark in northern Australian waters prior to the declaration of the AFZ in 1979. Today, there is limited access by traditional Indonesian fishermen to an area off northwestern Australia. Some illegal fishing by Indonesians persists within the AFZ.¹⁵²

NEW ZEALAND There was a large, mainly unreported, catch by Japanese, Taiwanese and Korean tuna longliners that fished intensively in New Zealand's EEZ during the late 1970s and early 1980s.¹⁵⁵

MANAGEMENT

Australian shark fisheries are generally agreed to be among the best managed in the world, while New Zealand is also believed to manage its fisheries well. However, fisheries experts in the region are the first to acknowledge the significant gaps in understanding of shark fisheries and management.

FAO recommends

Ascertain control over access of fishing vessels to shark stocks

Decrease fishing effort in any shark where catch is unsustainable

Improve the utilization of sharks caught

Improve data collection and monitoring of shark fisheries

Train all concerned in identification of shark species

Facilitate and encourage research on little known shark species

WildAid concludes

There is an urgent need to assist some developing countries in preventing illegal fishing, often carried out by foreign boats, within their EEZs. But few fisheries agencies have either the resources to patrol their EEZs or the cooperation of their navies.

Many fisheries managers lack basic information to establish whether or not a fishery is sustainable. Evidence often clearly indicates sharks are being overfished. The “boom and bust” history of directed shark fisheries and the fact that sharks’ life history makes them extremely vulnerable to overexploitation means that sustainability should be assumed the exception, not the rule.

Finning not only wastes 95-99% of the shark, but also makes accurate monitoring of shark catches impossible. The burgeoning demand for shark fin over the past 15 years is very likely to continue. If it does, the practice of taking sharks for their fins will become even more widespread. As human populations grow, this constitutes a truly shameful waste of the world’s resources.

Few countries record accurate catch data by species, which is the first step toward ensuring sustainable fisheries.

Many fishing communities have their own local names for shark species. There is no provision for these to be translated into commonly recognized names.

Top shark specialists are concerned by the paucity of data on individual species, particularly those known to be heavily fished.

WildAid recommends

Marine Reserves must be protected as a matter of urgency with international financing if necessary. If properly patrolled, they are among the few areas where sharks are assured of protection. Establishing which areas need closing during particular seasons and identifying and protecting shark pupping and nursery grounds should also be priorities. It will also be necessary to police such restrictions. Developed fishing nations should support these efforts financially.

Basic research is urgently to be carried out on catch levels, effort and composition. In the interim, a highly precautionary approach must be taken to quota-setting, area closure, bycatch reduction, species protection, establishment of Maximum Sustainable Yield and other management measures. Sharks will face increasing environmental pressures from pollution, global warming, ozone depletion etc. Allowances should be made for these factors when using a precautionary approach to shark management.

The UN should enact an immediate ban on shark finning in international waters. Some shark species migrate many thousands of miles. Only an international ban would make sense for these species. Some nations already prohibit finning nationally; while similar bans do not exist in other EEZs and on the high seas, their attempts to conserve sharks are compromised.

Governments should enact immediate bans on finning in national waters. Enforcement could be made appropriate to the needs and resources of developing countries. Specific ports could be designated for shark landings, and on-board and beach-side observers could also be used.

Data collection must be vastly improved in almost all countries. Catch and landings data should be species-specific. On-board observers could be used more extensively in monitoring catch effort, volumes and composition.

All fisheries should, at the very least, use species identification cards. Simple, inexpensive, waterproof cards showing the main species in the area with local names have been produced by Taiwan, for example.

Research at all levels is an urgent priority, and not only for little known species. Governments of major shark-fishing nations should put far more resources into research on species and stock abundance, shark biology, reproductive behavior, migration patterns and responses to fishing pressure. Further research should also be done on predator-prey relationships and potential ecosystem changes following shark declines.

FAO recommends

Obtain utilization and trade data on shark species

Ban or restrict certain destructive fishing practices, e.g. limit length of longlines, etc.

The IPOA-SHARKS is voluntary...all concerned states are encouraged to implement it.

States that contribute to fishing mortality on a species or a stock should participate in its management

WildAid concludes

Numerous factors hamper this process: poor reporting, the cash basis of many transactions, complex export and re-export arrangements and aggregation of data. These data are not compiled on a national (let alone an international) basis.

Unnecessary shark bycatch is caused by inappropriate fishing gear and/or destructive deployment of fishing gear.

The FAO alone with member nations complying on a voluntary basis will not ensure the long-term conservation of all shark species. Response has already been poor from most member nations.

Many developing nations currently lack the resources to manage their shark fisheries sustainably.

WildAid recommends

Trade and utilization data should be species-specific and should be submitted to the FAO—and to CITES—in a timely manner. The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) has designed a plan to track toothfish shipments in international trade. The system is based on certificates of origin and could equally be applied to the international fin trade.²¹⁴

The FAO should be more pro-active in its data-gathering. Many nations keep detailed import and export data, in some cases making it available to the public.

Highly damaging fishing methods must be limited or prohibited if the goals of fisheries managers are to ensure sustainable fisheries and maintain employment in the fishing industry. There should be considerable reduction of shark bycatch through the use of appropriate and selective fishing gear and fishing techniques.

CITES and other international bodies and treaties must finally assume their necessary roles in shark conservation. For example, international trade clearly threatens a number of shark species, yet CITES has not listed any shark species to date. If these bodies do not accept their responsibilities it may be necessary to develop a new international body or treaty to coordinate management of shark fisheries internationally.

Wealthier nations, particularly those that have benefited considerably from trade in shark products, should support these countries' research and management efforts financially. For example, Hong Kong has undoubtedly profited more than any other city or nation from the shark fin trade and yet has put few, or no, resources into sustainable management of sharks. It is in the long-term interest of consumers that sharks are managed sustainably.

In addition, WildAid concludes and recommends

WildAid concludes

Measures to conserve sharks to date have focused entirely on managing the supply. As long as the high prices and high levels of demand for shark products, fins in particular, are not addressed, such measures are likely to have limited success. WildAid found there is little or no awareness of the threats to sharks among consumers or of the waste involved in finning or the extent of illegal fishing for sharks.

WildAid recommends

To assist in shark management, demand reduction programs are needed now in key consumer countries. There should be a major international effort to raise awareness of the threats to sharks and to discourage the ongoing expansion of consumption of shark products. Alternatives to shark fin soup should be actively promoted.

Appendix

Problems Facing Global Fisheries

THE WORLD'S FISHERIES

The threats currently faced by sharks are typical of much broader problems facing global fisheries. Oceans are under severe pressure from overfishing, excessive bycatch and waste, lack or failure of management and pollution and degradation of coastal ecosystems.

In 1996, total world fish production reached 121 million mt. Marine capture fisheries accounted for 87.1 million mt of this, the rest being from inland waters and the aquaculture sector. The value of world exports of fish and fisheries products was estimated to be US\$52.5 billion.¹⁵⁷

However, these astronomical figures should not be taken as evidence of healthy marine fish stocks or of a healthy fishing industry. On the contrary, the rate of increase in marine capture fisheries is continually slowing down despite technological advances and subsidized industrial expansion. Many fish stocks are in trouble and many jobs have been lost through overfishing.

In the 1950s and 1960s, total global marine fisheries production increased, on average, by as much as 6% per year, doubling from 17 million mt in 1950 to 34.9 million mt in 1961, and doubling again in the following two decades to reach 68.3 million mt by 1983. In the next ten years, annual growth slowed to 1.5% and to just 0.6% during 1995 and 1996.¹⁵⁷

In the 1970s, there were half a million fishing vessels on the seas; now there are over one million,



© M. KANDA/WILDAD

many of them using ever more sophisticated fishing technology.

In 1989, the FAO estimated that it cost US\$92 billion to operate the global fishing fleet, which generated US\$70 billion of revenue; the shortfall was made up by subsidies. To that point Japan had given some US\$19 billion of credit to its fleet. In the 1990s, Canada was spending \$3 on its fisheries for every dollar earned.¹⁵⁸

AT THE LIMIT

In 2000, the FAO estimated that 44% of major fish stocks for which information is available are fully exploited and producing catches that have reached, or are very close to, their maximum limit with no room for further expansion. Around 16% are overfished and have no room for expansion. Moreover, there is an increasing likelihood that catches might decrease if remedial action is not undertaken to reduce or suppress overfishing.¹⁵⁷

A further six percent appear to be depleted, with a resulting loss in total production, and only three percent appear to be recovering slowly.¹⁵⁷

Seventy percent of British waters are being overfished.¹⁵⁸ The North Sea has been fished to the limits of its productivity, with most stocks “outside safe biological limits,” that

Above: A Japanese industrial longliner

“There are too many fishermen with too much sophisticated gear chasing too few fish.”

PETER BENCHLEY,
JAWS AUTHOR

is, unable to replenish themselves and in imminent danger of collapse. Species of importance that are thought to be on the brink of commercial extinction are cod, mackerel, hake and North Sea haddock. North Sea whiting is also reported to be at very low levels.¹⁵⁹

THE PATH TO EXTINCTION

Until very recently, the general perception of oceanic fish species was that they could not be driven to extinction by human activity. In November 2000, the American Fisheries Society, a leading body in the field of marine biology, published a report co-funded by the National Marine Fisheries Service (NMFS) challenging this view.

“It has long been a dogmatic view that extinction of marine fish stocks is an impossibility,” said John A. Musick, lead author of the report. “Now we’re beginning to realize that we can drive these fish out of existence.”¹⁶⁰

The report listed 82 species and stocks of fish in North American waters as being “at risk of extinction.” Some of the species were once abundant—some of them the subject of long-established commercial and recreational fisheries.

On the East Coast, species such as cod and halibut are listed. On the

West Coast, species included lingcod, cowcod, bocaccio, giant sea bass, Pacific ocean perch, shortspine and thornyhead. West Coast fisheries face area closures for the first time, as opposed to merely establishing closed seasons and catch limits. Two vast tracts of southern California coastal waters have been declared off limits to deep-water fishing. In closing these areas, the US government was tacitly recognizing that humans are capable of wiping out entire salt-water species, rather than just individual stocks.

TECHNOLOGY: THE DESTROYER

In the second half of the twentieth century, commercial fisheries changed beyond recognition. Radar technology, sophisticated navigation equipment and the use of sonar to detect schools of specific species have all contributed to our ability to find and catch every last fish.

Factory ships are often 140m or longer, with 3,630mt capacity or more, pulling trawls with openings large enough to swallow jumbo jets. They trawl 24 hours a day. The ocean floor left behind is a desert.¹⁶¹ Schools of fish can be located by spotter aircraft, while sophisticated mapping has turned vast, uncharted

oceans into a series of small squares, allowing a fishing vessel to return time and again to within meters of a chosen location.¹⁶²

We are now capable of catching far more fish than ever before, and yet the rate of increase in global catches is continuing to decline.

BYCATCH AND WASTE

Not only are we causing severe depletions of fish stocks taken in directed fisheries, we are wasting some 35% of the fish caught.¹⁶² Marine mammals, seabirds, fish and other animals, which are accidentally caught in fisheries targeting other species are classified as bycatch. Bycatch is usually discarded at sea, sometimes still alive, more often dead or dying.

The FAO estimates that from 1988-90, an average of 27 million mt of fish per year were discarded, compared with the “usable harvest” average of 77 million mt.¹⁶²

Discarding occurs mainly in the larger commercial fisheries. Artisanal and small-scale fishermen tend to land most of their catch.

LACK OR FAILURE OF MANAGEMENT

Fisheries suffer from the “tragedy of the commons.” As the fisheries are not owned by individual fishermen



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Above right:
Wandering
albatross
drowned on
longline

Below left: Olive
Ridley turtle
caught in shrimp
fishery, India

there is little incentive to abide by regulations to protect fish which someone else will catch. One author summed up the situation noting, “One of the greatest obstacles to restoring the cod stocks of Newfoundland is an almost pathological collective denial of what has happened and the fact that the fishing industry rarely considers regulation to be its responsibility. As the industry sees it, the duty of the government is to make the rules and the duty of the industry is to navigate around them. If the stocks are not conserved, governmental mismanagement is to blame.”¹⁵⁸ The author illustrates his point with an example, “When Iceland called for larger mesh to protect their cod, the fishermen responded with more boats. When boat numbers and days at sea were restricted, fishermen switched to more efficient gear.”¹⁵⁸

Many attempts at fisheries management have been governed by politics and controlled by vested interests rather than science and conservation and have often been too little, too late. Numerous regulatory measures have been sidestepped by fishermen, with little risk of detection on the high seas.



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CAN OUR FISH STOCKS RECOVER?

Fisheries' managers often considered that if fishing effort was reduced, stocks would bounce back. However, recent research has shown that many species of marine fish are not recovering as quickly as had been predicted and that a very large proportion of species are not as resilient as previously thought.

Analysis has shown that, of 90 fish stocks for which data were available, many gadids (e.g. cod, haddock) and other non-clupeids (e.g. flatfishes) experienced little, if any, recovery as much as 15 years—approximating to three generations—after reductions in reproductive biomass of between 45% and 99%. Of these 90 stocks, 37 (41%) continued to decline after the 15-year period, 46 (51%) showed some recovery, and only seven (8%) had fully recovered.¹⁶³

THE CONSEQUENCES OF OVERFISHING

The economic and social consequences of fisheries collapse are considerable. The collapse of New England groundfish stocks, including cod, is reported to have cost US\$350 million in lost annual income and 14,000 jobs.¹⁶⁴ In the UK, the number of fishermen has fallen by more than half since 1948, with a drop of 20% in the last decade alone.¹⁶⁵

In the US, it is estimated that 300,000 jobs have been lost to overfishing. Advances in technology and efficiency have also destroyed jobs as labor intensive artisanal fishing has been replaced by capital intensive industrial methods.

It has been estimated that around 200 million people are directly employed in commercial and small-scale fisheries globally and that perhaps 500 million draw their livelihoods indirectly from the sea.¹⁵⁸

AQUACULTURE

Fish farming is often cited as the answer to declining fish stocks. However, in a recent evaluation of worldwide aquaculture, ten leading experts (ecologists, economists, fisheries and aquaculture specialists) found that, overall, fish farming may be exacerbating rather than alleviating the problem.

In 1996, aquaculture accounted for roughly 22% of global fisheries production.¹⁵⁷

Many types of aquaculture were found to be relying too heavily on feeding farmed fish with wild-caught fish. It is thought that three pounds of wild fish is required to rear one pound of shrimp or salmon.

Some aquaculture produces waste containing fish feces, antibiotics and uneaten feed, and produces a flow of untreated effluent which contributes to pollution of coastal waters.

Hundreds of thousands of hectares of coastal wetlands and mangroves—critical nursery areas for many fish and shellfish species—have been destroyed for aquaculture. Even herbivorous farmed fish species are often fed with fish oil and fishmeal from the wild.

The future of fish farming should ultimately depend upon whether bad practice can be sufficiently reduced for aquaculture to become a net contributor to the global demand for fish. At the moment, there appears to be a net deficit.



© NATURE

ATLANTIC COD

Gadus morhua

A cod can produce up to ten million eggs and stocks have been exploited commercially for centuries. In recent times, some stocks have crashed. During the 1950s, catches grew annually in the North Sea, off the coasts of Iceland and Norway and westward across the Atlantic to the Gulf of St. Lawrence and along the New England coast. However, high-powered “factory ships” with freezers heralded the decline of the Atlantic cod fishery.¹⁶¹

Cod now faces commercial extinction in UK waters.¹⁶⁵ In 1981 the North Sea cod catch was 287,000mt, falling to 86,000mt ten years later.¹⁵⁸ Cod stocks are reported to be just ten percent of their size 30 years ago. The volume of young cod, haddock and plaice produced by North Sea stocks has fallen by up to 60% during the past 40 years. In mid-2000, it appeared that the year's quota of 31,117mt would not be met, as catches up to July 13, 2000, amounted to 12,070mt because of the difficulty of finding the fish.¹⁴⁷

In the Irish Sea, cod stocks are at an historic low. The quota for 2000 was 80% lower than that set for 1999, nevertheless, catches have still failed to meet the quota.¹⁶⁵

In July 1992, Canada closed Newfoundland, the Grand Banks and the Gulf of St. Lawrence to ground fishing. Fishermen claimed that offshore trawlers had taken virtually every last cod. The prediction is that it will take 15 years with no commercial fishing to restore the fishery.¹⁵⁸

Above: Cod stocks have collapsed in many regions

PATAGONIAN TOOTHFISH

Dissotichus eleginoides

(CHILEAN SEA BASS; BLACK HAKE)

The toothfish is a very slow-growing, long-lived species, reaching maturity at 10–12 years of age. This means that, even if regulations are enforced now, the species' recovery from overfishing is likely to be a long process, estimated to take 30 years.¹⁶⁹

A deep-sea species fished to a depth of 3,500 meters, the toothfish is caught mainly in the south Atlantic and the south Indian Oceans.¹⁶⁹

Stocks show signs of being overfished in most fishing zones, and several vessels granted licenses in the Argentina zone have stopped fishing for the species, owing to small catches.¹⁶⁹

At the 1998 meeting of the CCAMLR in Hobart it was stated that it is no longer commercially viable to fish in the South African-owned Patagonian toothfish grounds, owing to depletion of stocks by illegal fishermen. This fishery had been operating for only two years.

The average size of fish landed from areas around the Prince Edward Islands is reported to have dropped from 80-90cm in 1996 to 60cm in 1997. The same applies to fish caught around Kerguelen and Crozet.¹⁶⁹

The Patagonian toothfish has suffered from massive illegal fishing during the past few years. Estimates suggest that the illegal catch in 1997 amounted to 100,000mt, with a value of more than US\$420 million.¹⁷⁰ Between 50 and 70 vessels are thought to be involved in "pirate fishing" for this species.¹⁶⁹

The illegal fishing is often carried out by vessels flying Flags Of Convenience. Pirate vessels, while often registered in Panama, Honduras, Belize and Cyprus, are usually owned by companies in Europe, the US and Japan.¹⁷⁰

However, if illegal and unregulated fishing continues, scientists predict that the Patagonian toothfish will be commercially extinct within the next two to three years.¹⁷⁰

SOUTHERN BLUEFIN TUNA

Thunnus maccoyii

The southern bluefin tuna can live for up to 40 years and can weigh as much as 200kg. Coveted for the Japanese sashimi market, one kilogram of bluefin tuna can sell for US\$100.¹⁶⁶

Numbers fell dramatically following severe overfishing in the 1960s and 1970s. The species has declined by as much as 98% since the 1950s¹⁶⁷ and has been classified by the IUCN as a critically endangered species. Australian government scientists have predicted that at the current level of fishing there is a less than 50% likelihood that the stock will recover back to 1980 levels by the year 2020.¹⁶⁷ As a result, the species has been subject to strict catch quotas.¹⁶⁶

Despite this, in 1998 and 1999 Japan took a "scientific" quota of southern bluefin tuna, in the face of strong opposition from Australia and New Zealand. In 1999, Japan sent 65 tuna fishing vessels to the west coast of Australia with the intention of catching a further 1,814mt, 25% over the established quota.¹⁶⁶

A Tribunal for the UN Law of the Sea ruled that Japan should immediately cease fishing for bluefin tuna and that any excess of its 1999 quota should be subtracted from its quota for 2000. However, a year later another Tribunal, also under the UN Law of the Sea, reversed the interim ruling.¹⁶⁸

SWORDFISH

Xiphias gladius

Swordfish, like tuna, are a highly valuable commercial species. Populations in the north Atlantic are reported to have been severely depleted and in August 2000 the US government announced measures to protect juvenile north Atlantic swordfish from fishing.¹⁷¹

In 1960, most swordfish caught in the North Atlantic weighed over 110kg. Today, three decades after the emergence of longlining, the average north Atlantic swordfish caught weighs only 40kg, which is thought to be below breeding size.¹⁷¹

The US decision will close 132,670 square miles of the Atlantic ocean to pelagic longline fishing on a seasonal basis. The closures are expected to result in a reduction of between 31% and 42% in the number of juvenile Atlantic swordfish caught by longliners.¹⁷¹

Below: A bluefin tuna can fetch US\$40,000 in Japan



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Finned whitetip reef shark. Is this the future for the world's sharks?



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