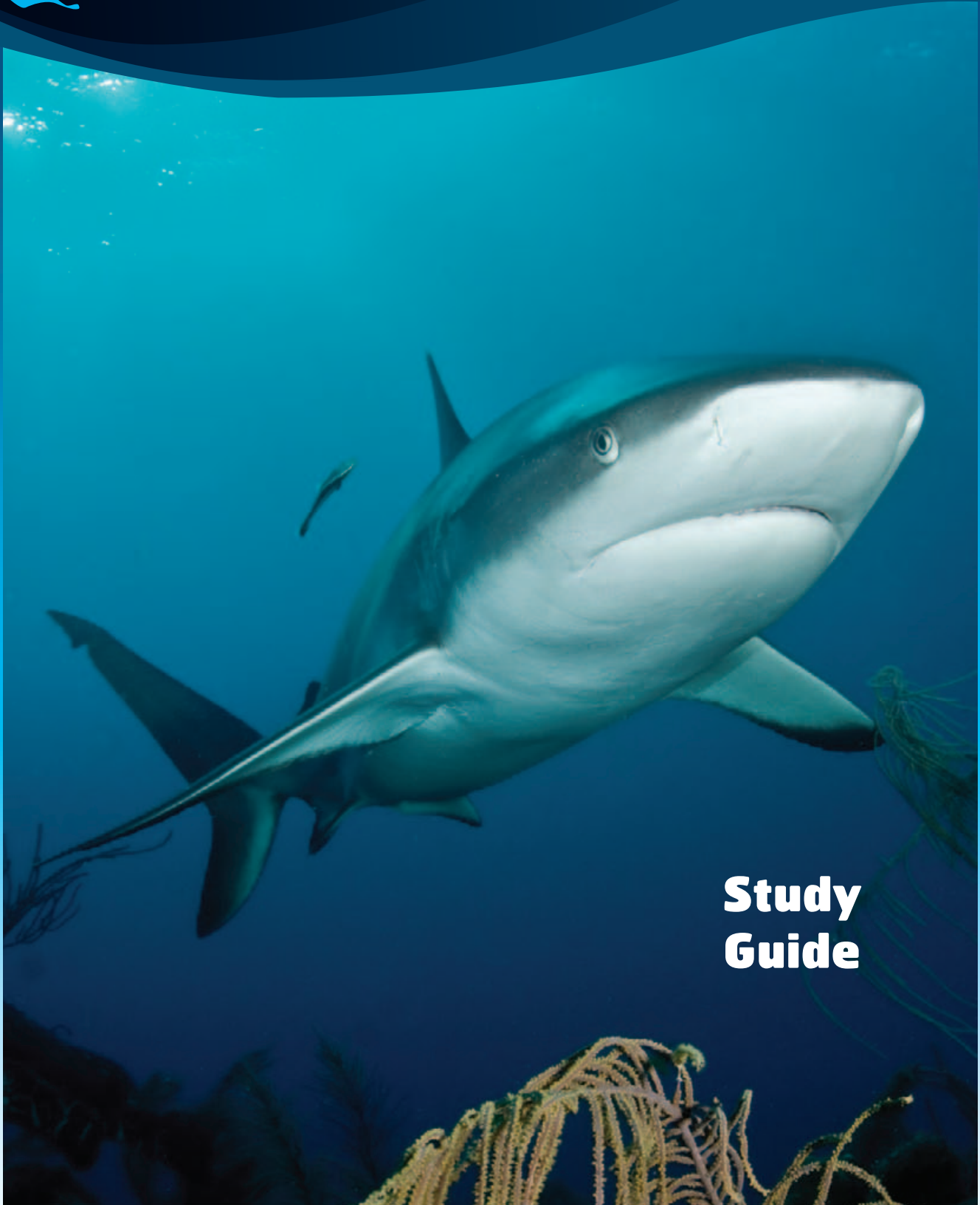




AWARE Shark Conservation

Distinctive Specialty Course



Study Guide



AWARE Shark Conservation

Study Guide

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AWARE Shark Conservation

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Let's help our friends the sharks!

Sharks are in trouble and need our help - will you help our friends the sharks?

Sharks are crucial to marine ecosystems. They maintain a balance in populations of prey species and keep the ocean healthy by removing ill or diseased animals. They are an important resource supporting local economies through fishing and as an attraction to dive tourists.

But sharks are in a global decline. Overfishing has reduced many shark populations around the world to levels that threaten their continued existence. Shark numbers have fallen by more than 80% in many cases, and the continued existence of some species is at immediate risk in some regions.

This Study Guide takes you down with the sharks. Read on to discover what makes sharks unique and find out that, despite their bad reputation, they play a crucial role in keeping our ocean healthy.

You will also discover how close we are to losing some shark species forever, but there is hope. This Study Guide takes you through the management strategies that can help protect sharks and, best of all, the many actions you can take to give sharks a fighting chance.

This Study Guide is a companion to Project AWARE's scuba dive course, the **AWARE Shark Conservation Diver Distinctive Specialty**. If reading this Guide leaves you thirsty for more shark knowledge and experience then contact your local PADI Dive Centre to participate in the dives that accompany this course. You will learn about sharks in your region and the local issues that may be harming them. Complete the course to receive PADI certification as an AWARE Shark Conservation Diver.

Not a diver? No problem! Everyone can help the sharks through their personal actions and purchase decisions, this Study Guide shows you how. However, you can also contact your local PADI Dive Centre to join an AWARE Shark Conservation course for the classroom presentation alone. You will receive a certificate of participation and who knows, perhaps be inspired to become a diver!

So read on and discover why the sharks deserve your friendship. Not just deserve: they are in desperate need of you as a friend. We hope this Study Guide will inspire you to take action, join the Project AWARE movement and become a champion for shark conservation.

Let's help our friends the sharks!



Sharks in peril and why we should care

Unique physical attributes of sharks

The first sharks appeared in the world's oceans over 400 million years ago, more than 150 million years before the first dinosaurs took to the land. Most of the modern sharks we see today first appeared around 100 million years ago. By comparison the first humans evolved only around 200,000 years ago.

Sharks occupy every marine environment from tropical coral reefs, to temperate coastal waters, to the open ocean, to the icy ocean depths. Some species also venture into freshwater such as the bull and the river shark.

Sharks have evolved into roughly 500 species and come in many sizes from the dwarf lantern shark at around 7 cm to the whale shark - the world's largest fish - that grows up to 12 metres.

We usually think of sharks as having a streamlined, torpedo shaped body with rigid dorsal and pectoral fins. Most sharks do have this form but others are quite different. For example Bullhead Sharks (Order Heterodontiformes), are chubby with large heads and horns over their eyes, while Angel Sharks (Order Squatiniformes), have flattened, disc-like bodies and look much like a ray.

Sharks eat a great variety of prey. Most sharks are

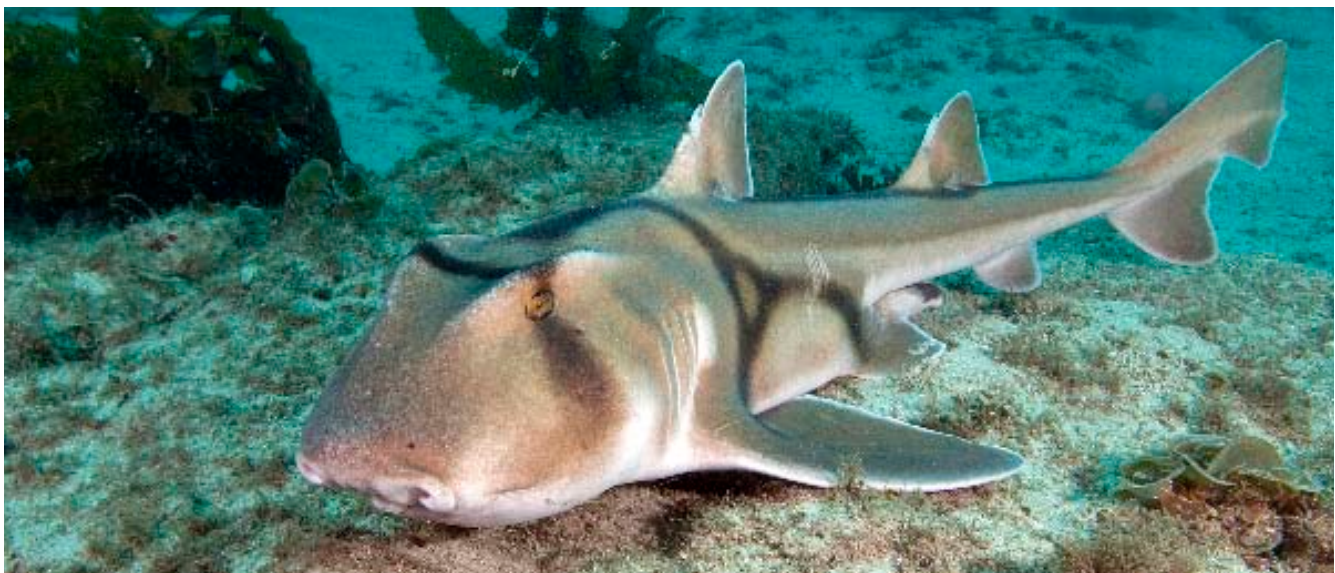
predators, but some are scavengers, while whale and basking sharks are filter feeders with eating habits similar to a baleen whale.

With so many differences between sharks, how do we tell when a fish is a shark? Scientists use a system known as taxonomy to classify species according to their unique physical attributes.

The unique physical attributes that make sharks different from fish are a skeleton made from cartilage, lack of a swim bladder, and exposed gill slits. In contrast fish have skeletons made from bone, gas-filled swim bladders to control buoyancy, and a cover over their gills.

A skeleton made from cartilage - the same substance that supports our noses - gives sharks several advantages as it is light, strong and flexible. Since sharks lack a swim bladder they have a natural tendency to sink. Their lightweight skeleton combined with a liver full of oil helps them overcome this tendency.

Sharks share these body attributes with skates and rays. Due to these shared attributes these animals are placed together in a Suborder known as Elasmobranchii.



Port Jackson shark

© Jayne Jenkins www.underwatersydney.org

Conservation status of sharks

The International Union for the Conservation of Nature (IUCN) is a leading authority on the status of the world's plant and animal species. IUCN Specialist Groups assess and classify plants and animals to identify those in danger of extinction. Their findings are published in the IUCN Red List of Threatened Species™.

Species assessed as Critically Endangered,

Endangered or Vulnerable are considered by the IUCN to be Threatened. The Red List review of 1044 sharks, rays and chimaeras found that 30% are Threatened or Near Threatened with extinction. A further 47% are categorised as Data Deficient, meaning that more information is required to place them in a threat category. Species in the Data Deficient category may be found to be Threatened once they have been assessed.

International Union for the Conservation of Nature (IUCN) Red List Review of 1044 Shark, Ray and Chimaera Species		
Critically Endangered	2%	Extremely high risk of extinction in the wild
Endangered	4%	Very high risk of extinction in the wild
Vulnerable	11%	High risk of extinction in the wild
Near Threatened	13%	Close to qualifying or likely to qualify for a threatened category in the near future
Least Concern	23%	Not qualifying as Threatened including widespread and abundant species
Data Deficient	47%	More information required for assessment

Research into certain shark species or regions has uncovered more alarming estimates:

- **One third of pelagic (open ocean) sharks and rays are threatened with extinction**
- **Hammerhead sharks have declined by 89% in the North West and Western Central Atlantic since 1986**
- **Great hammerheads have declined by 80% in the eastern Atlantic**
- **Porbeagle and spiny dogfish sharks have been reduced by 90% in the Northwest Atlantic**
- **One third of European sharks are Threatened with extinction, one of the highest levels of all assessed regions in the world**
- **14 species of Mediterranean sharks and rays are Critically Endangered**

These statistics show that sharks are in serious trouble. If we do not act quickly and decisively we risk virtually emptying the ocean of sharks. This will have devastating consequences for marine ecosystems and human society.

The Red List review of 1044 sharks, rays and chimaeras found that 30% are Threatened or Near Threatened with extinction

Life history traits that make sharks vulnerable

Most shark species are characterised by one or more life history traits that make them vulnerable to overfishing, including:

- **It takes them a long time to reach sexual maturity**
- **They have long gestation periods (one to two years)**
- **They have a small number of offspring (pups)**
- **They breed only every second or third year**

Compared to other vertebrates (animals with a backbone including mammals), sharks generally have a slow reproductive cycle. The reproductive strategy of most shark species more closely resembles those of whales, elephants and birds than other fish.

Under natural conditions this slow reproductive strategy works well for sharks as they have few predators and so have no need to rapidly replenish their numbers.

These traits work against sharks when they need to recover from overfishing or other substantial losses. A slow reproductive strategy means they are unable

to respond quickly to the removal of many individuals from a population.

For example, the dusky shark can take more than 20 years to reach sexual maturity. Most shark species give birth to between 2 and 20 pups after a pregnancy of 8-12 months, though spiny dogfish are thought to gestate for nearly two years. Females of many shark species rest between breeding cycles for at least one year.

The shark's reproductive strategy is very different to most bony ocean fish that release millions of eggs in a lifetime. As we shall see later in the course, this key difference contributes greatly to the many problems associated with shark fisheries management.

Another trait that makes some shark species vulnerable to heavy fishing is their tendency to form groups based on their age, sex and/or maturity. Large, older females of many shark species produce greater numbers of stronger pups than younger females, so the sudden removal of these older females through fishing can have serious consequences for the population.



Importance of sharks to marine ecosystems

Sharks play a crucial role in maintaining the health of marine ecosystems by keeping a balance among prey species and by removing sick, injured and diseased animals.

Sharks are often the apex predator in their ecosystem, meaning they are at the top of many food chains. As adults they have no or few natural predators.

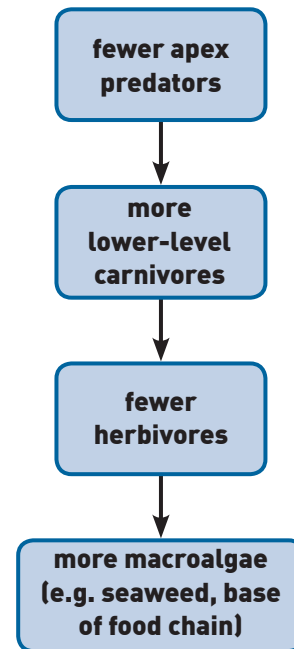
Typical traits of apex predators is that they feed on many different species and change food sources when one prey animal becomes hard to find. In this way sharks help maintain a balance that ensures no one species over-populates and depletes the species on which it feeds.

Food chains describe how energy moves among species. A typical food chain starts with plants that use the sun's energy to make their body parts. Plants are consumed by herbivores (plant eaters), who are consumed by carnivores (meat eaters). Small carnivores are consumed by large carnivores until the apex predators - the last animal in the food chain - are reached.

Most animals are links in multiple food chains within an ecosystem. Together these food chains form a complex food web that intimately links predators to prey.



Removing an animal from a food web can have repercussions throughout an ecosystem. The diagram reveals the potential impacts to a simple food chain of removing sharks from a marine ecosystem:



To see how removing apex predators affects marine ecosystems we need to study marine areas that have had little exposure to human impacts, especially fishing. Studies of remote reefs have revealed ecosystems that are very different from those we know today.

A study of reefs in the Northwestern Hawaii Islands found that apex predators, including sharks, comprise over half of the fish biomass compared to less than 10% on reefs that are fished. On the unaltered reefs the sharks are bigger and populations of all species are far greater. Additionally the unaltered reefs are home to a larger variety of other species than regularly fished reefs.

The presence of sharks can also protect seagrass beds from over-grazing by dugongs and green sea turtles. These animals prefer to eat in the middle of a sea grass bed where the quality of food is the highest. But it is harder for them to escape a hunting shark from the middle of a large seagrass bed, so they stay on the outside when sharks are present. Seagrass beds are an important habitat for many fish and invertebrate species.

Managing threats and recognising values

Major threats contributing to declines in shark populations

Overfishing is the main cause of the rapid decline in shark populations. It is mostly due to overfishing that many shark species are threatened with extinction.

Sharks are caught in targeted fisheries and as bycatch (see page 12). Demand for high value fins, the primary ingredient for Asian shark fin soup, is a main driver of shark fisheries, but demand for shark meat, particularly in Europe, is also strong and has led to serious depletion of several shark populations.

Sharks are caught by countries from all around the world. The top 20 shark catching nations account for nearly 80% of the annual reported shark catch. The top four shark fishing countries account for more than 35% of the annual reported take.

Some of the many uses of shark body parts are:

- **Shark fins for shark fin soup in Asia and many other countries**
- **Spiny dogfish meat is popular in Europe, often used in *fish and chips* in the United Kingdom and smoked to create *Schillerlocken* in Germany**
- **Porbeagle meat is prized as *veal of the sea* in France**
- **Mako, thresher and blacktip shark steaks are popular in America**
- **Meat from Greenland and basking sharks is used to produce *hákarl*, a traditional delicacy of Iceland and Greenland**

- **Shark is known as *flake* in Australia and often used in *fish and chips***
- **Products called *fish* may contain shark, such as *fish fingers***
- **Shark liver oil has many industrial uses**
- **Shark skin is a delicacy in many cultures and is used to make leather products**
- **Shark liver oil and shark cartilage are said to have health benefits, though their benefits are unproven**
- **Shark jaws and teeth are sold as souvenirs**

It is mostly due to overfishing that many shark species are threatened with extinction

The top 20 shark catching nations in order of size of catch, greatest take first

Rank	Country	Rank	Country	Rank	Country	Rank	Country
1	Indonesia	6	Mexico	11	Thailand	16	Portugal
2	India	7	Pakistan	12	France	17	Nigeria
3	Spain	8	USA	13	Brazil	18	Iran
4	Taiwan	9	Japan	14	Sri Lanka	19	UK
5	Argentina	10	Malaysia	15	New Zealand	20	S Korea

Source: *The Future of Sharks: A Review of Action and Inaction*

Major threats contributing to declines in shark populations

Estimating how many sharks are killed in fisheries every year is difficult for several reasons. Fishing nations have different reporting requirements and capacity, or none at all. For example, most countries fishing sharks in the Indian Ocean do not report their catches properly if at all. Reported totals do not usually include bycatch, illegal fishing, or sharks taken by small scale fishing (traditional, artisanal and/or subsistence) and recreational fishing.

The FAO reports that commercial catches of sharks, rays and chimaeras have declined from a peak of 0.9 million tonnes in 2003 to 0.75 million tonnes in 2006. It is unknown whether this is due to improved management of shark fisheries or decreasing shark

populations through overfishing or a combination of both.

Other reports have revealed that the FAO figure is a serious underestimate. A study that analysed shark fin trade records estimated that the weight of sharks killed annually to support the global shark fin trade is between 1.21 and 2.29 million tonnes with a median of 1.70 million tonnes. This is equivalent to between 26 and 73 million sharks killed every year with a best estimate of 38 million individual sharks.

The report warns that actual global shark mortality is higher as this figure does not include sharks killed for the fishing country's domestic fin market, sharks discarded dead at sea, or sharks used only for their meat.



Soup fin and cow sharks piled up on a dock

© Fiona Ayerst/Marine Photobank

Shark Fin Soup

Shark fin soup is a status symbol in Chinese culture as historically it was a dish reserved for the Emperor. Today serving shark fin soup to your guests demonstrates that you think highly of them, and that you have great personal wealth.

But the demand for shark fin soup is fast outpacing supply. Rapidly growing populations and rising incomes means many more people can now afford shark fin soup. Demand for shark fins is driving the global depletion of shark populations as fishers from all countries learn of the opportunities for profit.

Shark fins are among the world's most valuable fisheries products. Processed shark fins can cost hundreds of dollars per kilogram compared with US\$1 to US\$10 per kilogram for shark meat depending on species. A bowl of soup can sell for as much as US\$100.

Shark fins add texture to soup rather than flavour. Many chefs use chicken soup as a base for their shark fin soup.

Major threats contributing to declines in shark populations

Dried Shark Fin Market

© www.silentreef.com.au



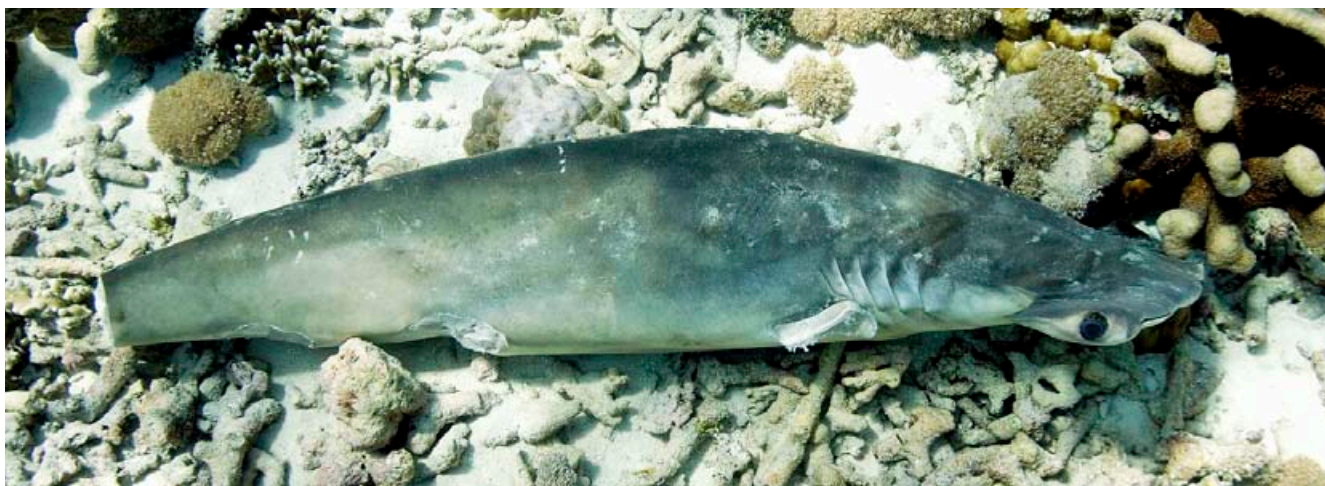
Shark Finning

Shark finning is the practice of removing a shark's fins at sea and discarding the body overboard. Sharks are frequently finned while still alive.

Why do fishers go to the trouble of catching a shark only to throw most of it away? The answer lies in the high value of shark fins. Shark fins are among the world's most valuable fisheries products while shark meat is generally much less valuable. So the temptation is strong for fishers to throw the bulky

shark carcasses overboard leaving room in the ship's holds for more shark fins or more valuable species such as tuna and swordfish.

Shark finning has been banned by many countries, though international trade in shark fins is allowed for most species. Because finning happens out at sea where monitoring is generally poor and fishing regulations are lacking or weak, the practice of finning continues.



Finned Shark

© Nancy Boucha, www.scubasystems.org 2005/Marine Photobank

Major threats contributing to declines in shark populations

Bycatch

Fishers use a variety of methods to catch fish; most of them result in bycatch. Bycatch refers to the part of a catch that is not the target species or is undersized. Bycatch can not be landed in many regions depending on local regulations and how strictly they are enforced. When bycatch can not be landed or is not wanted it is dumped overboard, sometimes live, sometimes dead or dying.

Bycatch includes sharks and bony fish as well as dolphins, whales, turtles, invertebrates and seabirds. Bycatch accounts for the majority of the total catch in some shrimp trawl fisheries.

Tens of millions of sharks are killed as bycatch every year. Discarded bycatch is rarely accounted for in fishery records so these shark deaths are missing from official statistics.

Shark finning is to remove a shark's fins at sea and discard the body overboard



Fishing bycatch dumped overboard

© Naomi Blinick/Marine Photobank

Major threats contributing to declines in shark populations

Other Impacts

Many human activities on land have a negative effect on sharks, particularly reef and coastal species. Scientists warn that 75 percent of the world's coral reefs are threatened from local pressures such as coastal development, pollution and overfishing, combined with the impacts of rising sea temperatures caused by increased concentrations of CO₂ and other greenhouse gases in the atmosphere. One fifth of the world's mangroves have been removed since 1980 for land reclamation projects and aquaculture farms.

Coastal development can damage important shark habitats and nurseries. Mangroves, estuaries and salt marshes provide important habitats for sharks to give birth and mature. These areas are rapidly being destroyed in mankind's rush to accommodate a growing population.

Coastal development in Southern California



© Wolcott Henry 2005/Marine Photobank

Marine debris - the rubbish we allow into the ocean - kills and injures sharks through entanglement or because they eat it. Ghost nets - fishing nets that have been accidentally lost or purposefully dumped at sea - also contribute to the annual shark death toll.



© Jane Dermer/Dhimurru Aboriginal Corporation,
Courtesy of GhostNets Australia

Other impacts include swimmer protection devices such as beach nets and drumlines with baited hooks used in Australia and South Africa. These devices kill sharks including species that are of no threat to humans, as well as many other marine animals such as dolphins, rays and turtles.

Key management strategies that can protect sharks

Sharks need protection - from us! Many shark species migrate over great distances; they cross international boundaries and move from areas of high protection to areas of no protection. Effective shark management strategies needed to make shark fisheries sustainable include:

- **Well-enforced, science-based catch limits**
- **Conservation measures consistent throughout the range of each species.**
- **Being based on scientific advice and the precautionary approach**
- **An aim to minimise waste**

Following are some of the management strategies that can help protect sharks.

International Plan of Action-Sharks (IPOA-Sharks)

The 1999 United Nations Food and Agriculture (FAO) International Plan of Action for Sharks (IPOA-Sharks) was a significant step toward encouraging management of shark fisheries. It calls on each shark fishing nation to develop and adopt a National Plan of Action (NPOA) for the conservation and management of sharks.

NPOAs are intended to make shark fisheries sustainable by:

- **Assessing threats such as overfishing**
- **Protecting critical habitats**
- **Minimising waste and discards (e.g. finning bans)**
- **Encouraging the full use of dead sharks**

All members of the FAO's Committee on Fisheries (COFI) agreed that all relevant fishing nations should implement a Shark NPOA by 2001. However this process is voluntary and as of January 2011 only 13 of the world's top 20 fishing nations had a Shark NPOA in place.

It is impossible to speculate about the status of national and international shark fisheries management had the IPOA-Shark not been developed, however reports published in 2011 revealed that a country that has a NPOA in place does not necessarily have sound shark fisheries management.

The IPOA process has been very slow, but this instrument has raised the profile of sharks and their plight, and has led to helpful guidelines and a source of assistance for countries with the political will to manage their shark fisheries.



Bull shark caught in net

© Fiona Ayerst/Marine Photobank

Key management strategies that can protect sharks

Regional Fisheries Management Organisations (RFMOs)

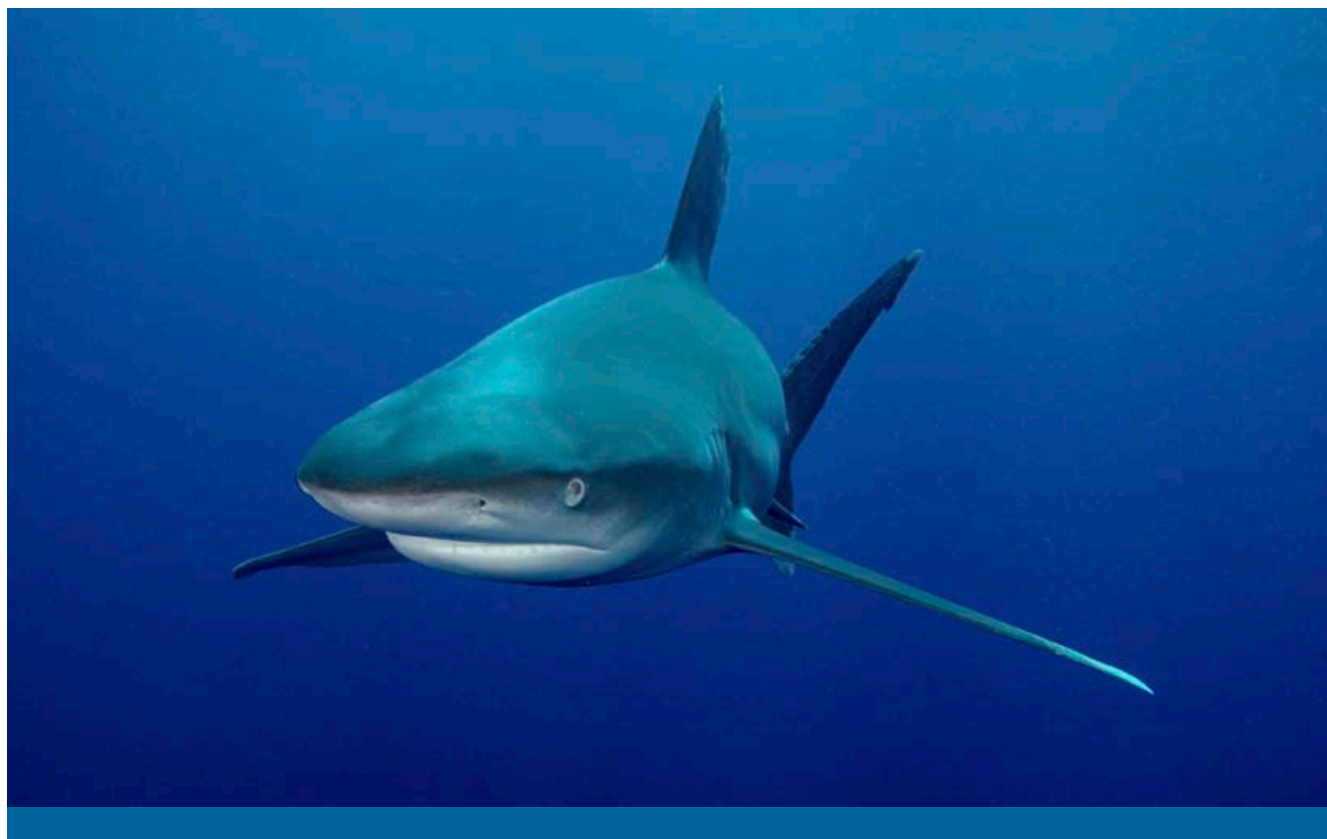
RFMOs facilitate the management of multi-nation fishing of shared fish-stocks taken from international waters or highly migratory species. RFMOs aim to conserve fish populations through cooperative agreements on vessel-monitoring, area management, and fishing limits.

RFMOs have been slow to address shark overfishing, and their record is also generally poor in conserving species that are the focus of traditional fisheries management, such as tuna, swordfish, billfish, groundfish and shrimp.

As explained earlier, the life history of sharks differs greatly from other fished species. Sharks warrant a particularly precautionary management approach based on their slow reproductive strategy. However, because sharks have traditionally not been as

valuable as other fish, information on their life cycles and catch records are lacking. These issues should be addressed in Regional Plans of Action for sharks which are also recommended under the IPOA. As of 2011 no RFMO has developed such a plan.

Most RFMOs have banned shark finning (see page 16) but have not set any international shark fishing quotas for the high seas. The International Commission for the Conservation of Atlantic Tunas has adopted bans on the retention and sale of bigeye thresher and oceanic whitetip sharks along with some limits on hammerhead shark fishing. The Indian Ocean Tuna Commission has prohibited the retention of all thresher shark species, but this measure has yet to be implemented by the vast majority of member countries.



Key management strategies that can protect sharks

Finning Bans

Most RFMOs and nearly 30 countries including the USA and the Member States of the European Union have adopted finning bans. Finning bans do not stop sharks from being caught; instead they aim to ensure that fishers do not dump shark carcasses overboard after removing the fins.

Finning bans work by stipulating a maximum fin-to-carcass weight ratio that must be maintained onboard a fishing boat. If fishers dump shark carcasses overboard after removing the fins, the weight of fins will be too high compared to the weight of carcasses.

The IUCN has recommended that fin to carcass ratios should not exceed 5% of the dressed weight of shark carcasses. Dressed carcasses are those that have had their heads and guts removed. Using the whole weight creates a loophole through which an estimated two to three sharks could be finned for every one kept.

In order to match differing standards among member countries, RFMO finning bans do not currently

stipulate whether their ratio refers to the dressed or whole carcass weight. The European and Brazilian finning bans specify a ratio of 5% of the whole weight, thereby lowering global standards and setting a bad example for other countries.

Another major loophole in the European finning ban is that it allows fins to be landed at separate ports to carcasses, making it hard to enforce the ban.

The IUCN, conservation groups and most scientists agree the most effective way to enforce finning bans is to require that carcasses are landed with fins naturally attached. Fins can be partially cut for ease of storage. This arrangement also makes it easier to collect much needed species-specific shark catch data, as sharks are easier to identify with their fins attached.

If properly enforced, finning bans can dramatically reduce waste and shark mortality while more rigorous fishing limits are developed.



© Phil Simha

Finning bans do not stop sharks from being caught; instead they aim to ensure that fishers do not dump shark carcasses overboard after removing the fins

Key management strategies that can protect sharks

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES is an international agreement among the governments of 175 member countries that helps to regulate international trade in more than 30,000 species of threatened animals and plants. CITES can provide protection for sharks by regulating or banning international trade.

CITES provides three levels of protection for listed species. The highest level is Appendix I, which essentially bans international commercial trade. Appendix II requires that trade is monitored, which can result in controls being put in place if trade is found to be detrimental to wild populations. Most CITES-listed species are included under Appendix II.



Whale shark and diver

CITES is a strong conservation agreement because it is binding on member countries. Countries can give heavy penalties to people found smuggling listed animals or plants across international borders.

Member countries have shown considerable resistance to listing marine species including sharks under CITES, especially species that are commercially valuable. Two thirds of member countries must vote for a species to be listed under Appendix I and II, and too often economic interests win over environmental concerns. As of 2011 only three shark species are included under CITES, all under Appendix II:

- **Basking Shark (2002)**
- **Whale Shark (2002)**
- **Great White Shark (2004)**

Countries can officially register a reservation on a species listing so that it does not apply to them. A handful of countries have registered reservations on the above sharks.

Proposals to list spiny dogfish and porbeagle sharks under Appendix II were defeated at CITES conferences in 2007 and 2010, and proposals to list hammerheads and oceanic whitetip sharks under Appendix II were rejected in 2010.

Member countries have shown considerable resistance too often economic interests win over environmental concerns

Key management strategies that can protect sharks

Marine Protected Areas (MPAs)

Marine Protected Areas are spaces in the ocean where human activities are more strictly regulated. MPAs can protect marine life from extractive industries such as fishing, mining and collecting for the aquarium trade. MPAs are known by a variety of names such as marine parks, aquatic reserves, marine reserves and sanctuary zones.

MPAs provide different levels of protection depending on how they are established. Some MPAs are fully protected no-take zones where all extractive activities are banned, while others allow for multiple uses through a system of zoning. Both systems have their merits, but the IUCN suggests that large, multi-zoned MPAs may provide greater protection than smaller no-take areas.

Studies have shown that protecting bony fish in MPAs allows them to recover from overfishing and results in more fish in surrounding areas. MPAs have also been shown to bring economic advantages to adjacent communities through marine tourism. Despite this only around 1% of the world's ocean is protected by MPAs; and less than one tenth of a percent of these MPAs are fully protected no-take zones.

To be effective for shark conservation, MPAs need to be positioned over key shark habitats such as places where sharks congregate to mate or nursery grounds where females give birth.

MPAs work best for sharks that have a limited range and so do not regularly swim outside of the protected

area. They can be effective for migratory shark species when they are part of a greater network of MPAs designed to provide protection over the range of habitats through which the sharks migrate.

Dive tourism is creating an incentive for many countries to protect sharks in shark sanctuaries. Palau banned shark finning and commercial shark fishing within 50 nautical miles of its shores in 2003, then extended these protections in 2009 making its entire ocean territory a shark sanctuary. In 2010 the Maldives increased existing shark fishing bans to include their entire ocean territory. In 2011 the Bahamas and Honduras both declared their territorial waters to be shark sanctuaries, in recognition of the value of sharks to the environment and the economy.

Creating effective shark sanctuaries is a challenge. Management, monitoring and enforcement require extensive effort and funding. Host governments need to patrol large areas to enforce the rules and punish violators. In addition, commercial and artisanal fishers should be compensated or provided with alternate sources of income for shark sanctuaries to be successful.

Dive tourism is leading to local and even national protection for sharks, but tourism-driven shark protection should always be backed up with better fisheries management and enforcement of regulations.



Key management strategies that can protect sharks

Illegal, Unreported and Unregulated (IUU) Fishing

Fisheries management failures result in what is known as Illegal, Unreported and Unregulated fishing.

A major driver for illegal fishing of sharks is the high value of their fins. Requirements for sharks to be landed with their fins naturally attached hold promise to reduce illegal finning.

Most of the world's shark fisheries are loosely managed or completely unregulated. Therefore the level of illegal shark fishing may not be very high; not necessarily because fishers don't break the rules, but because there are few rules to break.

For example there are no EU or international catch limits on mako and blue sharks, the main shark species targeted by fishers from Spain, which ranks among the top five shark fishing nations in the world. The top two shark fishing nations – Indonesia and India – do not impose any shark catch limits on their large fleets of small-scale fishers.

The lack of species-specific reporting of shark catch is a huge hindrance to shark population assessments and conservation worldwide.



Bull sharks with diver

© Fiona Ayerst/Marine Photobank

Value of sharks to local economies

Sharks provide economic benefits to countries and to local communities as a source of food and as tourist attractions.

Sharks provide an income or protein for many people and will continue to do so if fished at a sustainable level. The problem is not that we are fishing for sharks; the problem is that in most cases we are overfishing sharks.

Some populations of sharks are valuable as a tourist attraction. Sharks repeatedly rank number one in surveys of the marine animal that dive tourists most want to see. Studies have shown that live sharks close to tourism centres can have a far greater economic value to a country over a longer period of time than the one-time value of selling their fins and meat.

In Palau sharks are estimated to bring \$18 million per year into the economy through dive tourism. One reef shark over its lifetime will earn the country an estimated US\$1.9 million compared to a one-off income of US\$108 when fished.

In the Maldives each live grey reef shark is worth an estimated US\$3,300 per year through dive tourism and as much as US\$33,500 at the most popular sites. The same shark has a one-off value of US\$32 when fished.

In the Bahamas sharks have brought an estimated US\$800 million into the economy through tourism over a twenty year period. A single reef shark is estimated to be worth US\$250,000 over its lifetime. If fished the same shark would earn only US\$50-60.

Global whale shark tourism was valued at US\$47.5 million in 2004. In The Canary Islands shark and ray tourism supports an estimated 429 jobs and earns the region an estimated €17.7 million annually. In South Africa diving with great white sharks brought in US\$4.1 million in 2003 and diving with tiger sharks earned US\$1.8 million in 2007.

Dive tourism can improve people's appreciation of sharks and turn them into advocates for shark conservation. This can lead to improved protection for shark species not usually associated with diving, such as those in international waters.



**The problem is not that we are fishing for sharks;
the problem is that in most cases
we are overfishing sharks**

Removing common misperceptions of sharks that are a barrier to conservation

Sharks have an undeserved reputation of being mindless killers. They are often portrayed as man-eaters that show no mercy and should be given no mercy. Media outlets often feed the public's fears by sensationalising shark attack stories.

Humans have long feared being attacked by sharks but it was the 1975 film *Jaws* that first portrayed sharks as vengeful hunters of humans. *Jaws* triggered an unprecedented retaliation on sharks as people around the world took it upon themselves to make the seas *safer* by killing sharks.

One of the barriers to gaining greater protection for sharks is overcoming public perceptions that sharks do not deserve to be protected. Since the release of *Jaws* many conservationists, including the story's author Peter Benchley, have worked hard to restore the shark's reputation.

A clear understanding of the likelihood of being attacked by a shark is a first step to overcoming our misperceptions. The International Shark Attack File (ISAF) is a compilation of all known shark attacks. In 2010 ISAF reported 79 unprovoked shark attacks on humans, only six of them were fatal.

ISAF states that shark attacks have levelled off over the last 30 years to an average of 63.5 per year, but notes that the rapidly growing human population could be masking a drop in shark attacks. Each year there are more people in the water and so there should be more shark attacks. ISAF states that falling shark populations could partly explain why shark

attacks have not become more frequent with the growing human population.

Poor knowledge of the great variety of shark species is another barrier to protecting them. Of roughly 500 species only about ten are implicated in unprovoked attacks on humans. Bull, tiger, and white sharks are responsible for most attacks. The majority of shark species have never bitten a human.

Sharks are often thought of as man-eaters. In fact it is rare for a shark to attack a person and even rarer for a shark to eat a live human. Most shark attacks on humans are thought to be mistakes or explorations. These attacks consist of an exploratory bite during which the shark discovers we are not their normal food. In most cases the shark then leaves the victim unmolested. The unfortunate reality is that one exploratory bite from a large shark can be fatal. Still, it is clear that under normal circumstances sharks do not seek humans to eat.

Another way of clearing our perceptions is to understand that when we swim in the ocean we are entering the shark's home. Few would be surprised or outraged if someone walking across the Serengeti in Africa was attacked by lions. Yet, when a swimmer is attacked by a shark it often provokes a great backlash. But the ocean is the shark's home just as much as the Serengeti is the lion's home. We need to understand that when we are in the water we are in the shark's environment, not ours. We are free to take the risk if we choose, but we shouldn't blame the shark if an incident occurs.



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Taking action and joining the Project AWARE movement

Personal actions you can take to protect sharks

You have learned a great deal about the damage being done to shark populations. Now is your chance to help protect the sharks. Following are actions you can take for sharks. Get involved in these activities and encourage other people to join you.

Everyday Actions

Get involved

- Support Project AWARE's work that seeks greater protection for sharks
www.projectaware.org/project/sharks-peril
- Find resources here
www.projectaware.org/category/resource-zone/sharks

Make personal changes to protect sharks

- Write a personal pledge or action plan on how you will protect sharks in the future

Join campaigns

- Write a letter to your country's Fisheries Minister and Environment Minister letting them know you support shark conservation

Support Marine Protected Areas

- Read about Project AWARE's involvement in marine park campaigns
www.projectaware.org
- Research marine park campaigns in your area and support them. Register for online newsletters, sign petitions and make public submissions. You have a powerful voice in persuading politicians to act.

Tell others

- Spread the word about the importance of shark conservation
- Encourage friends to take this course
- Share with others everything you learned in this course
- Tell your shark conservation stories through Project AWARE's My Ocean or other online networks such as Facebook and Twitter

Respond to alarmist media stories

- Write to the editor to correct factual errors and ask for balanced reporting

Support Project AWARE

- Join the Movement - join thousands of divers around the world protecting our ocean planet – one dive at a time. Visit www.projectaware.org to join the movement.
- Donate to support a clean, healthy and abundant ocean
www.projectaware.org/donate

Personal actions you can take to protect sharks

Tread lightly on the planet

- Reduce and offset your carbon emissions
- Rethink, reduce, reuse and recycle

Purchase Decisions

If you choose to eat seafood

- Only eat seafood, including shark meat, from sustainable fisheries and organically certified aquaculture
 - See links to sustainable seafood guides for many countries in Resources
- Find out which seafood products contain shark and avoid them
- Look for eco-labels on fish products such as Dolphin Friendly or Marine Stewardship Council
- Let restaurant owners know you only eat seafood from sustainable sources

Choose not to eat shark fin soup

- Let restaurant owners know you will not eat in their restaurant if they have shark fin on the menu

Avoid purchasing items that contain shark products

- Includes souvenirs, medicines, leather goods, jewellery, shark oil and others
- Tell store owners about the issues and why you refuse to buy these items

Support genuine ecotourism operations

- Stay at locally owned resorts and use locally owned businesses so that more of your money stays in the country and supports the local economy. This reinforces the value of natural assets that attract tourists, such as sharks.
- Look for resorts that treat sewage and wastewater and dispose of rubbish properly

Be an AWARE Diver

Make your dives count

- Use your diving skills to increase knowledge of impacts to the marine environment
- Participate in Project AWARE's Dive Against Debris survey
- Monitor coral bleaching through the CoralWatch program

Be an AWARE diver

- Follow Project AWARE'S *Ten Ways A Diver Can Protect The Underwater Environment* and *Ten Tips for Underwater Photographers*
- Choose to dive with operators who use moorings or drift dive techniques rather than anchors



Find the conservation status of your local sharks

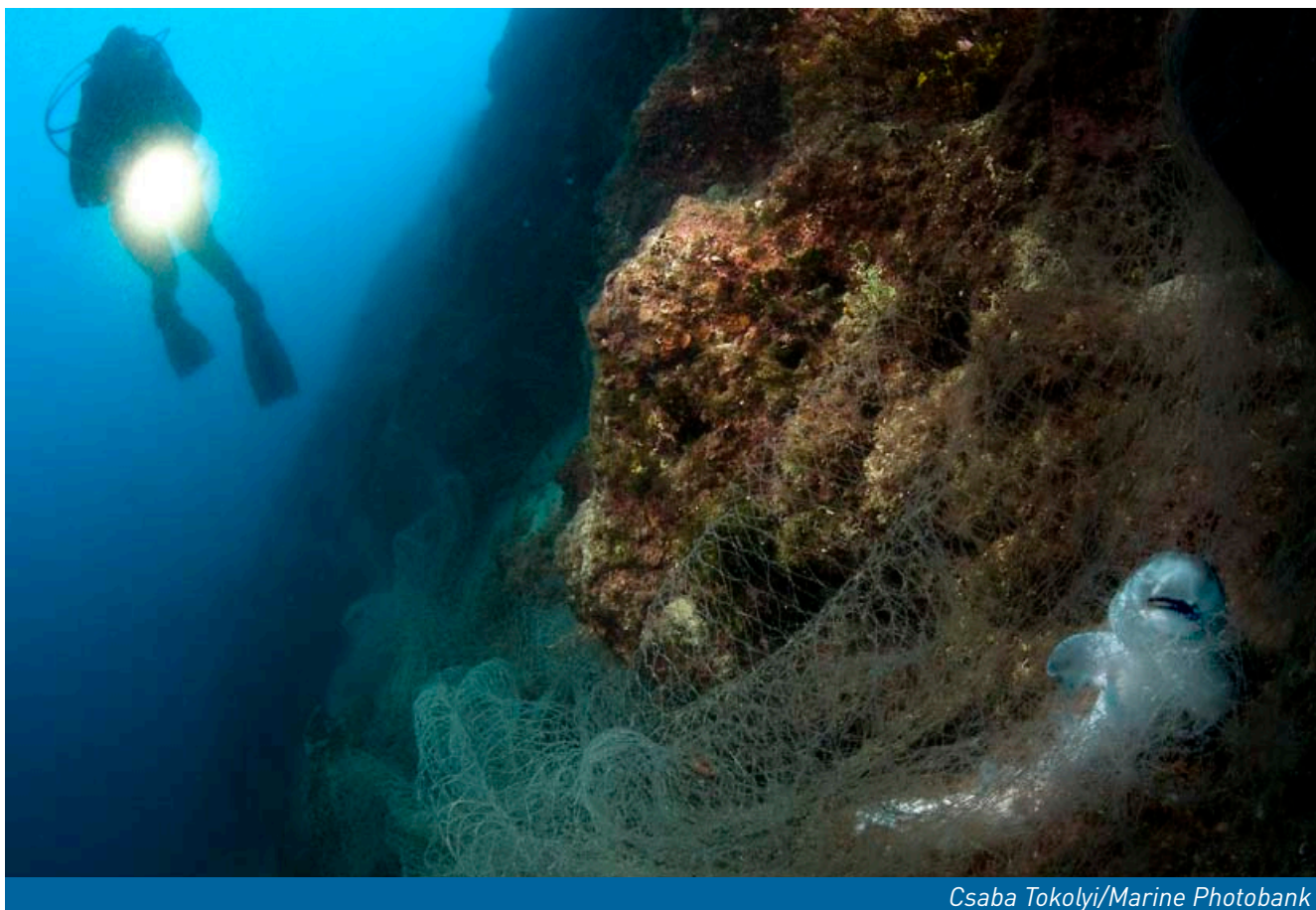
You can find the conservation status of sharks in your local area or at your dive destination by searching the IUCN Red List of Threatened Species: www.iucnredlist.org/

Search the database using the scientific name or common name. You are more likely to find the shark you are looking for by using the scientific name. You can retrieve a list of all included sharks by typing the word “shark” into the search field.

Discover the sharks in your region

Want to know more about sharks in your region or at your travel destination? Then contact a PADI Dive Centre to complete your **AWARE Shark Conservation Diver Distinctive Specialty Course**. Your PADI Instructor will introduce local sharks and tell you about their conservation status. During your training dives you will use the **AWARE Shark Conservation Guide To Impacts on Sharks** to appraise the location for potential impacts on sharks or features that may help protect sharks. If sharks are seen during your training dives you will identify them by species name.

The AWARE Shark Conservation program is also available to **non-divers**. You will learn about local sharks and how you can help reduce impacts. You may complete a land-based appraisal of impacts using the **AWARE Shark Conservation Guide To Impacts on Sharks**. Complete the program to have your achievement recognised with an **AWARE Shark Conservation Program Participation Certificate**. Contact your local PADI Dive Centre for details.



Csaba Tokolyi/Marine Photobank

Join the global movement of Project AWARE divers

Project AWARE Foundation is a global movement of scuba divers protecting the ocean planet - one dive at a time. Focused on the critical issues of Sharks in Peril and Marine Debris, Project AWARE empowers thousands of divers in more than 180 countries to work together for a clean, healthy and abundant ocean planet.

Project AWARE's powerful movement for ocean protection starts with you.

Join the Movement

The ocean is fighting for its life. But divers are a powerful, growing force who can give the ocean a big voice. Divers are acting in their own communities and favourite dive sites every day to tackle impacts on the marine environment.

Visit www.projectaware.org and join the movement to discover actions and opportunities to support ocean protection in your local community and on a global scale.

Battle the Big Two

Divers around the world are focussed on two major ocean protection issues:

- **Shark decline, and**
- **Marine debris, or rubbish in the ocean**

Project AWARE is zoning in on these two issues where scuba divers are uniquely positioned to make long-term change. Project AWARE is tackling these issues on three fronts: ongoing underwater action, leading grassroots change and influencing effective environmental policies.

Many shark populations are on the brink of collapse and a growing number of AWARE divers will no longer stand for unsustainable fishing practices. You can help by telling others about this shark conservation course, frequently checking the shark *Issues & Projects* pages on Project AWARE's website, spreading the word and taking action.



Dive Against Debris

© Mayan Divers, Honduras

Project AWARE's powerful movement for ocean protection starts with you

Join the global movement of Project AWARE divers

Divers are critical to addressing marine debris issues underwater. Cleanups are important community actions but they're not the only answer. You can help by reporting data about the debris you find underwater through Project AWARE's **Dive Against Debris** program. Your involvement will shine a light on debris issues and help reduce its devastating impacts on marine life. Project AWARE has the tools and training to get you started.

My Ocean

My Ocean is Project AWARE's unique eco-networking site where dive centers and AWARE leaders are taking action for ocean protection. Here, they manage local conservation events, report data and connect

with passionate volunteers like you. You can explore My Ocean by creating a profile, volunteering for events and finding like-minded dive buddies in your community.

Be an AWARE Diver

Visit www.projectaware.org to find the latest calls to action, petitions and activities centered on our ocean planet. Think ocean protection every time you dive and report the data that is so important for our cause.

Together, we can re-think what's possible and share a positive vision for our ocean future. Join the movement to protect our ocean planet – one dive at a time - www.projectaware.org

Your Profile

Your Blogs

Create your own My Ocean profile and join the global movement of divers caring for our ocean

View Edit Account Settings Edit My Ocean Find Divers Glogya User Info (debug)
File browser Invite Divers to Join AWARE Signups Friends' Activity My Activity Devel

NAME: David Roe
LOCATION: Sydney, NSW Australia
33° 49' 27.2026" S, 151° 16' 36.9552" E
See map: [Google Maps](#)

MEMBER TYPE: Individual
WEBSITE: Website

BIO: I am Marine Conservation Officer for Project AWARE in the Asia Pacific region. I develop science and advocacy based programs for divers and am fortunate to assist many divers and dive centres across Asia Pacific with their conservation projects. Previously I managed sea turtle conservation programs and organised marine conservation projects including a survey of marine fish with volunteer divers. Before this I managed dive operations in Vanuatu and Fiji. My passion and fears for marine environments can be found on my website. www.silentreef.com.au

MY BLOG ENTRIES

Submitted by [David Roe](#) on Aug. 14/11
Sydney Dive(Against Debris)Academy
Last weekend it was my pleasure to Dive Against Debris with club members from Sydney Dive Academy. We did our dive at Bare Island in south Sydney, a site famous for its bright sponges and warty seadragons, though much more famous for being where they filmed the final action scenes in Mission Impossible II.

Submitted by [David Roe](#) on Aug. 12/11
Divers to protect grey nurse sharks
Grey nurse sharks are big, beautiful and mostly harmless. And in NSW, Australia they are also critically endangered. With so few along the east coast of Australia every one is precious. But the NSW Government has just lifted restrictions on types of fishing designed to protect grey nurse sharks.

PROFILE ADMINISTRATION

- Manage relationships
- Create a new Blog Entry
- To edit a Blog, find it in your Blog listing click it, and click the "Edit" tab
- Create a new Image Gallery
- Edit Image Galleries
- Create a new Event/Action
- Manage Events/Actions
- Create a new Video
- Edit Videos
- View your Diver Profile
- Logout
- Moderate Content
- Moderate Actions

UPCOMING ACTIONS

No actions found.

DIVE BUDDIES [SEE ALL](#)

- Lucanna Paydel
- ATLANTIS BALI
- Tiffany Williams
- Danika Wuehheim
- Ratukiri
- Sarah Ann Wormald

BLOG [SEE ALL](#)

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Responsible Environmental Guidelines for Diving With Sharks

Note: these environmental guidelines do not provide safety guidelines for diving with sharks. Following these environmental guidelines will enable you to minimise your impacts on sharks when diving with them. These guidelines do not, and are not intended to, eliminate the risks of diving with sharks. Always seek safety advice from a dive professional familiar with sharks found at the dive site before diving with sharks.

When diving with sharks avoid actions that may disrupt natural behaviour or damage the environment. When you see sharks they may be feeding, resting or courting. Disrupting these natural behaviours may affect their health or interrupt an opportunity to reproduce, and may subject divers to risk of serious injury or death.

Follow these environmental guidelines when diving with sharks:

- **Be an AWARE diver:**
 - Follow AWARE's *Ten Ways A Diver Can Protect The Underwater Environment*
 - Follow AWARE's *Ten Tips for Underwater Photographers*
 - Complete further training such as Peak Performance Buoyancy or Underwater Naturalist courses to improve your skills and expand your knowledge of underwater environments.
- **Do not block their movement by swimming in front of them, allow them to move away**
- **Do not block their exit if they are inside a cave or overhang**
- **Do not descend on top of sharks**
- **Do not get close to sharks**
- **Be familiar with and follow local regulations and protocols**



AWARE Shark Conservation Guide to Impacts on Sharks

Use this guide to assess your dive location for features and characteristics that may have negative or positive impacts on sharks. This exercise need not be limited to the dive site; it can take place in as broad a geographic region as you choose. These are only some of the potential impacts to sharks; add additional impacts to this list that are found in your location.

Positive Impacts	How
Marine Protected Areas	<ul style="list-style-type: none"> • No-take MPAs give sharks a safe haven to replenish their populations
National Parks	<ul style="list-style-type: none"> • National Parks that protect coastlines also protect mangroves and other key shark habitats
Sewage and wastewater treatment plants	<ul style="list-style-type: none"> • Reduces the amount of nutrients entering the water
Waste management facilities	<ul style="list-style-type: none"> • Gross Pollutant traps prevent rubbish/litter in streams and stormwater drains from entering the ocean
Litter education programs	<ul style="list-style-type: none"> • Reduction in public littering on land leads to less marine debris
Dive tourism	<ul style="list-style-type: none"> • Places an economic value on protecting some shark species • Increases public awareness of shark threats and builds a desire to protect sharks • Builds an incentive for countries to create shark sanctuaries
Ecotourism	<ul style="list-style-type: none"> • Reduced environmental impacts through waste reduction and sewage management • Tourism revenue remains in the host country thereby reinforcing the value of natural assets • Educates guests about conservation issues
Conservation groups	<ul style="list-style-type: none"> • Raises public awareness of environmental concerns • Builds community support for environmental conservation • Lobbies government to increase protection • Opposes harmful developments
Mooring lines	<ul style="list-style-type: none"> • Protects substrates from anchor damage
Active dive community	<ul style="list-style-type: none"> • Strong voice in campaigns for marine protected areas • Divers can improve public awareness of shark issues through stories and photographs • Improve shark habitats through underwater marine debris removal • Divers become advocates for marine conservation • Increased diver knowledge of issues through training courses and dive trips
Land-based volunteer groups	<ul style="list-style-type: none"> • Complete foreshore cleanups resulting in a cleaner ocean • Complete mangrove and other habitat restoration work resulting in healthier coastal habitats



AWARE Shark Conservation Guide to Impacts on Sharks

Negative Impacts	How
Fishing (all types including dynamite and cyanide)	<ul style="list-style-type: none"> • Sharks caught as target species or as bycatch • Decrease in potential prey as fishing reduces fish populations • Disturbance to marine ecosystems results in less healthy habitats
Coastal development	<ul style="list-style-type: none"> • Removal of mangroves destroys shark habitats and nurseries • Decrease in ecosystem health through increased sedimentation, nutrients and pollution
Human population growth	<ul style="list-style-type: none"> • Increased demand for shark products • Increased demand for seafood • Increased demand for coastal developments • Increased recreational fishing activity • Disturbance to normal behaviour through increased boat traffic
Aquaculture Farms	<ul style="list-style-type: none"> • Removal of mangroves to make way for aquaculture farms • Pollution of ecosystems from antibiotics used to keep fish stocks healthy • Increased nutrients from feed and faeces • Reduction in marine ecosystem health • Decrease in potential prey as wild fish are caught to feed aquaculture animals
Sewage outfalls	<ul style="list-style-type: none"> • Increased nutrients lead to algae blooms and other ecosystem impacts
Offshore mining	<ul style="list-style-type: none"> • Potential for a major impact from oil spill (or other substance) • Disturbance to normal behaviour through increased boat traffic
Heavy industry	<ul style="list-style-type: none"> • Increased ocean pollution • Sharks have high concentrations of mercury (an industrial waste product) in their bodies
Farming	<ul style="list-style-type: none"> • Increase of nutrients in the water through fertiliser run off, leads to algae blooms and other ecosystem impacts • Pollution of water due to pesticide run off
Land clearance	<ul style="list-style-type: none"> • Removal of trees leads to increased soil sediments in the water that smother marine life and reduce visibility
Swimmer protection devices	<ul style="list-style-type: none"> • Beach nets and baited drumlines catch and kill sharks of all species including those not a danger to humans • They also catch and kill potential prey species such as dolphins, turtles and rays
Global climate change	<ul style="list-style-type: none"> • Increased sea temperatures, changing ocean currents and increased storm ferocity will have many negative impacts on marine ecosystems
Coral bleaching (due to increased sea temperatures)	<ul style="list-style-type: none"> • Reduction in coral reef health • Reduction in coral reef ability to support a large and diverse marine life community
Marine debris	<ul style="list-style-type: none"> • Sharks ingest or become entangled in marine debris • Sharks are caught in ghost nets • Reduction of prey species through ingestion or entanglement
Anchor use	<ul style="list-style-type: none"> • Destroys substrates impacting on the food chain
Aquarium collecting	<ul style="list-style-type: none"> • Removal of juvenile sharks for aquariums • Reduction in the health of marine ecosystems

AWARE Shark Conservation Knowledge Review

Answer the following questions. Your instructor will review your answers with you.

1. What are the unique physical attributes of sharks that can be used to tell them apart from bony fish?
 - a.
 - b.
 - c.

2. Fill in the missing information in the following table.

International Union for the Conservation of Nature (IUCN) Red List Review of 1044 Shark, Ray and Chimaera Species		
Critically Endangered	2%	
	4%	Very high risk of extinction in the wild
Vulnerable		High risk of extinction in the wild
	13%	Close to qualifying or likely to qualify for a threatened category in the near future
Least Concern	23%	Not qualifying as _____ including widespread and abundant species
Data Deficient	47%	

3. List the life history traits that make sharks vulnerable to overfishing.
 - a.
 - b.
 - c.
 - d.
4. List three reasons why sharks are important to marine ecosystems.
 - a.
 - b.
 - c.
5. Fill in the blanks in the following sentence:
 _____ is the main cause of the rapid decline in shark populations. It is mostly due to overfishing that many shark species are threatened with _____ .
6. List three key management strategies that can protect sharks.
 - a.
 - b.
 - c.
7. Name two ways in which sharks contribute to local economies.
 - a.
 - b.

8. Describe how your personal perceptions of the relationship between sharks and humans have changed as a result of taking this course.

9. List five personal actions you could now take to protect sharks.

- a.
- b.
- c.
- d.
- e.

10. Name sharks found in your local area (or those sharks introduced to you by your instructor) and list their conservation status.

- a.
- b.
- c.
- d.
- e.

11. List responsible environmental guidelines for diving with sharks.

- a.
- b.
- c.
- d.
- e.
- f.
- g.

12. Name the two major ocean protection issues that Project AWARE is tackling and the social media platform through which you can connect with Project AWARE's worldwide movement of divers.

- a.
- b.
- c.

Student Statement: I've completed this Knowledge Review to the best of my ability and any questions I answered incorrectly or incompletely I've had explained to me, and I understand what I missed.

Name _____ Date _____

Web-based Resources

Project AWARE

Sharks In Peril

www.projectaware.org/project/sharks-peril

Get involved in Project AWARE's work to gain greater protection for sharks.

Sharks In Peril Resources

www.projectaware.org/category/resource-zone/sharks

Resources to help you protect sharks; petition sheets, posters, web banners and more.

Other Resources

www.projectaware.org/category/resource-zone/other

Further Project AWARE resources to help you protect our ocean planet including *Ten Ways A Diver Can Protect the Underwater Environment*, *Ten Tips for Underwater Photographers* and *Project AWARE, Our World Our Water*.

Shark Identification and Information

Shark Foundation

www.shark.ch/Database/

Search for shark information using scientific names as well as English, German, French and Spanish common names. Website available in English and German.

ReefQuest Centre for Shark Research

www.elasmo-research.org/education/ecology/id-guide.htm

Comprehensive listing of known shark species and a flowchart style identification guide. Use pictures and key body features to identify your shark.

The Shark Trust

www.sharktrust.org/v.asp?level2id=6160&rootid=6160&depth=1

Shark database, factsheets and ID guides plus much more shark information.

Marine Species Identification Portal

<http://species-identification.org/index.php>

An online version of the UNESCO publication *Fishes of the North-eastern Atlantic and the Mediterranean*. Use the search facility or to browse shark listings click on "Fishes - Rays, Skates and Sharks" in the left column.

Australian Museum

<http://australianmuseum.net.au/animalfinder/Shark-ray-and-chimaera-finder>

Information on 62 species of sharks, rays and chimaeras found in Australian waters. Many also found worldwide.

Shark Alliance

www.sharkalliance.org/content.asp?did=35766

Download a guide to European sharks plus lots of other shark information.

Canadian Shark Research Laboratory

www.marinebiodiversity.ca/shark/english/key.htm

Identification key to 19 species of sharks found in waters around Atlantic Canada.

Shark Threats, Management and Conservation

IUCN Red List of Threatened Species

www.iucnredlist.org/

Find the conservation status of each shark on the IUCN Red List of Threatened Species including distribution, habitats and threats.

Shark Specialist Group, IUCN

www.iucnssg.org/index.php/conservation

Information on many topics covered in this course, including fisheries management and finning. Look under “Publications” for global and regional status reports.

Shark Advocates International

www.sharkadvocates.org

Provides leadership in advancing science-based national and international shark conservation policies, and is a reliable source for shark and ray related information.

International Plan of Action for Conservation and Management of Sharks, FAO

www.fao.org/fishery/ipoa-sharks/about/en

Information on the IPOA-Sharks that aims to ensure the conservation and management of sharks and their long-term sustainable use.

International Shark Attack File

www.flmnh.ufl.edu/fish/sharks/isaf/isaf.htm

Read the facts about shark attacks.

Sustainable Seafood Guides

Marine Stewardship Council

www.msc.org/

Marine Stewardship Council runs an ecolabelling and certification program to help you choose sustainable fish products. Find which seafood products are certified by clicking on the map.

Australia: Australian Marine Conservation Society

www.amcs.org.au/Sustainable-Seafood-Guide-Australia.asp?active_page_id=695

UK: Marine Conservation Society

www.fishonline.org/

USA: Monterey Bay Aquarium

www.montereybayaquarium.org/cr/seafoodwatch.aspx

WWF: Guides for many countries and languages

wwf.panda.org/what_we_do/how_we_work/conservation/marine/sustainable_fishing/sustainable_seafood/seafood_guides/

Country specific sustainable seafood guides in many languages, plus links to additional sources.

Ten Ways a Diver Can Protect the Underwater Environment

1. Dive carefully to protect fragile aquatic ecosystems

Many aquatic organisms are delicate and can be harmed by the bump of a camera, the swipe of a fin or even the gentle touch of a hand. Some aquatic organisms like corals grow very slowly and breaking even a small piece can destroy decades of growth. By being careful you can prevent longterm damage to magnificent dive sites.

2. Be aware of your body and equipment placement when diving

Keep your gauges and alternate air source secured so they don't drag over the reef or other vital habitat. Control your buoyancy, taking care not to touch fragile organisms with your body or equipment. You can do your part and prevent injury to aquatic life every time you dive.

3. Keep your dive skills sharp through continuing education

Before heading to open water seek bottom time with a certified professional in a pool or other environment that won't be damaged. You can also refresh your skills and knowledge with a PADI Scuba Review, PADI Advanced Open Water Diver course or Project AWARE Specialty course such as Peak Performance Buoyancy.

4. Consider how your interactions affect aquatic life

Avoid touching, handling, feeding or riding on aquatic life. These actions may stress the animal, interrupt feeding and mating behavior or provoke aggressive behavior in normally nonaggressive species.

5. Understand and respect underwater life

Playing with animals or using them as food for other species can leave a trail of destruction, disrupt local ecosystems and rob other divers of their experiences with these creatures. Consider enrolling in a PADI Underwater Naturalist, AWARE Fish Identification or Coral Reef Conservation Specialty course to better understand sustainable interactions.

6. Be an ecotourist

Make informed decisions when selecting a destination and choose Project AWARE Environmental Operators or other facilities dedicated to sustainable business practices. Obey all local laws and regulations and understand your effect on the environment. Don't collect souvenirs like corals or shells. Instead, take underwater photos and follow Project AWARE's *10 Tips for Underwater Photographers*.

7. Respect underwater cultural heritage

Divers are privileged to access dive sites that are part of our cultural heritage and maritime history. Wrecks can also serve as important habitats for fish and other aquatic life. Help preserve these sites for future generations by obeying local laws, diving responsibly and treating wrecks with respect.

8. Report environmental disturbances or destruction

As a diver, you're in a unique position to monitor the health of local waters. If you notice unusual depletion of aquatic life, injury to aquatic animals or strange substances in the water, report these observations to responsible authorities in your area.

9. Be a role model for other divers and nondivers when interacting with the environment

As a diver, you see the underwater results of carelessness and neglect. Set a good example in your own interactions so that others can learn from you.

10. Get involved in local environmental activities and issues

You can greatly affect your corner of the planet. There are plenty of opportunities to support healthy aquatic environments including Project AWARE conservation and data collection activities like local beach and underwater cleanups and CoralWatch monitoring, supporting environmental legislative issues, attending public hearings on local water resources, conserving water or making responsible seafood choices.



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