THE SHARK... FRIEND OR FOE?

STORY BY JENNA CAVELLE ▸ PHOTOS BY BEVERLY FACTOR

EXPLOITED BY THE MEDIA AS "VICIOUS KILLING MACHINES", SHARKS HAVE LONG BEEN CAST AS MAN'S ULTIMATE OCEAN ENEMY.

Through the years, sharks have earned a top spot in the press, turning out best-selling books, blockbuster films and hair-raising headlines like "My Moment of Hell – Inside the Mouth of a Great White Shark". As the star performer of endless spine-chilling tales, it's not surprising that humans often approach sharks with the attitude of "kill or be killed". The shark's most famous performance to date is apparent in its breakout movie role as Jaws in Peter Benchley's 1975 blockbuster film, which celebrates its 30th anniversary this year.

Without argument, sharks have enjoyed a celebrity status unparalleled by any animal on land or in sea. Yet even the most fame hungry movie star will confess, with stardom comes an equally challenging quest for self-preservation. No other marine animal has experienced the double edge of this sword to the degree of the shark. No species is more misunderstood, having suffered unnecessarily from the mixture of scandal and fame. If man does not act quickly to redeem the shark's reputation, we will lose one of our most important ocean allies forever.

True or False? More people die from the common bee sting and more farmers are maimed by camels, hogs and steers than from shark attacks every year? True. The reality is that a person has a greater chance of being killed by a car while walking across the street to get to the beach, than she does by a shark while swimming in the water.

Decimation of Apex Predators and the Collapse of the Ecosystem

At the top of the food chain, sharks are a crucial part of our complex marine ecosystems, weeding out the weak and injured to guarantee a healthy sea. There are 370 known species of sharks, 150 of which live in the Sea of Cortez. At least eight are in danger of extinction due to shark fishing and fining including Hammerhead Sharks, Blue Sharks, Bull Sharks, Sand Sharks, Tiger Sharks, Mako Sharks, Great White Sharks and Thresher Sharks.

According to a team of researchers led by Biologist Ransom Myers of Dalhousie University in Nova Scotia, from1986 to 2000, nearly all shark species may have declined at least 50%, with some populations approaching extirpation. Tiger Shark populations are down 65%, the legendary Great White Shark has fallen 79%, and the Hammerhead is in the worst shape of all, down a staggering 89%.

Man must shift his position from the predation of sharks to their preservation. As I write this, in certain parts of the world large tuna vessels are long-lining for sharks and reeling in 60-year old, 500-pound sharks by

(ABOVE) **The Black Tip Reef Shark (*Carcharhinus melanopterus*) is commonly confused with the Grey Reef Shark (*Carcharhinus amblyrhynchos*, *FACING PAGE*) which lacks the distinctive black markings. *(RIGHT)* Hammerhead Sharks (Sphyrna mokarran) are the most endangered of all the shark species. These sharks are known by their oddly shaped heads and are known to congregate in large schools over open ocean seamounts. Averaging 11 feet long, these predators can be very dangerous but seldom attack unless threatened.**

photo by Bob Cranston

the dozens only to slice off their fins and mindlessly dump their live bodies back into the sea. If you've ever witnessed such a sight, then you are perplexed that sharks, rather than humans, are perceived as the ruthless hunters. After all, they're murdered for a $200 bowl of shark fin soup, considered a delicacy in Asia and Western Europe. After seeing the barbaric act on film for the first time, I determined that there's nothing delicate about shark fin soup and that I'd rather starve to death than eat it.

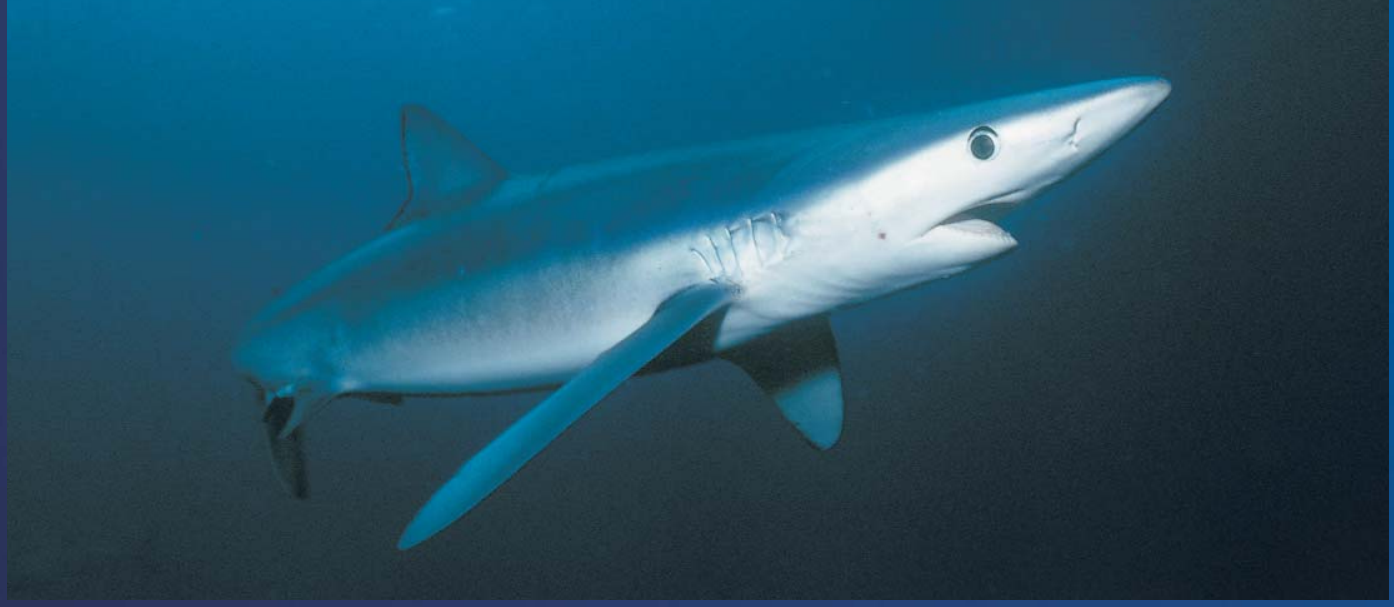
Sustainable Resource or Economic Disaster?

The economic value of sharks should be accurately priced at priceless. The shark's commercial value surpasses that of any other animal because it can be used in so many ways. According to research conducted in the Bahamas during 1992 by Discovery Communications for a documentary film, a dead shark is worth about $1,000. A live shark is worth well over $250,000 per year in tourist dollars and continues to grow annually.

Although scientists strongly advocate against the commercialism of sharks, its uses are nonetheless, wide-ranging. Shark hide can be processed into the toughest leather in the world, and its by-products (teeth, jaws, vertebral discs) are converted into curios and jewelry. The gelatin extracted from shark fins is a staple in Oriental diets, and the flesh, already being consumed by millions of people, could feed starving multitudes all over the globe. Coastal gift shops and diving headquarters purchase teeth and jaws for souvenir merchandise. Sharks are even featured on postage stamps, providing revenue for the government. It's easy to see that if the shark population were restored to sustainable levels (which could take several decades or more), its industrial revolution would be massive. Sharks are late maturing, slow growing and have low reproductive rates. The killing of sharks for commercialism, sport or otherwise must be suspended if the shark is to regain sustainable population levels.

Along with the commercialism of sharks, there is another factor that plays into the decimation of sharks — tournaments and the killing of sharks for trophy. Twenty-six miles west of San Francisco lay the Farallon Islands where biologist Peter Pile spends half the year studying shark attacks and the check and balance system that exists between sharks, sea lions and seals. Pile's research concluded that a growing Great White population is elemental in the balancing out of the Sea Lion and Seal population. In 1982, just off the Farallon Islands, a fisherman set hooks in the surrounding waters and killed five Great White Sharks for sport. Immediately, the event was celebrated during the nightly news and the fisherman's picture was splashed all over the newspapers.

(ABOVE) **A young boy stares at the destruction of a fishery and his future. Ignoring the chance to leave the legacy of a healthy sea for our children, the indiscriminant slaughter of sharks continues, creating nothing but a lifeless wasteland for future generations to inherit.** ***(BELOW)*** **Sharks are senselessly slaughtered by the millions for their fins so that a few can eat sharkfin soup in distant restaurants.** ***(FACING PAGE)*** **To guarantee a healthy sea, marine ecosystems will contain large numbers of sharks to weed out the weak and injured.**



(ABOVE) **The Blue Shark (*Prionace glauca*) is among the fastest swimming sharks and can even leap out of the water. Blue sharks are pelagic; they are found in open waters. The blue shark's diet consists mostly of squid, but it will eat almost anything as it is an opportunistic feeder with pointed and serrated teeth. This enables the shark to catch slippery squid and fish, the mainstay of its diet. Sharks' teeth are located in rows. The first two rows are used in obtaining prey; the other rows rotate into place as they are needed. As teeth are lost, broken or worn down, they are replaced by new teeth that rotate into place.** ***(BELOW)*** **The largest of all sharks, the Whale Shark (*Rhincodon typus*) grows to 46 feet in length and weighs up to 15 tons. It is also the biggest fish, but is not a whale as its name implies. Its mouth can be up to four feet wide and is at the very front of its head, not on the underside like in most sharks. This shark is not aggressive and filter feeds by forcing enormous amounts of plankton, up to 1,500 gallons per hour, through its gills as it slowly swims. These graceful animals are estimated to live 100-150 years.**

photo courtesy SeaWatch.org

Peter Pile says this in response to that event, "The effects were terrible. We noticed a significant decline in the shark population. This kind of sport is something we need to discourage. The White Shark is a natural component to the ecosystem here. It's not this terrible beast to be feared. Humans tend to get overly excited about this sort of thing, and of course it doesn't help that the media portrays sharks as a ferocious killer. Yes, it will eat a sea lion or a seal, but that's just part of the natural process. Controlling the sea lion and seal population is a necessary component of the eco-system. If you rid the waters of white sharks, the lion and seal population would explode. They would take more fish and fisherman would lose part of their industry. There would be an entire set of hard-to-predict repercussions that would throw the entire balance off."

Highly Evolved Predator or Super Scavenger?

The shark is both a predator and a super scavenger, which is why its survival is so crucial in the balancing of a clean sea. A living vacuum cleaner, sharks remove organic pollution and sick or injured fish. This helps control the populations such as tuna, mackerel, salmon and herring and thus ensures that only the healthy stock is perpetuated.

Armed with the precision of a finely tuned early warning system, each of the sharks' senses locks on as it approaches its prey. With well-developed inner ears, sharks can pick up sounds from up to 1,700 yards away. They are particularly attracted to irregular vibrations with frequencies at or below 40 hertz. Not surprisingly, this is the same sound and frequency emitted by a wounded fish.

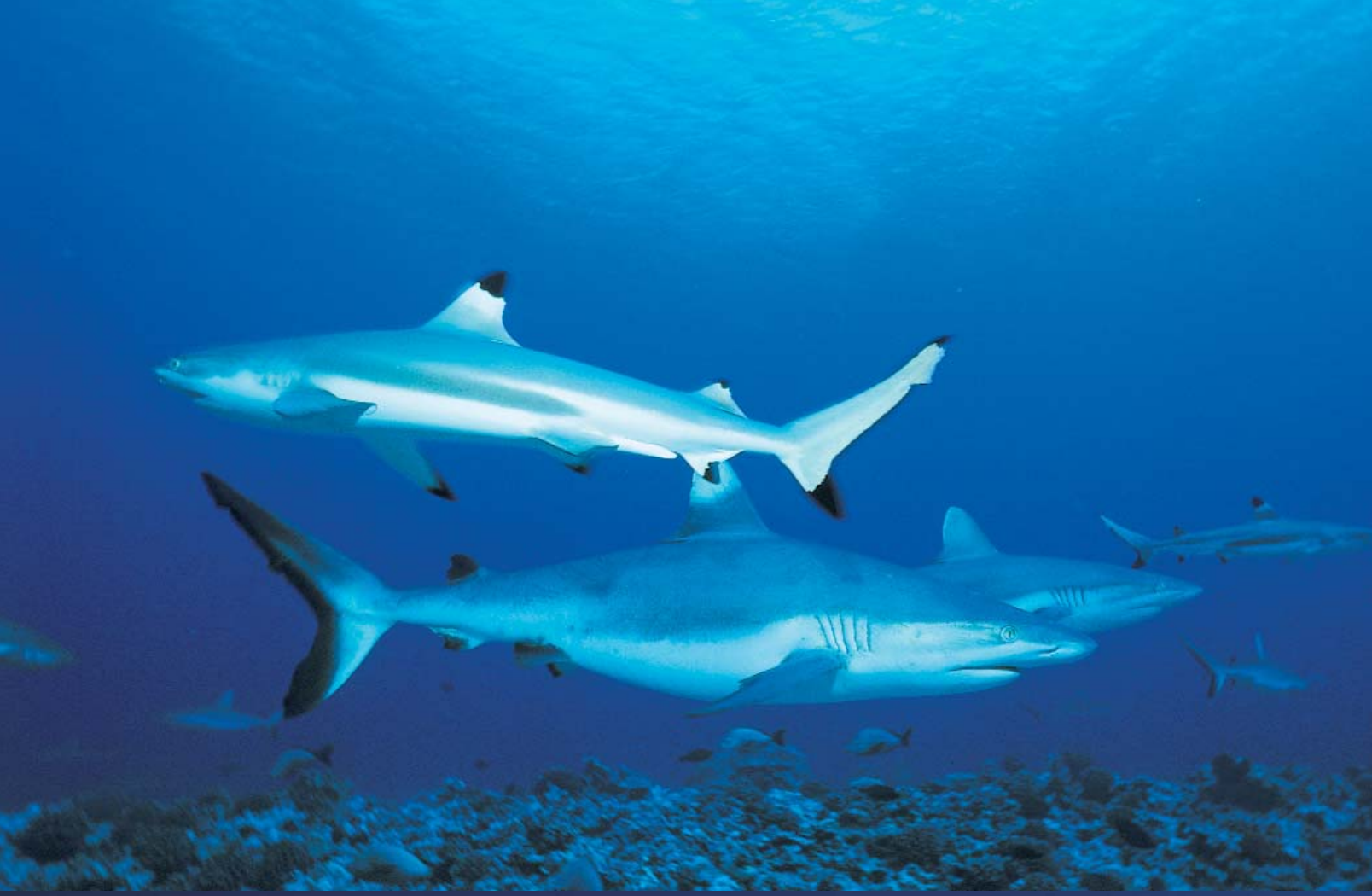
As the shark closes within a few hundred yards of its prey, the sense of smell takes over and guides it ever closer. A shark is capable of picking up a single molecule of blood in over a million molecules of water. The apparatus responsible for smell is located in the two nostrils near the front of the snout. As the shark swims, odor latent water is forced into its nostrils and over delicate sensory tissue. From about 100 yards, sharks can begin to detect even the faintest vibrations created by the movements of struggling fish. The vibrations are picked up by ultra-sensitive fluid filled canals that run beneath the skin. Lining the canals are tiny receptors, which are attuned to the kinds of vibrations made by wounded prey.

At around 30 yards, the shark sets its sights on the hunted and by the time the shark is within six feet it can detect prey that is not within view. It does this with sensory organs connected by pours located in the snout and head. These jelly filled sacs are capable of detecting electrical fields as well as the direction they are coming from. These fields can emanate from a tiny open wound or an animal buried in the sand and can be as weak as 1/100 millionth of a volt. Any one of the sharks' highly tuned senses is capable of leading it to its prey, but when combined, the outcome is usually deadly.

Medical Benefits to Man

Countless research projects have proven that serums and vaccines derived from shark blood and organs can preserve human life. Entire shark carcasses are being used in

This baby horn shark (*Heterodontus francisci*) is not fearful of the diver but may bite back if harassed. It is sluggish, nocturnal and mostly a solitary species. These sharks inhabit rocky bottoms, kelp beds, sandy draws between rocks, sand flats, deep crevices and small caves and also large underwater caverns. Adults tend to return to the same resting place every day. Horn sharks feed on benthic invertebrates, especially sea urchins, crabs and probably abalone and fishes. These sharks have broad muscular paired fins used as limbs for clambering on the bottom. They are hunted for use as fish meal, fin spines and are used in the production of jewels.



(ABOVE) **Black Tip Reef Sharks (*Carcharhinus melanopterus*) are one of the most common reef sharks in the Pacific Ocean possessing distinctive black markings. Primarily distributed in shallow tropical and subtropical waters, this shark is often found near coral atolls and lagoons adjacent to reef habitats. They average six feet in length and are very quick, feeding primarily on reef fish. It hunts in small groups during the day and commonly preys upon sturgeon fishes and mullet. Although it is one of the most common sharks, Black Tips are regularly caught by inshore fishermen and are vulnerable to depletion because of their small litter sizes and long gestation periods.**

medical studies dealing with human physiology, immunology and virology. The medical breakthroughs resulting from shark research range from treatment of the common cold to fighting carcinoma.

Sharks are known to be virtually disease free and the medical community is eager to know "why." For example, the "Infantile Proteins" that provide immunity to certain diseases remain in sharks throughout their entire lives. Additionally, shark blood contains antibodies that combat foreign substances in the body. Although sharks produce only one of three types of antibodies found in man, they manufacture ten times as much. In studying these antibodies, researchers hope to solve the primary complication faced in organ transplants; the rejection of foreign tissues by the body. Extensive research will provide answers to many problems involving the treatment of cancer, malaria and heart disease.

Humans are without a doubt situated at the top of the food chain as the most cognitively evolved species on earth. But does this grant us the right to kill and destroy without regard? Or does it mean that we have a responsibility to exercise intellect and compassion to preserve and protect all parts of the ecosystem that serve us? ■

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