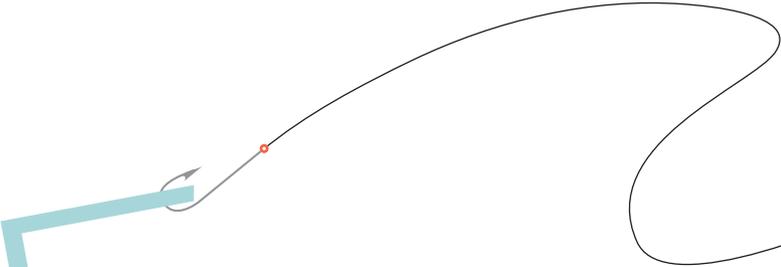


Hook, Line & Sinkers

Humans' unbridled hunger for fish is decimating our oceanic ecosystems, threatening entire species, and wreaking havoc on our health. Writer **Jonny Vasic** explores what's happening offshore, and what consumers can do about it.



FOR THE PAST EIGHT YEARS, CAPTAIN KURT Lieber and his all-volunteer team have been shocked by the devastation they've witnessed while diving off the coast of Catalina Island in Southern California. Their target on the latest recovery dive (an expedition to remove fishing debris) is a ghost net lost by the *Infidel*, a commercial trawler that sank in 2006. Six California sea lions, several turtles, and even a few sea birds became trapped in it and suffered miserable deaths, due to the all-too-common total disregard for the oceans and their ecosystems by those who profit from their plunder.

Lieber is the president and founder of Ocean Defenders Alliance, a non-profit group that works on the front lines to remove discarded nets and traps that litter the ocean. ODA has removed tens of thousands of pounds of fishing debris. "This is just a fraction of what is out there. It's a horrible way for these beautiful sea creatures to die," says Lieber. Worldwide, human hunger for fish threatens not only the species we consume, but the livelihoods of roughly 450 million people—and the food security of some 3 billion others, according to the Pew Environmental Group. An international group of ecologists and economists warns that the world will run out of seafood by 2048 if steep declines in marine species continue at current rates. The report found that 29 percent of all fished species have collapsed, meaning they are now at least 90 percent below their historic maximum catch levels (the highest number of fish that it is possible to catch, given a certain population size and environment). And the rate of population collapse has been accelerating. Today, the fishing industry harvests almost 8,000 species commercially; the demand for fish flesh has never been higher, nor has the state of our oceans been more desperate. Enhanced technology, the blight

of bycatch—animals unintentionally trapped in nets or on hooks—and the misconception that fish is a healthy alternative to red meat are destroying the world's most important ecosystem: our oceans.

Open-Water Attacks

Overfishing—the harvesting of wildlife from the sea at rates too high for fished species populations to replenish—is a challenge to quantify. Captain Ahab, probably the world's most famous fisherman, was a product of the mid-1800s, when the desire to use whale blubber as lamp oil nearly wiped out whales altogether, and to this day has left eight of the 13 great whale species either threatened or endangered. Whales are joined by the Atlantic cod, herring, and Pacific sardines, which were also nearly driven to extinction by the mid-1900s. Much like the transition from family farms to the factory farming of land animals, local fishermen were replaced by industrial fishing operations, funded and encouraged by government subsidies. Ninety percent of our large fish (such as halibut, swordfish, tuna, and marlin) populations have disappeared, leaving the oceanic ecosystem in a treacherous flux. The disappearance of dominant species results in a domino effect of destruction throughout the food chain. For example, many sharks eat rays, and as the sharks are killed for their fins, the ray population surges. Meanwhile, rays eat scallops, and with more rays preying on them, the scallops can't keep up, thus their numbers plummet. Scallops feed on urchins, which means that as a result, the urchin numbers increase, leading to the overconsumption of algae (a plant that keeps the carbon dioxide and oxygen balance in check via photosynthesis). One species' destruction or survival is directly tied to the rest of the oceanic ecosystem. Peter Knights, executive director of Wild Aid, a nonprofit dedicated to

ending the illegal trade of wild animals, says, "These are ecosystems that have evolved over millions and millions of years. As soon as you start to take out an important part of it, it's like a brick wall. You take out bricks and eventually it's going to collapse."

One of the classic examples of overfishing is the demise of bluefin tuna. Torpedo shaped, warm-blooded, and able to swim faster than 45 miles per hour, bluefin migrate all over the world. More than 4 million metric tons of these majestic creatures are caught annually by tens of thousands of fishing vessels, many of which move from ocean to ocean over the course of a year. The huge demand for tuna—whether in sushi or processed and canned—has resulted in overfishing and mismanagement of many tuna species. "Now with sonar, [fishermen] can spot a rock the size of a picnic table 300 feet deep, and keep hitting the same spot day after day," says Ray Hiemstra of the Orange County Coastkeeper, a nonprofit that works to protect marine habitats. "It's a real problem." Sonar fish finders, mapping technologies, spotter planes with temperature maps, and other techniques have led to us being *too* efficient.

Much like tuna, sharks have been driven to the brink of extinction by humanity's insatiable hunger. More than 95 percent of the annual harvest of shark fins worldwide is consumed in mainland China, Hong Kong, and Taiwan. With the growth of the middle class in China, more people can afford to buy shark-fin soup, a dish that signifies wealth and



Did You Know?

Fillet cuts of Chilean seabass (Patagonia Toothfish) served in restaurants often come from mature fish up to 200 years old.

By the Numbers

According to the United Nations Food and Agriculture Organization, 148 million metric tons of fish were captured in 2010—to the tune of \$217.5 billion. Of that number, 86.4 percent went to feed humans. Here's a look at who caught—and ate—the most.

Top 10 Fish Consumption per Capita in 2010 (in pounds)



Top World Aquaculture Producer in 2010 (in tons)

China
36.7 million

Next Top 9 Producers Combined (in tons)
15.6 million

is traditionally served at weddings. This year, however, the Chinese government announced that shark fins will be removed from the menus of all official functions. This could potentially have a massive positive impact on the regional practice and represents a surprising turn of events, as the Chinese government has, for the most part, been silent on the issue. In 2011, President Obama signed into law the Shark Conservation Act to strengthen federal laws against shark finning. Illinois recently became the fifth state to ban shark fins, joining California, Washington, Oregon, and Hawaii. Although only a fraction of the market, these laws are important statements.

Frightening Farms

Fish factory farming, or aquaculture, is the large-scale commercial farming of fish, producing approximately half of the seafood

as herring, anchovies, and other small fish are removed from the ocean food chain to feed farmed fish (it takes at least three pounds of small wild fish to grow one pound of farmed salmon.) Ironically, even the wild-caught fish isn't all for human consumption. Nearly 14 percent of the total world production of fish is used to manufacture animal feeds. With pigs, chickens, cows, and even farmed fish eating a fifth of the world catch, it's an extremely inefficient system for human protein consumption.

Fish farms don't just harm the ocean environment—they also threaten those who eat the fish. The seafood industry has long touted fish as a healthy alternative to beef and an abundant source of omega-3s, but there is growing concern among those working in the marine field that eating farmed fish can have disturbing effects on human health.

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consumed around the world. While that percentage is expected to increase, the environmental impact of fish farms is already devastating at best. Disease and parasites easily migrate between farms and wild fish. Uneaten food and fish waste from the farms pollute the water and the ocean floor, essentially creating a dead zone under and around the fish pens, and fish that escape these farms can "pollute" the gene pools of wild species. Fish farms are often located close to the shoreline, which is an important area for the spawning and development of wild fish. In a move parallel to the clear-cutting of Brazil's rainforest in order to make room for cattle grazing, many tropical countries such as Thailand have turned native mangrove forests into shrimp farms. Not only do mangroves provide crucial habitats for wild species of plants and animals, but the shrimp farms are often abandoned after a few years once the location is too polluted to continue farming there, and the shoreline becomes less stable and resilient to wave activity as the mangroves are uprooted.

An estimated 90 percent of forage fish such

Many fish accumulate extremely high levels of chemical residues such as polychlorinated biphenyls, which have been found to cause cancer (including melanoma, brain, and liver cancers), impair the neurological and motor function of infants, and disrupt hormonal balance. For instance, farmed salmon has 16 times more PCBs than wild-caught salmon.

As the world learned after the highly publicized hospitalization of actor Jeremy Piven, mercury poisoning is another major concern for those who regularly consume sashimi. *The New England Journal of Medicine* reports that fish "are the main, if not the only, source of methylmercury," a substance that has been linked to cardiovascular

Did You Know?

Despite the fact that fish have been proven to experience pain in the same way as other animals, there are no anti-cruelty laws to protect them from suffering during slaughter.

disease, blindness, deafness, and fetal brain damage, as well as issues with motor skills, language, and attention span. The Food and Drug Administration and The Environmental Protection Agency warn women of childbearing age and children not to eat fish such as swordfish, king mackerel, and shark, and to consume fewer than 12 ounces per week of other fish because of dangerously high mercury levels. Those two groups are especially susceptible, but the rest of the population may be purposefully ingesting potentially deadly ingredients, too.

There Goes the Neighborhood

As Captain Lieber and his team have discovered time and time again, fish are not the only ones suffering from the ravages of overfishing. Marine mammals and sea birds are in dramatic decline worldwide and fishing paraphernalia is one of the major culprits. Roughly 100,000 marine mammals die each year due to the ingestion of, and entanglement in, marine debris. Discarded monofilament fishing line is the number one killer of adult brown pelicans. And it's not just pelicans—pretty much every type of water or shore bird can get caught up in stray lines, including herons, egrets, and roseate spoonbills.

Back in the water, one of the world's smallest and rarest dolphins, the Maui's dolphins, on the north island of New Zealand are in a dire situation, with only around 100 animals left. The species is being wiped out by entanglement in fishing nets; coastal pollution and marine mining are also thought to be contributing to their demise. The government has been slow to react and has received criticism for not doing enough.

Did You Know?

Some fish use tools, smashing clams with rocks to in order to remove their shells before eating them.



Dave Rastovich, a native New Zealander and the co-founder of Surfers for Cetaceans, says, "There is a grassroots effort taking place in New Zealand right now, aiming to create sanctuary zones for the Maui's dolphins so that we can give them the space they desperately need to make a comeback."

The human addiction to fishing will be hard to overcome with the industry generating more than \$200 billion a year worldwide. "We are now beginning to see some of the consequences ... species have been disappearing from ocean ecosystems, and this trend has recently been accelerating," says Boris Worm, an assistant professor of marine conservation biology at Dalhousie University in Halifax, Nova Scotia. Whether studies examine tide pools or the world's oceans, the same picture is emerging. The stability and productivity of entire ecosystems become endangered as species are lost. The decimation of our oceans and their fish can only be stopped by an informed public that chooses to forego fish flesh. By removing ourselves from the exploitative equation, we can hope to reverse some of the damage already done to our seas. [VN](#)

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Recreational Fishing

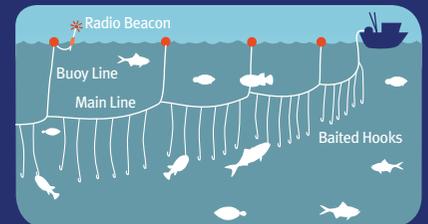
So-called "sport" fishing is practiced by an estimated 25 million anglers. Although numbers are in decline in recent years, recreational fishing accounts for nearly 25 percent of over-fished saltwater species. Even with many "hobby" fisherman using catch-and-release as their preferred method, researchers at the Oklahoma Department of Wildlife Conservation found that as many as 43 percent of fish released after being caught die within six days. The sport is having a major impact on the health of fish populations; fish who are released after being caught can suffer from loss of their protective scale coating, rendering them vulnerable to disease. They can have lactic acid build-up in their muscles and suffer from oxygen depletion, causing damage to their delicate fins and mouths.

Terrifying Terms

How exactly are we catching fish? Here are a few of the most common methods.



Pair Trawling. Two boats work in tandem, dragging a net the size of a football field between them. With thousands of these and other types of fishing vessels equipped with modern gear around the world, the effects are devastating.



Longlining. Ships drag up to 50 miles of line with baited hooks every few feet and catch not only sharks and other big fish, but also many unintended species, which the industry calls "bycatch." These undesired sea animals are hauled but tossed back into the ocean, usually to die.



Shark Finning. Sharks are hoisted on board and have their fins cut off, and the body is thrown back into the ocean where they die a slow death. Shark meat doesn't fetch a price high enough to warrant keeping the whole shark, and the fins are dried and sold primarily to the Asian market for shark-fin soup. Sharks make up 25 percent of the total catch in some open ocean longline tuna fisheries.