Fishing to the Bottom—and Back?

Ocean Fishing Can Remain Viable—If We Act Now.

By Carl Safina

Oceans have long affected humans, and vice versa. Anthropologists tell us people have been fishing for 100,000 years. Today, nearly half of humanity lives within 100 miles of the coast. The question on our plates today is: how much longer will fishes be joining us for dinner?

For a long time, people have caught fishes faster than the sea produced them. In 1631 King Charles I proclaimed, "The former abundance of fish is turned into such scarcitie and deareness, that ... our citie of London, and even our owne Court, are many times unprovided for their necessary dyet ... therefore ... the nets heretofore called traules ... which is notoriously known to destroy the said frie & spawne ... is ... forbidden by the law."

The scarcity and dearness of fishes is now global. But recognition of that problem is new. Until recently, whenever the question arose of how to feed the booming populations of the future, thoughts turned seaward. Assumptions were made about vast undiscovered populations of fishes and of an ocean that would somehow remain resilient to all assaults.

"A revolution in fishing power has caused the rapid depletion of fishes."

A Fishing Revolution

However, a revolution in fishing power has caused the rapid depletion of fishes. The revolution came in two steps, one mechanical and one electronic. In the early 1900s internal combustion engines greatly increased boats' net-towing power. After World War II, detection technologies that were developed for fighting enemies at sea quickly found adaptation for what amounted to a veritable war on fishes. Sonar allowed boats to see fishes hundreds of feet deep; Loran allowed boats to pinpoint and return to any rockpile or drop-off where fishes congregated in the seemingly trackless distances of the ocean. Radar allowed boats to fish through fogs that might previously have suspended operations. Before this revolution in fishing, fishes had two great *de facto* reserves in the sea, known to fishermen as "too far" and "too deep." But after industrial fishing came of age, fishes could no

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longer hide. And while we could see the fishes anywhere, our new nylon nets and lines were virtually invisible to them.

By the 1960s, new fishing technology fueled a lawless gold rush in the ocean, the last great global commons. Government-subsidized fleets hurried to the hunt. Fisheries management was geared entirely toward finding new sources and catching more.

Depletion

This headlong race hit its first significant bump in the mid-1970s, when a few countries began declaring waters out to 200 nautical miles from the coast as their "exclusive economic zones." (The feature article entitled "A Constitution for the Oceans" contains more information about EEZs.) Communist-bloc nations' intensive fishing just off the beaches of New England brought the first widespread cries of overfishing in the United States By the time the United States declared its own 200-mile zone in 1976—specifically to protect its own fishermen and fishes from the catching power of foreigners—the notion that an ocean could be depleted by boats towing nets had gained international traction.

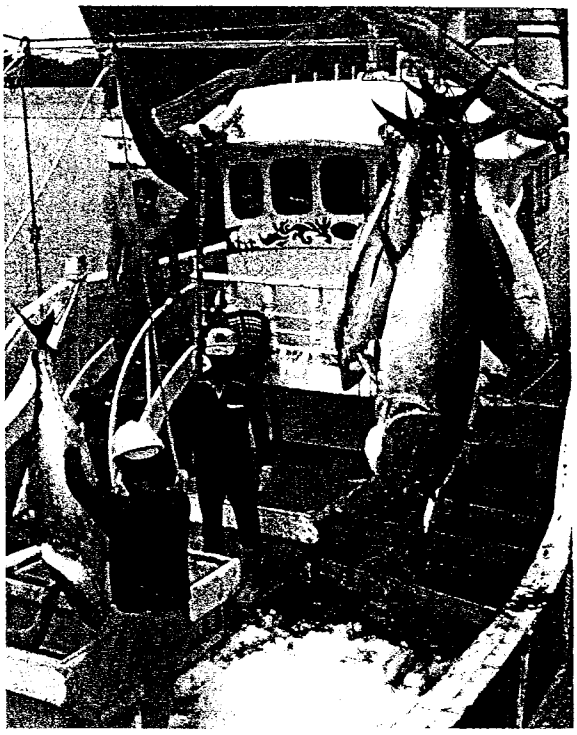
As declarations of 200-mile exclusive economic zones became standard policy and nations closed their continental shelves to foreign fishing, some countries finished the job of depleting their own waters during the 1980s. During the early '90s, the fisheries of the Grand Banks (a huge shoal in relatively shallow ocean waters off the coast of Newfoundland and Labrador) and Georges Bank (70 miles off the coast of New England) were closed. For half a millennium these areas had produced the richest fisheries on Earth; their closure signaled radical changes in government policies. Finally, there was some recognition that overfishing had diminished major resources to commercial extinction.

Massive unemployment, social dislocation, and government bailouts followed, shaming once-proud people and fracturing communities that had been stable and prosperous for centuries. In just twenty years, the reputation of the North Atlantic's fishing grounds went from the world's richest to the most depleted. As other developed countries serially depleted their fishes and profitability dissipated, European and Russian distant-water fishing fleets shrank. The remnants turned south, underpaying their way into the fishing zones of countries too desperate for foreign cash to say no.

Things were changing on the high seas, too. In the early 1990s the United Nations banned the large-scale drift nets (which were up to 40 miles in length) that a fleet of about 1,000 mostly Asian boats had been using, mainly in the Pacific. Many drift netters subsequently regeared to target tunas with longlines. As continental shelves closed to foreign boats and international agreements began to govern fishing in the Southern Ocean, unlicensed, illegal ships greatly increased their efforts in sub-Antarctic waters, largely targeting toothfishes (which are marketed as Chilean seabass).

New scientific reports confirm that fishing has largely depleted the prey it depends on. Not one peer-reviewed, journal-published scientific paper examining the issue has found evidence to the contrary or reason to question the conclusion that many once-abundant populations of fishes have been driven to all-time lows. Teams led by the University of British Columbia, Scripps Institution of Oceanography, Duke University, Dalhousie University, and several independent scientists have contributed major new scientific assessments. In a series of papers, these scientists have shown that:

- Abundance of large marine animals including fishes, whales, and turtles in the oceans and coastal waters of the pre-industrial past was almost inconceivably greater than it is today.



Fisherman unloading tuna catch from boat

- Abundance of large fishes such as tunas, sharks, cod, and groupers has declined roughly 90 percent since 1950.
- Humans remove from continental shelves fully one-third of the annual productivity of those waters.
- Because of depletion of large edible fishes, fisheries are forced to target animals lower on the food web. For example, some new fisheries target jellyfish for human consumption.
- One quarter of all sea life caught is unwanted and discarded dead. This *bycatch* is driving serious declines endangering sea turtles, albatrosses

and certain other seabirds, and certain fishes. For example, in shrimp fishing, five to ten kilograms of unwanted juvenile fishes and other sea creatures are commonly discarded for each kilogram of shrimp caught.

Improvements

Increasing recognition of these problems has led to changes in some fishing practices, legislation, and international cooperation. Some fisheries have succeeded in markedly reducing bycatch. For example, catches of endangered turtles have been significantly reduced in the United States and several other places by fitting trawl nets with release devices called turtle excluders. Albatrosses and most other seabirds can be kept away from lines or nets with scaring devices, by setting nets deeper, and by fishing at certain times of day. The eastern Pacific tuna fishery's improved dolphin-release procedures have greatly reduced the numbers of dolphins drowned in their nets (though questions remain about separation and loss of dolphin infants chased to exhaustion prior to netting; tuna follow dolphin herds, and the boats encircle dolphins with nets to get the tuna beneath them). These improvements point the way toward success but need to be refined and more widely adopted.

International bodies are increasingly recognizing the overfishing problem. The United Nations has enacted a high-seas fisheries treaty and published a Code of Conduct for responsible fishing, and drafted Plans of Action for reversing sharp declines in populations of sharks and seabirds. Though change will come slowly, these represent major steps toward recognizing the problems. And the Convention on International Trade in Wild Fauna and Flora, also known as CITES, recently took action to track trade in seahorses, sharks, and caviar-producing sturgeon. This body, which made it illegal to import elephant ivory, had been reticent to wade into fisheries until recently.

The United States has committed some of the worst mistakes in fisheries management, but it also has taken some of the most forward-thinking steps. In an overhaul of its federal fishing legislation, the United States passed the Sustainable Fisheries Act in 1996. This act defined overfishing, prohibited fishery managers from allowing catches beyond sustainable levels, mandated that overfished species be listed annually, and mandated recovery plans for overfished species. Since the law was implemented in 1998, numerous declines have been arrested; some populations of previously depleted species have shown substantial recoveries.

Toward the Future

Ocean fishing can remain viable if we rebuild fish populations and then cap catches. In a world facing increasing human populations, this will be challenging. Fishing power must be reduced by about half. One way of achieving this is through a system of transferable fishing quotas. In some fisheries in Alaska, for example, managers have reduced fishing power by allowing boats to buy and sell shares of the allowed catch quota. This has allowed some marginal operators to sell out and other marginal operators to buy quota shares and thus increase profitability. For this to work economically, fish landings have to be scientifically limited and enforced. For it to work socially, safeguards limiting share ownership must be in place to prevent corporate monopolies. Alaska's system provides good examples of both.

Many ask whether it would be best to stop hunting wild fishes and focus on fish farming. While fish farming is the fastest-growing sector in agriculture, it is not necessarily an answer to ocean woes. Farming has not reduced fishing pressure on wild fishes or shrimp for two reasons. First, fish farms are often constructed by destroying natural habitats that support diverse wild populations and human fishing communities.

FOR DISCUSSION

When did people and countries become concerned about overfishing? What steps did they take to address the problem? What were some of the intended and unintended consequences of their actions?

What does the Sustainable Fisheries Act require? Has the act been effective? In your opinion, can domestic laws effectively limit overfishing?

What steps can we take to ensure that fisheries remain viable in the future?

What international laws have been enacted to encourage responsible fishing? Why is international regulation necessary?

Second, many farmed fish and shrimp must be fed fishes caught from the ocean. For example, it can take three to five kilos of edible fishes to produce one kilo of farm salmon—a net *loss* of protein. Yet some fishes and shellfish are raised in environmentally benign ways. The way forward lies in developing progressively less harmful farming methods and supporting best practices.

Marine reserves, closed to fishing, have become a focus of debate in recent years. New Zealand, Australia, the Philippines, and several other countries have established such reserves, but on a global basis this approach is in its infancy. What is clear is that the size, abundance, and fecundity of fishes increases in reserves. It is less clear how often this leads to improved fishing outside the reserve boundaries. Whether it does probably depends on the size of the reserve. Ecologists are working to answer this question.

Consumers of seafood can also play a large role in improving ocean fishing and farming practices. Several organizations such as Blue Ocean Institute, Environmental Defense, Monterey Bay Aquarium, and Marine Stewardship Council publish consumer advice recommending menu choices that seafood enthusiasts can enjoy with a clear conscience. Increasing awareness, celebrity-chef involvement, and news media coverage have made the seafood experience more meaningful for choosy seafood lovers.

The answers to ocean recovery lie in fishing slower than the fishes can breed, farming seafood in ecologically less destructive ways, and giving consumers the information they need to vote with their conscience and their wallet. There is time. And, yes, there is hope.

Maritime Piracy in the Modern World
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And in November 2005, pirates unsuccessfully tried to board the luxury cruise ship *Seabourn Spirit* off the coast of Somalia.

Prevention Efforts

To ward off attacks, shipowners now regularly reroute their ships to avoid areas known to harbor pirates, as well as to steer clear of "chokepoints" (such as narrow channels) where, because of limited maneuverability, large vessels are particularly vulnerable.

When such course changes are not possible, captains are instructed to take special precautions. Among the more common ones are not stopping in unfamiliar places (two-thirds of all attacks occur while ships are at anchor or in berth), not having money on board, locking all exterior doors, keeping search lights illuminated, increasing the number of lookouts, running the ship's engines at maximum speed, charging the fire hoses so they can be used to repel boarding parties, and, controversially, issuing weapons to the crew.

In addition to these low-tech strategies, a variety of high-tech ones are being employed. Many vessels now are equipped with Long Range Acoustic Devices (LRADs), more commonly known as "sonic cannons." When activated, these small round dishes produce a deafening sound. By having its security officer use one while the captain took wake-producing evasive action, the *Seabourn Spirit* was able to fend off the pirates that attacked it.

Other innovations include SecureShip, a collapsible electrified fence that can be mounted on a ship's deck and delivers a nonlethal shock to would-be intruders, and SHIPLOC, a satellite-tracking system that allows a vessel's location to be plotted if it is hijacked. And in an attempt to stop the burgeoning trafficking in stolen ships, the 2002 International Ship and Port Facility Code requires vessels to emboss their International Maritime Organization number on their hulls.

The Future

In July 2004, Indonesia, Malaysia, and Singapore agreed to work together to safeguard the Strait of Malacca, the 621-mile waterway that links the Indian and Pacific oceans and accounts for nearly 40 percent of all attacks. So far, however, this effort has not been successful, in part because of a lack of money and in part because of squabbles between the partner governments.

So just where does the fight against piracy stand? The answer is best summed up by two events that occurred in January 2006. Near the end of that month, pirates captured by the destroyer USS *Winston S. Churchill* (which had been acting on a tip from the PRC) were handed over to Kenya for prosecution. Yet even as the transfer was taking place, another band of pirates was being paid $450,000 in ransom to release three Taiwanese fishing boats. Thus, while there is reason for hope, there also is reason to believe that real pirates will be with us for some time to come.