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Environment



High Tech Methods Decimating Fish Populations

By **Cat Lazaroff**

BOSTON, Massachusetts, February 18, 2002 (ENS) - New fishing methods based on military technology are accelerating the decline of commercial fish populations, a new study suggests. Despite increased fishing efforts, catches continue to decline in the North Atlantic and other prime U.S. fishing grounds, shows research detailed this week at a scientific conference in Boston.

Fish nets used to come up full. Now, fishers must travel farther and fish longer to fill their nets - often with smaller fish (Photo courtesy National Oceanic and Atmospheric Administration)



Faced with dwindling stocks and rising demand for seafood, fishers are employing new technologies that leave no safe haven for fish, including the application of military technologies, spotter planes and round the clock exploitation.

At the annual meeting of the American Association for the Advancement of Science (AAAS) in Boston on Sunday, an international group of leading marine scientists presented examples of overfishing from around the world, arguing that new technologies and increasing fishing efforts make the need for marine reserves imperative.

"New technologies and fishing effort have peeled the lid off the oceans," said University of York scientist Callum Roberts. "If we want to keep seafood on our plates, we need to put back refuges so some fish survive long enough to reproduce."

For most of human history, fish and other marine species had naturally protected areas: places inaccessible to fishing because they were too remote, too deep or too dangerous to fish.



Sonar systems first developed for the military are now being used to track fish and identify prime fish habitat (Photo courtesy U.S. Navy)

But civilian applications of military technologies, such as those developed for submarine warfare and espionage, have grown by leaps and bounds since the end of

the cold war. These transferred technologies include sonar mapping systems that reveal every crack and contour of the seabed in exquisite detail.

The U.S. Geological Survey is now publishing maps that are enabling fishers to penetrate deep into regions once considered too difficult to fish. Private companies are also weighing in, selling the secrets of the seabed for short term profit.

Guided by precision satellite navigation systems, fishers can now drop nets into previously unseen canyons, or land hooks on formerly uncharted seamounts.

"Such places may be the last refuges of vulnerable species like skates or rockfish," warned Roberts.

Planes and satellite temperature maps help fishers track schools of fish like these yellow fin tuna (Photo courtesy [National Undersea Research Program](#))



Fishers are also looking to the skies for better catches. Off the U.S. East coast, the Atlantic swordfish fleet receives daily faxes from the National Oceanic and Atmospheric Administration, showing satellite images of sea surface temperatures on the fishing grounds. These maps, along with temperature and depth sensors carried by boats, allow the fleet to target the places where swordfish are most vulnerable.

The same technology guides the bluefin tuna fleet to the best fishing areas, and spotter planes help boats pursue schools to the last fish.

"The modern fishing armory has vastly expanded," said Yvonne Sadovy of the University of Hong Kong. "The boats of today are larger, faster, stronger and can fish in conditions that would have been impossibly dangerous 100 years ago."

They fish deeper, for longer and employ nets that can penetrate areas of rough seabed, moving rocks up to three meters (10 feet) in diameter and weighing up to 16 metric tons.



Using high-tech equipment to pursue fish makes economic sense when a single bluefin tuna, like these on sale at a fishmarket in Japan, can fetch up to \$80,000 U.S. dollars (Photo courtesy Greenpeace Australia)

"Not all new fishing technologies are hi-tech," said University of Hawaii researcher Charles Birkeland. "Modern improvements can be just as devastating to fish stocks."

In islands throughout the Pacific, for example, fishers have long valued the huge and docile bumphead parrotfish. By day, these wary fish would keep their distance from spearfishers, so the take was never very high.

But in recent years, spearfishers equipped with scuba equipment have begun targeting the parrotfish at night when they sleep in shoals in shallow reef lagoons.

"Spearguns and nightlights are as lethal to bumphead parrotfish today as rifles and railroads were for American Plains bison in the 19th Century," Birkeland said.

The unsustainable pursuit of larger and more desirable coral reef species is also being fueled by the growth of international markets.

Scuba diving equipment and underwater lights now allow fishers to seek valuable fish after dark, when the fish are sleeping (Photo courtesy U.S. Navy)



"Greater prosperity and demand for live food fish in South-East Asia has driven prices so high that it is profitable to pursue fish to the farthest corners of the world," noted Sadovy. "Because so many species are targeted, fishing operations can remain economically viable far beyond the point where the most vulnerable species have been eliminated."

As fishers expand their reach, the importance of creating natural refuges for sustaining breeding stocks increases, the researchers argue.

"When there is no place for fish to hide, we can devastate entire populations. There is evidence that severely overexploited species may not recover, even decades after depletion," said University of Dalhousie scientist Jeff Hutchings.

For example, more than 100 tons of black-lipped pearl oyster were taken from Pearl and Hermes Reefs in the Northwest Hawaiian Islands in 1927. Just six individuals were found during an intensive survey late in the year 2000, 63 years after the harvest.

In Canada, northern cod were depleted to a few percent of their former abundance in the early 1990s, and there is still little sign of recovery.

"We are realizing, too late in some cases, that severe depletion can

undermine population resilience by impairing reproduction, reducing recruitment of young animals, degrading habitat integrity, and altering behavior and interactions with other species," said Howard Choat of James Cook University. "This further points to the need to be proactive so that populations don't reach this point of no return."



Many marine protected areas do not fully ban fishing. These boats are fishing in Monterey Bay National Marine Sanctuary off the California coast (Photo by Kip Evans courtesy [National Marine Sanctuaries](#))

"We are pushing fisheries off the edge of viability, and species to the edge of extinction," added Birkeland. "We must recreate the refuges of old by establishing networks of marine reserves."

New evidence indicates that fully protected refuges can help protect stocks from reaching the point of no return by providing safe havens, protecting habitats and by exporting fish and their offspring to surrounding fishing grounds.

"Without such marine reserves, the ocean's future looks bleak," Roberts concluded.

Their work found support Saturday when scientists presented a new portrait of the state of fisheries in the North Atlantic, showing that over the last 50 years, the catch of preferred food fish species such as cod, tuna, haddock, flounder and hake has decreased by more than half, despite a tripling in fishing effort.

The study shows that large scale fishing in the North Atlantic has undermined the ocean's ability to sustain further catches.

Some fishing methods can harm other species and destroy habitat. Here, a lobster was crushed in the path of a scallop drag (Photo by A. Shepard courtesy OAR/National Undersea Research Program; University of North Carolina at Wilmington)



"The only way we are maintaining yield is by increasing effort," said Dr. Daniel Pauly of the University of British Columbia Fisheries Centre, and the head of the large international project behind Saturday's presentation at the AAAS meeting. "But you need fish to make fish, and so we have created a massive reduction in productivity."

Serial depletion of large predatory fishes at the top of all marine food webs means the major fisheries are now invertebrates. "We are fishing for bait and headed for jellyfish," warned Pauly.

Today, the large fish found in North American markets are being imported from developing regions of the world such as West Africa, South East Asia and other areas masking the crisis in local waters, added Reg Watson of the University of British Columbia.

"We are paying fishers in other oceans to grind down their marine ecosystems for our consumption," Watson said. "This is a serious concern for global food security."

Pauly explained that the next steps are a substantial reduction of fishing fleets, eventual abolition of subsidies to industrial fisheries, and restoration of the oceans' depleted resources through the establishment of networks of no take marine reserves.



A leopard shark swims among kelp forests in the Monterey Bay National Marine Sanctuary - the nation's largest marine sanctuary (Photo by Kip Evans, courtesy National Oceanic and Atmospheric Administration)

"In order to restore productivity to a fishery, the broader ecosystem with its many parts needs to be

conserved," Pauly concluded.

An international coalition of conservation groups recently sponsored a poll that interviewed 750 residents of New England and Atlantic Canada regarding their support for marine reserves. The poll found that 74 percent of New England respondents and 73 percent of Canadian participants support establishing fully protected no take ocean areas that bar all fishing, mining, and other potentially damaging activities.

"This new poll shows that there is strong support among those who live in New England and Atlantic Canada for establishing fully protected areas in the ocean that prohibit all extractive activities, including commercial and recreational fishing," said Priscilla Brooks, director of the marine resources project at the Conservation Law Foundation.

"Both the United States and Canadian governments need to create public processes that will create fully protected areas in the ocean, which are science based, participatory and also give full consideration to fishing industries," added Robert Rangeley, Atlantic marine program director of World Wildlife Fund - Canada.

More information on declining fish catches in the North Atlantic is available at: <http://www.seaweb.org/AAAS2002/>

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