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Plumbing the depths, there's less to plumb

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Heavy fishing is endangering species and disrupting oceans' ecosystems

NEW YORK Most of the Earth's surface is covered by oceans, and their vastness and biological bounty were long thought to be immune to human influence. But no more. Scientists and marine experts say decades of industrial-scale assaults are taking a heavy toll.

More than 70 percent of commercial fish stocks are now considered fully exploited, overfished or collapsed. Sea birds and mammals are endangered. And a growing number of marine species are reaching the precariously low levels where extinction is considered a possibility. "It's an incipient disaster," said Richard Ellis, author of "The Empty Ocean."

Behind the assault, experts say, are steady advances in technology, national subsidies to fishing fleets and booming markets for seafood.

Directed by precise sonar and navigation gear, more than 23,000 fishing vessels of more than 100 tons and several million small ones are scouring the sea with trawls that sweep up bottom fish and shrimp; setting miles of lines and hooks baited for tuna, swordfish and other big predators; and deploying other gear in a hunt for seafood in ever deeper, more distant waters.

Seafood industry officials say overfishing and disregard for environmental harm peaked a decade ago. They point to the spreading adoption of gear that avoids unintended catches, acceptance of quotas and other limits, and agreements to conserve ocean-roaming fishes like tuna.

"We now have a better understanding of the limitations of the resources," said Linda Candler of the National Fisheries Institute, an industry lobbying group. Federal fisheries officials note that although 80 American fish stocks have serious problems, restoration plans are in effect, and other stocks are rebounding.

Pietro Parravano, who trolls for salmon out of Half Moon Bay, California, an hour's drive south of San Francisco, said fishery critics tended to overlook damage done by pollution and destruction of coastal wetlands. "It's not just our activity that's leading to this decline," he said. "If fishermen are doing something wrong, they're willing to adapt."

The various fleets from around the world are sustaining harvests only by moving into untapped resources, said Daniel Pauly, a marine scientist at the University of British Columbia.

"Since the 1970's," he said, "when the big fishing areas of the Northern Hemisphere saw catches drop, you've had this front moving out, with a massive effort off West Africa, in Southeast Asia, the southern Atlantic."

Moreover, scientists said, global fishing is spreading so fast that it is devastating marine ecosystems before scientists study them or get a rough idea of the size of populations. Off the coasts of North America and Australia, for example, biologists have found areas where trawls have uprooted communities of cold-water corals and other bottom dwellers that are centuries old.

Recent studies have estimated that stocks of many fishes are now one-tenth of what they were 50 years ago.

International agreements protect some species, like tuna and swordfish in the Atlantic. But most fisheries in international waters are rarely monitored.

Declining catches have led to fast growth in fish farming and other aquaculture. But these activities have exacted an ecological price, as well. Salmon and shrimp farms expanding in coastal waters displace ecosystems that are nurseries for much sea life, or they threaten local species through releases of nutrient-loaded waste, nonnative species or diseases.

The result has been a transformation of the oceans that is terrifying, said Sylvia Earle, formerly the chief scientist of the National Oceanic and Atmospheric Administration. "Fleets of squid boats can be seen by astronauts," she said. The lights attract the big-eyed cephalopods. "And with the demise of these creatures," she said, "the ecosystems upon which they're dependent become unraveled."

Experts say the industry expansion has been driven by growing populations and prosperity around the world. Almost a billion people now rely primarily on fish for protein.

A host of scientists and organizations have recently sounded alarms and proposed solutions. Last summer, nations at an environmental summit in Johannesburg agreed to manage fisheries in a sustainable fashion by 2015.

In June, the Pew Oceans Commission - with a nonpartisan membership including fishermen, scientists and elected officials - recommended "a serious rethinking of ocean law."

This autumn, a federal oceans commission, after three years of study, is to issue a comprehensive report recommending new policies.

If nations shifted billions of dollars from subsidies to programs to buy out boats and retrain their crews, experts say, the industry could shrink without exacting too great a cost in jobs.

The most important strategy of all is simply to fish less, experts say. This can be accomplished in many ways.

Harvest limits can be set, with quotas allotted to fishery individuals who can then trade them.

Iceland has set the standard for this approach, which has also been adopted in a few American fisheries. By limiting the overall catch and allowing people to buy and sell their fishing rights, the system encourages some to leave the business, said William Hogarth, director of the National Marine Fisheries Service.

Fishing pressure can also be cut by creating marine reserves or closing some areas to create nurseries.

Reserves in coastal waters have already proved their worth, with rising catches in nearby areas.

Experts clash on the likely outcome of the solutions.

Hogarth said he sees ample reason for optimism if sound practices can spread before irreversible damage occurs. Overall, he and others said, fish can be extraordinarily resilient.

Ellis argued that the crisis would abate only when people better understood the threat.

"Worldwide awareness," he said, "is the root of the solution."

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