



Giants of the ocean 'facing extinction'.

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First it was cod, now industrial fishing is wiping out species such as marlin and tuna. Mark Henderson reports

More than 90 per cent of the world's stocks of large fish such as tuna, marlin and swordfish have disappeared over the past half-century, purged from the ocean by industrial fishing, research has found.

The advent of pelagic long-line fishing and trawling has devastated populations of open-ocean predators such as tuna and larger groundfish such as cod and halibut all over the globe, the major study says. Analysis of fishing records and conservation data has shown that the present stock of large species is less than 10 per cent of what it was in 1950, before industrial fishing techniques really took hold.

Dramatic cuts in fishing quotas and subsidies, as well as the introduction of new technology to eliminate the catching of unwanted species, are needed to reverse the decline, scientists from Dalhousie University in Canada and Kiel University in Germany say.

"From blue marlin to mighty bluefin tuna, and from tropical groupers to Antarctic cod, industrial fishing has scoured the global ocean," Ransom Myers, of Dalhousie University, who led the research, said. "There is no blue frontier left.

"Since 1950, with the onset of industrialised fisheries, we have rapidly reduced the resource base to less than 10 per cent - not just in some areas, not just for some stocks, but for entire communities of these large fish species from the tropics to the poles."

The survey, which was compiled over ten years using data from every major fishery in the world, confirms the bleak picture emerging from regions such as the North Sea, where cod has been fished to the brink of extinction, and suggests that the global outlook may be just as bad.

Large species such as bluefin tuna, marlin and swordfish, as well as cod, halibut, skate and flounder, are all severely affected. Details of the research are published today in the journal Nature.

Boris Worm, of the University of Kiel, said the results showed that mankind had damaged the world's oceans on a scale that no one had fully understood. "The impact we have had on ocean ecosystems has been vastly underestimated," he said.

"These are the megafauna, the big predators of the sea and the species we most value. Their depletion not only threatens the future of these fish and the fishers that depend on them, it could also bring about a complete reorganisation of ocean ecosystems, with unknown global consequences."

The scientists analysed information from four continental shelves and nine deep-ocean ecosystems, finding similar results in each. Some of the most dramatic data came from the records of Japanese pelagic longline fisheries, which use thousands of baited hooks trailed from vessels to catch tuna and other large sea fish.

"Whereas longlines used to catch ten fish per 100 hooks, now they are lucky to catch one," Dr Myers said. "This isn't just about one species. The sustainability of fisheries is being severely compromised worldwide."

Fish size is also decreasing. "Where detailed data are available we see that the average size of these top predators is only one fifth to one half of what it used to be," he said. "The few blue marlin today reach one fifth of the weight they once had. In many cases, the fish caught today are under such intense fishing pressure they never even have the chance to reproduce."

Dr Myers said that this was exactly the situation he saw in the 1980s as a fisheries biologist in Newfoundland, at the time when its Grand Banks cod fisheries collapsed irreversibly. "No one understood how fast the decline happened at the end. It was only a couple of years. The quotas had been too high. They refused to slow down because they had seen lots of little fish ...The little fish were caught and discarded and there was no future."

The world had yet to realise the full extent of the crisis and its implications, the researchers said. "Understandably, some fisheries managers find it hard to accept," Dr Myers said.

"We are in massive denial and continue to bicker over the last shrinking numbers of survivors, employing satellites and sensors to catch the last fish left.

"We have to understand how close to extinction some of these species are, and we must act now, before they have reached the point of no return. I want there to be hammerhead sharks and bluefin tuna around when my five-year-old son grows up. If present fishing levels persist, these great fish will go the way of the dinosaurs."

Daniel Pauly, of the University of British Columbia in Canada, said that the picture may be even worse than the researchers suggest. "Because longlining technology has improved, the authors' estimates are conservative," he said. "If the catch rate has dropped by a factor of ten and the technology has improved, the declines are even greater than they are saying."

Jeremy Jackson, of the Scripps Institution of Oceanography in La Jolla, California, said that much of the remaining optimism was explained by a lack of understanding of how rich the oceans used to be.

"We have forgotten what we used to have. We had oceans full of heroic fish, literally sea monsters. People used to harpoon three-metre-long swordfish in rowboats. Hemingway's *The Old Man and the Sea* was for real."

The only answer was a drastic reduction in the quantities of fish caught, Dr Myers said. "A minimum reduction of 50 per cent of fishing mortality may be necessary to avoid further declines of particularly sensitive species," he said.

"If stocks were restored to higher abundance, we could get just as much fish out of the ocean by putting in only one third to one tenth of the effort. It would be difficult for fishermen initially, but they will see the gains in the long run."

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