



Up to Half of Ocean Species Lost to Overfishing

Half of all sea fish species have disappeared from the major fishing grounds of the world, according to a study that shows how ocean life has declined rapidly in the past 50 years.

The dramatic fall in the diversity of fish is blamed on overfishing rather than pollution or climate change, the scientists behind the study said yesterday.

The study, which examined fishing logbooks dating back to the 1950s, also found that the size of ocean 'hot spots', which were traditionally rich in a diverse array of fish species, had shrunk significantly over the same period.

A research team led by Boris Worm and Ransom Myers of Dalhousie University in Halifax, Nova Scotia, calculated that species diversity has declined by between 10 and 50 per cent in all oceans, with the most important predators such as sharks, tuna, swordfish and marlin suffering most.

Dr Worm said there was now a clear link between overfishing and the shrinking of the ocean regions where most fish tended to congregate in what the scientists call species-diversity hot spots.

'Everywhere you go, in every ocean basin, our hot spots today are only relics of what was once there. It really hurts to see this,' Dr Worm said.

Dr Myers said that where fishermen might have caught 10 species of fish on average in any one area of the sea five decades ago, today they could only catch five. 'It's not yet extinction. It's local fishing-out of species. Where you once had a range of a species in dense numbers, now you might catch one or two of a certain species,' Dr Myers said.

Both scientists took part in an earlier study that showed a 90 per cent decline in some of the top predators of the open ocean. The latest study confirms that the decline has affected diversity as well as overall numbers.

Comparisons between the hot spots of ocean diversity in the 1960s and the 1990s clearly show the decline. Tuna and marlin, for instance, were once abundant off the north-west coast of Australia, but now the region is no richer than other areas.

The study, published in the journal *Science*, used data from the logbooks of Japanese fishermen, who have the biggest longline fleet of trawlers in the world and have collected continuous data on the size and diversity of catches for many decades.

Longlines can be more than 60 miles long and are baited with thousands of hooks which attract many species of fish, as well as snagging turtles and seabirds as by-catch.

The scientists believe the longline data is an accurate sample of the fish living in any one region at any one time. They also cross-referenced this information with data on fish diversity gathered between 1990 and 1999 by the government agencies in Australia and the United States, which

collated data on more than 140 fish species.

Nathan Mantua of the University of Washington in Seattle said that changes in the weather patterns of the oceans over a decade " such as the El Nio phenomenon in the Pacific Ocean " could also affect fish diversity.

'If this were the only factor, we might expect declines to be quickly reversible. What they've shown is that we're on a curvy one- way street, with clear trends towards a reduction in biodiversity. There is real cause for alarm here,' Dr Mantua said.

Daniel Pauly, a fish biologist from the University of British Columbia in Vancouver, said the study highlighted a decline that sometimes could be obscured by other environmental factors. 'This study brings to the surface something that was buried. The long- term trend of decline is not discernible at first because there are lots of things happening, like the short-term effects of El Nio,' he said.

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