

Ocean's great fish all but gone

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Bob Holmes

The world's fisheries are in a far worse state than anyone thought. Great predatory fish such as shark, marlin, swordfish and tuna that once filled the seas are much scarcer than they once were, according to a new assessment. And worse, stocks that appear to be flourishing may already have been stripped bare without anyone noticing.

Many of the world's important fisheries have already collapsed. The most notorious recent example is the cod fishery in the Atlantic off Newfoundland. Now a decade-long trawl through the archives by marine ecologists has revealed just how fast commercial fishing fleets clear the sea of large fish.

Populations of these species plummet as soon as big fishing boats arrive, the researchers found (*Nature*, vol 423, p 280). They fall by about 80 per cent within the first 10 or 15 years, but eventually stabilise at around 10 per cent of the original numbers. In other words, the world's oceans once held 10 times as many large, predatory fish as they do today.

And even these disturbing figures masks the true scale of the decline, says Ransom Myers of Dalhousie University in Nova Scotia, Canada, who carried out the survey. That is because the fish that remain are also smaller. Tuna average only half the weight they did two decades ago, for example, and marlin only a quarter. He likens the loss to denuding a game reserve of its wildlife. "There was a Serengeti in the ocean, and it's gone now," Myers says.

Hidden devastation

The scale of the devastation has remained hidden because in most of the world's oceans industrial fishing began long before fisheries biologists started making accurate estimates of fish numbers. But now, by scouring the archives, Myers and his colleague Boris Worm have found a few locations for which records show the abundance of fish at the time commercial exploitation was just beginning.

A few involved fisheries for cod and other large bottom-dwelling fish that began in the 1950s and 1960s in the Antarctic Ocean, the Gulf of Thailand and parts of the north-west Atlantic.

The rest came from the records of Japanese longline fisheries for tuna, swordfish and other large predatory fish in the open oceans, which also began in the 1950s. Each told a similar story of fish stocks crashing within years of the arrival of industrial fishing.

The rapidity of the plunder means the damage is usually done before governments can put regulations in place to manage the fishery. "It takes 10 to 15 years for fishermen encountering a new resource to reduce it by an order of magnitude," says Daniel Pauly, a fisheries biologist at the University of British Columbia in Vancouver, Canada. "The institutions we have all require longer than that to become involved and set up a regulatory framework. When management starts building up, the resource is already gone."

Number trap

The fact that populations tend to level off at about 10 per cent of their pristine numbers poses a further trap for managers. Myers thinks fish populations often stabilise at this level because the reduced catch rates drive many commercial boats to fish in other places or for other species.

The danger is that fisheries managers remain unaware of the initial plenty, and come to see this degraded state as normal. Because numbers remain relatively stable, they may even regard the fishery as healthy when it is in fact a mere shadow of its former self.

Myers hopes his study will help dispel that view. "This gives us a baseline to refer to of what the oceans could look like," he says. But to restore these plentiful stocks will be difficult. "I think it means we have to fish a lot less."

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