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**Fish stocks****Dead in the water**

Feb 21st 2002 | BOSTON

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**Stocks of the North Atlantic's most valuable fish are in trouble****Get article background**

THE early prosperity of Massachusetts was based on cod, so a meeting held in the state's principal city was, perhaps, an appropriate place to read the last rites over the North Atlantic's fishing grounds. But no good murder mystery is complete without a post-mortem, and this was one of the topics of discussion at this week's AAAS meeting.



Plenty more fish in the sea?

A number of academics at the University of British Columbia, in Vancouver, have mapped in fine detail the collapse of fish stocks in the North Atlantic basin. Until now, this was not possible because of the way that data about catches are reported by the United Nations' Food and Agriculture Organisation.

Reg Watson and Villy Christensen divided the North Atlantic into 22,000 grid cells, each measuring  $\frac{1}{2}^\circ$  of latitude by  $\frac{1}{2}^\circ$  of longitude. Data from the past century were then painstakingly "retrofitted" on to this grid in order to calculate each cell's biomass of high-value "table fish" (ie, species that are eaten by man, such as cod, haddock and halibut).

The biomass in each cell was reconstructed using a mathematical model that distributes individual species according to known environmental and physical variables, and also historical records of what fish were caught where and when. Then the researchers were able to calculate the fishing intensity as the ratio of the catch data to this biomass.

One result of this work is a clear picture of how fishing expanded from the coasts of North America and Western Europe, pushing out farther and farther into the ocean—something known as serial depletion. This continued until catches peaked in 1975, after which the catch began to decline. Dr Christensen estimates that over the past century the intensity of fishing in the North Atlantic has increased eightfold, while the biomass of table fish has fallen by 85%.

It is not only the amount of fish taken that matters. Fishing alters ecosystems, as well as depleting them, because fishermen favour the

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The [American Association for the Advancement of Science](#) posts a [press release](#) on the research into North Atlantic fisheries presented at its [annual meeting](#). See the [Food and Agriculture Organisation's fisheries page](#), the [Bedford Institute of Oceanography](#) and the [Michelsen Institute](#).

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largest and most valuable specimens. Alida Bundy of the Bedford Institute of Oceanography, in Dartmouth, Nova Scotia, described this process for the Eastern Scotia fishery region off the coast of Canada.

The Eastern Scotia fishery used to yield cod. Lots of them. But catches dwindled until the early 1990s when they suddenly collapsed. Cod of catchable size vanished. What is more, a moratorium on cod fishing failed to lure them back. The whole ecosystem seemed to have shifted, so that adult cod, once the top predator in the region, had no place in it.

Dr Bundy and her colleagues used Ecopath and Ecosim, two computer programs, to track energy flows through the various species in an ecosystem and explore what had happened. They showed that there had been a shift of top predator from cod to hake and seals. More baby cod were being eaten as a result, so adult cod populations could not recover.

**A shift of top predator from cod to hake and seals meant that more baby cod were being eaten**

Ironically, this has turned out to be good for those fishermen who are willing to bend to altered circumstances. The new food web favours invertebrate species such as prawns and lobsters, and their numbers have grown. These are worth more than the fish they have displaced. That does not, however, detract from the fact that, in the North Atlantic as a whole, the productivity of table fish has plummeted and there is no guarantee that profitable invertebrates will fill this gap.

What, if anything, is to be done about it? Ussif Rashid Sumaila, of the Michelsen Institute in Bergen, Norway, suggested modifying the concept of discounted present value in the econometric equations used to describe the exploitation of fisheries. He wants to incorporate the possible interest of future generations in continuing to eat cod, rather than in being rich enough to buy lobster, into the equations.

Such subjective guesswork is unlikely to find favour among mainstream economists. Most economists, though, would look benignly on the removal of subsidies. In the North Atlantic, Dr Sumaila calculates that governments subsidise fishing to the tune of \$2 billion-2.5 billion a year. And while EU fishermen are subsidised to less than a fifth of the value of their catches, subsidies to American and Canadian fishermen amount to a third of the value. But, with many stocks in such awful shape, nobody is fishing for any compliments.

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