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How can we tackle falling fish stocks?

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Under the Microscope: Recent studies have shown that fisheries worldwide are in danger of collapsing from over-fishing.

Some countries, particularly China, have returned inflated figures when reporting their fish catch, which has hidden the gradually declining catch worldwide. Demand for fish is great and fishing boats must now travel much further and fish much deeper in order to try to keep abreast of this demand. The current situation is unsustainable and urgent measures must be introduced to save the fisheries for future generations. The situation is summarised by D. Pauly and R. Watson in July's issue of Scientific American.

Traditionally the oceans of the world were an open resource, fleets from various countries travelling far and wide to fish. In 1982 the UN Convention on the Law of the Sea granted exclusive fishing rights up to 200 miles offshore to ocean-bordering countries. These zones include the continental shelves where most fish live. Relatively few fish live in the open ocean.

Individual countries subsidised the building of new offshore fleets equipped with the latest technological improvements in fishing gear, such as acoustic fish-finders. The result was to greatly increase the fish take, a further acceleration of a trend in place since the 1960s, when large-scale commercial fishing began.

There is great demand for fish worldwide. This demand is fuelled in the developing world by booming populations and in the developed world by the perception that fish is a highly nutritious food, as well as by the demand for fish meal and fish oil. About a third of the worldwide fish catch is used to make fish meal and oil. A third of

the fish meal is used to feed fish in fish farms and two-thirds in feed for land animals.

On May 15th R. A. Myers and B. Worms published a landmark study in the science journal Nature, showing that the great marine predators are being wiped out. The oceans of the world have lost 90 per cent of large predatory fish - marlin, swordfish, tuna, rays and others - since the advent of industrial fishing.

Alarm bells are also going off for other species of fish. The cod population off Newfoundland fell to almost zero 11 years ago. A fishing ban was introduced, but no signs of recovery are evident. Cod stocks in the North Sea and the Irish Sea are close to collapse.

The fish in the oceans are arranged in a food web of several layers. The largest fish eat the next largest, who in turn eat the next largest below them. And so it is down to the bottom of the food chain, which is composed of microscopic plant life called plankton. When the larger fish are depleted by over-fishing, the smaller species are targeted. Pauly and Watson have documented this trend in fisheries worldwide.

Marine fish stocks have become so depleted that, despite the intensive fishing effort, global fish takes have been declining since the late 1980s. The extent of the reverse of the upward trend was masked for a while by the fact that China was over-reporting its fish take, claiming twice as much fish as it actually landed. Because of its large size and the extent of over-reporting, the Chinese figures skewed the global figures. Some other countries also over-report, but they tend to be cancelled out by those that under-report.

The reason for the Chinese over-reporting was political. The communist government set ambitious targets for the Chinese fishing fleets. The fleets failed to meet these targets, but the figures were adjusted upwards to meet the targets as they filtered upwards through the bureaucratic accounting chain. Officials who meet targets are much more likely to be looked on favourably by superiors than officials who fail to meet them.

So what is to be done? You might think that fish farming is the answer, but this will reduce pressure on sea fish only if farmed fish do not consume fish meal. It is possible to farm muscles, clams and tilapia, an herbivorous fish, without fish meal. But fish farming exacerbates the over-fishing problem when fish meal is fed, as is done with salmon and various other carnivores.

Fish meal is made from small sea fish, including many that are fit for human consumption, such as herring, sardines, anchovies and mackerel. Salmon farms consume more fish than they produce. Up to three kilograms of fish meal is needed to produce a kilogram of salmon.

Current worldwide fishing practice is unsustainable. In order to develop sustainable fisheries it will be necessary to significantly reduce fish catches for a while and to introduce "no-take" zones. Such zones should be established close to shore, to protect coastal species, and large offshore zones, to protect ocean fish. In time fish in these zones will thrive, and shoals will move into waters where they can be fished without threatening the seed populations.

Why has the over-fishing problem never caught the imaginations of the environmental pressure groups in the way that other problems have, such as global warming and rainforests? Pauly and Watson suggest that our perceptions of the sea persist from an earlier age, when fishing was a matter of wresting sustenance from a hostile sea, of infinite size and resources, using tiny boats and simple gear - a heroic contest between very unequal combatants. That is no longer the case.

William Reville is associate professor of biochemistry and director of microscopy at University College Cork

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