

The sea

How to catch the overfishermen

Big data allow fish to be protected as never before. Governments should take advantage of this
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OVERFISHING is reaching catastrophic levels. According to a recent study, stocks of the biggest predatory species, such as tuna and swordfish, may have fallen by 90% since the 1950s. Another study, published last week in *Science*, suggests extinction is on the cards for many species. This matters for numerous reasons, not the least of which is that a lot of people rely on fish as part of their regular diet. About 3 billion of the Earth's inhabitants get a fifth or more of their protein from fish—which means that fish are a bigger source of the stuff than beef is. The difficulty is, in part, a consequence of the problem known as the tragedy of the commons, whereby a commonly held resource is over-exploited. Nobody owns the high seas, which are therefore vulnerable to a perfectly legal free-for-all. But a lot of fishing is carried out in territorial waters that stretch 12 nautical miles from a country's coastline, as well as so-called exclusive economic zones that stretch to 200 nautical miles beyond coastlines, over which a more limited sovereignty exists. Governments, in thrall to fishing lobbies which are more concerned with making money today than preserving fish stocks for the future, set unrealistic quotas, and there is a lot of illegal fishing too, conducted without permission in controlled waters. The Pew Charitable Trusts, an American research group, estimates that one fish in five sold in a shop or served in a restaurant has been caught illegally. That amounts to 26m tonnes of fish a year, worth more than \$23 billion.

Until now, trying to stop this illegal trade has been more or less futile. The oceans are vast. Navies and coastguard patrols are small. Even finding those who are up to no good has been hard. That, though, is changing through the use of "big data". It is now feasible (see article) to synthesise information from sources such as radio transponders and satellite observations, in order to track every ocean-going vessel that is, or might be, a fishing boat. Such data can show when a vessel is behaving suspiciously in a prohibited area. They can also link particular vessels with the receiving ships to which they transfer their catches for transport to market.

This promising system will work only if governments enforce existing rules. Like other vessels, fishing boats are required to carry transponders that indicate their position, speed and direction. Captains may switch their transponders off, of course. But the very act of doing so will be noticed, and will immediately suggest they are, as it were, up to something fishy. Other means of scrutiny, such as direct observation by satellite, can then be brought to bear.

Chain reaction

Crucially, given many governments' ambivalence towards enforcing fisheries rules—especially when their own nationals are fishing in other people's waters—the new technology will also help companies protect their supply chains. The one-in-five illegal fish identified by Pew are often being sold by otherwise law-abiding firms that have no way of reliably tracing them back to the vessels that caught them. Soon, retailers will be able to do so—and at least some of their customers will care enough about the matter to make sure these supply chains are, indeed, traced routinely in the way that meat is now traced from farm to chiller-cabinet.

The existence of policing technology will also make it easier to set up marine reserves in which fish can breed, to the benefit of fisheries outside these protected areas. Experiments have shown that these reserves increase catches in the long term, provided no one cheats by plundering them. Big data will make it easier to stop such plunder.

There is a nice irony in this development. Overfishing is the product not just of human greed, but also of technologies such as sonar that have made finding and catching fish far more efficient in recent decades. It is a matter for celebration that technology is now up to the task of catching illegal fishermen as well as fish.

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