

## The ripple effects of shellfish fisheries

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For eco-conscious eaters, choosing shellfish over some popular fin fish at the supermarket often feels like a way to have their seafood and eat it too. We think of them as rapidly reproducing, abundant, and low on the food chain—a guilt-free meal.

But according to a first-of-its-kind study, the exploitation of invertebrate fisheries has significant cascading effects in the ecosystem that affect other species of commercial and conservation interest.

“You can’t fish something without it having an ecosystem effect, but I don’t think anyone was expecting the average ecosystem effects for invertebrate fisheries to be as high as we found them to be,” said lead author Tyler Eddy. “With fin fisheries collapsing around the world, people are turning to new targets—but often without understanding the role they play within the ecosystem.” According to the study, invertebrate catches have increased six-fold since the 1950s.

For the study, published recently in *Fish and Fisheries*, the researchers used 12 ecosystem models from different areas of the world which included 73 groups of invertebrates. These models essentially map out the food web, detailing how much food each species needs and how much they provide to other species. The researchers used these models to run simulations that showed the effects on other species groups when a target invertebrate group was depleted by 0, 25, 60, 80, and 100 percent. An “ecosystem effect” is measured as the percentage of other trophic groups that had a 40 percent biomass change at a given level of target invertebrate depletion.

The simulations found that invertebrate fisheries had a wide range of effects, with cephalopods (like squid) exerting some of the strongest ecosystem effects. Twenty percent of other groups had a greater than 40 percent biomass change as a result of a medium to high intensity exploitation of cephalopods. Of note, the study found that at levels of exploitation that would be considered normal in fishery management plans, there were very strong declines among species of conservation interest including marine turtles, dolphins, and seals.

On average, invertebrate depletions of 60 percent resulted in a 40 percent biomass change for 11 percent of other groups. This is just under the 15 percent ecosystem effect found for forage fish, which include sardines and anchovies. But the researchers found that the maximum level at which invertebrates can be sustainably fished occurs at a lower depletion level than it does for forage fish.

In recent years, growing appreciation for the role forage fish play in ecosystem health has moved scientists to call for slashing depletion rates of many of these species. Meanwhile, the US government recently banned fishing of several species of forage fish. In contrast, Eddy says, most invertebrate fisheries aren’t even subject to management plans.

Given their findings, the authors conclude that it is time to put some backbone into the management of invertebrate fisheries. —Catherine Elton | 15 July 2016

**Source:** Eddy, T.D., *et al.* (2016). Ecosystem effects of invertebrate fisheries. *Fish and Fisheries*. DOI: [10.1111/faf.12165](https://doi.org/10.1111/faf.12165)

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