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nation and world

Only small fish left in oceans by 2050, experts say

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WASHINGTON — Over the past 100 years, about two-thirds of the large predator fish in the ocean have been caught and consumed by humans, and in the decades ahead, the rest are likely to die, too.

In their place, small fish such as sardines and anchovies are flourishing in the absence of the tuna, grouper and cod that traditionally feed on them, creating an ecological imbalance that experts say will forever change the oceans.

"Think of it like the Serengeti, with lions and the antelopes they feed on," said Villy Christensen, of University of British Columbia's Fisheries Centre. "When all the lions are gone, there will be antelopes everywhere. Our oceans are losing their lions and pretty soon will have nothing but antelopes."

This grim reckoning was presented at the American Association for the Advancement of Science's annual meeting Friday during a panel that asked the question: "2050: Will there be fish in the ocean?"

The panel predicted that although there would be fish decades from now, they will be primarily the smaller varieties currently used for fish oil, fish meal for farmed fish and only infrequently as fish for humans. People, the experts said, will have to develop a taste for anchovies, capelins and other smaller species.

That the oceans are being overfished has been documented before, and the collapse of species such as cod and Atlantic salmon is also well-known. The new research attempts to quantify the overall decline in larger fish, based on data from more than 200 ecological systems studied since 1880. Those results were then modeled across the globe.

One startling conclusion: More than 54 percent of the decrease in large predator fish has taken place over the past 40 years.

"It's a question of how many people are fishing, how they are fishing and where they are fishing," Christensen said. A majority of the catch, and now of the decline, involves East Asia, which has witnessed sharp overall economic growth.

In describing the likely explosion of small fish, Christensen's team differed with a 2006 report in the journal *Science* that warned of an ocean without fish for humans by midcentury.

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But they say that absent predators, the fisheries will be out of balance and more subject to die-offs from disease and from boom-and-bust cycles that, over time, can lead to algae or bacteria blooms that take the oxygen out of the waters and make them uninhabitable.

Jacqueline Alder of the U.N. Environment Program suggested that the number of fishing boats and days they fish have to be restricted.

"If we can do this immediately, we will see a decline in fish catches," she said. "However, that will give an opportunity for the fish stocks to rebuild and expand their populations."

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