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Fishing down food web leaves fewer big fish, more small fish in past century

Predatory fish such as cod, tuna, and groupers have declined by two-thirds over the past 100 years, while small forage fish such as sardine, anchovy and capelin have more than doubled over the same period, according to University of British Columbia researchers.

Led by Prof. Villy Christensen of UBC's Fisheries Centre, a team of scientists used more than 200 marine ecosystem models from around the world and extracted more than 68,000 estimates of fish biomass from 1880 to 2007. They presented the findings today at the American Association for the Advancement of Science (AAAS) Annual Meeting in Washington, DC.

Their finding of the simultaneous decline of predatory fish and increase of forage fish provides the strongest evidence to date that humans are indeed "fishing down the food web" and impacting ecosystems globally. The UBC team also found that of the decline in predatory fish population, 54 per cent took place in the last 40 years alone.

"Overfishing has absolutely had a 'when cats are away, the mice will play' effect on our oceans," said Christensen, a professor in the UBC Fisheries Centre. "By removing the large, predatory species from the ocean, small forage fish have been left to thrive."

While the doubling of forage fish amounts to more fish production, Christensen cautioned that the lower trophic-level food web is more vulnerable to environmental fluctuations.

"Currently, forage fish are turned into fishmeal and fish oil and used as feeds for the aquaculture industry, which is in turn becoming increasingly reliant on this feed source," said Christensen. "If the fishing-down-the-food-web trend continues, our oceans may one day become a 'farm' to produce feeds for the aquaculture industry. Goodbye, wild ocean!"

Christensen's presentation was part of an experts' panel to answer the question "2050: Will there be fish in the ocean?" The panel predicted that while there would be fish in 2050, it would consist mostly of the smaller variety.

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