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# Count the bycatch

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Scientists question widely adopted indicator of fisheries' health



Bycatch contributes to fishery decline (Photo: Amit Shanker)A WIDELY used yardstick for judging the health of marine ecosystem may be flawed. The indicator, mean trophic level, uses catch data to assess changes in the balance of species in the food web of an ecosystem. An international team of scientists recently said the indicator overlooks factors like discarded bycatch and recreational fishing and hence could be leading to inaccurate conclusions about

the health of marine ecosystems.

The indicator, first proposed by Daniel Pauly, fisheries scientist at University of British Columbia in USA, in 1998, has been used by Convention of Biological Diversity since 2000. The trophic level of an organism shows where it fits in the food web. For example, microscopic algae are at the level of one, algae-eaters like oysters are at the level two and large predators like tuna and shark are at the top. Pauly, after analysing four decades of catch data, had found the average trophic levels of fish caught were declining since the 1950s.

He had said people are “fishing down marine food webs” by overfishing the ones at the highest trophic levels and then moving down the web. But this is not always the case, said Suresh Sethi, fisheries scientist at University of Washington in USA. Fishers pursue high revenue species that may feature anywhere in the food web, he added. The recent study led by scientists of the university corroborates Sethi's views. Sethi was not part of the study.

Many fisheries do not overexploit the top fish species first, said Trevor Branch, the lead author. In the Gulf of Thailand, for example, fisheries started on mussels and shrimps which are placed low in the food web and then moved on to higher species. As per the mean trophic level theory, the average trophic level of what is being caught in the gulf has been rising and should mean a healthy ecosystem. Instead, surveys there by research trawls show all species of fish have declined tenfold. This indicated a degraded ecosystem, the scientists noted in *Nature* on November 18.

To understand the reliability of the indicator, Branch and his team compared it with the average trophic level of fish in an ecosystem, which was calculated by combining data of fish caught, trawl surveys and fisheries stock. Using computer simulations, they examined four fishing scenarios in 25 ecosystems across the world. One, fishing down scenario in which higher trophic levels were

depleted first followed by lower levels; and two, fishing through scenario in which fishing gradually progressed from higher trophic level to top and lower species.

In the third scenario fishing depended on the species availability and in the fourth scenario, all species were overexploited. In 13 ecosystems, the indicator, mean trophic level of fish caught, did not match with the mean trophic level of ecosystem. The researchers said in most ecosystems, catch from all trophic levels are rising, indicating a fishery collapse.

Instead of relying on the indicator, Branch suggested there is a need to measure trends of species population through scientific surveys. This would also help identify individual species that are being depleted and take measures to cut their catches, he added.

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