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New study questions work of celebrated B.C. scientist

By Margaret Munro, Postmedia News November 18, 2010

One of B.C.'s most celebrated scientists is taking issue with a new study that suggests humans are not fishing down the food web.

The study, published in the journal Nature, challenges a widely cited theory by Daniel Pauly at the University of B.C., who has been warning for years that we could end up eating jellyfish sandwiches because global fisheries target large long-lived fish and then move down the food web to overexploit smaller species.

The new study, led by Trevor Branch at the University of Washington in Seattle, says that in many areas fishermen are not overexploiting the top fish species first. In Thailand, for example, fishermen have been moving up the food web, says Branch, who is calling for better assessment of the health of marine ecosystems.

Pauly takes issue with the new study, saying it is seriously flawed and its conclusions unsubstantiated.

"This paper is a hatchet job, and it's a bad hatchet job," says Pauly, who has a collection of international awards, leads the Sea Around Us Project, and is former director the UBC's fisheries centre.

In 1998, Pauly and his colleagues made international headlines with a study that warned of the dangers of "fishing down the food web" by overharvesting fish such as halibut, cod and tuna at the top of the marine web and then going after smaller fish and invertebrates.

The Branch study is based on a more detailed data set that shows not only what type of fish are being caught but also which fish are in ecosystems. It concludes that the so-called "mean trophic level" of the fish being caught, one of the main indicators Pauly cites as evidence of fishing down the food web, "does not reliably predict changes in marine ecosystems."

"This is important because that measure is the most widely adopted indicator by which to determine the overall health of marine ecosystems," says Branch. Pauly's work prompted the United Nations Convention on Biological Diversity to use the "average trophic level" of fish being caught as a key measure of global marine diversity.

A trophic level is where a species fits in a food web, with plankton and jellyfish near the bottom of the marine food web and large predators such as sharks, halibut and tuna at the top.

Some top predators -- most notably Atlantic cod -- have been depleted by overfishing, but Branch says overharvesting can also start at the bottom of the web.

"For the Gulf of Thailand, the measure [average trophic level] fails because fisheries first targeted mussels and shrimps near the bottom of the food web, before shifting to predators higher up in the food web," says Branch, noting that the average trophic level of what is being caught in the Gulf of Thailand is rising, which should indicate improving ecosystem health.

Instead, he says fish at all levels in the gulf have declined tenfold since the 1950s because of overharvesting.

Branch says the study found using the average trophic levels to assess the state of marine ecosystems led to "inaccurate conclusions in nearly half" the 14 ecosystems examined.

"It's about as good as flipping a coin; half the time you get a right answer and half the time you get the wrong answer," he says.

Pauly says the study does not properly reflect the expansion of the global fisheries and ignores many important fisheries in Asia, Africa and South America.

It also "flies in the face of everything we know in fisheries, and generally in biology, where long-lived large organisms are more easily overexploited than short-lived, small ones," says Pauly, who is firing off a letter to the editor of Nature taking issue with the study.

Branch says that the study is "not personal" and notes that Pauly's groundbreaking work has made it socially unacceptable to overfish.

"It's had an enormous impact internationally," he says.

But Branch says a more comprehensive measures are needed to assess fishing impacts and ecosystem management. He and his colleagues call for more emphasis on tracking trends in the true abundance of marine species, particularly those vulnerable to depletion.

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