

Diverse catches are better for fishery ecosystems

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Fishing for a 'balanced harvest' can achieve productive fisheries as well as environmental conservation, an international scientific team reports today in the journal *Science*.

In contrast, increasing fishing [selectivity](#) to catch a small group of species and sizes neither maximises production nor minimises the ecological effects of fishing, according to the paper titled, 'Reconsidering the Consequences of Selective Fisheries'.

The [collaboration](#) that led to the paper was fostered by the International Union for the Conservation of Nature's Commission on Ecosystem Management and involved both conservation and fisheries scientists.

It supports earlier research by co-authors Shijie Zhou, Beth Fulton and Tony Smith of the CSIRO Wealth from Oceans Flagship that found a moderate level of fishing – spread across a wide range of species, stocks and sizes – can achieve high catch levels while conserving biodiversity.

The new evidence, including results from Dr Fulton's modelling of 30 ecosystems worldwide, confirms that with fishing spread over more groups and sizes, yields are higher and the adverse impacts of fishing on biodiversity are lower.

"Traditionally, fisheries have used species and size limits, gear technology and spatial and temporal fishing restrictions to increase selectivity: capturing species, sexes, and sizes in proportions that differ

from their occurrence in the ecosystem," Dr Smith says.

"This has been intended to help sustain target populations, protect rare and charismatic species, and minimise the capture of unwanted species and sizes (bycatch).

"But selective removals, except at economically unacceptably low levels of harvest, inevitably alter the composition of a population or community and, consequently, ecosystem structure and biodiversity."

The authors show that heavy selective fishing has caused structural changes to [fish](#) communities in the North Sea and elsewhere.

By contrast, in several African small-scale inland fisheries, the fish size spectrum – a measure of community structure – has been maintained under intensive and diverse fishing activities that cause high mortality with low selectivity.

Implementing balanced harvesting requires coordinated management at an ecosystem level across all fisheries in a region. Ecosystem modelling could help in determining appropriate patterns of fishing.

Markets and the processing sector in some regions would need encouragement to accommodate sizes and species not traditionally utilised.

The authors say that while issues regarding the potential benefits and implementation of balanced harvesting remain, consideration of food security and ecosystem impacts suggests the time has come to take action.

Provided by CSIRO Australia

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