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# Fisheries in Focus: Recent paper in Science confirms basic fisheries science, conjures causality

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By Max Mossler

**Size-based conservation is a possible approach only for species that humans do not fish**



Sustainable Fisheries-UW: Better fisheries management requires enforcement of already-in-place limits, not new regulations that also go unenforced.



A recent paper in *Science* (<https://www.science.org/doi/10.1126/science.adi7562>) spent millions of dollars deploying underwater cameras around the world to measure the size of fish in proximity to humans and in protected areas. The results add visual confirmation to long-held tenets of fisheries science, but the authors' conclusions – namely, how to best enhance and protect big sharks – are unsupported.

Here is a breakdown of some of the key points from Letessier et al. (<https://www.science.org/doi/10.1126/science.adi7562>) and why its conclusions miss the mark.

## The size of fish in proximity to humans

The researchers found that fish were larger on average the farther they were from human activity. This makes intuitive sense, and indeed, it has been known for hundreds of years that fisheries reduce the average size of individual fish. Growing old and large is much harder when being fished every year.

Older and larger fish reproduce more efficiently, but good fisheries management accounts for that – every sustainably fished population in the world would have bigger and older fish if fishing stopped. In the paper, most of the underwater camera samples occurred off the coast of Australia and New Zealand, which have excellent fishery management – we would expect those well-managed fisheries to have smaller fish.



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## The size of pelagic fish in protected areas

The conclusion that fish farther away from human development are larger is not surprising and it holds up when adding spatial protection as a variable. Fish in partially or highly protected areas are larger the farther away they are from human markets.

Pelagic megafauna that migrate in and out of protected areas – like sharks, tunas and billfish – show a disproportionate increase in size when far away from humans and in a highly protected area. However, smaller benthic fauna see little difference in size in protected areas and are mostly dependent on distance from humans.

## Are distant protected areas the answer then?

Based on their results, the authors of the paper argue that large, protected areas far away from humans (like on the high seas) would help protect large pelagic species, specifically sharks and ensure that they can grow large. Tuna and billfish are doing well around the world, but many shark species are overfished and threatened.

Evidence shows that reducing fishing pressure on sharks is the best way to help them. Large, highly protected areas might reduce a little fishing pressure, but most fishing will simply move to other, unregulated areas and continue to threaten sharks.

The major shark conservation paper cited by the authors, [Dulvey et al. 2021](https://www.sciencedirect.com/science/article/pii/S0960982221011982#undfig1) (<https://www.sciencedirect.com/science/article/pii/S0960982221011982#undfig1>), which led a global review of shark threats found that:

Species are disproportionately threatened in tropical and subtropical coastal waters. Science-based limits on fishing, effective marine protected areas and approaches that reduce or eliminate fishing mortality are urgently needed to minimize the mortality of threatened species and ensure sustainable catch and trade of others.

Science-based catch limits are already in place in many of the places studied (including the high seas). Enforcement is not as robust as it should be on the high seas; the answer is better enforcement of already in-place limits, not new regulations that also would not be enforced.

The authors also argue for more size-based conservation. That is a possible approach for species that humans do not fish, but any population that is fished and highly mobile (like tuna, sharks and billfish), will not reach pre-industrial sizes, no matter the conservation interventions. Fishing, like all food production, requires trade-offs.

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