

New study highlights hidden values of open ocean

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Marine life such as eastern spinner dolphins help capture and store carbon, an example of "ecosystem services" that provide lasting value. Credit: R. Pitman/NOAA Fisheries

What is the value of the open ocean? While commercial fisheries may be one of the most obvious sources of economic value the ocean provides, they are not the only one.

Now a team of scientists from NOAA Fisheries and the University of

California San Diego (Scripps Institution of Oceanography and Department of Economics) has for the first time attached a dollar value to several of the leading "ecosystem services"—or natural benefits - provided by the Eastern Tropical Pacific Ocean, an immense region stretching west from the west coasts of North and South America.

Taken together, the ecosystem services provided by the Eastern Tropical Pacific are worth at least close to \$17 billion, the scientists found. That includes commercial fishing worth \$2.7 billion a year, but also includes sport fishing worth \$1.6 billion a year and the capture and storage of carbon that would otherwise cost \$12.9 billion annually, according to the research results published in April The previous link is a link to non-Federal government web site.

The scientists caution that the numbers are minimums, based only on available data and [fisheries](#) records, and the true economic value is probably even higher. For instance, research and conservation efforts to understand and protect the ocean's biodiversity may contribute hundreds of millions of dollars more worth of economic value.



The Eastern Tropical Pacific is an especially rich region of the world's oceans, including more than one-third the world's cetacean, seabird and marine turtle species. Credit: NOAA Fisheries

"This study combined my interests in biology and economics, and it changed the way I think about the ocean," said Summer L. Martin, a postdoctoral researcher at NOAA Fisheries and lead author of the new paper. Her coauthors included Lisa Ballance of NOAA Fisheries' Southwest Fisheries Science Center and Theodore Groves of the University of California, San Diego. "We hear a lot about fishing on the high seas, and fishing is important, but there's so much more going on," Martin said.

Why attach a dollar value to the ocean? For one thing, it will help ocean management agencies and the public understand the value of complete ecosystems, as opposed to pieces of the ecosystems such as certain species of fish. That is increasingly important as agencies shift toward more ecosystem-based management that strives to recognize and protect intact ecosystems.

Putting values on the environmental benefits of the ocean may also help managers weigh trade-offs between different values. For example, fishing that depletes populations of fish or marine mammals reduces the capacity of the ocean ecosystem to capture and store carbon within those animal populations, leaving it in the atmosphere where it may contribute to climate change.

Rebuilding depleted populations of dolphins and fish may provide \$3.2 million worth of carbon storage, based on average European carbon market prices, for instance.



Researchers developed maps showing areas richest in seabird species such as the red-tailed tropicbird. Credit: L. Ballance/NOAA Fisheries

"Understanding the benefits and values we derive from ocean ecosystems is an important part of making decisions about our activities today and into the future," Martin said.

The Eastern Tropical Pacific is an especially rich region of the world's oceans, including more than one-third the world's cetacean, seabird and marine turtle species. The study developed maps highlighting areas of commercial fisheries catches, sightings of marine turtles and species richness of cetaceans, seabirds and larval fishes. The maps showed that hotspots of commercial fishing, biodiversity and recreational fishing

often overlap.

"This research is important for pushing us toward ecosystem-based management in the open [ocean](#)," said Ballance, co-author and director of the Marine Mammal and Turtle Research Division at NOAA Fisheries' Southwest Fisheries Science Center. "It sets the stage for further analyses of trade-offs, which can inform decisions about resource management and biodiversity conservation."

More information: Summer L. Martin et al, An Ecosystem Services Perspective for the Oceanic Eastern Tropical Pacific: Commercial Fisheries, Carbon Storage, Recreational Fishing, and Biodiversity, *Frontiers in Marine Science* (2016). [DOI: 10.3389/fmars.2016.00050](https://doi.org/10.3389/fmars.2016.00050)

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