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Harrison Tasoff

A conservation market could incentivize global ocean protection

The countries of the world agreed: Our planet needs more protection from human activity. And with the globe facing an assortment of environmental crises, they realized the plan needed to be ambitious. Thirty-by-thirty was their proposal: protect 30% of the planet by 2030. But while conservation is popular in principle, the costs of actually enacting it often stall even the most earnest efforts.

Three researchers at UC Santa Barbara have proposed a market-based approach to achieving the 30x30 targets in the ocean. They tested whether a system that allowed countries to trade conservation credits could reduce costs, incentivizing nations to actually meet their goals. Allowing voluntary trade always reduced the cost of conservation, sometimes by more than 90%. The study, published in Science, is the first to draft and analyze a conservation market for achieving 30x30 targets in the ocean.

The 30x30 initiative is one aspect of the Convention on Biological Diversity, a multilateral treaty developed in the early 1990s. In fact, it’s target No. 3 of the larger Global Biodiversity Framework (GBF) adopted by the 196 countries that convened for the UN Biodiversity Conference in 2022. It calls for the effective protection and management of 30% of the world’s terrestrial, freshwater, coastal and marine areas by the year 2030 — a goal that many scientists say humanity must achieve to secure our planet’s long-term health. And while the GBF requires countries to commit to conservation targets, it does not outline which areas should be protected,

how to do so inclusively or how to pay for it.

“This project started just over four years ago,” said co-author Juan Carlos Villaseñor-Derbez, who completed his doctorate at UCSB’s Bren School of Environmental Science & Management. At this point, countries were falling short of the 10% protection benchmark as they drafted plans for 30% protection. “It seemed like most nations were genuinely committed to marine conservation, but that the costs of conserving were preventing some from engaging in it at all.

“At the same time,” he added, “a lot of research had already shown that if you could get nations to cooperate around conservation, you could substantially reduce the costs of conserving.” He and his co-authors realized the world needed an institution, policy or framework that could support this.

Uneven costs and benefits

The cost of protecting acres of ocean is not the only aspect that differs from place to place. The ecological benefits of conservation also vary based on location. Achieving 30x30 in the ocean will require coastal nations to consider potential trade-offs associated with these protections. Because high-value fisheries can coincide with important marine ecosystems — such as coral reefs, seagrass meadows and kelp forests — meeting the obligation could come at a high cost for some nations but not others. “Without an innovative policy solution, the cost of conservation for many nations could stall progress toward 30x30,” said Villasenor-Derbez.

This variability means that trade could incentivize additional gains. Instead of investing in areas with high conservation costs, or low benefits, nations could exchange their duties to double down on regions where protection yields higher returns.

Environmental economists and scientists at UC Santa Barbara’s Environmental Markets Lab (emLab) wondered if a conservation credit system could help meet 30x30 targets in the ocean. They devised a system whereby nations could trade their conservation obligation with other nations through a “transferable conservation market” policy built around ecological principles.

“Like existing mandates, this approach requires every country to protect a certain fraction (say 30%) of its marine habitat,” said Distinguished Professor Christopher

Costello, emLab's director. "But unlike other approaches, we allow those obligations to be traded across countries, within strict ecological constraints." In this way, countries with higher conservation costs pay others to increase their conservation efforts. This study estimates the potential global cost savings under various trading constraints.

"For example, Norway, which has valuable fisheries, might pay Palau, a country that has already invested significantly in coastal conservation, to conserve additional areas on Norway's behalf," Costello said. This enables Norway to fulfill its conservation obligations in another part of the world.

Achieving 30x30 in the ocean

Costello, Villaseñor-Derbez and co-author Professor Andrew Plantinga developed a model to estimate the potential costs and benefits that could be achieved through a conservation market like this. They combined distribution data for 23,699 marine species with fisheries revenue data to build conservation supply curves for the world's coastal nations.

They then defined "trade bubbles" based on biological and geographic factors. A country could trade conservation credits only with other nations within these predefined bubbles in order to ensure conservation was equitably spread across Earth's different marine habitats. The authors examined five bubble policies that allow nations to trade within hemispheres, biogeographic realms, provinces, ecoregions, or globally, to determine potential costs.

Regardless of how they tweaked this setup, a market for marine conservation always reduced the costs of conservation. The model estimated savings could range from 37.4% all the way to 98% under the 30x30 target.

"It just highlighted how inefficient it is to require uniform conservation obligations from each nation," Villaseñor-Derbez said. "After all, national boundaries don't really overlap or line-up with the distribution patterns of marine biodiversity."

Savings were highest in a global market, where every nation stands to gain from trade. But a global market could inadvertently focus conservation efforts on only a

single type of habitat, neglecting others. That was precisely why the team introduced the trade bubble constraint.

“When nations facing large costs are allowed to trade, they can ask themselves ‘should I conserve in my waters at this high cost, or can I find someone in my bubble that has habitat just as good as mine but at a lower price?’” Villaseñor-Derbez said. The same would be true for a selling nation. They could decide whether to conserve more than they are required depending on the trading price.

Of course, a country could always go it alone, fulfilling their conservation obligations (and theirs alone) entirely within their own territory. Indeed, this is precisely how the 30x30 initiative currently looks. But the authors’ analysis suggests that very few countries will. Most find it far more economical to either buy or sell conservation obligations.

Conservation colonialism vs fair compensation

If a market system were established, some might wonder what would prevent wealthy nations from simply “paying off” their conservation obligations and offloading them onto poorer nations. For Costello, Villaseñor-Derbez and Plantinga, the market itself offers a solution. “All such exchanges are purely voluntary,” said Plantinga, who heads emLab’s Productive Landscapes Group. “The selling nation (the poor country in this example) only engages in trade if they find it advantageous.”

In fact, the market could be a boon for developing nations. The current 30x30 scheme requires even a cash-poor country with high conservation to conserve 30% of their territorial waters. The market approach offers a degree of flexibility: The country can weigh their finances against their conservation costs. They can then decide how much of their obligation to fulfill within their own waters, how much to buy from another nation, and how much to offer up for sale. This flexibility is not possible under the current approach to 30x30.

This system could also incentivize habitat restoration, target No. 2 of the GBF. Nations that tend to specialize in exploiting marine resources could compensate those who specialize in conserving marine biodiversity. “Our approach provides an explicit payment for conserving marine ecosystems,” Costello said. “Under the

current system, there is rarely a payment to conserve.”

Lowering costs incentivizes action. This measurable effect is a central tenet of economics employed by governments, companies and industries across sectors and countries. So why not harness this principle for conservation? According to the authors, these savings could be redirected towards solving other pressing issues.

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Media Contact

Harrison Tasoff

Science Writer

(805) 893-7220

harrisontasoff@ucsb.edu

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