

BLUE CARBON

A Potentially Winning Climate Strategy

As global leaders struggle to cut greenhouse gas emissions, a cost-effective way to reduce the amount of carbon dioxide (CO₂) released into the atmosphere may lie in preventing the loss of mangrove forests found on the coastlines of most tropical nations.

Mangroves, which are among the most unique and rapidly disappearing natural environments in the world, store enormous amounts of carbon, especially in the earth below their roots, possibly equal in total to roughly 2.5 times annual global CO₂ emissions. Between 1990 and 2005, mangrove loss occurred at a rate of about 0.7 percent per year. When these coastal habitats are disturbed by changes in land use, the so-called blue carbon locked away in the bodies of the plants or in the soil is gradually exposed to air and released as CO₂ into the atmosphere.

In a new study released by RFF and the University of California, Davis, co-authors

Juha Siikamäki, James Sanchirico, and Sunny Jardine estimate that protecting mangrove forests from development can reduce CO₂ emissions at a cost of \$4–\$10 per ton, while the current market prices for carbon offsets are on the order of \$10–\$20. By protecting these ecosystems from development or destruction, global leaders could achieve a reduction in greenhouse gas emissions on par with taking millions of cars off the roads. This suggests that in many places mangroves are worth saving for their carbon storage potential alone.

One upshot of protecting mangroves for the purpose of offsetting emissions is preservation of habitats and biodiversity. A conservation strategy based solely on carbon would not automatically target areas most valuable for biodiversity. However, a biodiversity-focused strategy would only modestly raise the costs of a blue carbon program.



"We find that protecting mangroves can be competitive with other approaches for reducing global greenhouse gas emissions," said Siikamäki, a fellow and associate research director at RFF. "The bonus is that in doing so, we can preserve important habitats critical to coastal fisheries, rich in biodiversity, and home to hundreds of species of plants and animals, many of them endangered."

A promising vehicle for valuing and preserving blue carbon may be bilateral deforestation agreements. Developed countries looking to cut their emissions could choose to finance those reductions by preserving mangroves in developing countries rather than adopting high-cost domestic mitigation actions, such as retrofitting factories, adopting regulations on automobiles, and otherwise reducing fossil fuel use. The two countries would define the types of projects that are eligible to be counted as offsets as well as the rules for determining the quality of those offsets.

One serious challenge to realizing the potential for blue carbon may lie in limits to governance capacity. It is plausible that governments with problematic manage-

ment and institutional environments will be unable to join the carbon market. Removing countries that score in the bottom half of the World Bank's index on governance effectiveness reduces the potential blue carbon offset supply by three-quarters.

Today, there is no formal system for including blue carbon ecosystems in global or regional emissions trading programs. The economics of preserving blue carbon habitats suggest it would be worthwhile to focus on establishing a place for blue carbon in such programs.

Language included in the American Power Act of 2010 paved the way for including marine ecosystems in carbon-offset programs that would eventually have been part of a cap-and-trade program had the bill become law. Although it did not pass, including such provisions increases the likelihood that blue carbon could be part of US offset programs with developing countries in the future. ●

FURTHER READING

Siikamäki, Juha, James N. Sanchirico, and Sunny L. Jardine, 2012. Global Economic Potential for Reducing Carbon Dioxide Emissions from Mangrove Loss. *Proceedings of the National Academy of Sciences Early Edition*, July 30. <http://www.pnas.org/content/early/2012/07/25/1200519109.short>.