National Ecosystem Services Partnership

FEDERAL RESOURCE MANAGEMENT AND ECOSYSTEM SERVICES GUIDEBOOK

Federal Agency Explorations and Applications: Case 3: (National Oceanic and Atmospheric Administration))

Operationalizing and Leveraging an Ecosystem Services Framework for Habitat Conservation: Coastal Blue Carbon

Ariana Sutton-Grier

FEDERAL AGENCY EXPLORATIONS AND APPLICATIONS: CASE 3

National Oceanic and Atmospheric Administration

Operationalizing and Leveraging an Ecosystem Services Framework for Habitat Conservation: Coastal Blue Carbon

Ariana Sutton-Grier, University of Maryland and
National Oceanic and Atmospheric Administration

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FEDERAL RESOURCE MANAGEMENT AND ECOSYSTEM SERVICES

Institutional Partners

National Oceanic and Atmospheric Administration
U.S Army Corps of Engineers
U.S. Bureau of Land Management
U.S. Department of Agriculture
U.S. Department of the Interior
U.S. Environmental Protection Agency
U.S. Forest Service
U.S. Geological Survey

Clark University
Duke University
The University of Maryland Center for Environmental Science
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About This Document

This case is part of the Federal Resource Management and Ecosystem Services (FRMES) Guidebook created by the National Ecosystem Services Partnership (NESP). NESP, housed at the Nicholas Institute for Environmental Policy Solutions, seeks to enhance collaboration within the ecosystem services community and to strengthen coordination of policy implementation and research at the national level. The FRMES Guidebook represents a collaborative effort by federal agencies and outside experts to develop a credible and feasible approach to incorporating ecosystem services into the decision-making processes of federal agencies.

Cases are written and approved by the author(s)' agency, but they have not been peer reviewed. They describe the decision-making context within which that agency is considering or testing an ecosystem services management framework, and they present approaches or innovations that the agency is using to incorporate ecosystem services into its planning and decision-making processes. Cases informed development of the FRMES Guidebook and could be of value to others embarking on ecosystem services planning and management efforts.

To read other federal agency explorations and applications of an ecosystem services management framework, visit www.nespguidebook.com.

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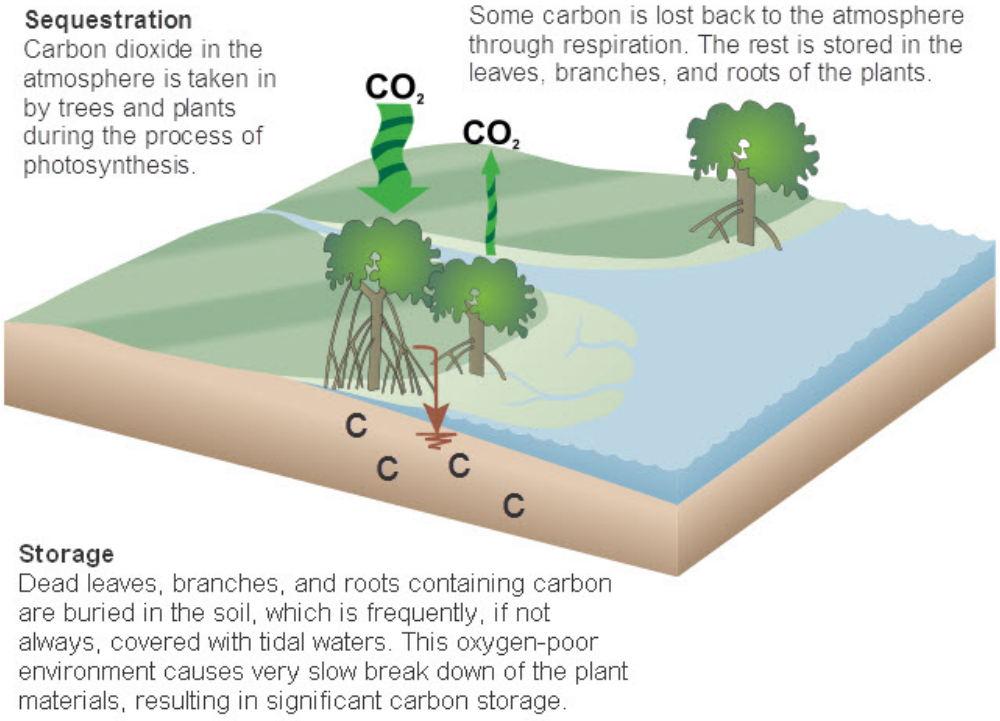
Background

Blue carbon is the carbon sequestered (meaning taken up by biological organisms) and stored in marine and coastal habitats (Figure 1). Coastal blue carbon is the portion of blue carbon in coastal habitats, and refers specifically to three habitats: mangroves, salt marshes, and seagrass meadows.

Figure 1. Carbon Sequestration and Storage in a Mangrove Swamp.



Source: NOAA Office of Habitat Conservation.

Coastal habitats play an important role in the global carbon cycle by sequestering large amounts of carbon annually and storing carbon for long periods of time (decades to centuries). Recent studies have determined that blue carbon habitats annually sequester 10 times as much carbon as terrestrial forest ecosystems such that, even though blue carbon habitats represent a smaller total area on the planet, they are an approximately equivalent sink to forest systems (McLeod et al. 2011). Despite the impressive rates of carbon sequestration and storage in coastal ecosystems, however, human activities, including climate change, urbanization, and unsustainable aquaculture, are contributing to the rapid degradation or destruction of these habitats worldwide: 0.7–7% of total global area are lost per year (McLeod et al. 2011). When these habitats are degraded or lost, we lose not only their capacity to sequester carbon each year, but also long-term storage of carbon in their soils; important natural carbon sinks become large greenhouse gas sources. Protecting or restoring these coastal habitats can therefore be a win-win situation that will not only contribute to climate mitigation efforts, but also provide further incentives to conserve ecosystems on which humans depend for a

wide variety of other valuable ecosystem services, including nursery habitats for fisheries, storm protection, tourism and recreational opportunities, and water quality improvements.

Figure 2. Examples of Coastal Blue Carbon Habitats.

(a) Mangroves *(b) Salt marsh* *(c) Seagrass*

Source: NOAA.

NOAA's Coastal Blue Carbon Projects

Two primary projects have resulted from NOAA's coastal blue carbon efforts to date. First, in part to meet milestones in the National Ocean Policy related to coastal habitat restoration, NOAA led a policy analysis examining whether coastal blue carbon is currently being included in the implementation of any federal policies.[1] Two studies investigated the potential role of coastal blue carbon in federal regulations and statutes, including the Clean Water Act, the Coastal Zone Management Act, the Natural Resources Damage Assessment process, the Endangered Species Act, the Principles and Guidelines for federal water projects (P&G), and the National Environmental Policy Act (Sutton-Grier et al. 2013; Pendleton and Sutton-Grier et al. 2013). These analyses demonstrated that coastal blue carbon is not included in the implementation of these policies, but that it could be included in all of them without any changes to the legislation. They also determined that if coastal blue carbon were included, the outcome of implementation of these policies, which currently focus on living resources, could change. For example, consider the possible outcome of reflecting carbon services in Clean Water Act mitigation requirements. Because blue carbon habitats have such high rates of carbon sequestration—approximately 10 times that of forested ecosystems (McLeod et al. 2011)—and because they store large amounts of carbon that is decades to centuries old, mitigation ratios that would offset the loss of carbon sequestration and storage would likely be much higher than current mitigation ratios that offset the loss of living resources such as habitat. Or consider the possible outcome of reflecting carbon services in the Natural Resources Damage Assessment process, which involves determining the habitat equivalency for injured ecosystems. If carbon services were to be reflected in coastal ecosystem damage assessments, these assessments would increase sharply. Consequently, more restoration would be necessary to offset the lost services (damages).

Carbon services are not considered in policy implementation because of (1) a lack of guidance on how to incorporate them into that implementation, (2) a lack of standard methods for measuring and valuing them, and (3) a lack of capacity in federal agencies for assessing proposed projects or actions' impacts on them. For more specific details of these analyses, see Sutton-Grier et al. (2013) and Pendleton and

[1] http://www.whitehouse.gov/files/documents/2010stewardship-eo.pdf.

Sutton-Grier et al. (2013). Overall, including carbon services in the implementation of federal policies could lead to additional habitat conservation—through additional restoration, as described above, or agency decisions that could lead to additional protection.

A second project is a scientific research project funded at one of the National Estuarine Research Reserve Systems (NERRS) that focuses on understanding how nitrogen pollution affects the sequestration and emission of greenhouse gases (carbon dioxide, nitrous oxide, and methane) in estuarine wetlands.[2] One of the goals of this effort is to develop a carbon-offset protocol for coastal wetlands, which would allow carbon in wetlands to be included in voluntary markets. (For more information, visit http://wbnerrwetlandscarbon.net/).

Decision Context

NOAA focuses its coastal blue carbon efforts on carbon sequestration and storage. It wants other federal agencies to recognize that preserving these carbon services leads to protection or restoration of entire ecosystems and hence protects all the other services these ecosystems provide (storm protection, nursery habitat, water filtration, and so on). Valuing the carbon in coastal habitats is one tool that can lead to additional habitat protection or restoration—through changes in the implementation of policies or through additional funding via carbon markets. Thus, for NOAA, the end goal is coastal habitat conservation, and carbon services are one tool to achieve that goal.

NOAA hopes its efforts related to coastal blue carbon will affect planning, management, and implementation of policies in several ways. As mentioned above, the two recent policy analyses (Sutton-Grier et al. 2013 and Pendleton and Sutton-Grier et al. 2013) suggest ways in which the carbon services provided by ecosystems can be incorporated into federal policies and thereby potentially lead to additional habitat conservation. Other NOAA activities support the development of carbon market mechanisms that could promote habitat conservation. For example, NOAA helped fund some studies needed to inform the development of a methodology for getting voluntary carbon credits for restored wetlands. This methodology was submitted for review in December 2013 to the Verified Carbon Standard (VCS).[3] If it is approved, anyone around the world could potentially receive carbon credits for wetland restoration projects. Overall, NOAA has supported, and will continue to support, a number of blue carbon science and policy efforts with the end goal of protecting and restoring more coastal habitats in the United States and around the world.

NOAA Coastal Blue Carbon Capacity and Partners

NOAA leadership became interested in coastal blue carbon during the fall of 2010, in large part because of updates presented to NOAA on the work of partners, primarily Conservation International (CI) and Restore America's Estuaries (RAE).[4] It requested an analysis of the state of coastal blue carbon science and policy and subsequently, a work plan for how NOAA could best leverage its resources and engage in coastal blue carbon activities. To perform these tasks, the NOAA Coastal Blue Carbon team was formed in January 2011. Its ad hoc members come from many of the NOAA line offices. Other team members come from NOAA's International Office, Office of Habitat Conservation, Marine Protected Areas Office, and Climate Program Office.

NOAA has capitalized on a great deal of existing resources to make progress on coastal blue carbon. We have used our expertise in coastal habitat science, carbon dynamics of ecosystems, and

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[2] http://www.nerrs.noaa.gov.
[3] http://www.v-c-s.org.
[4] http://www.conservation.org/Pages/default.aspx; http://www.estuaries.org.

biogeochemistry to understand the science of blue carbon. We have used our expertise in federal policies related to fisheries and coastal ecosystem management to assess the state of U.S. policy related to blue carbon. We have used our expertise in climate negotiations to understand the international policy landscape related to blue carbon.

NOAA has also relied on data available in reports and peer-reviewed publications to inform its analysis of coastal blue carbon science and policy opportunities, particularly to understand the amount and dynamics of carbon sequestered and stored in coastal habitats as well as the negative impacts when these habitats are degraded or destroyed. Although we are not yet calculating trade-offs between carbon services and other ecosystem services in coastal habitats, we are tracking the development of a new tool that will help us do so. The tool Marine InVEST will soon have the capability to model carbon sequestration and storage, allowing us to assess trade-offs between carbon and other ecosystem services when doing coastal and marine spatial planning.[5]

NOAA has two primary coastal blue carbon leaders or champions: Paul Sandifer, chief science adviser for the National Ocean Service, and Craig McLean, deputy assistant administrator for program and administration in Oceanic and Atmospheric Research (OAR). But we have no programmatic home for coastal blue carbon, and no specific office has taken responsibility for implementing actions in the coastal blue carbon work plan. The Coastal Blue Carbon Team has implemented actions as they relate to members' other job duties, such as climate change mitigation and adaptation, international partnerships, and habitat conservation.

No new funding has been directed to NOAA's coastal blue carbon efforts. All these efforts have relied on existing programmatic funding. Additional funding to fill gaps in coastal blue carbon science is particularly needed.

Given its budget constraints, NOAA has relied on its partners to help make progress on blue carbon efforts. We have worked closely with RAE and CI as well as with outside partners, including the International Union for the Conservation of Nature and colleagues in the Nicholas Institute for Environmental Policy Solutions at Duke University. In the spring of 2011, we established the Coastal Blue Carbon Interagency Team, which is co-led by NOAA and the Fish and Wildlife Service (FWS) and includes representatives of the EPA, the U.S. Geological Service, the Forest Service, USAID, and the U.S. State Department. Participation is voluntary, and to date the team has focused on information sharing.

Conclusion

NOAA, like most federal agencies, is working out how best to use an ecosystem services framework to improve its natural resource management. One of our primary responsibilities, protecting fisheries, is a key ecosystem service, but NOAA is also concerned with coastal habitat conservation and restoration, the protection of coastal communities and economies, and marine transportation and commerce, among many other priorities. All of these have connections to ecosystem services and the benefits people receive from healthy oceans and coasts. Our blue carbon efforts are still relatively new, but the hope is that the lessons learned from blue carbon activities and partnerships will help inform the development and application of an ecosystem services framework that can guide future agency activities.

[5] http://www.naturalcapitalproject.org/pubs/marine/MarineInVEST_Belize.pdf.

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About the Author

Ariana Sutton-Grier is a member of the research faculty at the University of Maryland and ecosystem science advisor for the National Ocean Service at the National Oceanic and Atmospheric Administration.

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About the National Ecosystem Services Partnership

The National Ecosystem Services Partnership (NESP) engages both public and private individuals and organizations to enhance collaboration within the ecosystem services community and to strengthen coordination of policy and market implementation and research at the national level. The partnership is an initiative of Duke University's Nicholas Institute for Environmental Policy Solutions and was developed with support from the U.S. Environmental Protection Agency and with donations of expertise and time from many public and private institutions. The partnership is led by Lydia Olander, director of the Ecosystem Services Program at the Nicholas Institute, and draws on the expertise of federal agency staff, academics, NGO leaders, and ecosystem services management practitioners.

About the Nicholas Institute for Environmental Policy Solutions

Established in 2005, the Nicholas Institute for Environmental Policy Solutions at Duke University improves environmental policymaking worldwide through objective, fact-based research in the areas of climate change, the economics of limiting carbon pollution, emerging environmental markets, oceans governance and coastal management, and freshwater management. The Nicholas Institute is part of Duke University and its wider community of world-class scholars. This unique resource allows the Nicholas Institute's team of economists, scientists, lawyers, and policy experts not only to deliver timely, credible analyses to a wide variety of decision makers, but also to convene decision makers to reach a shared understanding of this century's most pressing environmental problems.

For more information about the
Federal Resources Management and Ecosystem Services Guidebook,
visit www.nespguidebook.com.

For more information, please contact:

Lydia Olander
E-mail: Lydia.olander@duke.edu
Phone: 919-613-9713
Web: http://bit.ly/1zCpSnt

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