

Measurement Protocol: Change in Economic Costs Resulting From Carbon Emissions

Project: GEMS
<http://bit.ly/NI-GEMS>

If you are encountering GEMS protocols for the first time, please read:

- The GEMS protocols can help you develop a monitoring plan for a restoration project. They were developed based on existing published monitoring methods, but should not be considered prescriptive or the only appropriate way to monitor.
 - Each protocol is written as if you are monitoring a single outcome, but it is very possible you will be measuring multiple outcomes and may be able to use the same or similar methods to do so. Think about ways to be strategic and efficient when combining methods from different protocols. For example, are there ways to ask questions about multiple outcomes using a single survey instrument? Or is there a way to host a workshop that asks community members about barriers to accessing multiple types of outcomes?
 - Please be aware that the “who” methods—aimed at documenting who will be affected by social and economic changes caused by a restoration project—are quite similar across protocols. Where possible and sensible, you should consolidate community engagement methods that assess stakeholder perceptions of project outcomes to avoid stakeholder fatigue.
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Background

This document provides an overview of methods for measuring the change in economic costs resulting from carbon sequestration associated with a habitat restoration project (mangrove, salt marsh, or seagrass restoration) or from reduced greenhouse gas emissions associated with a water quality enhancement project (e.g. agricultural BMPs, wastewater treatment plant improvements, and treatment wetlands).

This metric is calculated using an estimate for the social cost of carbon. The social cost of carbon is the calculated total economic cost to society of an additional ton of carbon dioxide equivalent released into the atmosphere. This cost incorporates many different impacts of climate change, including human health effects, changes in agricultural productivity, and increased flood risk. The Interagency Working Group on the Social Cost of Greenhouse Gases has developed [social cost of greenhouse gas estimates](#) for U.S. federal agencies to use in cost-benefit analyses.

The “how much” method below helps you measure what the avoided costs to society of carbon storage or emissions changes caused by the project are.

Relevant Coastal Restoration Approaches

Habitat Restoration – Salt Marsh, Seagrass, Mangrove Restoration

Water Quality Enhancement – Agricultural BMPs, Wastewater Treatment Plant Improvements, Treatment Wetlands

“How much” method:

Overview. This method helps the project answer: How large is the change in costs to society given an increase or decrease in carbon emissions due to the project? This is calculated based on how much carbon is sequestered by the project, or how much the carbon emissions changed due to the project.

“How much” method:

Method (click on method title to see more detail)	Method Outcome	Method Description	Human Subject Research Expertise Needed*	Effort Level
Estimate change in societal costs	The change in costs to society based on the carbon stored and sequestered by the project	The change in cost to society can be estimated by multiplying the social cost of carbon by the change in carbon sequestration or emissions.**	No	Low

*Refer to the [NIH Definition of Human Subjects Research](#) for more information

**Change in carbon sequestration or emissions can be estimated using literature values or models. [Click here for more details.](#)

“How Much” Metric Summary:

Social or economic outcome this metric is linked to:	Social cost of greenhouse gas emissions
“How much” metric tier:	<input checked="" type="checkbox"/> 1 (easier) or <input type="checkbox"/> 2 (harder)
“How much” measurement interval:	Once, after project completion (and again if the project area changes)
Use this protocol if:	The project is expected to sequester carbon or alter carbon emissions

“Who” Method:

Most protocols on the GEMS website include a “who” section that helps a project better understand who is being affected by the changes measured in the “how much” methods.

“Who” methods are meant to help answer questions about which particular communities or populations are accessing and receiving benefits associated with a project. Carbon emissions and associated economic costs of climate change affect the global community. That is **not** to say that everyone is affected by climate change equally, but the costs incorporated into the calculated social cost of carbon consider costs to society at large. Using this metric, it is therefore impossible to parse out who faces higher or lower costs associated with climate change.

If you are interested in examining inequities related to climate change effects more closely, you can use [geospatial tools to examine climate related vulnerabilities](#), or conduct [surveys](#), [focus groups](#), or [participatory mapping exercises](#) to ask communities how climate change has impacted them. Learn more about the broader field of climate justice [here](#).

For more information on the GEMS project metrics and protocols, [visit this page](#).

