

Measurement Protocol: Number of properties or length of infrastructure adjacent to shoreline with reduced erosion after project installation

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 available for measuring how coastal erosion is changing and how much property is affected by changes in coastal erosion as a result of project implementation.

The “how much” methods measure how much property is affected by changes in erosion caused by the restoration project. The “who” methods measure who is experiencing changes in property protection via changes in shoreline erosion due to the project.

The tables below list when methods would benefit from the expertise of social scientists trained in survey design and implementation, statistics, and economics. These experts should have experience with [human subject research](#), following best practices and, if relevant, conducting research in a way that is accountable to their respective institution’s oversight body, often called an [Institutional Review Board](#). If you do not have such expertise in your project or program, many university programs and consulting firms should be able to assist.

Relevant Coastal Restoration Approaches

Habitat Restoration – Salt Marsh, Seagrass, Oyster Reef, and Mangrove Restoration Living Shorelines;

Oyster Reef Specific – Structurally Complex, Not Intensively Harvested Oyster Reef Restoration (subtidal or intertidal); Protection or Enhancement of Existing Oyster Reef

Recreational Enhancement – Boat Ramps; Fishing Piers; Trails and Boardwalks

“How much” methods:

Overview. This method helps the project answer: How many properties or what length of infrastructure adjacent to the shoreline are affected by changing rates of shoreline erosion following project implementation?

We provide two options for performing assessments of erosion dynamics and shoreline change after the implementation of relevant recreational enhancement and habitat restoration projects. For each method option below, step 1 guides the user in identifying what area of shoreline is to be monitored for erosion. The remaining steps are methods for conducting an erosion assessment. If possible, data collection should be performed before project implementation as well as after to understand how the project has affected shoreline stability. Additionally, data collection should be performed pre- and post-large storm events to help measure how storm events affect shoreline stability with the project in place. Because some coastal areas are already vulnerable to erosion they may already be monitored, which means there may be existing data to work with or include in your analysis.

“How much” methods:

Method Option (click on method title to see more detail)	Method Outcomes	Method Option Description	Human Subject Research Expertise Needed*	Effort Level
A. On-the-ground shoreline erosion measurements	Identification of properties and infrastructure adjacent to shoreline experiencing changes in erosion	On-the-ground assessments using photographic monitoring, drones, and beach elevation profile monitoring to assess changes in shoreline characteristics.	No	High
B. Remote sensing of erosion change		Spatial analysis with tools such as the Digital Shoreline Analysis System to measure changes in shoreline characteristics.	No	High

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

“How Much” Metric Summary:

Social or economic outcome this metric is linked to:	Property Protection & Value - Property Protection (Erosion)
“How much” metric tier:	<input type="checkbox"/> 1 (easier) or <input checked="" type="checkbox"/> 2 (harder)
“How much” measurement interval:	Annually or after storm events
Use this protocol if:	The project is expected to impact shoreline erosion rates There is infrastructure or properties located along shorelines where the project is expected to change erosion rates

“Who” methods:

Overview. These methods help the project answer: Who owns or relies on private or public property that could be affected by shoreline erosion changes caused by the project? Does this property play a significant role for public service (e.g., school, park) or public safety (e.g., evacuation route)?

These methods can help restoration practitioners assess whether vulnerable groups and historically underrepresented stakeholders own or in some way rely on properties that will be affected by changes in erosion associated with the site. You can use these to better understand if your project has impacted inequality or inequity as it relates to property protection from shoreline erosion.

The table below describes a suite of methods that build off each other to provide a more holistic understanding of the population that would be affected by property protection provided by the project.

All of the methods below that involve focus groups, surveys, and participatory exercises, require inclusive stakeholder engagement¹ of all relevant communities within the project service area².

“Who” method components:

Method (click on method title to see more detail)	Method Outcomes	Method Description	Human Subject Research Expertise Needed*	Effort Level
Describe stakeholders	Project service area boundaries	Identify geographic boundary that encompasses the area a) where erosion rates could be changed by the project and b) that contains people who would care about and/ or be affected by erosion impacts to affected properties/infrastructure.	No	Low
	Demographics and social vulnerability of the project service area	Collate comprehensive demographic data of the communities within the project service area defined above	No	Low
	List of relevant stakeholders in the project service area	Conduct a stakeholder assessment to understand who is impacted by erosion/interested in protection from erosion in the project service area	No	Low

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



¹ There are many resources available that provide best practices and guidance for inclusive engagement. Some examples include: [Five step approach to stakeholder engagement](#) (BSR); [Equitable Community Engagement Toolkit](#) (Boston Public Health Commission); [Designing equity-focused stakeholder engagement to inform state energy office programs and policies](#) (NASEO); [Inclusive community engagement](#) (C40 Cities), and; [Stakeholder engagement for inclusive water governance](#) (OECD).

² The geographic boundary containing those stakeholders for whom a particular project outcome is relevant