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**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 a suggested method for measuring changes to residential property value based on installation of a restoration project.

Property value is typically assessed using appraisals or evaluations conducted by municipal or country governments or prior to any real estate transaction, or using sale or rental price data from real estate transactions. Many factors influence the value of residential properties, but it is recognized that proximity to green space (or blue space) and the associated environmental amenities these areas provide have an influence on property value (e.g. [Seong-Hoon Cho et al. 2006](#)). The hedonic pricing method described here can be used estimate the influence that restoration project attributes have on home sale (or apartment rental) prices.

The “how much” methods measure the change in neighborhood median home prices as the result of a restoration project. This method employs a hedonic pricing model which should be carried out by an experienced economist.

The “who” methods help to document who is and who is not experiencing a change in median home value as a result of the restoration project. Some of these methods require social science expertise, while others can be done by members of the restoration project team without special training.

## Relevant Coastal Restoration Approaches

**Habitat Restoration** – Salt Marsh, Mangrove Restoration, Beach and Dune Restoration

**Recreational Enhancement** – Boat Ramps, Fishing Piers, Trails and Boardwalks

**Water Quality Improvement** – Sewage System Improvements, Wastewater Treatment Plant Upgrades, Treatment Wetlands, Green Infrastructure, Agriculture Best Management Practices

## “How much” methods:

*Overview.* This “how much” method helps the project answer: How have property values changed due to environmental amenities provided by the restoration project?

This method described here provides an overview a hedonic pricing model that can be used to estimate the change in mean willingness to pay for proximity to green space associated with a restoration project.

**“How much” method:**

Method (click on method title to see more detail)	Method Outcomes	Method Description	Human Subject Research Expertise Needed*	Effort Level
<a href="#">Hedonic Pricing Model</a>	Estimate of change in home value due to proximity to project site and/or the amenities it provides	Conduct an analysis using a hedonic pricing model that discerns how the project is affecting nearby property and/or rental values	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 Value
“How much” metric tier:	<input type="checkbox"/> 1 (easier) or <input checked="" type="checkbox"/> 2 (harder)
“How much” measurement interval:	Once, at least five years after project implementation and update as needed.
Use this protocol if:	The project has created green space or recreational space.

**“Who” methods:**

*Overview.* These “who” methods help the project answer: who has is affected by property value changes due to the population?

These methods can help restoration practitioners assess equity in changes to property value associated with the project. These methods will help identify a) vulnerable groups and historically underrepresented stakeholders in the project service area<sup>1</sup>; b) the communities affected by property value changes as a result of the project; and c) whether groups may be disproportionately benefitting from or being harmed by changes in property value. You can use these methods to better understand if the project has had an impact on property values in a way that may benefit or harm vulnerable communities.

Please remember that there are historical and systemic inequities related to homeownership in the US independent from your restoration project. This includes systemic exclusion of Black families from homeownership and wealth generation both formally through policy channels such as [redlining](#) and informally via biases during [home appraisals](#), among many other forms of [systemic housing discrimination](#). For this reason, changes in property value have disparate impacts on different communities that may not be alleviated by participatory processes and careful planning on behalf of the

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<sup>1</sup> **Project Service Area Definition.** The geographic boundary containing those stakeholders for whom a particular project outcome is relevant

project. Nonetheless, these inequities should be considered in the project planning, implementation, and monitoring phases of a project.

**The table below describes a suite of methods that build off each other to provide a more holistic understanding of the communities that are and can be affected by changes in property value associated with the project site.**

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.

The methods below that involve focus groups, surveys, or participatory exercises require inclusive stakeholder engagement<sup>2</sup> of all relevant communities within the project service area.

**“Who” methods:**

Method (click on method title to see more detail)	Method Outcomes	Method Description	Human Subject Research Expertise Needed*	Effort Level
<a href="#">Describe stakeholders</a>	Project service area boundaries	Identify geographic boundary that encompasses all properties whose value may change as a result of restoration project as well as communities who may be affected by those changes in property or rental value	No	Low
	Demographics and social vulnerability in the project service area	Collate comprehensive demographic data of the communities who both own property or may be affected by changes in property value in the project service area	No	Low
	Identity of property owners and renters	Conduct a stakeholder assessment to understand who may be affected by changes in property value as a result of the restoration project	No	Low
<a href="#">Assessment of stakeholder perceptions on access and distribution of</a>	Identification of who is being affected by property value changes in the	Step 1. Use focus groups, workshops, or surveys <i>targeting people in the project service area</i> to ask questions about who is experiencing changes in property value?	Yes	High

<sup>2</sup> 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).

<a href="#">property value benefits</a>	project service area. Understanding of whether changes in property value are disproportionately helping or harming certain communities	Step 2. Consider information collected through step 1 in the context of the “who” information you already collected		
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\*Refer to the [NIH Definition of Human Subjects Research](#) for more information

To see all GEMS project metrics and protocols, [visit this page](#).

