Economic Tools for Coastal Management
MEASURING THE VALUE OF ECOSYSTEM SERVICES

WHY measure the value of ecosystem services?

The current structure of our economy values marketed goods and services with a price tag, but does not place a price tag on services from ecosystems to human beings (such as clean water, protection from natural hazards, and spiritual, cultural, and recreational benefits). **Estimating the value of non-market goods and services, like ecosystem services, can help create an incentive for people to sustain the ecosystems and the services they provide.** Without some measure of ecosystem services, the services may be undervalued, and it may be difficult to assess needed funding for sustainable management of these resources.

WHAT ecosystem service values can we measure?

Although the total value of Earth's ecosystem may be immeasurable, it is relevant and informative for policy makers and managers to measure **the changes in ecosystem services and their consequent impacts on human well-being**. Researchers have developed ways to evaluate the impacts using monetary metrics (such as the price of commercially important fish species) and non-monetary metrics (such as reduction of water-borne illness due to good water quality or lives saved from flooding risks).

WHOSE valuation of ecosystem services should we measure?

One policy or management decision may lead to changes in different ecosystem services, which can result in impacts to different groups of people. **Parties affected both positively and negatively in the political and ecological boundaries where the decision takes place need to be considered.** In some cases, it may be helpful to include non-local and even future beneficiaries, especially for recreational uses and cultural appreciation, since these services usually apply to wider populations.

WHEN do we measure ecosystem service values?

Measuring services in common metrics (dollars, lives saved, etc.) allows for comparisons among different policy and management alternatives, such as the benefits and costs of green infrastructure, habitat restoration, or use of green spaces. **Depending on policy and management contexts, one can determine whether a non-monetary evaluation is sufficient, or whether it is worth the time, resources, and expertise required to do a monetary valuation.**

HOW do we measure ecosystem service values?

The information on the next page gives an overview of different methods for measuring the value of ecosystem services, tips for using these methods, and best practices in coastal management. A basic understanding of these concepts will prepare you to work with economists, especially during project scoping. However, each of these methods relies on key assumptions. To make sure the project is conducted appropriately, **economists and other experts in biophysical science, social science, stakeholder engagement, and communication are usually needed** to do the actual work.

Methods Used for Ecosystem Services Valuation

Input Valuation Method measures the level of impact that changes in ecosystem services will have on the value of the outputs these services contribute to.

> **Use this method when** the ecosystem services being valued are inputs to marketed goods.
> **Example:** Changes in mangrove health affect fisheries production, landings, and revenue.
> **Pro:** The market price for the output is usually readily available.
> **Con:** Data and information to construct the impact to production is needed.
> **Best Practice:** *How People Benefit from New Hampshire's Great Bay Estuary*

Revealed Preference Method uses market prices pertaining to the choices made by consumers to estimate the values of non-market items.

> **Use this method when** some elements of the ecosystem services being valued are directly or indirectly used by people.
> **Examples:** The proximity to beaches and wetlands affects property values; the condition of a beach impacts the amount people are willing to pay for a visit.
> **Pro:** These observed real choices are easy to understand and are relatable.
> **Con:** People may not be fully informed of all consequences and may make biased decisions.
> **Best Practice:** *Economic Benefits of Reductions in Marine Debris in Orange County, California*

Stated Preference Method, also called choice experiments or contingent valuation, poses questions to people with a set of choices to see which alternative they prefer.

> **Use this method when** estimating the presence or existence values of ecosystem services (which are not used directly or indirectly by people) or estimating willingness-to-pay for management options.
> **Examples:** People's preferences can be used to estimate the values of restoring impaired wetlands, conserving species, developing renewable energy, maintaining urban open space, etc.
> **Pro:** One can ask survey questions about virtually any type of ecosystem service.
> **Con:** Many assumptions need to be carefully addressed to avoid critique.
> **Best Practice:** *Sustaining Coastal Landscapes and Community Benefits at the Wells Research Reserve*

Cost-Based Method estimates the system-wide costs (not an individual's willingness to pay) that would occur if the ecosystem services were lost or replaced by human-engineered alternatives.

> **Use this method when** there is limited time or resources to administer a survey.
> **Examples:** Without marsh, communities will suffer more damage from storms; if a healthy watershed is damaged, water treatment will be more costly for communities.
> **Pro:** These methods do not require administration of a survey.
> **Con:** If not done properly, it can generate inaccurate and potentially inflated estimates. In many cases, biophysical or ecological modeling expertise is needed.
> **Best Practice:** *Economic Valuation of Shoreline Protection at the Jacques Cousteau Research Reserve*

Benefit Transfer Method uses research results from existing valuation studies from one or more sites to estimate values at an unstudied site.

> **Use this method when** the unstudied site is similar in dimensions (geographic location, habitat type, population composition, etc.) to the studied sites.
> **Example:** The ecological production function linking coral reefs and fisheries in Caribbean areas can be transferred and used in a study for Southeast Florida.
> **Pro:** Time and resources are saved in comparison to some other methods.
> **Con:** It relies on assumed connections and similarity between the unstudied site and the study site in which benefits are being transferred from. Usually needs to transfer various ecosystem functions and valuation methods.
> **Best Practice:** *The Value of Nature's Benefits in the St. Louis River Watershed*