



Benefits Valuation Method:

BENEFIT TRANSFER

Overview

Benefit transfer is used to estimate the values of ecosystem benefits (goods and services) in a location or context, when values are not available from an original study, by applying data and values from studies in different but similar locations or contexts. If implemented properly, benefit transfer can be a reasonable and cost-effective approach to estimate benefits because it does not require primary data collection.

“Ecosystem goods and services” represent the human benefits that healthy ecosystems (e.g., mangroves, wetlands, dunes, coral reefs, oyster beds) provide, including water purification, flood protection, enhanced fisheries, carbon sequestration, and improved tourism and recreation opportunities. Many resilience-focused projects protect, enhance, or restore our nation’s ecosystems. These activities generate economic values that can be estimated using the benefit-transfer method. A good benefit-transfer study still has a large level of uncertainty; however, they are popular because the alternative is to implement a survey to measure the value of an ecosystem service, which can be expensive and time-consuming.

When to Consider

- To get at possible benefits when you don’t have the funds, time, or expertise to do a unique and original study that would estimate them for your specific project activities.
- Benefit transfer can be generally applied to economic benefit valuation, but this guide is focused on its application to valuing ecosystem services and goods. In other words, benefit transfer can be applied to other categories of benefits that are not ecosystem or ecological in nature and that one might want to measure, such as estimating the value of worker safety at a port.

Data Needs

In order to perform an ecosystem service valuation using the benefit-transfer approach, you need information on the ecosystem and a valuation study, or studies, of an ecosystem service.

Information on the Ecosystem

- Description, location, and size of ecosystem preserved, enhanced, or restored
- Description of how activities ensure ecosystem function (e.g., by preserving, enhancing, or restoring). This does not necessarily change the value the ecosystem ultimately has as these may all lead to a healthy functioning ecosystem, but the description is important context for telling the story of how the activity generates value.
- The services the ecosystem provides (e.g., food provisioning, recreation, flood protection).

Valuation Studies of an Ecosystem Service (with as many of the following characteristics as possible that align with your ecosystem)

- Similar ecosystem services (e.g., food provisioning, recreation, flood protection)
- Similar geography
- Similar population density near the ecosystem (particularly important for the value of flood protection so as not to compare flood protection of urban and rural areas)
- Similar ecosystem size
- A transferable value that you can apply to your ecosystem (e.g., value per acre of marsh, value per linear mile of beach)

Important Results

- The results will convey a rough or best estimate of the (average) value of an ecosystem service or good you're seeking to estimate based on other similar studies.
- The results will fit easily into a larger economic analysis. That is, the benefits identified through ecosystem service valuation studies can be used in a benefits valuation of benefit-cost analysis.

Strengths

- Benefit transfer is the process of finding values from previous studies for areas with similar ecosystem functions and benefits, and applying those values to your area. Primary data collection efforts (e.g., a field survey focused on the ecosystem service benefit of interest) provide the most defensible method, but they are resource-intensive and time-consuming. Conversely, benefit-transfer studies can be a reasonable and cost-effective approach.
- Does not require primary data collection efforts (e.g., a field survey focused on the ecosystem service benefit of interest), which can be resource-intensive and time-consuming.

Challenges

- The methodology has a higher level of error than a primary study.
- Requires professional economic judgment on the validity and applicability of other studies.

Key Suggestions, Interpreting Results, and Potential Mistakes

- Seek expertise. It is recommended you contract with an economist experienced in benefit transfer in order to ensure you produce defensible results.
- Select appropriate (similar) proxy studies. You will want to ensure that the studies are an appropriate proxy for your location and benefit type. Other examples of things to consider include selecting an original study from, if possible, a similar general time frame. Borrowing values from a study carried out decades ago, or if it took place prior to a large hurricane for example, might not be the best proxy if there are notably different macroeconomic and societal conditions between that time frame and present.
- It is important to note that you cannot use this method if there are no transferable values from other studies. You should instead describe your benefits qualitatively.
- Be careful about using values from post-disaster, restoration studies. These values may reflect an increased willingness to pay for benefits such as coastal armoring immediately after a disaster. You still may want to transfer these benefits but might want to have other studies as well to see how the values compare across studies.
- Transfer benefits carefully. You can also consider using multiple valuation methods, when possible, to get at different types of benefits. Be careful to not double count.
- Fundamentally, the values transferred (borrowed) from another study are only as good as that study. Thoroughly read the original study and ask experts if they think the methods and analysis are defensible and reasonable.

Key Steps

1. Identify relevant values to use for the benefit transfer.

Visit the resources section below for databases with ecosystem service valuation studies.

- To minimize uncertainty, look for estimated benefit values from similar geographies, ecosystem functions, types of land use development, and population density. We also recommend using ecosystem service values from more recent studies, ideally in the last 20 years.
- When there are multiple applicable studies, it can improve defensibility to use an average value calculated from the relevant studies or calculate the dollar value per unit for the lowest and highest value available in the literature.

2. Identify the units (e.g., dollars per acre per year; dollars per visitor) needed to estimate your ecosystem goods and services.

- Select the values from the literature. These will be presented in various ways, timescales, and units.

- b. Be cautious about using high values. Consider using an average value from multiple studies, if possible. Averages can be taken from multiple studies done on estimating similar categories of ecosystem goods and services in comparable units.
- c. Calculate benefits over a time frame representative of how long the benefits will continue to occur.
- d. Identify the benefits that cannot be assigned a value and describe them qualitatively.
- e. Step back and assess validity—does this pass an “eyeball test”? That is, are the estimated values plausible and consistent with other similar studies? An economist can help here. Use words like “potential” or “approximate” to underscore that all economic studies have levels of uncertainty attached, and that benefit-transfer studies tend to have greater uncertainties than methods that use primary data.

3. Add up benefits where possible.

- a. To get a more holistic picture of the suite of ecosystem goods and services provided by a natural infrastructure project, different categories of co-benefits can be added together so long as those estimates do not overlap in the original studies.
- b. Be careful not to double count the same benefit. It would be double counting to add up the value of the willingness to pay for cleaner water in an estuary and the value of recreation, as the cleaner water may already be part of why someone would pay more for recreation.
- c. It is okay if it is not possible to add together all estimates of benefits.

Example of Benefit-Transfer

A community received a grant to restore five acres of a salt marsh to improve coastal storm protection. In addition to coastal storm protection, the salt marsh activity area has additional ecosystem services, including carbon storage and improved water quality. To estimate the economic benefit of these activities, this community started with a literature search. Fortunately, surrounding communities have previously engaged in similar salt marsh restoration efforts and have conducted primary research efforts to value the outcomes of their work. Table 1 presents ecosystem service values from three primary studies from neighboring communities. The values from the three studies were evenly weighted for this hypothetical example.

Table 1. An example of ecosystem service values from relevant literature.

Ecosystem Services from Grantee Activities	Ecosystem Service Values from Literature			
	Study 1	Study 2	Study 3	Average Value per Acre
Coastal Storm Protection	\$5,000/acre	\$7,000/acre	\$10,000/acre	\$7,333/acre
Improved Water Quality	\$500/acre	\$350/acre	\$200/acre	\$350/acre
Carbon Storage	\$125/acre	\$80/acre	\$200/acre	\$135/acre

When there are multiple applicable studies, using an average value calculated from these studies can potentially improve defensibility because you would be less likely to select a lone study that produced an unusually high or low value for a reason unique to that one study. Another approach to maintain defensibility is to present ranges; calculate the dollar value per unit (in this case, acre) for the lowest and highest values available in the literature. The ecosystem service valuation calculations for this grant are as follows, using average dollars per acre values.

$$\begin{aligned} \text{Coastal Storm Protection: } & 5 [\text{acres}] * \$7,333 [\text{avg./acre}] = \$36,666 \\ \text{Improved Water Quality: } & 5 [\text{acres}] * \$350 [\text{avg./acre}] = \$1,750 \\ \text{Carbon Storage: } & 5 [\text{acres}] * \$135 [\text{avg./acre}] = \$675 \end{aligned}$$

Add up benefits where possible, but be careful not to double count the same benefit. For example, it would be double counting to add up the value of the willingness to pay for cleaner water in an estuary and the value of recreation, as the cleaner water may already be part of why someone would pay more for recreation. It is often a best practice to first present values separately by ecosystem service (as done above) to maintain transparency so that readers and stakeholders can understand which ecosystem service generated which economic benefit. Make sure to cite the literature from which you transferred ecosystem service values.

You may often run into situations where there is not comparable literature (e.g., differences in ecosystem function, geography, population density protected by the ecosystem). In this case, your error will likely increase as the ecosystem in the literature becomes increasingly dissimilar from your ecosystem. Whether you feel comfortable using this approach may depend on your tolerance for uncertainty and the level of accuracy needed for the results.

Additional Resources

Getting Help

- Reach out to our team (econguidance@noaa.gov) for specific questions or to brainstorm how to use the benefit-transfer approach.
- Hire a private consultant or request support from academic partners. Researchers, graduate students, and academic scholars may be able to provide guidance or work directly on your benefit-transfer analysis.

Other Resources

The following databases provide searchable user interfaces to identify studies to use in benefit transfer. While there is some overlap in the studies across the databases, all three databases can be excellent sources for finding studies relevant to your project:

- [Green Infrastructure Effectiveness Database](#): This database contains many articles on the efficacy of natural infrastructure projects and their benefits. It is being updated in 2021 to include articles on the costs and benefits for different natural infrastructure solutions.
- [BlueValue Database](#) (The Harte Research Institute for Gulf of Mexico Studies): This database is a self-select matrix with 24 ecosystem services and 10 ecosystem types with access to 1,400 ecosystem services valuation estimates. BlueValue's advantage is its focus on coastal and ocean ecosystem services.
- [Ecosystem Services Partnership \(ESP\) Database](#): The ESP database contains over 1,350 ecosystem services valuation estimates from over 300 case studies that users can select and use as reference points to fit their own needs. This database absorbed several other databases in the last few years and is recognized as a fairly comprehensive database of valuation studies, but it is not limited to coastal studies.
- [Benefit Transfer and Use Estimating Model Toolkit](#) (Colorado State University): This toolkit includes spreadsheet models based on meta-analyses that can be used to estimate values in a variety of contexts, as well as average values across studies valuing similar services.
- [Benefit Transfer Toolkit](#) (USGS): The U.S. Geographical Survey hosts a benefit-transfer toolkit to help planners, analysts, public land managers, and others on their benefit-transfer applications.