
Ecosystem Services in the Context of NRDAR

Ecosystem Services: How People Fit Into the Landscape

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EPA's Ecosystem Service Research Program: Overview and Opportunities

**Wayne Munns, EPA Office of Research and Development,
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***Square Pegs and Round Holes: Adventures in Finding
Restoration Projects with a Nexus to the Injury***

**Steve Hampton, Office of Spill Prevention and Response
CA Department of Fish & Game, Sacramento, CA**

***Using Ecosystem Service Models to Assess Land Use Impacts
and Land Use Options***

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Overview

- Why value ecosystem services?
 - How are ecosystem services valued?
 - How about equivalency methods?
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Why value ecosystem services?

- The economy and ecosystems are interrelated
 - The strength of the economy depends on:
 - Ability of ecosystems to provide inputs
 - Ability of ecosystems to assimilate residuals
 - The economy functions best when it recognizes all ecosystem values
 - Markets fail to maximize net benefits if ecosystems have no prices to guide their allocation to higher valued uses
 - Must value un-priced ecosystems
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Why value ecosystem services?

- NRDAR context

- CERCLA

- Compensable value is the amount of money required to ***compensate the public*** for the loss in services... (43 CFR § 11.83(c)(1))

- OPA

- ...trustees must consider compensatory restoration actions that provide services of the same type and quality, ***and of comparable value*** as those injured. (15 CFR § 990.53(c)(2))
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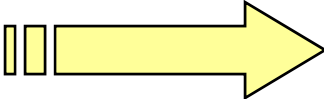
How are ecosystem services valued?

- What exactly is valued?
 - Defining this is challenging with ecosystems
 - **Natural resources:** tangible assets provided by nature
 - Air, water, minerals, biota
 - **Functions:** biophysical processes of natural resources that can be assessed independently of the human context
 - Habitat provision, nutrient cycling, photosynthesis
 - **Services:** beneficial outcomes of functions that are appreciated by people
 - Recreation, subsistence, flood control, existence
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How are ecosystem services valued?

- Ecosystem valuation focuses on **services**
 - People understand the beneficial outcomes they appreciate (services)
 - People may not understand the underlying biophysical processes (functions)
 - Functions are necessary but not sufficient for the provision of services
 - To be beneficial, people must also demand the outcomes of functions
 - Preferences
 - Opportunity
- Preferences

□ Opportunity



Landscape Setting
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How are ecosystem services valued?

- Types of ecosystem values
 - **Use values:** values derived from physical interaction with ecosystems
 - Values for fishing, hiking, wildlife viewing
 - **Non-use values:** values derived independently from physical interaction with ecosystems
 - Values for existence and preservation
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How are ecosystem services valued?

- Fundamental economic approach
 - Assign economic values according to the ability of resources to satisfy human needs
 - Anthropocentrism without apology!
 - Key determinants of economic value
 - **Preferences:** resources provide services that people demand and appreciate to various degrees
 - **Scarcity:** abundant resources are better able to provide services than scarce resources
 - Economic valuation of ecosystems follows this fundamental approach
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How are ecosystem services valued?

- Economic valuation methods
 - ***Revealed preference methods:*** observe people making binding choices regarding real alternatives
 - Cannot estimate non-use values
 - Cannot value un-experienced scenarios
 - ***Stated preference methods:*** observe people making non-binding choices regarding constructed alternatives
 - Can estimate non-use values
 - Can value un-experienced scenarios
 - Concern about “hypothetical bias”
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How about equivalency methods?

- Based on the same fundamental economic approach as valuation methods
 - Equivalency methods do not measure values
 - Assume equal unit values for injury and restoration
 - Important to consider the services replaced through restoration vis-à-vis the services lost through injury
 - Type
 - Quality
 - Comparable value (landscape setting)
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Suggested References

- <http://www.ecosystemvaluation.org>
 - King, D.M., L.A. Wainger, C.C. Bartoldus, and J.S. Wakeley. “Expanding Wetland Assessment Procedures: Linking Indices of Wetland Function with Services and Values.” Engineer Research and Development Center, U.S. Army Corps of Engineers, September 2000.
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