

Fifth National Conference on Ecosystem Restoration

NCER 2013

presentation by:
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INNOVATION, IMAGINATION, CONNECTION, KNOWLEDGE

*THE VIEWS EXPRESSED IN THIS PRESENTATION ARE SOLELY THOSE
OF THE PRESENTER

“The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased and not impaired in value.”

President Theodore Roosevelt 1907



July 2011 Report:

SUSTAINING ENVIRONMENTAL CAPITAL: PROTECTING SOCIETY AND THE ECONOMY

Executive Office of the President
President's Council of Advisors on Science and
Technology

Report's Key Findings:

- The economic and environmental dimensions of societal well-being are both indispensable, as well as tightly intertwined .
- Government must address the threats to both the environmental and the economic aspects of well-being that derive from the Nation's ecosystems and the biodiversity they contain.
- “Ecosystem services” underpin much economic activity as well as public health, safety, and environmental quality.

Among other recommendations,

“Federal agencies with responsibilities relating to ecosystems and their services (e.g., EPA, NOAA, DOI, USDA) should be tasked with improving their capabilities to develop valuations for the ecosystem services affected by their decision-making and factoring the results into analyses that inform their major planning and management decisions.”

Foundational Work:

- A **1997** Nature article (Costanza, et al) valued the earth's ecosystems at **\$33 trillion**. (\$44 trillion in today's dollars)
- First global review of ecosystem services was completed under the United Nations Millennium Ecological Assessment in 2005 (MEA 2005) finding that **over half of the world's major ecosystem services are in a state of decline.**
- The National Research Council (NRC 2005) reviewed ecosystem service concepts and methods as a foundation for economic benefits assessment. (*Valuing Ecosystem Services Toward Better Environmental Decision-Making*)

What are ecosystem services ???



Ecosystem services are typically categorized under 4 types: (2005 Millennium Ecological Assessment)



Provisioning: food, timber, fuel, fibers, water, soil, medicinal plants, etc.

Regulatory: air and water quality, climate and disease control, carbon sequestration, etc.

Supporting: soil formation, photosynthesis, and provision of habitat.

Cultural: spiritual and recreational benefits, intrinsic values.



(Courtesy
[MetroVancouver](http://www.metrovancouver.org))

Useful Definitions:

- The benefits provided by nature, which contribute to human well-being (USGS).
- *“Ecosystem goods and services are socially valued aspects or outputs of ecosystems that depend on self-regulating or managed ecosystem structures and processes.”*

*July 2013, Army Corps of Engineers, **Incorporating Ecosystem Goods and Services in Environmental Planning – Definitions, Classification and Operational Approaches** (Elizabeth Murray, Janet Cushing, Lisa Wainger, and David J. Tazik)*

Ecosystems provide a wide array of goods and services of value to people, including:

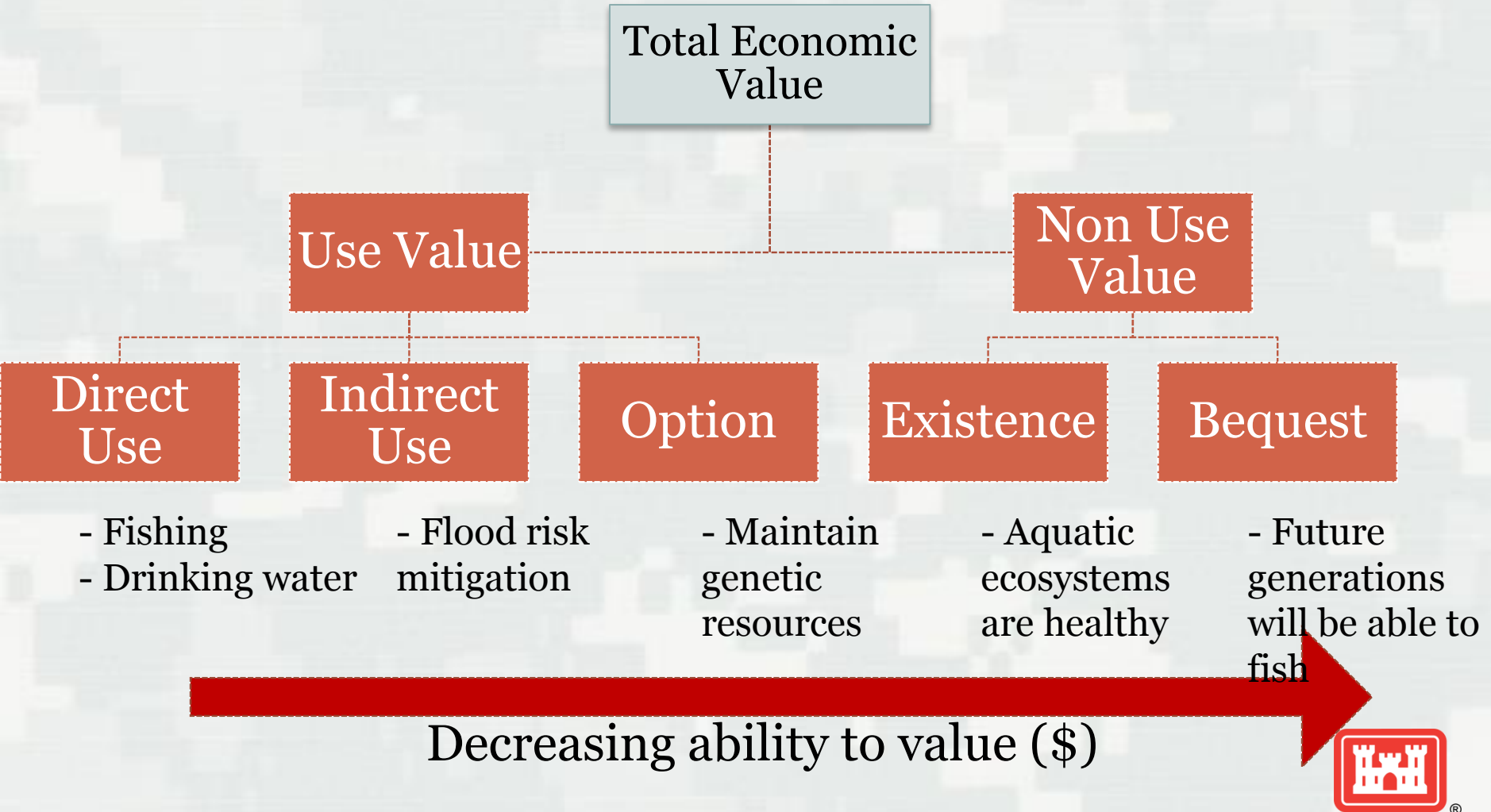
- ❖ Climate regulation
- ❖ Water supply
- ❖ Water quality
- ❖ Flood protection
- ❖ Recreational opportunities
- ❖ Aesthetic and cultural values
- ❖ Intrinsic values
- ❖ Biodiversity

These values are often not market based and are therefore difficult to factor into decision-making quantitatively. Also, ecosystem service classifications must be case specific.

Total Economic Value

Sum of use and non-use values

Elizabeth Murray, Janet Cushing and Lisa Wainger



Challenges in Application:

“The fundamental challenge of valuing ecosystem services lies in providing an explicit description and adequate assessment of the **links between the structures and functions of natural systems, the benefits derived by humanity, and their subsequent values.**

Probably the greatest challenge for successful valuation of ecosystem services is to **integrate studies of the ecological production function with studies of the economic valuation function.** To do this, the **definitions of ecosystem goods and services must match across studies.**”

(NRC 2005)

How can ecosystem service valuation be used by federal agencies?

Examples:

Economic and Regulatory Analysis:

- **Benefit Cost Analysis:** Quantifying ecological benefits of permits, planning and policies.
- **Regulatory Impact Analysis:** Evaluating relative benefits of regulatory alternatives.

Natural Resource Damage Assessment:

- Quantify lost services due to polluting activity.
- Inform restoration planning.
- Demonstrate service benefits of restoration projects.

Applying Ecosystem Service Consideration in Environmental Decision-making:

Develop a clear understanding of the purpose, scope and geographic scale of the valuation exercise.

Identify and address Significant data and information gaps based on the purpose, scope, and scale (NRC 2005).

Identify underlying ecological structure, functions and dynamic processes in order to forecast outcomes of different policy and management options

Identify and manage uncertainty in the data that may affect outcomes.

Tailor modeling to complexity of the problem

*July 2013, Army Corps of Engineers, **Incorporating Ecosystem Goods and Services in Environmental Planning – Definitions, Classification and Operational Approaches** (Elizabeth Murray, Janet Cushing, Lisa Wainger, and David J. Tazik)*

Benefits of Ecosystem Service Valuation in Planning:

- Fosters better communication with partners and other stakeholders.
- Allows a formal consideration of a broader array of benefits in formulation of alternatives analysis.
- Accounts for broader array of benefits of final selected alternative.
- Allows more transparent consideration of trade-offs in the planning process.

Army Corps of Engineers: Elizabeth Murray, Janet Cushing
and Lisa Wainger

Assessment of Ecosystem Services Values for the Central Everglades

Being conducted by:

Leslie Richardson, Lynne Koontz, Chris Huber - USGS Fort Collins Science Center

Laila Racevskis - University of Florida

Kelly Keefe – U.S. Army Corps of Engineers



Everglades Restoration

The Comprehensive Everglades Restoration Plan (CERP) was approved in 2000 .

Provides a framework to restore, protect and preserve the water resources of central and southern Florida, including the Everglades.

U.S. Army Corps of Engineers (USACE) is the lead agency overseeing this restoration effort .

The **Central Everglades Planning Project (CEPP)** will deliver a finalized plan for a suite of restoration projects in the central Everglades as part of CERP.

This is the nation's most comprehensive and costly restoration project to date.

Central Everglades Planning Project: Assessment of Ecosystem Services Values

CEPP's Tentatively Selected Plan (TSP) for restoration is anticipated to impact a range of ecosystem services – defined as the services from ecosystems that are integral to human well-being.

Recreation * T&E Species * Water Quality* Carbon Sequestration

Stakeholders, agencies in Florida, and Army Corps leadership requested ecosystem service valuation assessment of Everglades restoration.

The valuation is not to be used to select the TSP, but rather to show societal benefits resulting from it.

Central Everglades Planning Project: Assessment of
Ecosystem Services
Values

USGS and UF will coordinate with USACE to determine which methods and tools will be used, calculate the dollar values of ecosystem services that will be gained by CEPP over those that would be available if CEPP were not implemented, qualitatively discuss those services that cannot be valued monetarily, and provide documentation of the methods and results in a peer-reviewed written report.



Central Everglades Planning Project: Assessment of Ecosystem Services Values

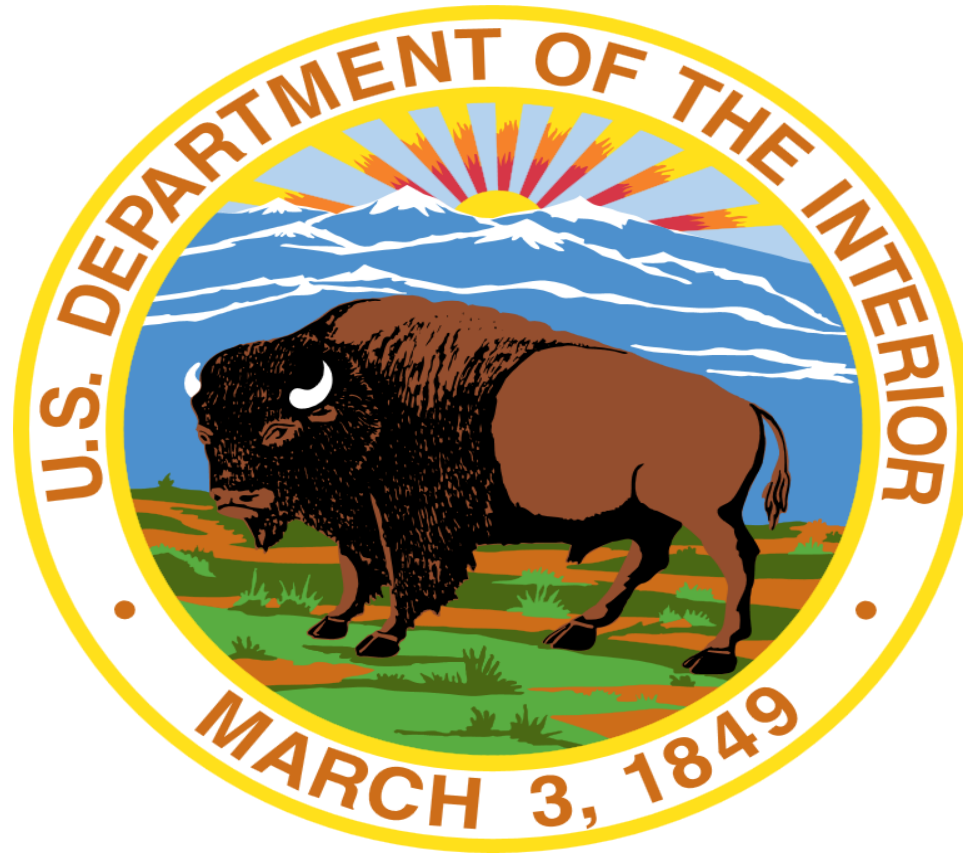
Importance of engagement with other team members, stakeholders, and scientists throughout the process.

Importance of effective communication across disciplines.

Making clear from the beginning exactly what data, i.e., ecological endpoints, are needed to value a particular ecosystem service.

Recognition that the use of existing data will limit the ecosystem services that can be monetarily valued in a particular study area- especially in a unique ecosystem such as the Everglades.

Department of the Interior



The U.S. Geological Survey : Leading research agency, with over 130 studies, models, programs, including:

- Modeling the impact of changing mussel biomass on ecosystem services in the Susquehanna River.
- Assessing Land Use Change scenarios in Urban Coastal Areas, including in the Puget Sound and South Florida.
- Estimating use of streams, rivers, lakes, estuaries and groundwater as sources of water to cool thermoelectric power plants.
- Research to support modeling of carbon sequestration and greenhouse gas emissions of wetland ecosystems.



The **Bureau Of Land Management** is looking at ways to better incorporate the nonmonetary qualitative assessment of values associated with cultural and archeological ecosystem services through a pilot project at Canyon of the Ancients National Monument in Colorado.

Canyons of the Ancients is managed as an *integral cultural landscape* containing a wealth of historic and environmental resources.



The U.S. Fish and Wildlife Service incorporates ecosystem service valuation into many of its regulatory and planning programs, including conservation banking to mitigate and offset adverse impacts from development on threatened and endangered species; and a study with North Carolina State University to quantify the economic benefits to property owners located near wildlife refuges.



A White Pelican feeding at J.N. Ding Darling National Wildlife Refuge, 2010 honorable mention | © Theresa Baldwin



The **National Park Service** performed the Greater Yellowstone Study to evaluate the impacts of noise, air emissions, and other impacts of snowmobile use.



CONCLUSIONS

- Better Information on monetary values of ecosystem services facilitates more efficient use of limited resources by enabling decision makers to understand the tradeoffs at stake in their decisions.
- Expressing ecosystem service values in monetary terms reflects the values the public places on ecosystem services.

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Connection, Knowledge**

THANK YOU