

**Post-Conference Summary**  
**ACES 2016 All-day Workshop**  
**December 5, 2016 | 8:30a-noon, 1:30p-5:00p**

**Title: *Methods for Incorporating Ecosystem Services into Decision-Making: From Benefit Relevant Indicators to Monetary Values***

**Goals:** The purpose of this workshop was to delve into the ecosystem services assessment methods provided in the Federal Resource Management and Ecosystem Services (FRMES) Guidebook (<https://nespguidebook.com>). It discussed detailed explanations of these methods and examples of how they are used to help build a common understanding of what it means to incorporate ecosystem services into decision making. This workshop provided an opportunity for the broader community to explore ecosystem service quantification and valuation methods in more depth with experts, using participant exercises to enhance the discussion and shared learning experience. Integrated question and answer sessions gave opportunities to engage participating experts on topics related to the application of these methods to various policy contexts.

**Presentations:**

- Workshop Overview, Guidebook Introduction, and Best Practices  
(Lydia Olander, National Ecosystem Services Partnership)
- Causal Chains, Conceptual Diagrams, Classification Systems, and Human Well-being Endpoints  
(Lydia Olander, National Ecosystem Services Partnership)
- Ecological Production Functions  
(Robert Johnson, George Perkins Marsh Institute at Clark University)
- Quantifying Benefit Relevant Indicators  
(Lisa Wainger, University of Maryland Center for Environmental Science)
- Valuation (Benefits Assessments) and Incorporating Preferences  
(Robert Johnson, George Perkins Marsh Institute at Clark University)

**Summary:**

The guidebook's assessment framework introduces a standardized, but customizable method for incorporating the value of ecosystem services into planning and decision-making processes. Following an introduction to the guidebook and a high-level overview of the assessment framework by Lydia Olander, presenters walked through key components of the assessment framework in depth.

Presentation topics included:

- Developing causal chain diagrams. These diagrams can be used to map out the cascading impacts of a management intervention from ecosystem changes to ecological processes, ecosystem services, and social benefits. The wide ranging uses for these diagrams include: scoping alternatives, identifying services and beneficiaries, engaging and communicating with stakeholders, a foundation for quantification, and a foundation for analytical modeling.
  - There was a presentation that demonstrated how these diagrams connect ecological processes to the provision of ecosystem services using a walk-through of the iterative processes used to create them, and then a small group exercise in which participants developed their own diagrams based on provided case examples.

- An overview of Ecological Production Functions (EPFs), how they are used, and the pitfalls associated with developing these equations. An examination of the various types of common EPFs was done, and the accuracy and errors linked to some EPFs were discussed. Rob Johnston highlighted the considerations that must be made when linking multiple EPFs through a causal chain. He ended with examples of how EPFs were used in his work to evaluate costs and benefits of beach nourishment.
- A presentation by Lisa Wainger about what constitutes a benefit relevant indicator (BRI), and how BRIs connect to both the ecological and social context they are applied to. Highlights were a discussion of the importance of creating a BRI that matches the end uses of a particular project so that these indicators incorporate equity concerns, express relative importance, and incorporate the appropriate relevant variables.
  - Participants then engaged in a group activity to develop BRIs for a specific management context
- The final presentation was on benefits assessment and valuation methods. Rob Johnston discussed the pros and cons of different valuation methods (including primary valuation methods and benefit transfer), and emphasized that economic valuation is designed to be only one of many tools used to inform decisions, not the only tool.

Lydia ended the day by explaining the likely future steps for continuing to incorporate ecosystem services into decision making. She elicited feedback from the group asking whether this type of framework would be useful for the type of work that participants do and how ecosystem services trainings could be further developed and improved.

#### **Workshop Participants:**

Over 100 people registered for the workshop, and approximately 80 attended the session. Participants came from multiple sectors, including NGOs, U.S. federal agencies, academic institutions, and consulting firms. There were representatives from at least 10 different countries.

#### **Workshop Organizers:**

**Lydia Olander** (primary contact)

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Lydia Olander, Ph.D. directs the National Ecosystem Services Partnership which has been working for the last 4 years to support federal government efforts to incorporate ecosystem services into decision

making. She also directs the Ecosystem Services Program at the Nicholas Institute for Environmental Policy Solutions at Duke University where she has worked on ecosystem services and environmental market policy since 2005. She has a doctorate in Biogeochemistry from Stanford University; a diversity of peer reviewed publications in science, policy and law; serves on the Environmental Advisory Board for the US Army Corps of Engineers; and was a AAAS Congressional fellow in 2004-2005 working in the office of Senator Lieberman on a range of environmental issues.

**Robert Johnston:**

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Robert Johnston, Ph.D. is a Professor of Economics and the Director of The George Perkins Marsh Institute at Clark University. His research interests include economic valuation, benefit transfer and ecosystem services, with an emphasis on aquatic, riparian and coastal systems. His recent work has focused on the economics of coastal vulnerability and adaptation (e.g., to sea level rise and coastal flooding), and the coordination of economic and ecological models to value aquatic, riparian and coastal ecosystem services. In addition to his grant-funded research, he works closely with international organizations, government agencies and non-profit organizations to assist in the appropriate use of economic information to guide environmental and natural resource decisions. He is a current member of the US EPA Science Advisory Board, the Ecosystem Science and Management Working Group of NOAA Scientific Advisory Board, the Management Committee and Science Advisory Board of the Narragansett Bay Estuary Program, and the Senior Advisory Board of the Connecticut Sea Grant Program. He has published widely on methods for ecosystem service valuation, and has served on multiple formal and ad hoc panels advising government agencies on the use of these methods.

**Lisa Wainger:**

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Lisa Wainger, Ph.D. is a Research Associate Professor of environmental economics at the University of Maryland Center for Environmental Science. Her primary research interest is developing integrated ecological and economic analysis tools to communicate changes in ecological conditions in terms of socio-economic impacts. She currently serves as a special economics advisor to the US EPA Office of Research and Development and serves on the Executive Board of the Scientific and Technical Advisory Committee to the Chesapeake Bay Program. She has served on numerous other advisory panels for the White House Council on Environmental Quality, US Army Corps of Engineers, and the National Fish and Wildlife Foundation, among others. She received her BS in Earth Science from the University of California, Santa Cruz and her PhD in ecological and environmental economics at the University of Maryland, College Park, with support from a MacArthur Fellowship.

**Sara Mason:**

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Sara Mason works as a policy and research assistant at the Nicholas Institute for Environmental Policy Solutions at Duke University. She received her Masters of Environmental Management degree from Duke, focusing in ecosystem science and conservation. Sara is part of the Ecosystem Services Program at the Nicholas Institute, and works as one of the coordinators for the National Ecosystem Services Partnership. Her work currently focuses on ways to integrate ecosystem services into decision making.