



## Welcome to the Federal Resource Management and Ecosystem Services Guidebook

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### PRESERVING OUR NATURAL RESOURCES

The Federal Resource Management and Ecosystem Services Guidebook serves as a training manual that helps to streamline the management of ecosystem services. With the guidebook, resource managers can create clear, workable plans that prioritize the work needed to establish and maintain resilient communities throughout the country. [LEARN MORE >](#)

UNDERSTAND THE **MOTIVATION**

EXPLORE **AGENCY USE**

VIEW THE **ASSESSMENT FRAMEWORK**

# Ecosystem Services in Federal Decision Making

*Lydia Olander, Duke University*

*National Ecosystem Services Partnership & Nicholas Institute for Environmental Policy Solutions*

Water Protection Network Meeting Washington DC September 2015





# What are Ecosystem Services?

## *Millennium Ecosystem Assessment*

### Provisioning

Goods or products produced by ecosystems



### Regulating

Natural processes regulated by ecosystems



### Cultural

Non-material benefits obtained from ecosystems



### Supporting

Functions that maintain all other services



Source of slide: Businesses for Social Responsibility

# Growing Use of Ecosystem Services



# How are ES useful?

Communicating benefits ecosystems provide to people

Constructive engagement of stakeholders before decisions are made

Communicating and explicitly considering trade-offs that involve ecosystem services

More systemic comparison of alternatives (such as greener vs grayer infrastructure options)

Determining monetary values for important but often undervalued benefits

*What about limitations to their usefulness?*

# National Ecosystem Services Partnership (NESP)

*NESP engages both public and private individuals and organizations to **enhance collaboration** within the ecosystem services community and to **strengthen coordination** of policy, market implementation, and research at the national level*

§Quarterly newsletter

§NESP Community of Practice

§Federal ES Community of Practice

§FRMES Online guidebook

[nespguidebook.com](http://nespguidebook.com)

§Best Practice Guidance

[nicholasinstitute.duke.edu/sites/default/files/publications/es\\_best\\_practices\\_fullpdf\\_0.pdf](http://nicholasinstitute.duke.edu/sites/default/files/publications/es_best_practices_fullpdf_0.pdf)

<https://nicholasinstitute.duke.edu/focal-areas/national-ecosystem-services-partnership>

# Goals of our current efforts

Help to fill the gap between concept and practice

Educate newcomers & managers on the ground

Shared learning across agencies

Connect ecological and social methods for ES evaluation

Common framework that spans decision contexts, geography, and capacity

Bring together agency and academic experts to bring credibility while remaining practical



# Why now?

1998

PCAST report -  
Teaming with Life: Investing in Science to Understand and Use America's  
Living Capital

2005

Millennium Ecosystem Assessment

2008

Farm Bill  
Establishment of USDA Office of Ecosystem Services and Markets  
Wetlands Compensatory Mitigation Rule

2010

Inter-agency dialogue on payments and markets for ecosystem services

2011

PCAST Report -  
Sustaining Environmental Capital: Protecting Society and the Economy

2012

Forest Service Planning Rule  
International Platform on Biodiversity and Ecosystem Services

2013

CEQ Principles and Requirements for Federal Investments in Water  
Resources

2015

CEQ new guidance?

# Online Guidebook



UNDERSTAND THE MOTIVATION for Ecosystem Services Approaches  
History, definitions, benefits, limitations, FAQs

EXPLORE AGENCY USE of Ecosystem Services  
Agency decision contexts and examples

THE ASSESSMENT FRAMEWORK for Ecosystem Services  
Methods for connecting ecological and social analyses

ABOUT

Federal Resource Management and Ecosystem Services Guidebook | [nespguidebook.com](https://nespguidebook.com)



# Assessment Framework

## REACTION

- Monitoring BRIs

## SCOPING

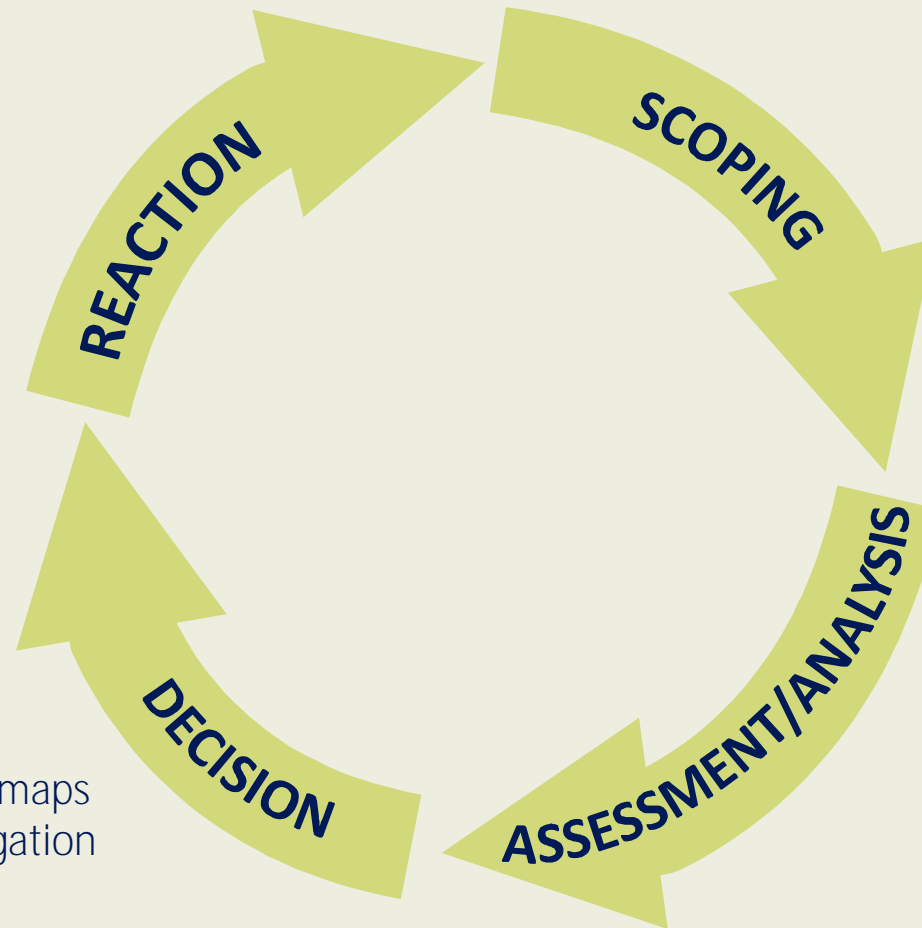
- Understanding socio-cultural context
- Engaging stakeholders
- Conceptual mapping
- Identifying services

## ASSESSMENT/ANALYSIS

- Causal chains
- Selecting services
- Quantifying BRIs
- Social evaluation (Monetary or non-monetary)

## DECISION

- Displaying results-alternative matrix or maps
- Weighting and aggregation



# Over 150 People Participated

## Project Leads

Lydia Olander, Dean Urban, Tim Profeta (*Duke University*)  
Lynn Scarlett (*The Nature Conservancy*)  
Jim Boyd (*Resources for the Future*)  
Sally Collins (*Consultant, Formerly USFS and USDA OEM*)

## Funders

Gordon and Betty Moore Foundation  
National Center for Ecological Analysis and Synthesis  
National Socio-Environmental Synthesis Center  
Duke University  
USDA Office of Environmental Markets  
Seed funding from several agencies

## Universities & Consultants

Clark University  
Colorado State University  
Duke University  
University of Maryland  
Ohio University  
University of Wisconsin  
Vanderbilt University  
The New School  
Institute for Natural Resources  
Parametrix  
Spatial Informatics Group

## Agency Partners

U.S. Forest Service  
U.S. Bureau of Land Management  
U.S. Fish and Wildlife Service  
U.S. Geological Survey  
U.S. Department of the Interior  
U.S. Environmental Protection Agency  
National Oceanic and Atmospheric Administration  
U.S. Army Corps of Engineers

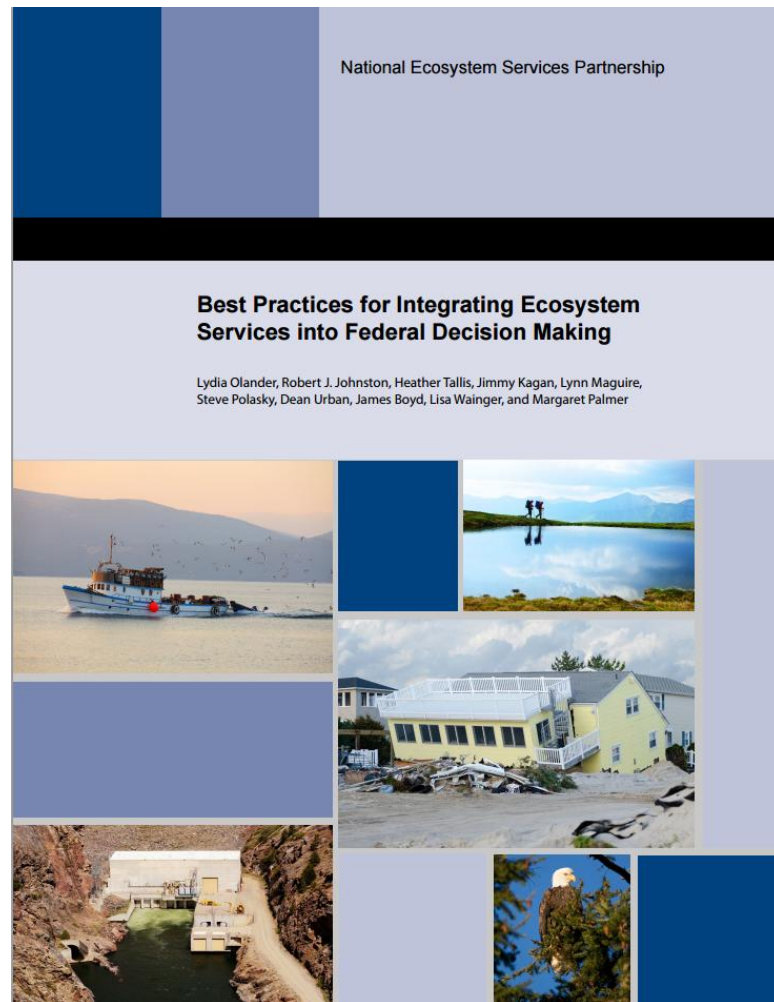
## Agency Observers

Council on Environmental Quality  
Office of Science and Technology Policy  
Office of Management and Budget  
USDA Office of Environmental Markets  
U.S. Department of State

## NGOs

Compass  
Defenders of Wildlife  
Conservation Science Partners  
NatureServe  
Resources for the Future  
The Nature Conservancy  
United Nations Environment Programme

# Best Practices for Integrating Ecosystem Services into Federal Decision Making



*Written by*  
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Dean Urban,  
James Boyd,  
Lisa Wainger,  
Margaret Palmer

*Guided by input and advice from*  
EPA, USGS, DOI, USACE, NOAA, USDA, USFS, CEQ,  
OIRA, BLM,



# How are the GB and BP being used?

Informing Forest Service process

- California regional planning effort

- Development of FS assessment tools

Parallel development with USACE framework

Informing metrics/indicator development (BRIs)

Training

- ACES workshop

- TNC training

Keeping up with the Jones's

- Finding out what other agencies are doing

Exploratory conversations -

- RESTORE council;

- USGS building ES resources;

- DOT webinar



# Key ES concepts that everyone needs to understand

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# Key ES concepts

What distinguishes an ecosystem assessment  
from an ecosystem *services* assessment

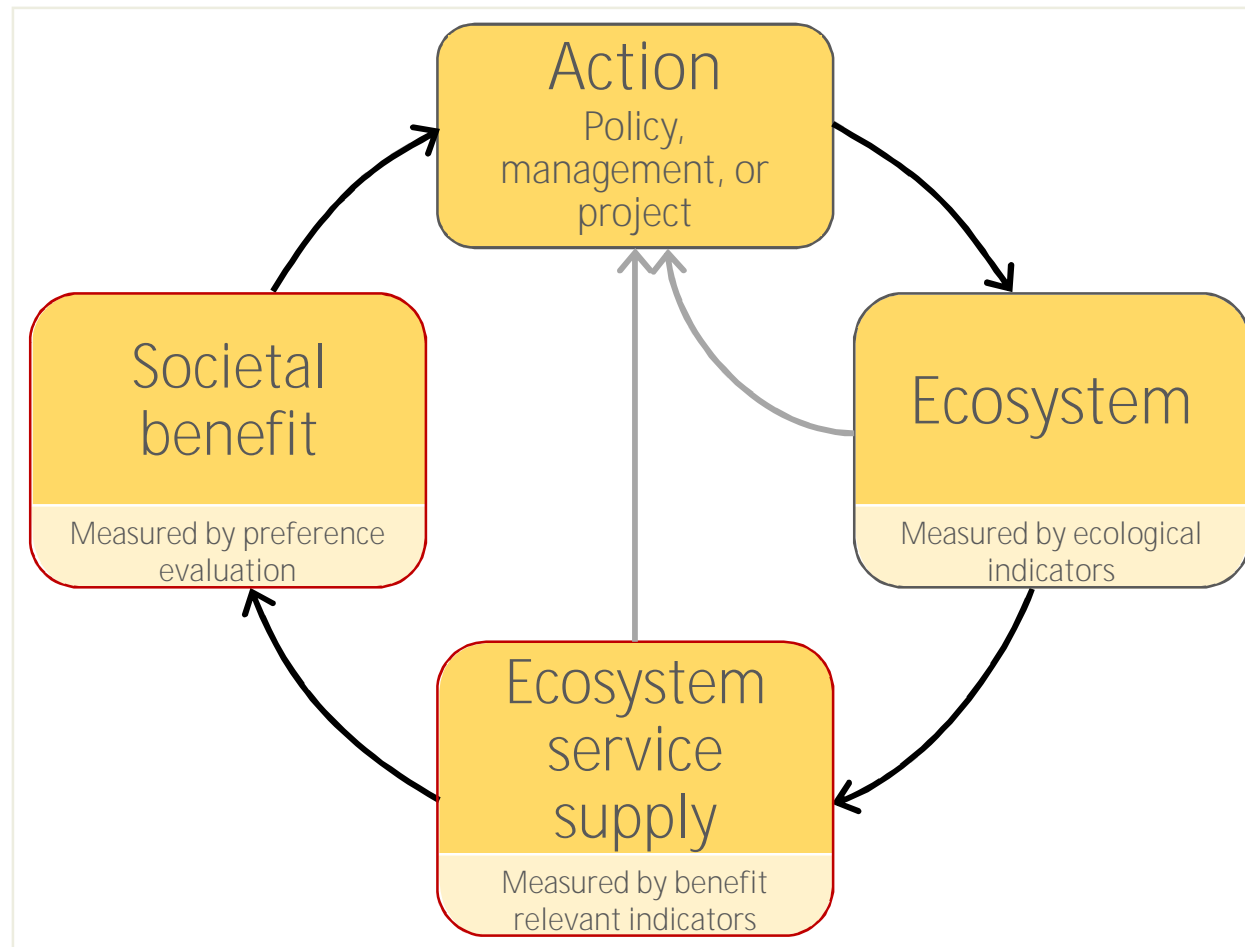
Connection to people



# An Ecosystem Services Approach

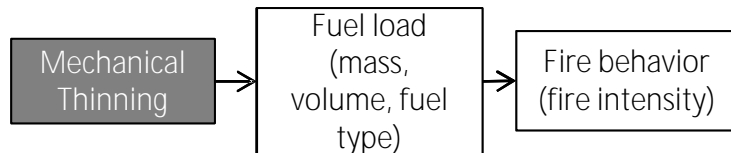


# Action – Ecosystem - Benefit

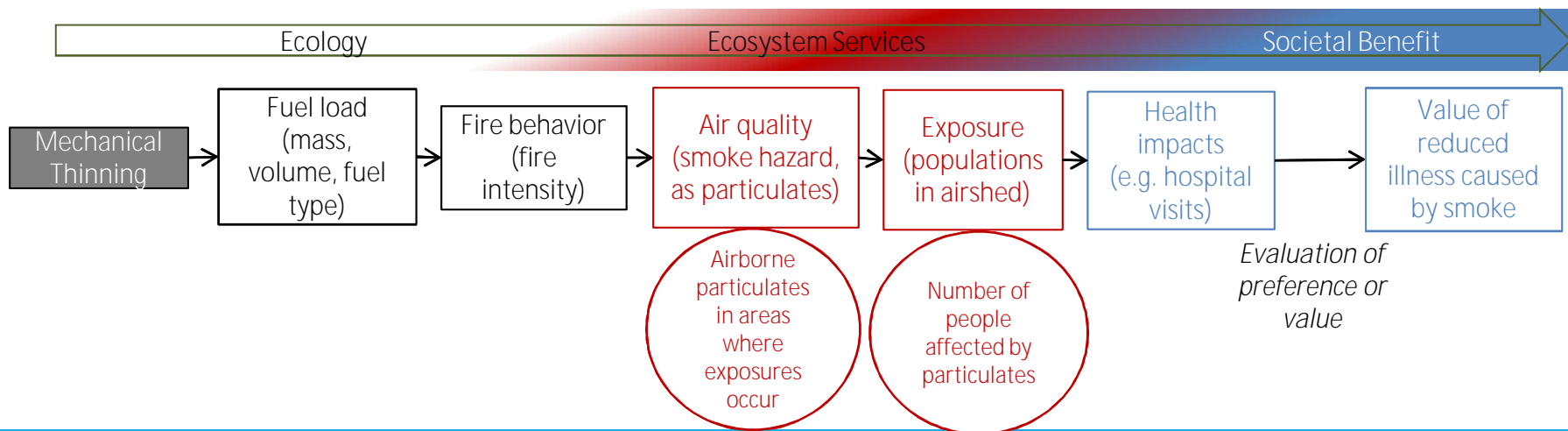


# Causal Chain

## A. Ecological Assessment and Indicators of Wildfire Risk



## B. Ecosystem Services Assessment and Benefit Relevant Indicators of Wildfire Impacts on Human Health





# Key ES concepts

What distinguishes an ecosystem assessment from an ecosystem *services* assessment?

Connection to people

What are well-defined measures of ecosystem services?

Benefit Relevant Indicators (BRIs)

# What are BRIs

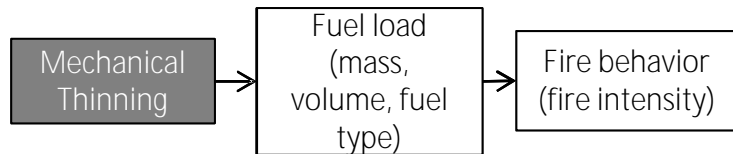
Benefit-relevant indicators (BRIs) are **measurable** indicators that capture the connection between the ecosystem and its affect on people.

**Ecological indicators are not BRIs** unless there is a connection to people

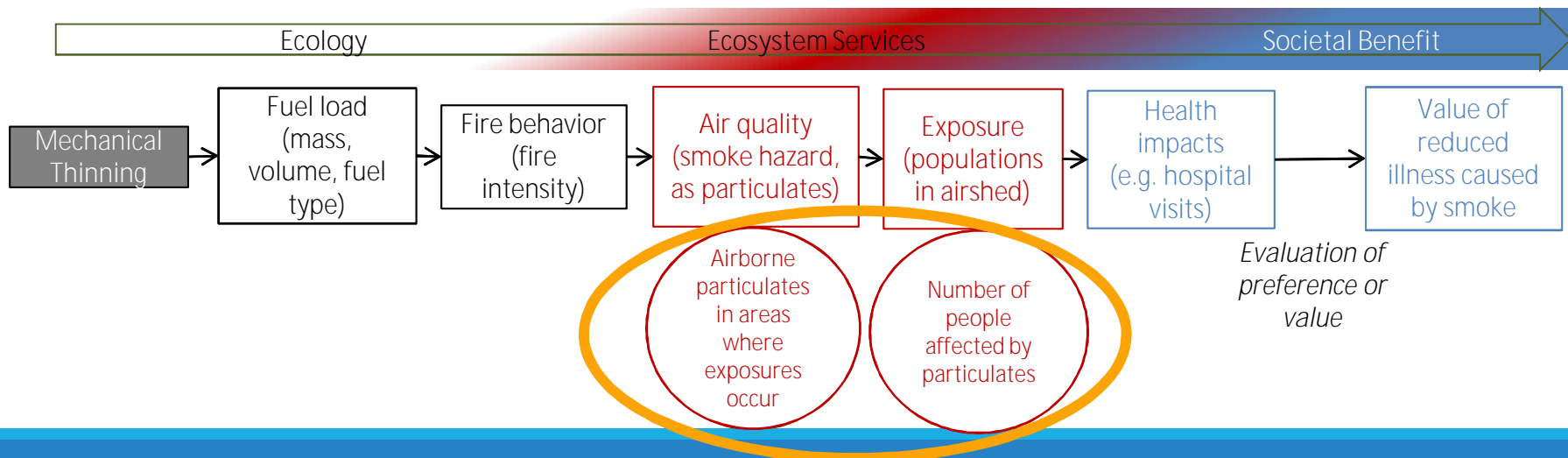
BRIs are not monetary values or preference rankings of the societal benefits.

# Causal Chain

## A. Ecological Assessment and Indicators of Wildfire Risk



## B. Ecosystem Services Assessment and Benefit Relevant Indicators of Wildfire Impacts on Human Health





# Example BRIs

EXAMPLES OF WHAT WOULD AND WOULD NOT QUALIFY AS A BRI

Ecosystem Service	<u>Not</u> BRI	<u>BRI</u>
Existence or abundance of wolves	People donating to general conservation organizations*	Numbers of wolves x Number of people holding existence value for wolves
Ecological production of recreationally harvested fish	Fish abundance	Abundance of recreationally targeted fish, in areas used by recreational anglers
Flood regulation	Flood frequency	Number of vulnerable people (elderly, ESL) in areas with flood risk reduced by management action
Water quality regulation	Nitrogen concentration (proxy measure)	"swimmable days" x number of people with ready access to the swimming sites

# Key ES concepts

What distinguishes an ecosystem assessment from an ecosystem *services* assessment?

Connection to people

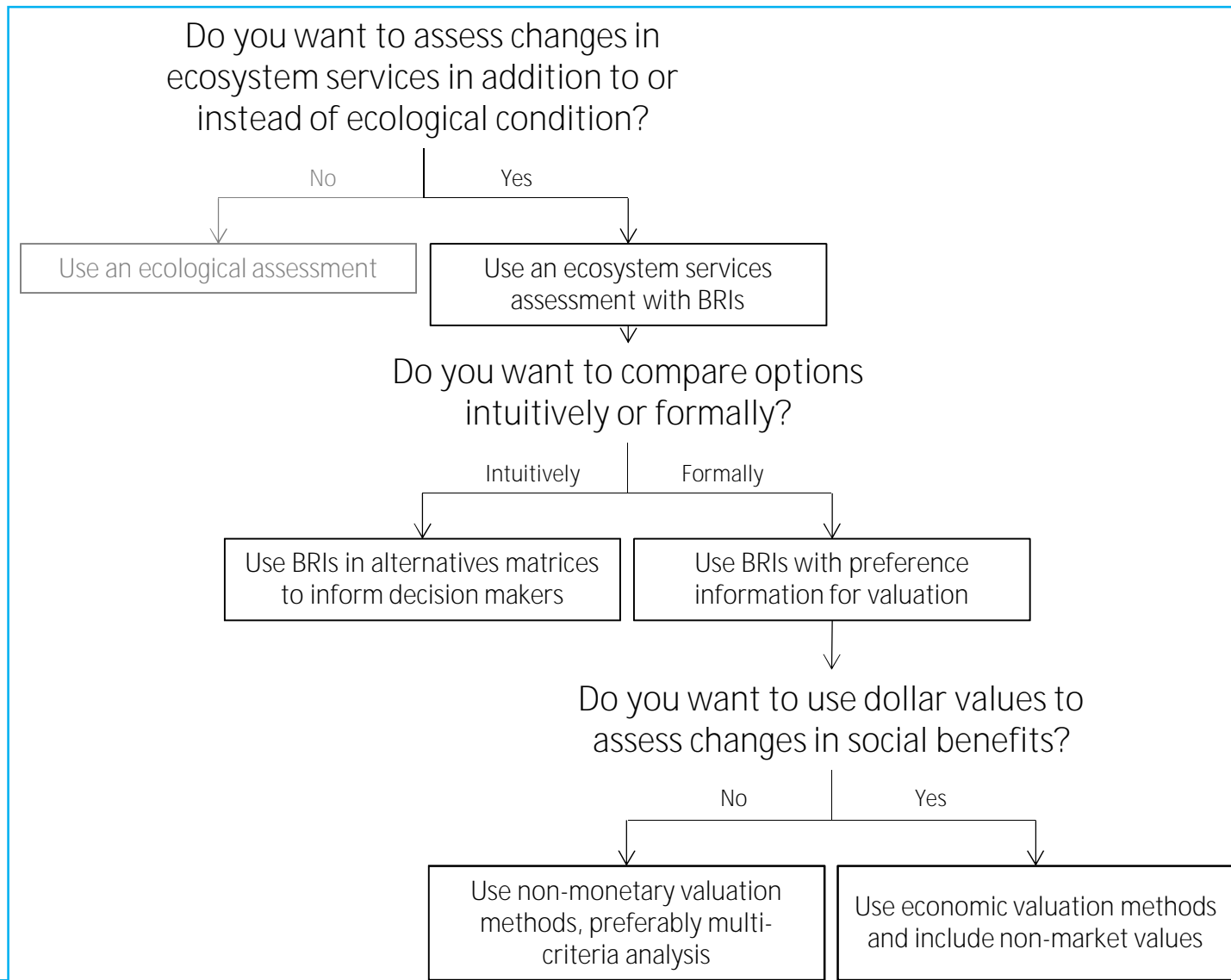
What are well-defined measures of ecosystem services?

Benefit Relevant Indicators (BRIs)

What are the different ways to quantify ES and what can they do (and not do) for you?

When are BRIs alone sufficient, versus preference evaluation/societal benefits (monetary / non-monetary valuation).

# Overview of ES assessment process



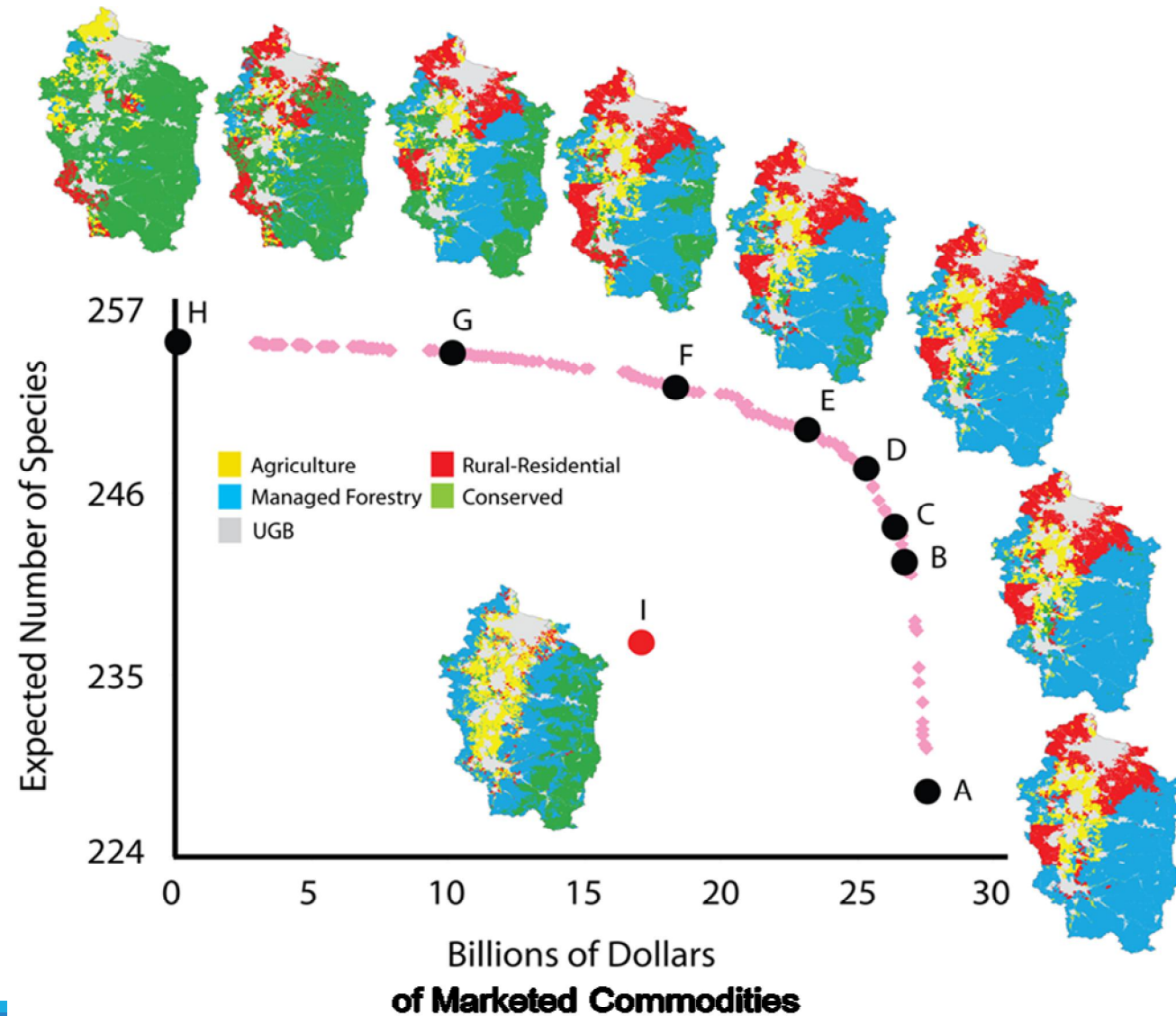
# BRIs in intuitive decision making

ALTERNATIVES MATRIX FOR CONSIDERING ECOSYSTEM SERVICES IN INTUITIVE DECISION MAKING

Policy or Management Alternative			Option A	Option B	Option C
Ecosystem Service Benefit Relevant Indicator	BRI 1	Vegetation density in areas upstream of flood prone area with people or property of interest			
	BRI 2	Aquifer volume accessible by households			
	BRI 3	Amount of fish landed commercially			
	BRI 4	Acres of wetland habitat supporting recreationally important bird or fish species			



# Evaluating trade-offs with BRIs



# Preference Evaluation

BRIs measure *what is valued*, but do not measure *values*. When is preference evaluation required?

An evaluation of preferences (monetary or non-monetary valuation) is needed if

1. service provision varies substantially across different stakeholder populations, i.e., there are tradeoffs across groups; or
2. changes in services in response to management or policy vary in direction (or magnitude) across services, i.e., there are tradeoffs across services.

Two main approaches

1. Monetary valuation
2. Non-monetary multi-criteria analytical methods

# Where could the Corps use ES?

§ Assessing and prioritizing Ecological Restoration projects

§ Comparing O&M options

§ Comparing alternatives for main business line projects  
(navigation, flood risk management, hydropower...)

§ Regulatory program

“While ecosystem services valuation is a positive step, it will not solve the many problems associated with using benefit-cost analysis as the primary tool for project selection”

–NGO comments to CEQ on P&S April 2010

“ES valuation does not capture cumulative impacts or the contribution of a project to the resiliency or sustainability of an overall system”

True, but perhaps that’s the wrong issue....

The problem is not that ES valuation does not capture cumulative impacts, but that cumulative impact assessments are not used in Benefit Cost Assessments.

And that cumulative impact analysis (where used) may not focus on ES (BRIs), but be limited to ecological indicators



“While ecosystem services valuation is a positive step, it will not solve the many problems associated with using benefit-cost analysis as the primary tool for project selection”

–NGO comments to CEQ on P&S April 2010

“given the current state of knowledge...in virtually every case, an evaluation of ecosystem services will undervalue both the costs of damaging a system and the benefits of restoring the system”

Yes, data and models are limiting quantification and valuation for many services, which in the past may not have been included, but....

Should be explicit and transparent about what services valued and which are not, and make sure they are included as BRIs (measures that communicate well)

Can use MCDA (combine monetary and non-monetary metrics and can include costs)

Also, as we identify these data gaps we can work to fill them.

“While ecosystem services valuation is a positive step, it will not solve the many problems associated with using benefit-cost analysis as the primary tool for project selection”

–NGO comments to CEQ on P&S April 2010

“The results... will also depend on the services selected for valuation, and the selection of the values to assign to those services...”

True

This is why our BP suggests the use of conceptual mapping to fully assess and be transparent about what services and benefits may be affected.

Criteria for selecting services should also be used.

- 1) Does the ES fall under the legal mandate of the assessor?
- 2) Is the impact on the ES likely to be large and strongly driven by the activity?
- 3) Will the expected changes to the ES affect many people or groups of special concern?

Agencies may need to collaborate to include services outside their authorities.



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