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The Rapid Benefits Indicators (RBI) Approach: A Process for Assessing the Social Benefits of Ecological Restoration

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Overall project – Restoration in urban and urbanizing areas

Photo: Rick McKinney

- 2 areas of research
  - Assessing benefits of restoration, with focus on freshwater wetlands
  - Investigating barriers and opportunities for restoration in urbanizing systems
- Today's focus is on the first – benefits of restoration
- Barriers and Opportunities work is available on our website

Challenges and Motivation

Environmental decisions require tradeoffs

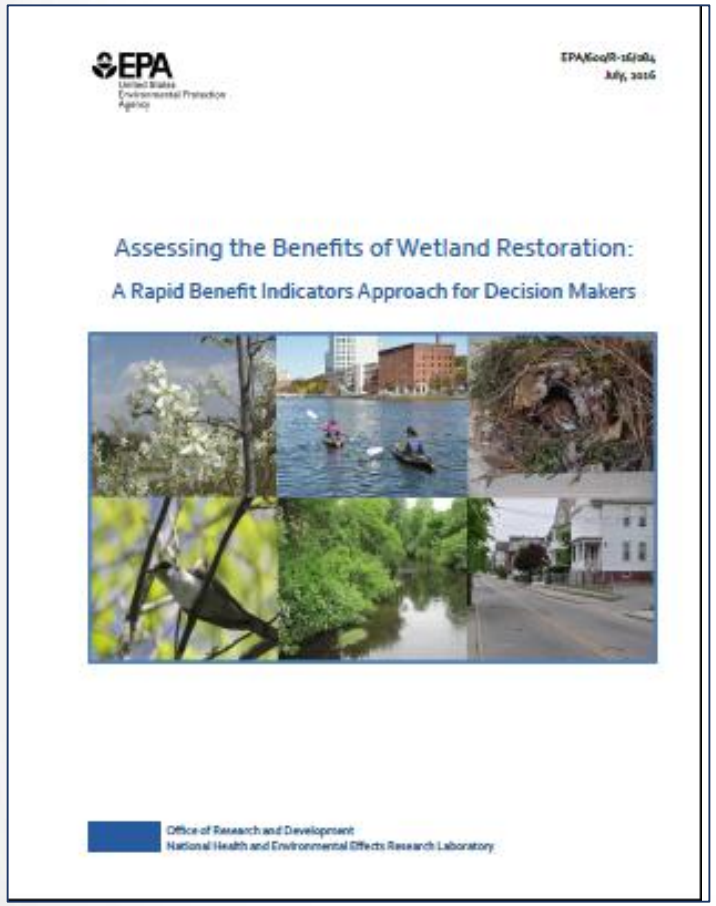
Which of these sites should we spend money on?

Both ecological and social criteria are important.

Challenges and Motivation

- Scarce funding for smaller, more urban sites
- Lack of easily-applied methods to include benefits

A rapid assessment approach using benefit indicators



- A framework for compiling and using benefit indicators
  - Based on economic principles
- User-friendly
  - Can be applied with different levels of detail, depending on context
- Focus is on benefits to people
- Designed to be used along with a biophysical/functional assessment
- Initial application to freshwater wetlands in a watershed ranging from urban to rural
  - May be applied, with modifications, to other ecosystems

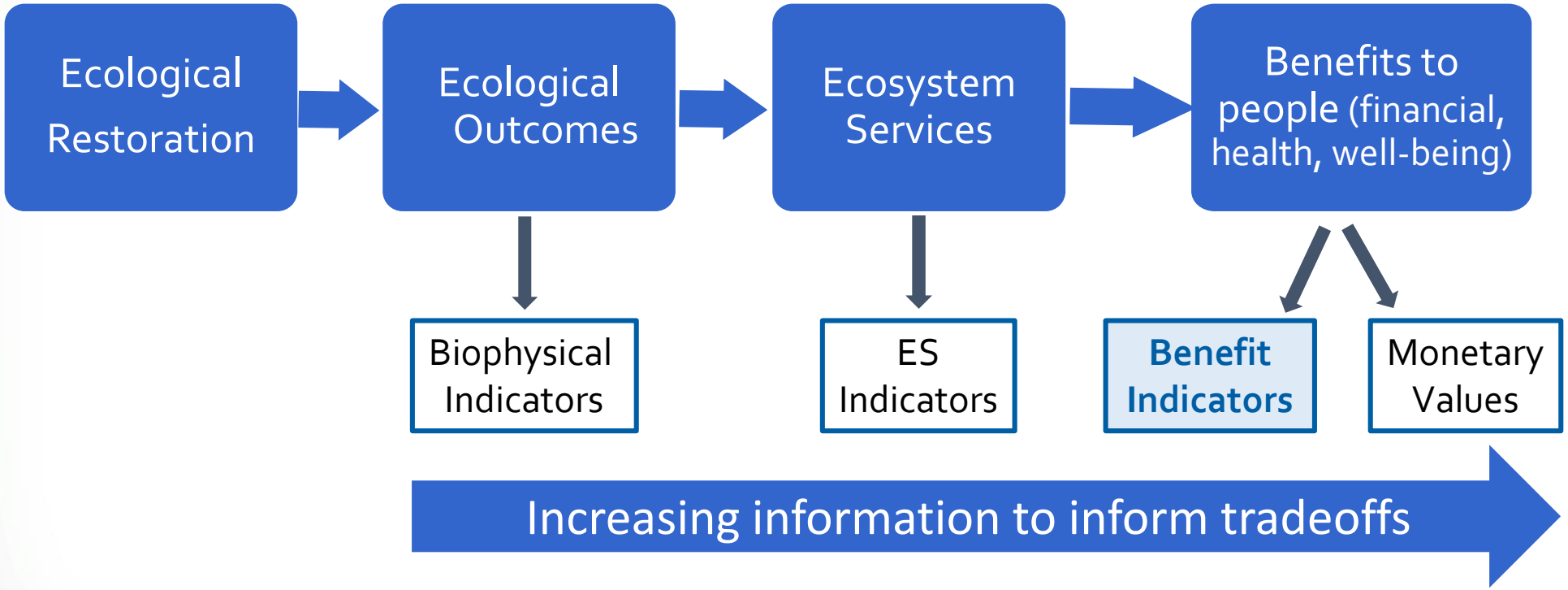
How this approach might be used

Who can use our guide?

- ✓Those who conduct or advocate for restoration, including:
  - ✓Watershed groups
  - ✓Community groups
  - ✓Federal, state, or local managers
- ✓Funders

- ❖ A few contexts for use:
  - ❖ prioritize sites or projects
  - ❖ funding decisions
  - ❖ inform the public
  - ❖ preliminary assessment for a more complex evaluation
  - ❖ augment benefit transfer approaches

Assessing Ecosystem Services



Slide adapted from Lisa Wainger

What are benefit indicators?

- Indicators are metrics that simplify complexity to inform decisions and actions
- Benefit indicators are based on economic models and empirical evidence of factors that affect value, i.e. **scarcity metrics**

Photo: Woonasquatucket River Watershed Council

Benefit indicators answer these questions:

1. Can people benefit from an ecosystem service?
2. How many people benefit?
3. How much are people likely to benefit?
4. What are the social equity implications?
5. How reliably will services be provided over time?

1. Can people benefit from an ecosystem service?

Yes, if:

1. There is demand

Photo: https://www.allstate.com/tools-and-resources/home-insurance/do-i-really-need-flood-insurance.aspx

2. There is sufficient quantity and quality of the service

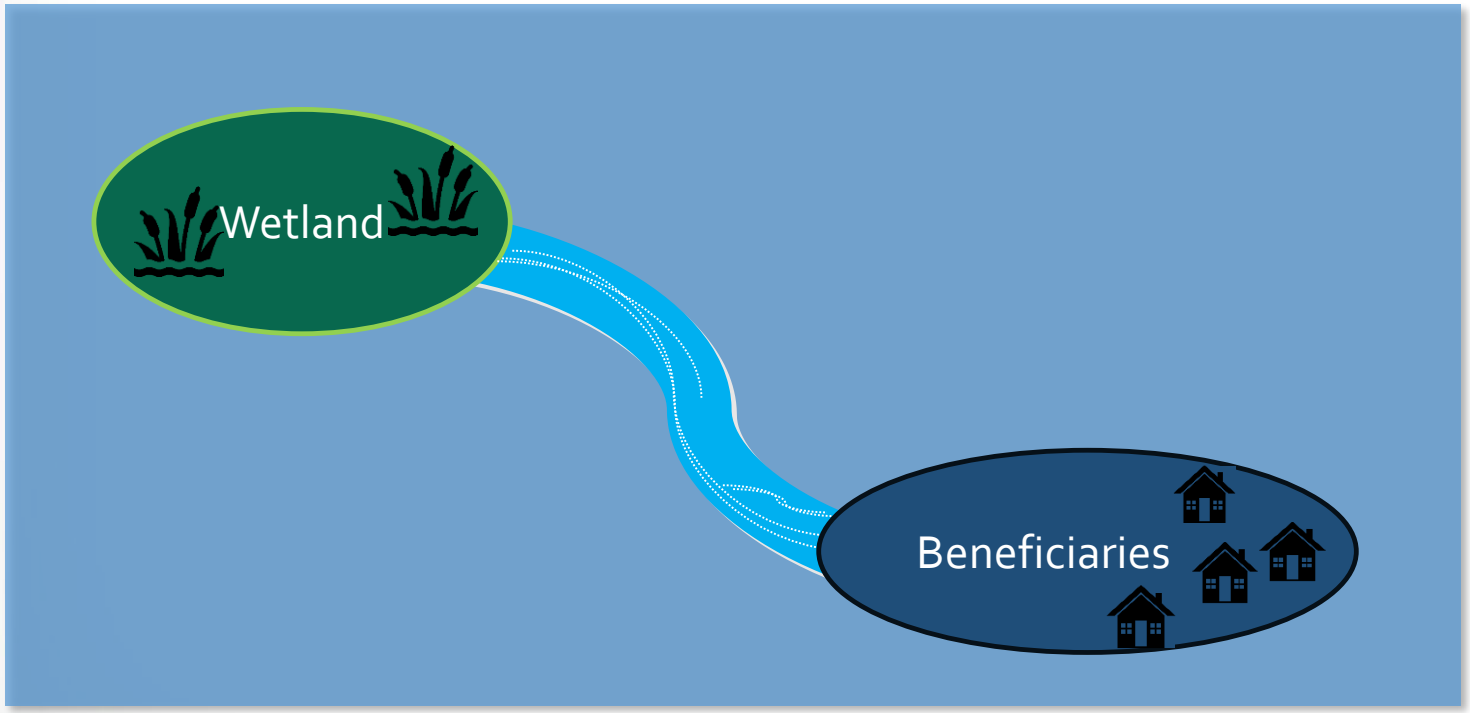

Photo: http://pubs.usgs.gov/circ/circ1209/major_findings.htm

3. If required, complementary inputs (infrastructure or other things that facilitate use) are available


Photo: outboardmotoroilblog.com

2. How many people benefit?

More people who benefit → Greater value



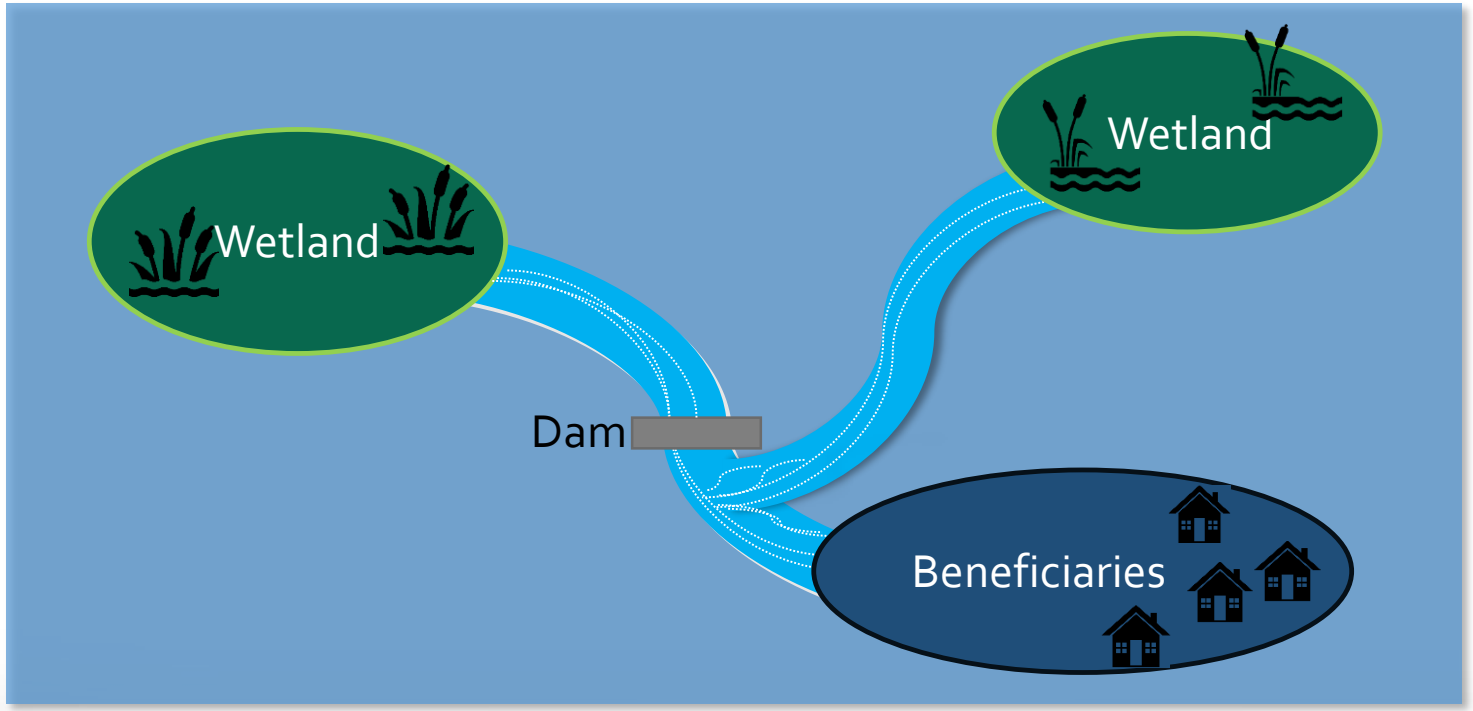
The number of people who benefit is often a stronger determinant of aggregate social value than value per person (Bateman et al., 2008)

3. By how much do people benefit?

3.1 Substitutes:

How many natural and technological substitutes are there?

Fewer substitutes or lower quality substitutes ⟶ Greater value

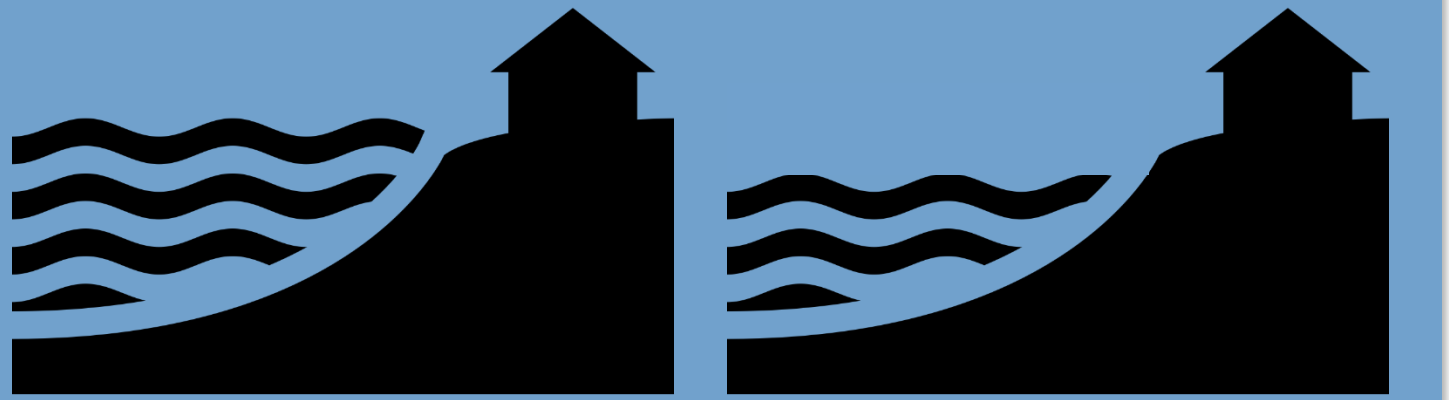


3. By how much do people benefit?

3.2 Quality:

Higher quality service → Greater value

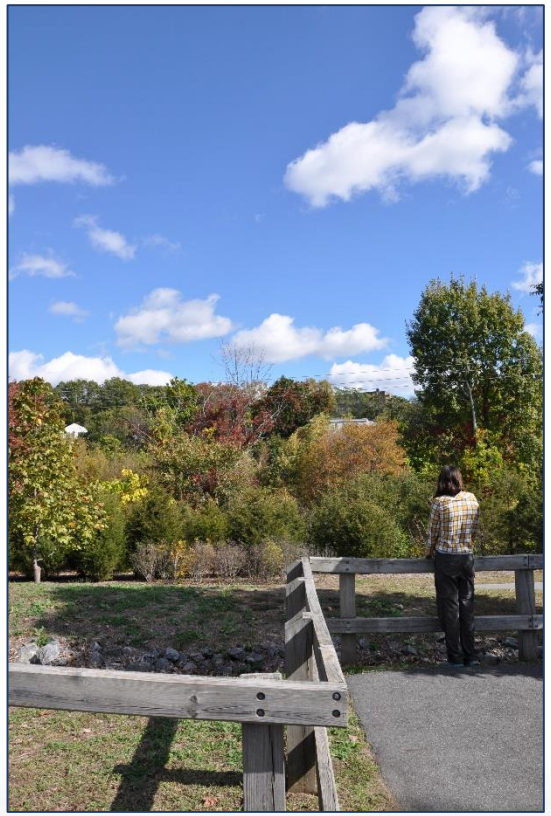
How much is flood risk reduced?



3. By how much do people benefit?

3.3 Quality of complements:

Higher quality complements → Greater value



3. By how much do people benefit?

3.4 Strength of Preferences:

Includes factors such as avidity, willingness/ability to adapt

not so avid angler

avid angler

4. What are the social equity implications?

Social Equity:

Are groups that are particularly socially vulnerable affected?

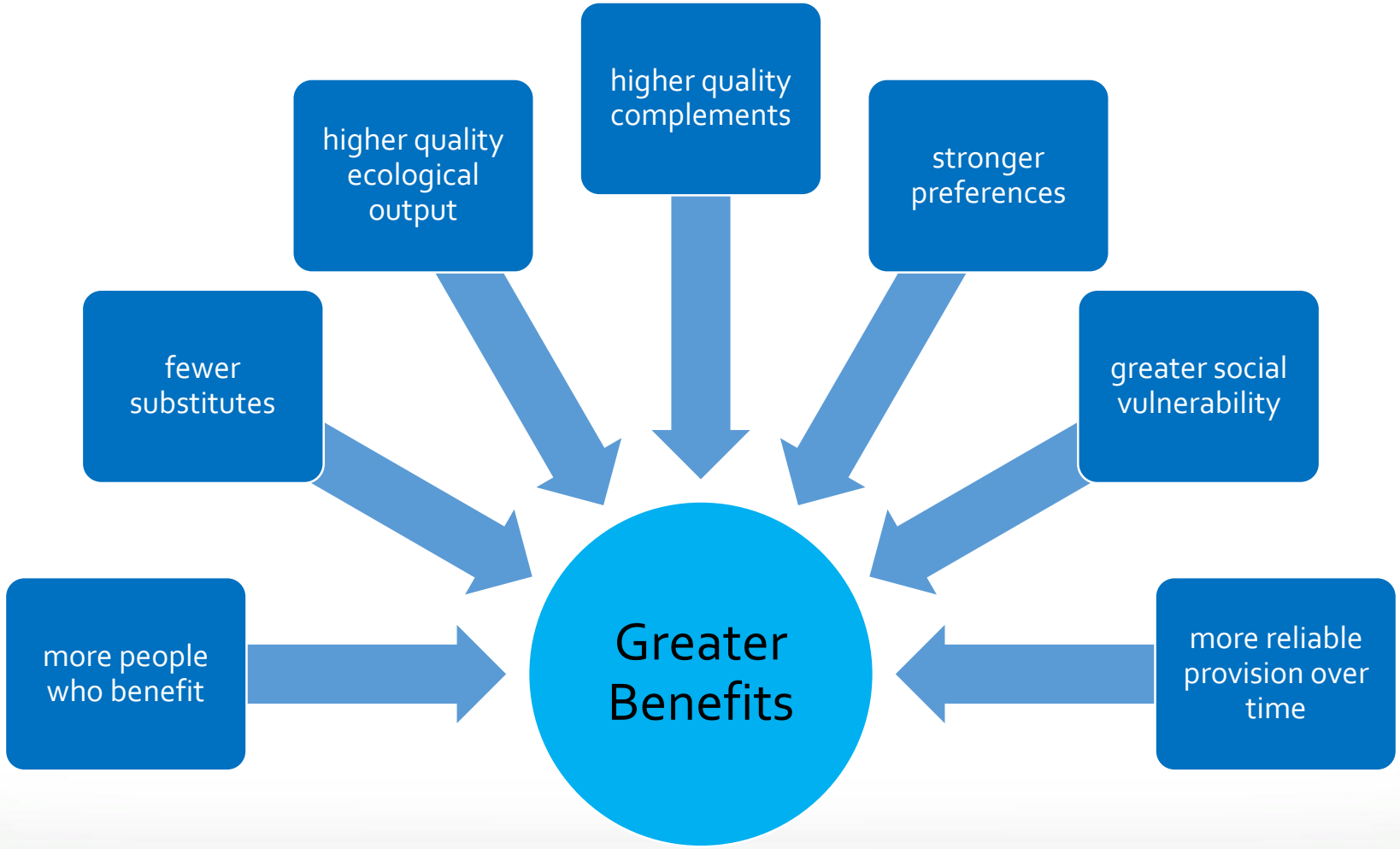
5. How reliably will services be provided over time?

Reliability:

How sure are we that benefits will continue?

More reliable → Greater value

Putting it all together – a set of benefit indicators



Prototype decision tool – automates aggregation

Instructions:

This Excel spreadsheet contains macros. Respond to security message (if any) by agreeing to enable macros.

This tool allows you to create up to four analysis scenarios by specifying which benefits and weights are included in an analysis. You can compare the analyses results on the map and table at right.

Touch any "Edit" button to create or modify a scenario.
Touch any "View" buttons to view results of a scenario analysis at right.

Mouse-over any information icon for a description of tool features.

Clear All Scenarios

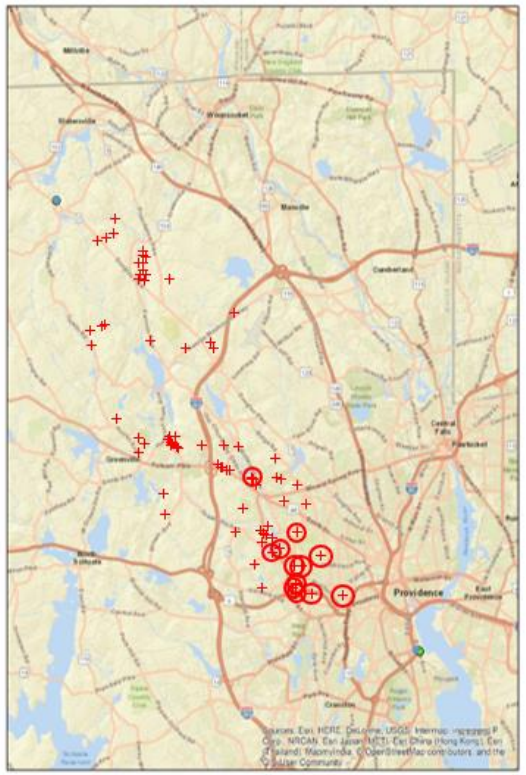
Edit Scenario 1	Edit Scenario 2	Edit Scenario 3	Edit Scenario 4
View Scenario 1	View Scenario 2	View Scenario 3	View Scenario 4

Benefits	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Flood risk	20		20	
Scenic views		40	30	
Education				
Recreation	50	50		
Bird watching	30			
Social equity		10	30	
Reliability			20	
Total	100	100	100	0

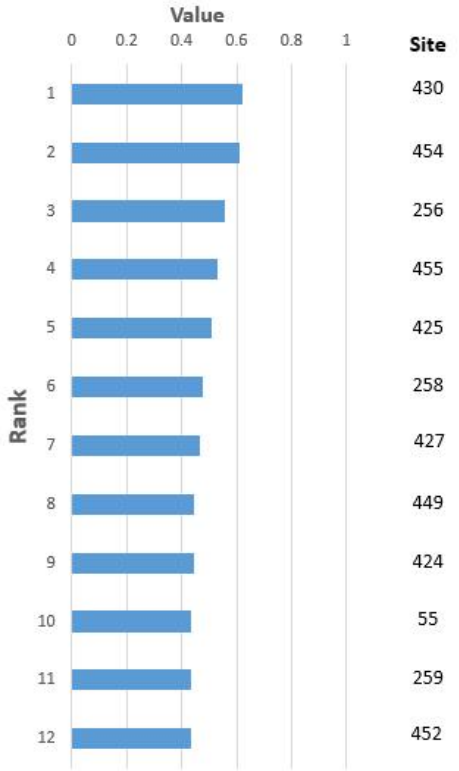
Top dozen ranked sites mapped and described

More

Scenario 3



Red 'X's indicate locations of all sites
Red circles indicate 12 top ranked sites
Circle size is proportional to rank value



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- The Guidebook includes examples of 5 Ecosystem Services:
  - Flood water regulation
  - Scenic landscapes
  - Learning opportunities
  - Recreational opportunities
  - Birds

Services and Benefits Addressed in this Guide

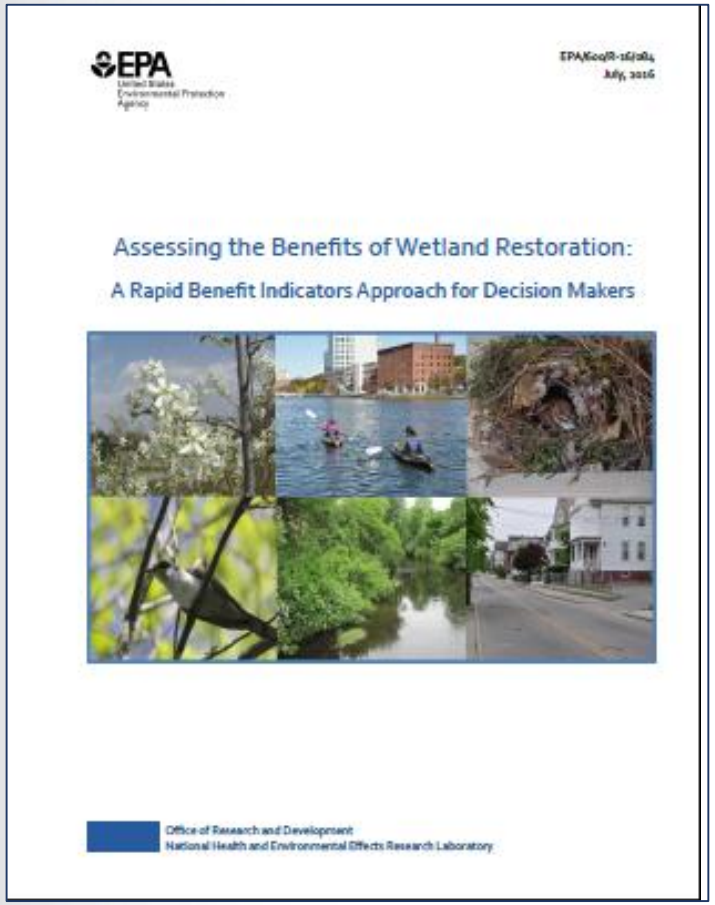
This guide addresses the following important services and benefits provided by wetlands in urbanized areas. We selected these because:

- They may be provided by relatively small, urban sites
- They are relevant to our example watershed
- They were mentioned in our interviews with managers

Wetlands can provide other services, and multiple types of benefits may result from each service. We are not providing indicators for a comprehensive set of freshwater wetlands' benefits, but are focusing on this subset of possible benefits. The approach we illustrate can be applied in a similar way to other services and benefits.

Ecosystem Service		How people benefit
	**Flood water regulation**	**Reduced Flood Risk:** The risks from floods to people and structures are reduced.
	**Scenic landscapes**	**Scenic Views:** People can enjoy scenic views.
	**Learning opportunities**	**Environmental Education:** People can benefit from studying nature or from enhanced connection to nature.
	**Recreational opportunities**	**Recreation:** People can enjoy recreation
	**Birds**	**Bird Watching:** People can watch or hear birds.

Applying the approach



1. Download our Guidebook and tools from:

   https://www.epa.gov/water-research/rapid-benefit-indicators-rbi-approach

2. The Guidebook presents an example application

3. We have 3 tools to help compile benefit indicator information

   1. Fillable PDF – easiest to use, works on any computer, least automated, requires data for your sites

   2. Excel® spreadsheet checklist tool – easy to use, requires appropriate software and operating system, and data for your sites

   3. Python GIS tool – requires GIS skills, provides the most detail and automates data handling (not available yet, but coming soon!)

4. We are working on a 4th tool to apply decision analysis methods to aggregate indicators

Questions?

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For more info or to download tools visit:
https://www.epa.gov/water-research/rapid-benefit-indicators-rbi-approach