

Benefit Indicators to promote and prioritize wetlands restoration

National Conference on Ecosystem Restoration

April 20, 2016

*Justin Bousquin, M. Mazzotta, K. Hychka C. Ojo, C.
Druschke & W. Berry*

Which of these sites should we spend money on?



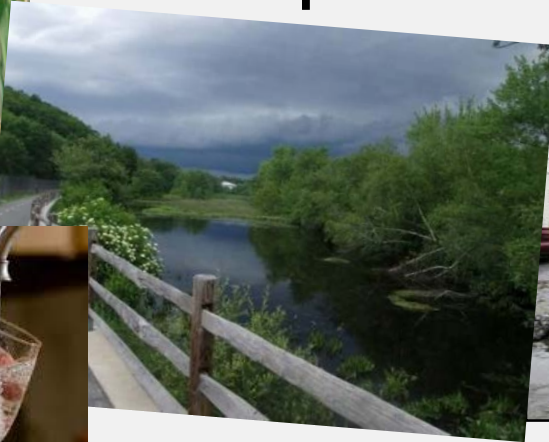
Environmental Decisions require tradeoffs

Wetlands Produce Ecosystem Services

Recreational
Waterways



**Aesthetic
Landscapes**



**Flood Water
Reduction**

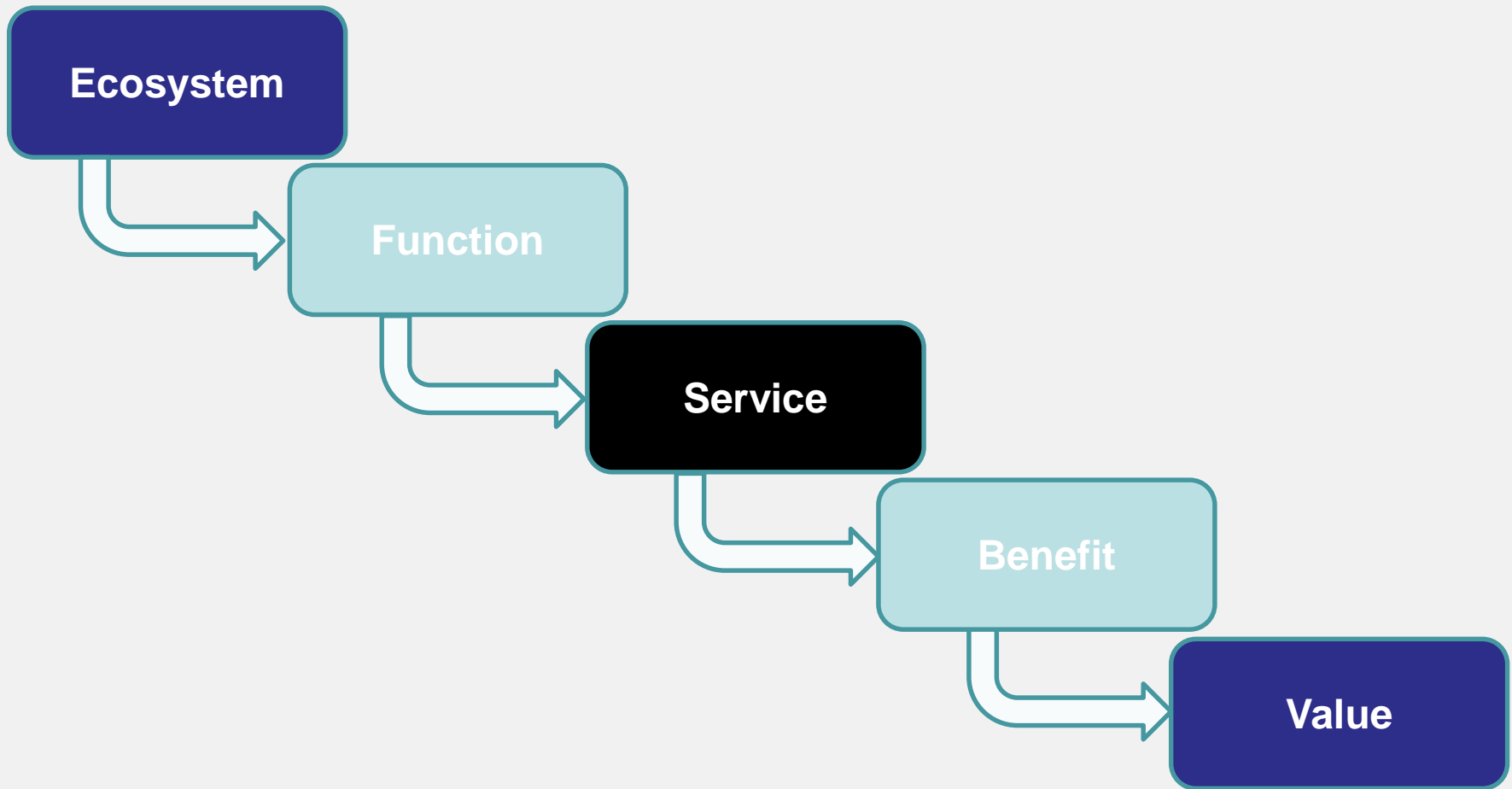


**Water
Purification**

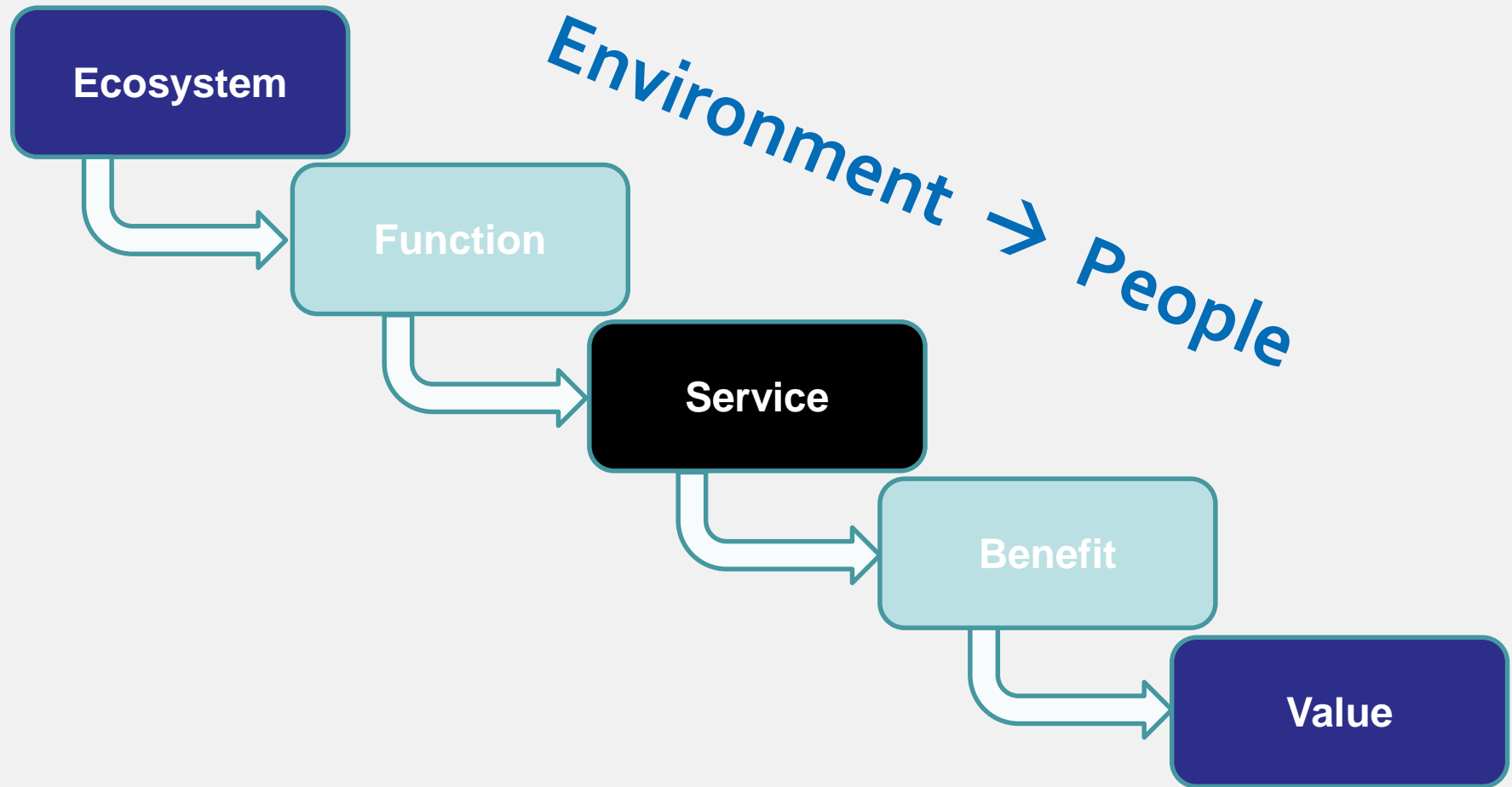


Ecosystem Services (ES) provide common **Metrics** to evaluate **Tradeoffs**

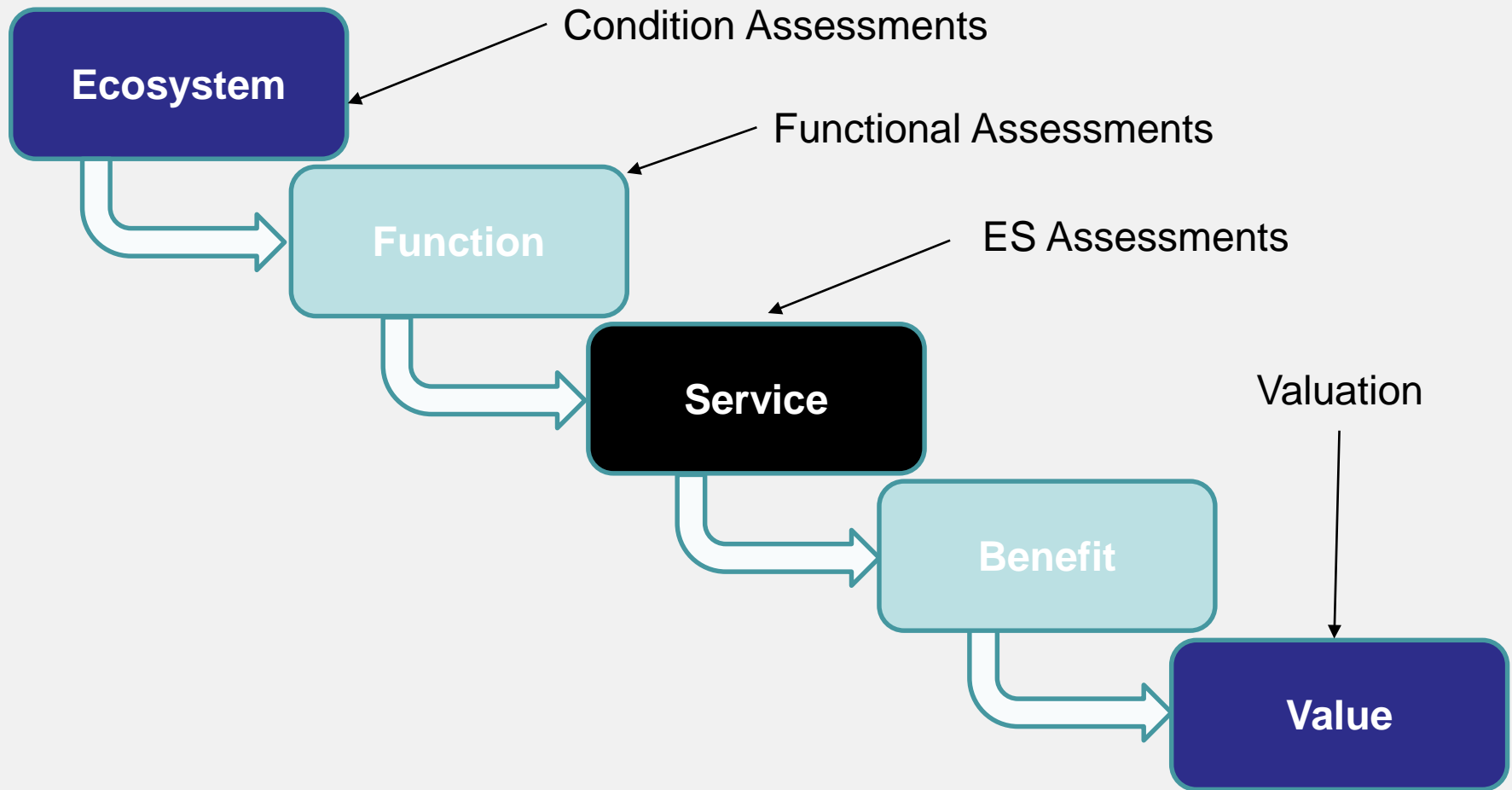
ES Cascade

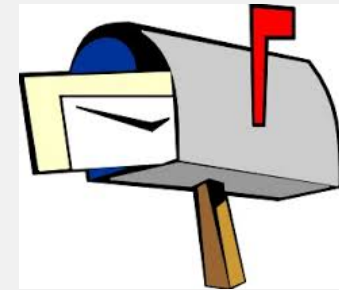
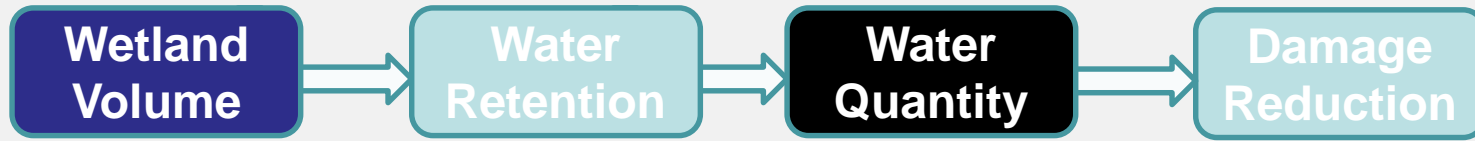


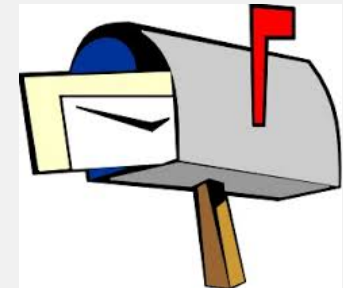
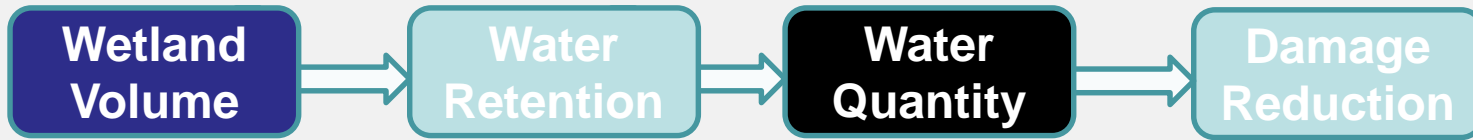
ES Cascade



Assessment Approaches







ES Assessments measure how much a good or service is produced, not delivered

Monetary measures are not always the solution

- Does it fit the decision?
 - Decision maker may lack resources
 - Decision may be able to be made without
- Does it add controversy rather than clarity?
- Does it tell the right story?
 - “Total value” is elusive
 - Distribution of benefits
 - Environmental justice



Rapid Benefit Indicators assessment approach

Assessing the Benefits of Wetland Restoration:

A Rapid Benefit Indicators Approach for Decision Makers



Marisa Mazzetta, Justin Bouquin, Claudette Ojo,
Kristen Hychka, Caroline Druschke, Walter Berry, Rick McKinney

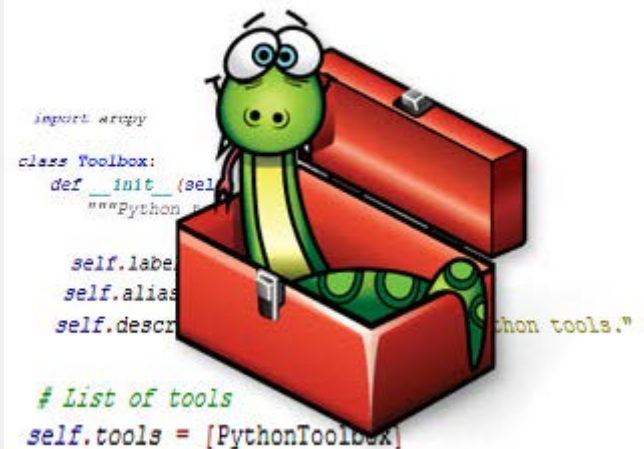
- Explicitly includes benefits to people using indicators
- Based on sound natural and social science
- User-friendly

What comes with it?

- Assessment guide book
- Example application
- Example Benefits (5)
- Checklist
- Arcpy Python toolbox
- Web maps

Step 4		Summarize the Indicators	Site	
Benefit	Indicators for Woonasquatucket Example	Site 1: Greystone	Site 2: #448	
Flood Risk	3.2 How Many Benefit?	2.5 mi downstream of site and in flood zone	20	6
	3.3.A Service Quality	Area of restoration site (acres)	0.54	3.84
		Features that increase retention volume?	Yes	Yes
	3.3.B Scarcity	Dams and levees 2.5 mi downstream?	Yes	Yes
		Wetlands in 5 mi (number or % area)	9.84	11.2
3.3.C Complements	NA	NA	NA	
3.3.D Preferences	Are people worried about flood risk?	Yes	Yes	
Scenic Views	3.2 How Many Benefit?	Number in 160 ft of site	9	0
		Number in 325 ft of site	1	0
		Weighted number who benefit	6.6	0
		Are there roads or trails within 325 ft of site?	Yes	No
	3.3.A Service Quality	Aesthetic features or characteristics?	Yes	
3.3.B Scarcity	Wetlands or water in 650 ft (number or %)	7.7		
3.3.C Complements	Natural land use types in 650 ft (types)	4		
3.3.D Preferences	Will people find it aesthetic?	Yes		
Environmental Education	3.2 How Many Benefit?	Education institutions in 0.25 mi of site	2	0
	3.3.A Service Quality	Features/habitat/wildlife of education interest?	Yes	Yes
	3.3.B Scarcity	Wetlands in 0.5 mi of the site	4.9	12.4
	3.3.C Complements	Educational facilities or infrastructure on site?	Yes	Yes
	3.3.D Preferences	Will people prefer characteristics of the site?	Yes	Yes
Recreation	3.2 How Many Benefit?	Number in 1/3 mi of the site	766	34
		Are there bike paths in 1/3 mi of site?	Yes	No
		Are there bus stops in 1/3 mi of site?	Yes	Yes
		Number in 0 to 0.5 mi of site	786	90
	3.3.A Service Quality	Number in 0.5 to 6 mi of site	102481	35734
		Total area of green space around site	45.1	48432.9
		green space in 2/3 mi of site	27.2	62.2
3.3.B Scarcity	green space in 1 mi of site	38	68.9	
	green space in 12 mi of site	39.5	38.8	
3.3.C Complements	Infrastructure supporting recreational activities?	Yes	No	
3.3.D Preferences	Are there additional features on the site?	No	No	
Bird Watching	3.2 How Many Benefit?	Number in 0.2 mi of site	298	8
	3.3.A Service Quality	Are there roads or trails within 0.2 mi of site?	Yes	Yes
		Will the site support rare or unique species?		
	3.3.B Scarcity	NA	NA	NA
	3.3.C Complements	Supporting infrastructure or habitat on site?	Yes	No
3.3.D Preferences	Will people be interested in birds at the site?	Yes	Yes	
3.4 Social Equity	Score	11.03	18.65	
3.5 Reliability	Score	15.2	58.4	

BLACK - NULL; GRAY - NA; GREEN - Above Average/YES; RED - Below Average/No* (*reverse for scarcity)



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?

Example: Flood risk reduction from wetlands

Demand: Are there buildings in the downstream flood zone?



Sufficient Quality:

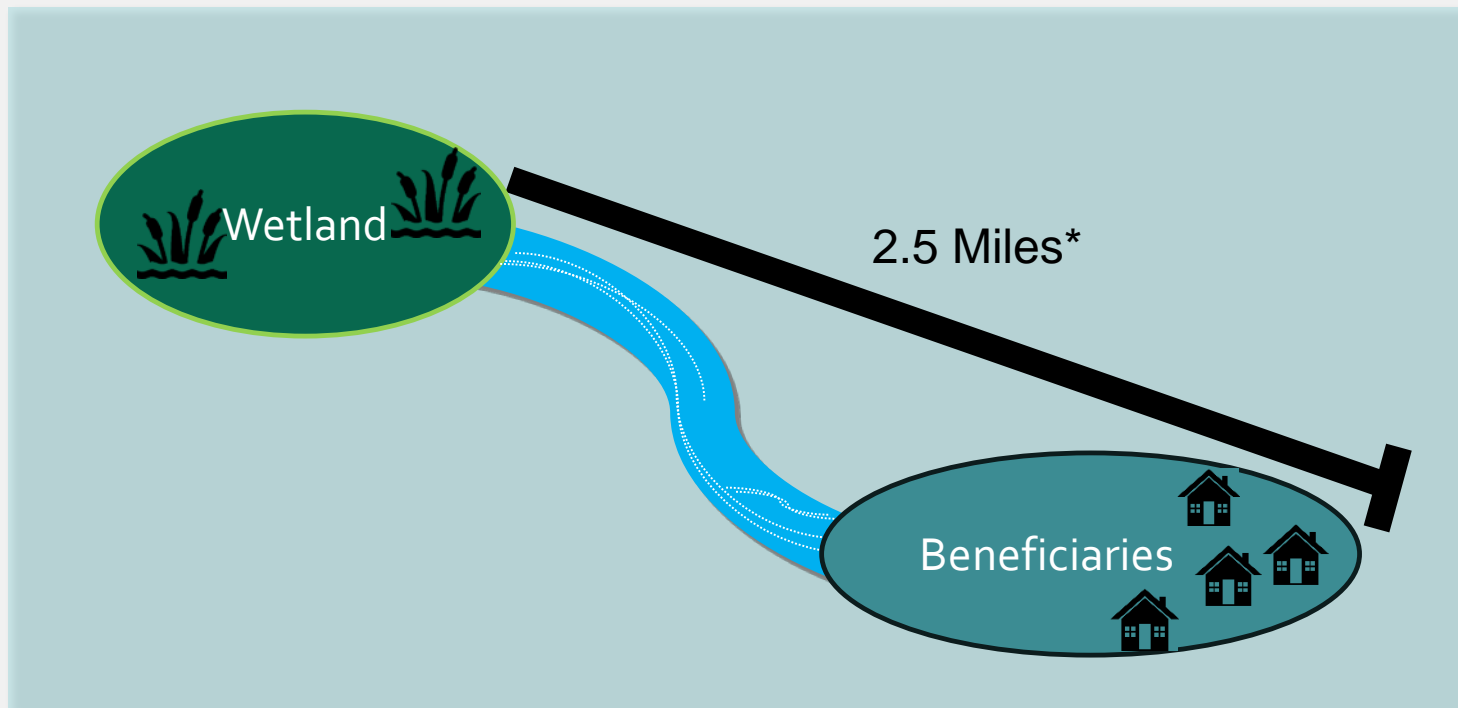
- ✓ Can wetlands retain or slow flood water?
- ✓ Is water available for retention?

Complementary Inputs are not needed

2. How many people benefit?

Number who benefit:

More Beneficiaries → Greater value

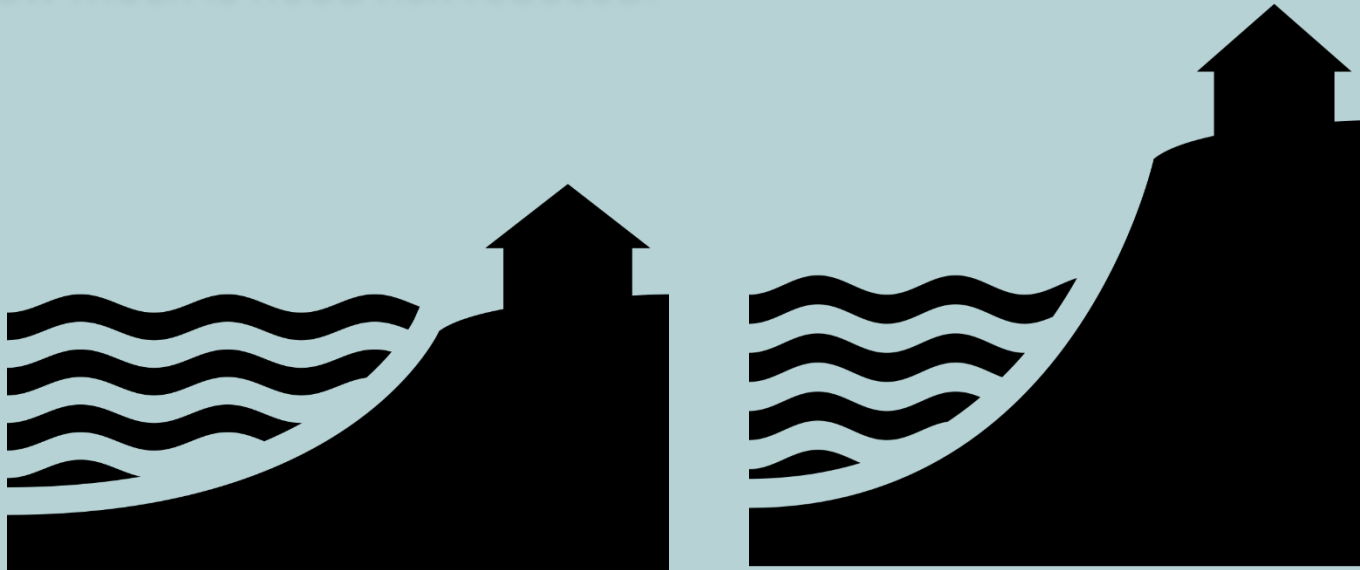


3. By how much do people benefit?

Quality:

Higher quality service → Greater value

How much is flood risk reduced?

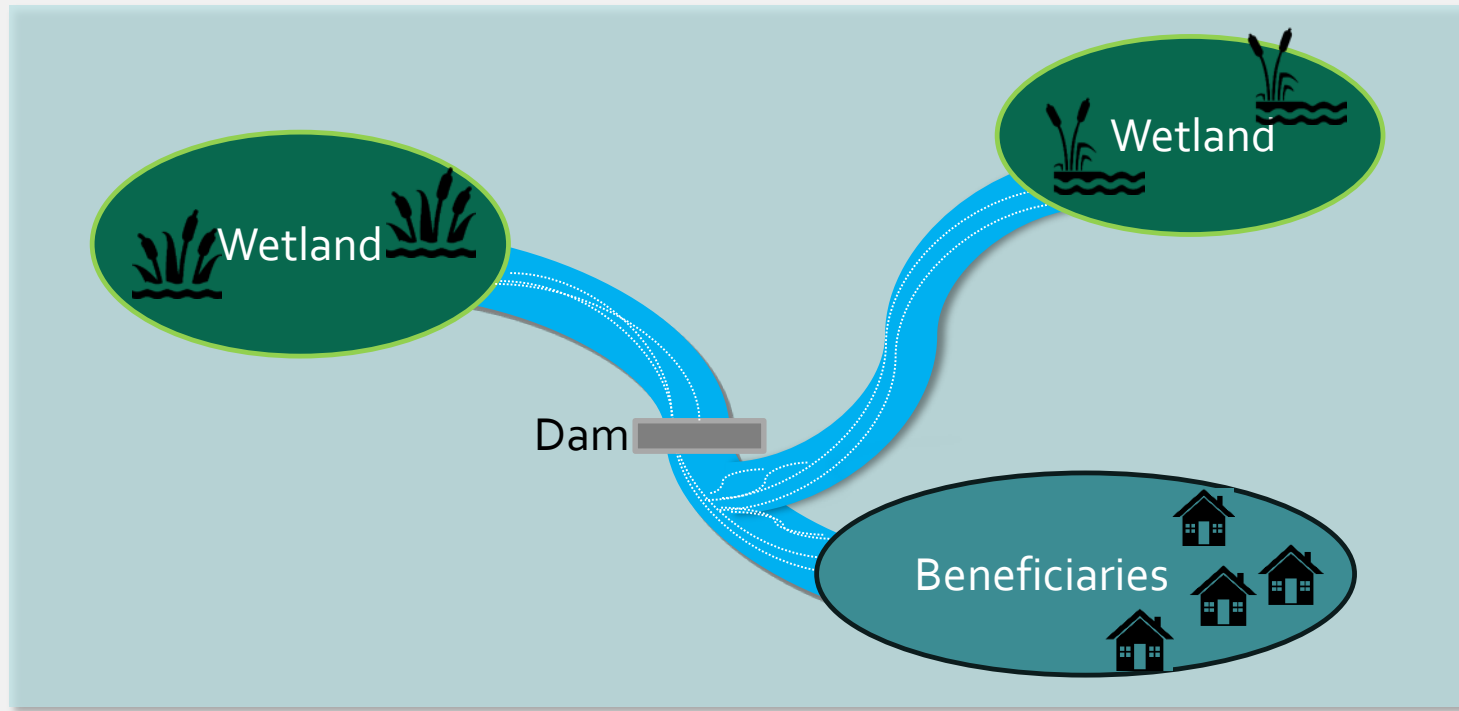


3. By how much do people benefit?

Substitutes:

How many natural and technological substitutes are there?

Fewer substitutes or lower quality substitutes → Greater value



3. By how much do people benefit?

Quality of Complements:

Complementary inputs are used alongside the Ecosystem Service and enhance its value

Better/more complementary inputs → Greater Value



3. By how much do people benefit?

Strength of Preferences:

Includes factors such as avidity, willingness/ability to adapt



not so avid angler



avid angler

4. Social Equity

Equity:

Are those who benefit particularly vulnerable?

More vulnerable → Greater value



5. Temporal Reliability

Reliability:

How sure are we that benefits will continue?

More reliable → Greater value



Questions???

Contact:

Bousquin.Justin@epa.gov

Mazzotta.Marisa@epa.gov

The Team:

Kristen Hychka
Marisa Mazzotta
Walter Berry
Claudette Ojo
Caroline
Druschke
Rick McKinney
Lisa Wainger