

Final Ecosystem Goods and Services: An ESRP Approach

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= Endpoints, Boyd Endpoints,
Valued Attributes

With

- Jim Boyd, Resources for the Future
- Dixon Landers, Matt Weber, Amanda Nahlik, Tony Olsen, US EPA, Office of Research and Development
- Attendees at Two Workshops

Why

- Biophysical units best suited for analyses of social well being
 - Well understood meaning for people
 - Avoid double counting
 - Requirement for bundling/stacking, benefits analysis
 - Ensure complete counting
- Communication

What would we do with them?

- Include in monitoring programs
- Model output
- Maps
- Benefits analysis
- Stacking and Bundling

Definition

- **Final ecosystem goods and services are biophysical features, quantities or qualities that require little further translation to make clear their relevance to human well-being.**

See --

Boyd, J., and S. Banzhaf. 2007. What are ecosystem services? The need for standardized environmental accounting units. *Ecological Economics* 63:616-626.

Boyd, J. W. 2007. The Endpoint Problem. *Resources* 165:26-28.

Ringold, P. L., J. W. Boyd, D. H. Landers, and M. A. Weber. 2009. Report from the Workshop on Indicators of Final Ecosystem Services for Streams, Pages 56 *in* U. S. E. P. Agency, ed. Corvallis, OR.

—. In Preparation. A Framework for Identifying Indicators of Ecosystems Contributions to Human Well Being: A Case Study with Streams.

Ringold, P. L., J. W. Boyd, A. Nahlik, and D. Bernard. In Preparation. Report from the Workshop on Indicators of Final Ecosystem Services for Wetlands and Estuaries, Pages 56 *in* U. S. E. P. Agency, ed. Corvallis, OR.

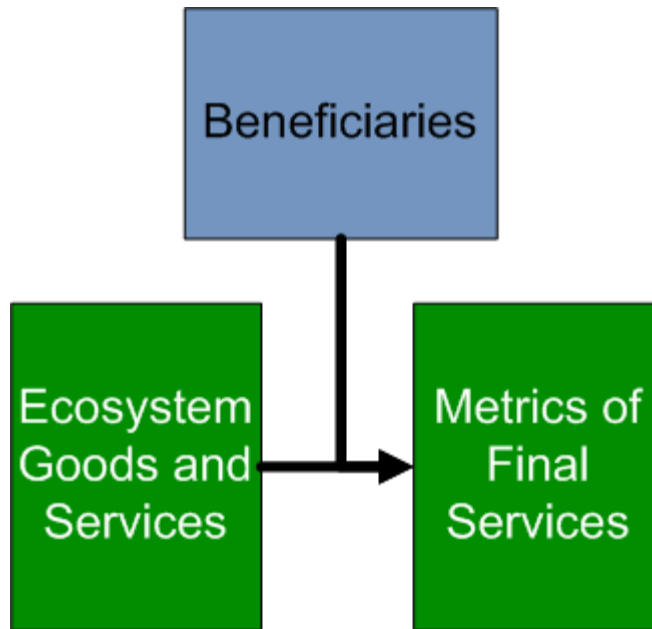
Russell, M., and R. Johnston. In Preparation. An Operational Structure for Clarity in Ecosystem Service Values.

Requirement

- If we really want to know what is relevant to people
 - Ask them
 - Work with social scientists

Ecosystems to Benefits

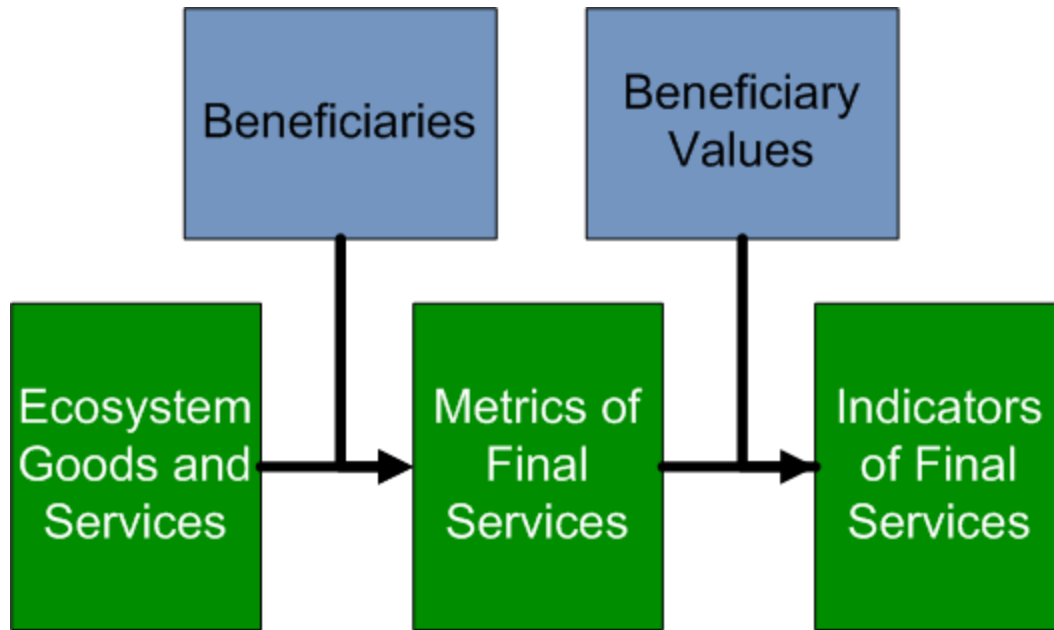
Step 1



$m_1, m_2 \dots m_n$

Ecosystems to Benefits

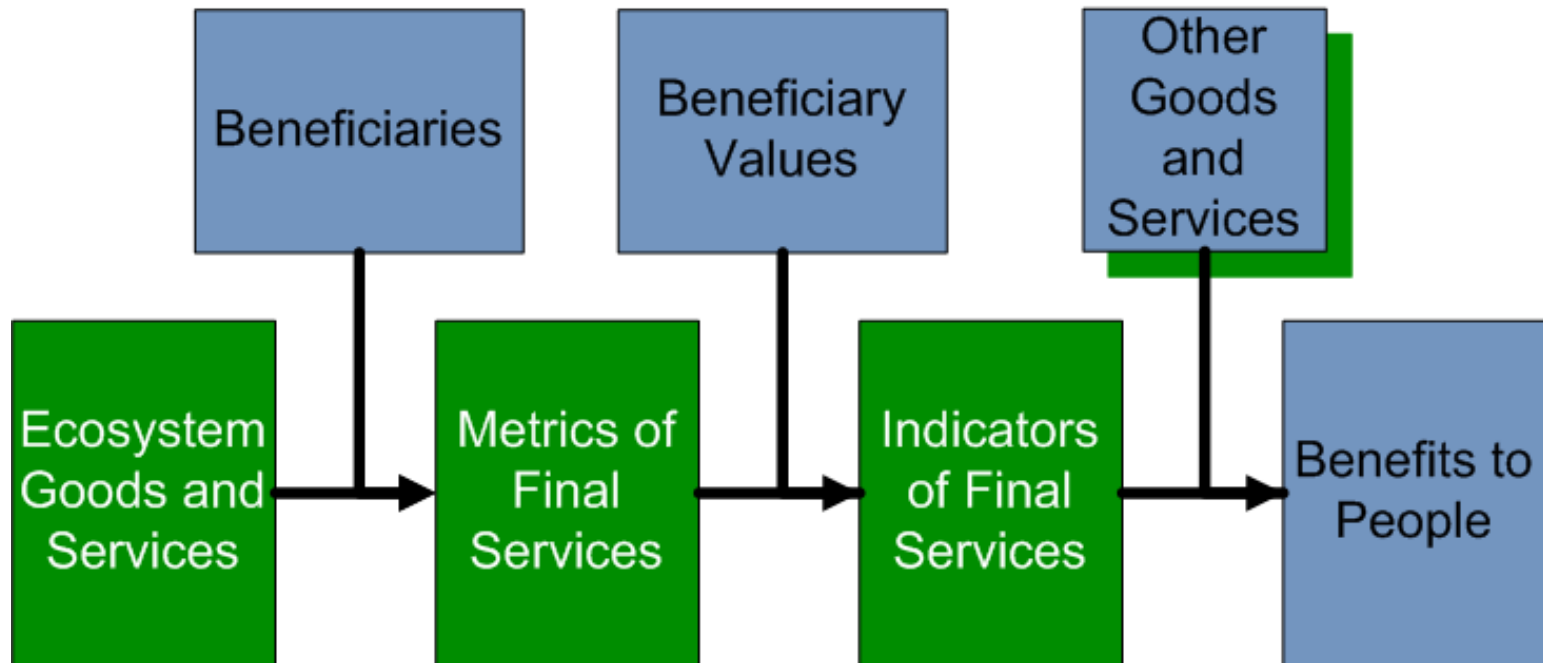
Step 2



$$I_b = f_b(m_1, m_2 \dots m_n)$$

Ecosystems to Benefits

Step 3



Two Workshops Three Ecosystems

- Identify users/beneficiaries of ecosystems
 - e.g. irrigators, trappers, drinking water source, barge operators, recreational anglers, non-use
 - Streams, Estuaries, Wetlands
- Identify metrics of final services for each
- Results are a working hypothesis.

Form of Results

		Ecosystem Attributes				
		Amount of Water	...	Vertebrates	...	Visual Appearance
Beneficiary Classes and Subclasses	Crop Irrigation	X				
	...					
	Recreational Angling			X		X
	...					
	Non-Use		X			

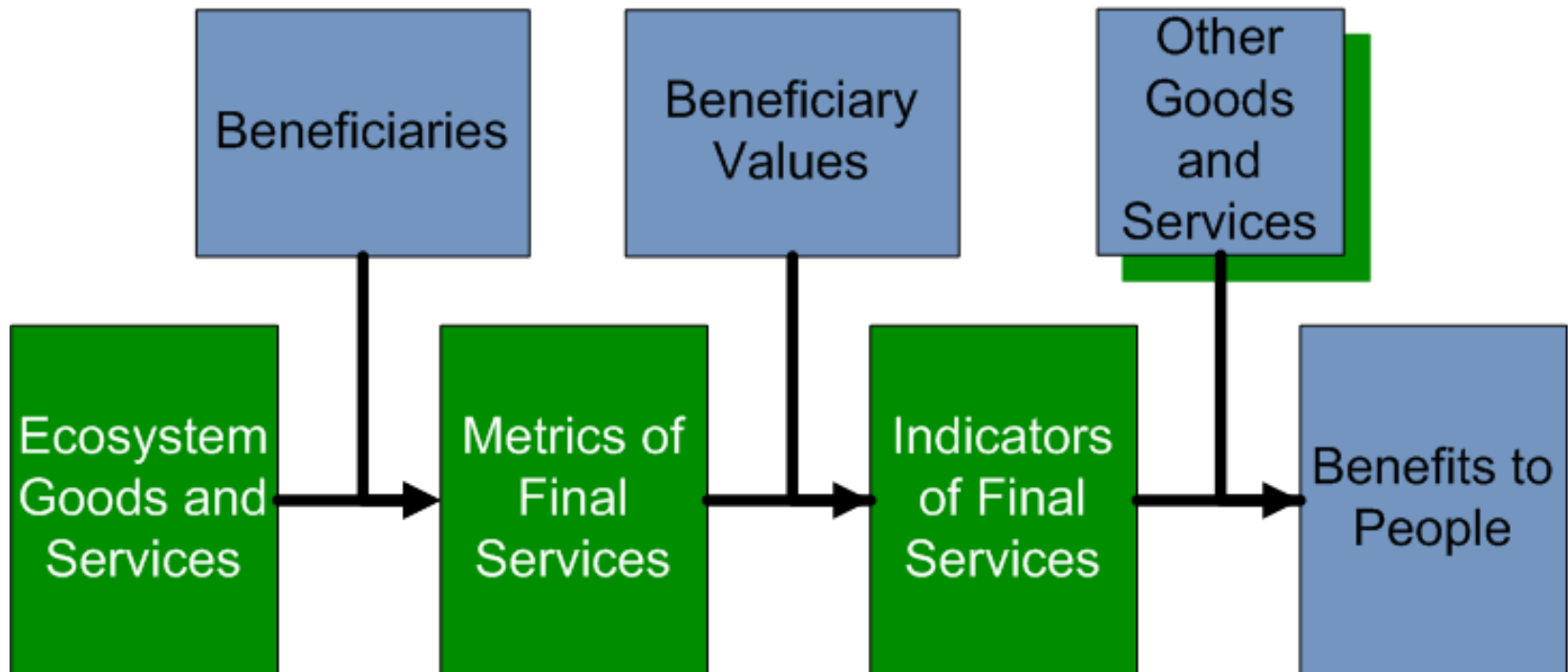
Metrics for Estuaries

Metric Description (Organism Community and Sub-Community Metrics)	1. Habitat Quality		2. Habitat Quantity		3. Habitat Function		4. Habitat Resilience		5. Habitat Sustainability		6. Habitat Viability		7. Habitat Resilience		8. Habitat Sustainability		9. Habitat Viability	
	Structure	Function	Quantity	Quality	Quantity	Quality	Quantity	Quality	Quantity	Quality	Quantity	Quality	Quantity	Quality	Quantity	Quality	Quantity	Quality
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<http://www.epa.gov/nheer/ar/streameco/index.html>

A Practical Principle

Final Ecosystem Goods and Services are Ecosystem Attributes Not Human Ones



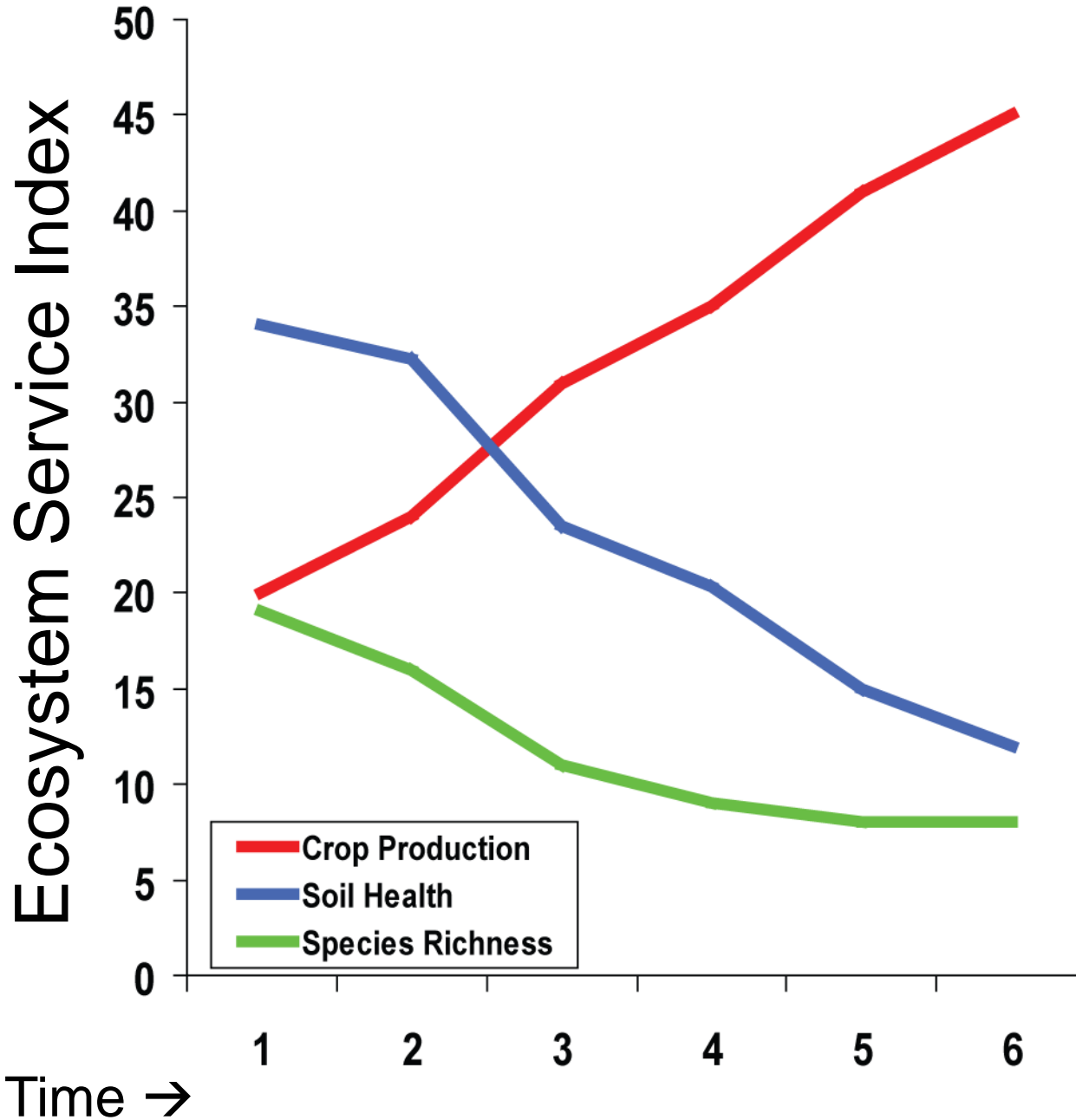
Principle

- Fish in the Water vs. Fish Landings
- Native or Naturalized Fish vs Stocked Fish*
- Drinking Water Intake vs Water at My Tap
- Site Condition Index vs Wood Fiber
- Ecosystem Condition vs Happiness
- Soil Condition vs Corn Harvest

Why is this important?

- Conceptual Consistency
- Accounting and tracking
 - Ecosystem status or human activity
- Communication and Interpretation

Is corn production an ecosystem feature?



You can get more and more harvest (Because of human and technological inputs) even though nature is in decline.. So if we rely on “harvests” as a signal of natural conditions, that can be misleading.

Getting these units right is key to:

1. Connecting ecosystems to human well being
 - Connecting social and natural sciences
2. Informing trade-off decisions
3. Supporting decisions on sustainability
4. Managing nature's wealth