

Challenges in Applying Ecosystem Services Assessment to Natural Resources Damages Cases: Ecological Considerations

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Presentation Outline

When is an Ecosystem Services Assessment Approach Appropriate for Ecological Assessments in a NRDA?

- Ecosystem Services and Ecological Services as drivers of methodological differences between ES approach and NRDA
- Key technical concepts of NRDA and why they are problematic for an ES approach
 - Concept of baseline
 - Concept of causation
 - Concept of “ecological services” and use of equivalency analysis

Ecosystem Services Approach and NRDA: Key Methodological Differences

ES Approach: By definition, founded on human wellbeing

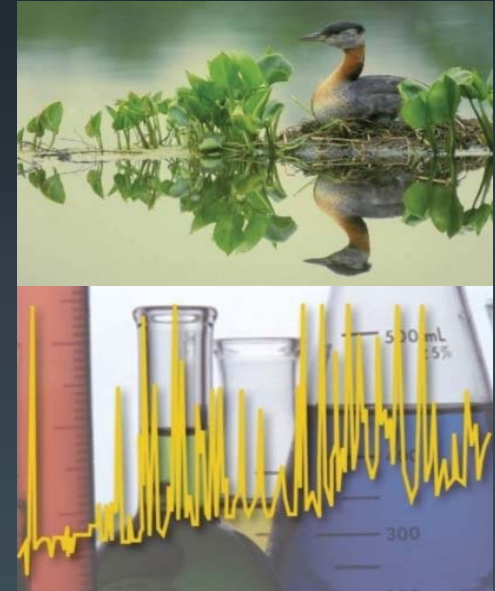
- Requires production functions linking injury to loss in welfare
- Goal is monetary quantification of final services (things people care about)

NRDA: Ecological services are distinct from human services

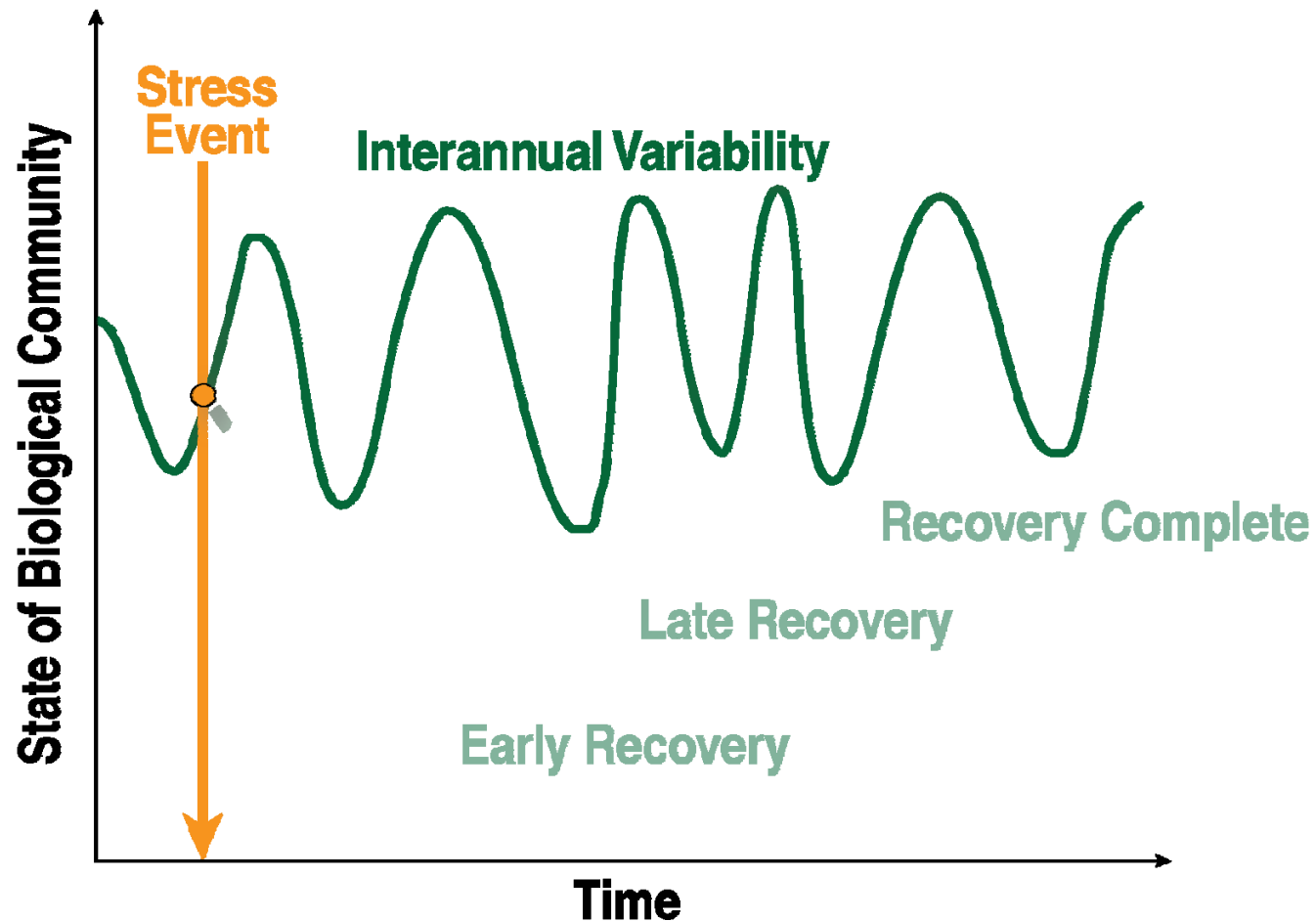
- Quantification of services is relative to “baseline” and causation is necessary
- Ecological services often used to quantify damages by estimating compensatory restoration needs

An ES Approach May Add Uncertainty to Consideration of Baseline Conditions

- Baseline is the condition of a resource “but for” a release
- ES approach requires quantifying the monetary value of **all** goods and services to humans under baseline compared to with release conditions
- NRDA establishes chemical/biological baseline for limited set of natural resources and compares baseline to “with-release” conditions



Baseline Services are Not Constant Over Time

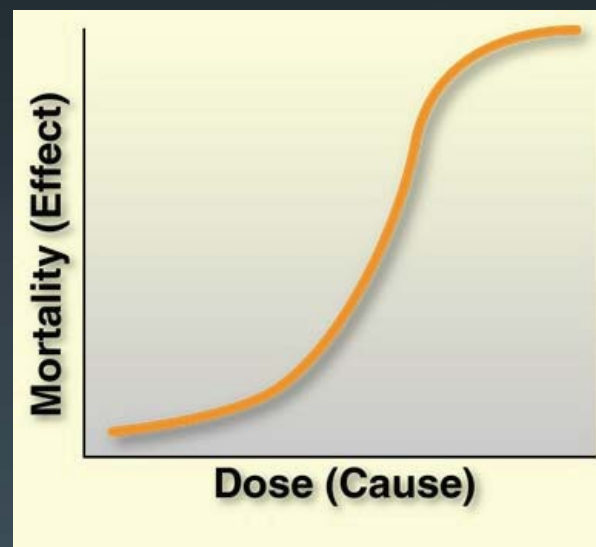


Baseline Must Consider Natural Variation



An ES Approach May Add Uncertainty to Consideration of Causation

- Causal analysis is key to all NRDA
- ES approach requires quantifying changes in the monetary value of all goods and services to humans associated with all potential causative agents
- NRDA assesses exposure and toxicity of a limited number of resources and the contribution of most important stressors



Some Causal Relationships are Relatively Straightforward

- Fish kills from chemical releases
- Bird mortalities from oil spills

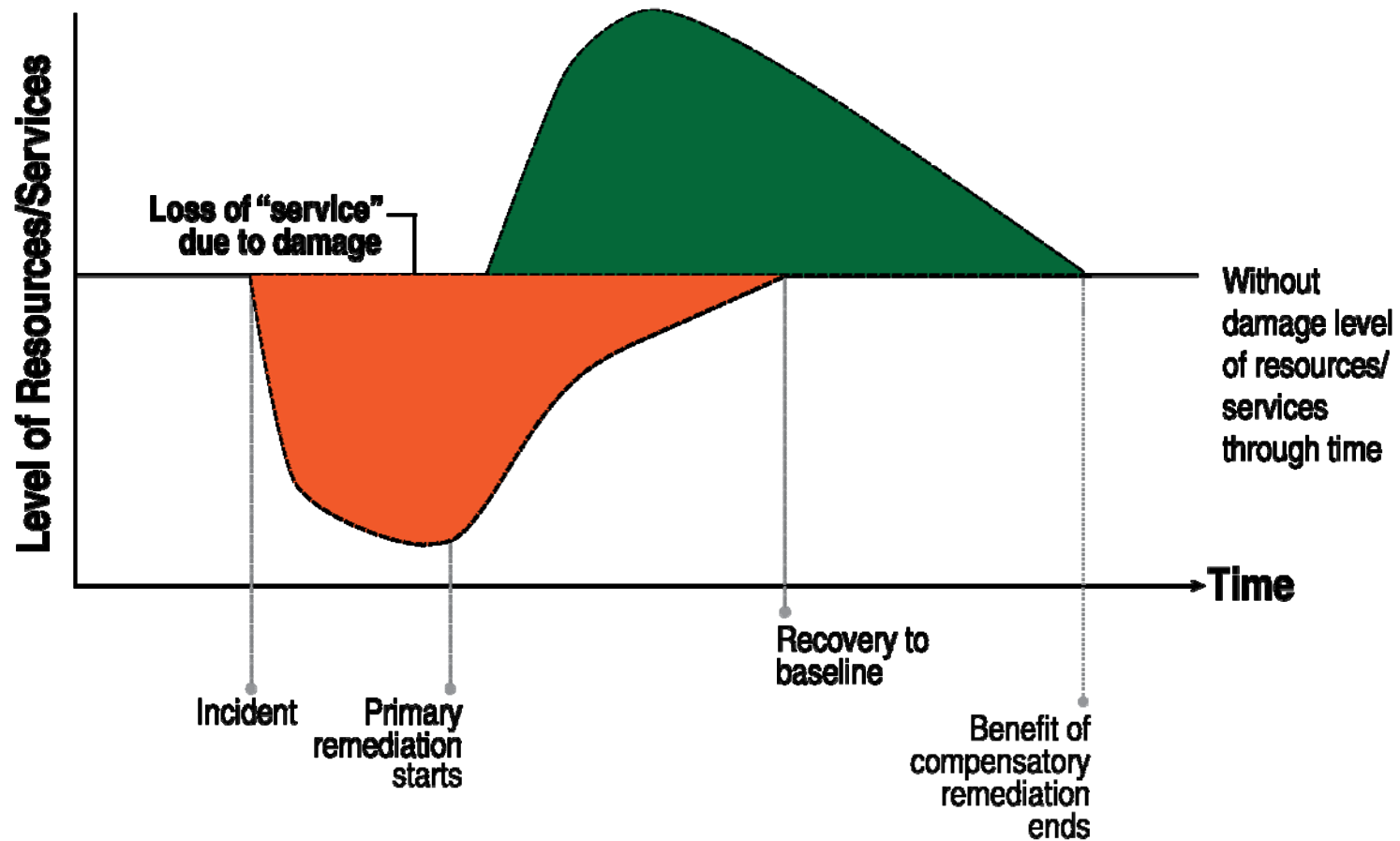


Equivalency Analysis in NRDA

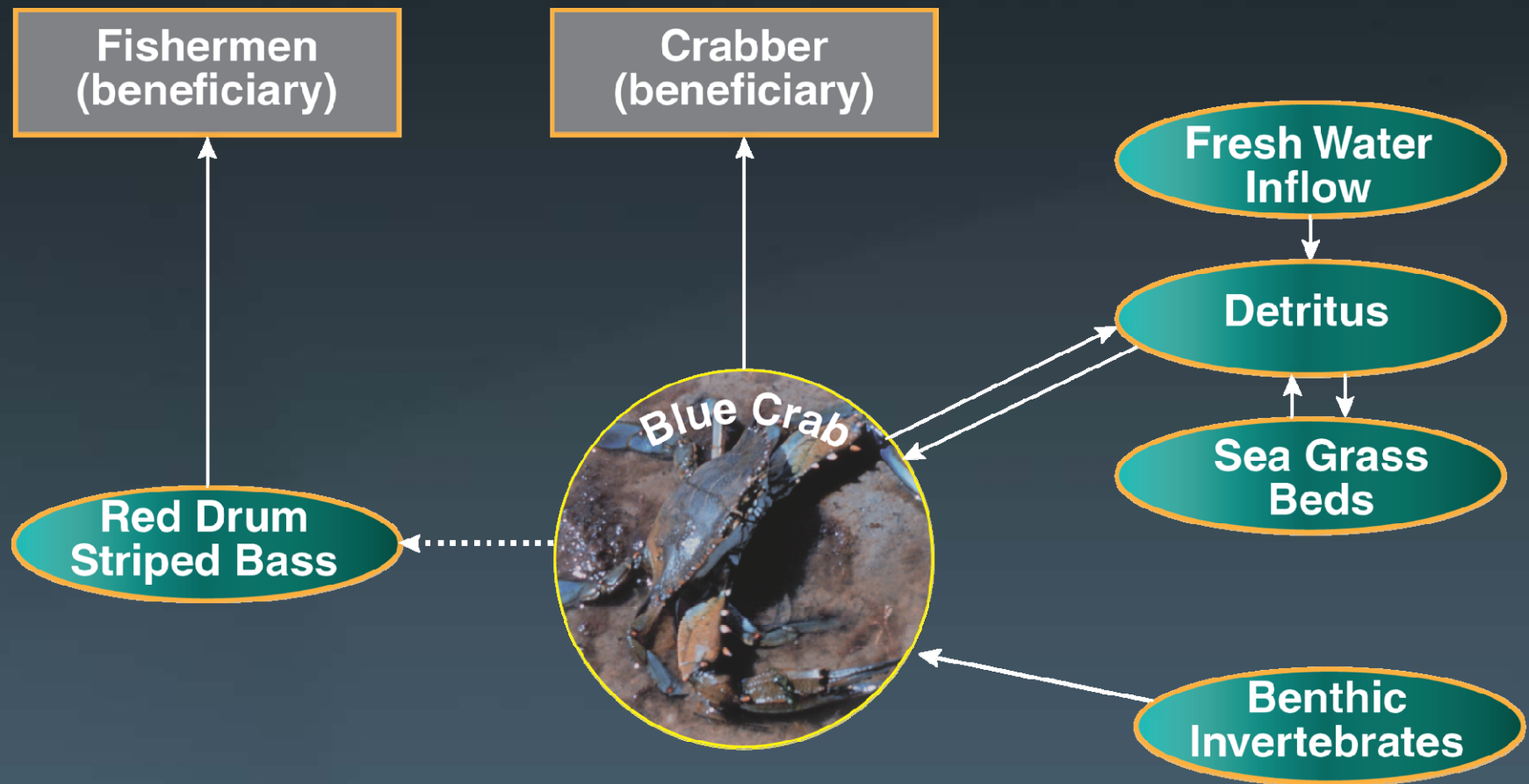


Ecological services of the
same type and quality

Concept of Ecological Services and Equivalency Analysis



Contrasting Methodologies: ES Approach and NRDA Equivalency Analysis



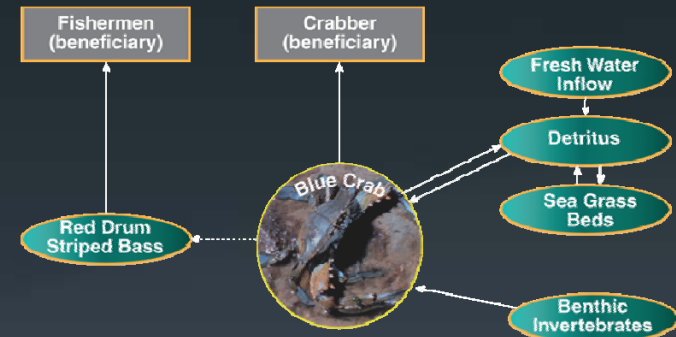
Contrasting Methodologies: ES Approach and NRD Equivalency Analysis *(continued)*

- ES Approach

- Measure standing stock
- Estimate resilience
- Develop ecological production functions relating crab/fish abundance to exposure to release
- Estimate of recreation visitation
- Collect survey information on changes in visitation
- Develop travel cost to estimate monetary value of losses

- NRDA approach

- Estimate losses in productivity and area affected (HEA)
- Estimate losses in biomass or individual crab/fish (REA)



Conclusion: An ES Approach may not be Appropriate for Ecological Assessments in a NRDA—Baseline and Causation

- ES approach—Requires assessment of changes in the monetary value of all goods and services to humans from a release, considering physical, chemical, biological, and social baseline as well as other causative factors.
- NRDA—Typically requires consideration of physical, chemical, and biological conditions to account for baseline and toxicity assessment to account for causation.

An ES approach may add significant complexity, scientific uncertainty, and transaction costs when considering baseline and causation.

Conclusion: An ES Approach may not be Appropriate for Ecological Assessments in a NRDA—Equivalency Analysis

- An ES approach focuses solely on quantifying effects on human wellbeing and thus may be incompatible with both HEA and REA, depending on the natural resource and the measurement endpoint

An ES approach may preclude the use of HEA which was developed over decades of NRDA practice and is broadly embraced as a cost-effective tool for reaching settlement in NRD matters.

THANK YOU!

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