2021 Webinars:

Assessing Environmental Benefits

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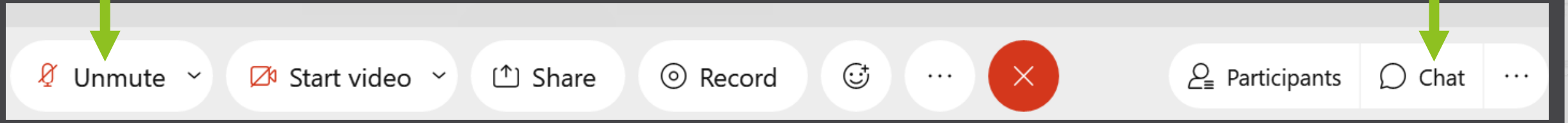
Assessing Environmental Benefits

Webinar Logistics:

- The webinar will begin at 1:00 PM CDT.
- To access the audio select “Call Me” – this is the preferred option to reduce feedback.
- If you are unable to connect via the “Call Me” feature,
  - Dial: 1-844-800-2712
  - Access: 199 565 7227#

Webinar Instructions

- All lines are muted.
- Submit questions or comments in the Chat Box to "Everyone".
- The webinar is being recorded and will be shared following the meeting.

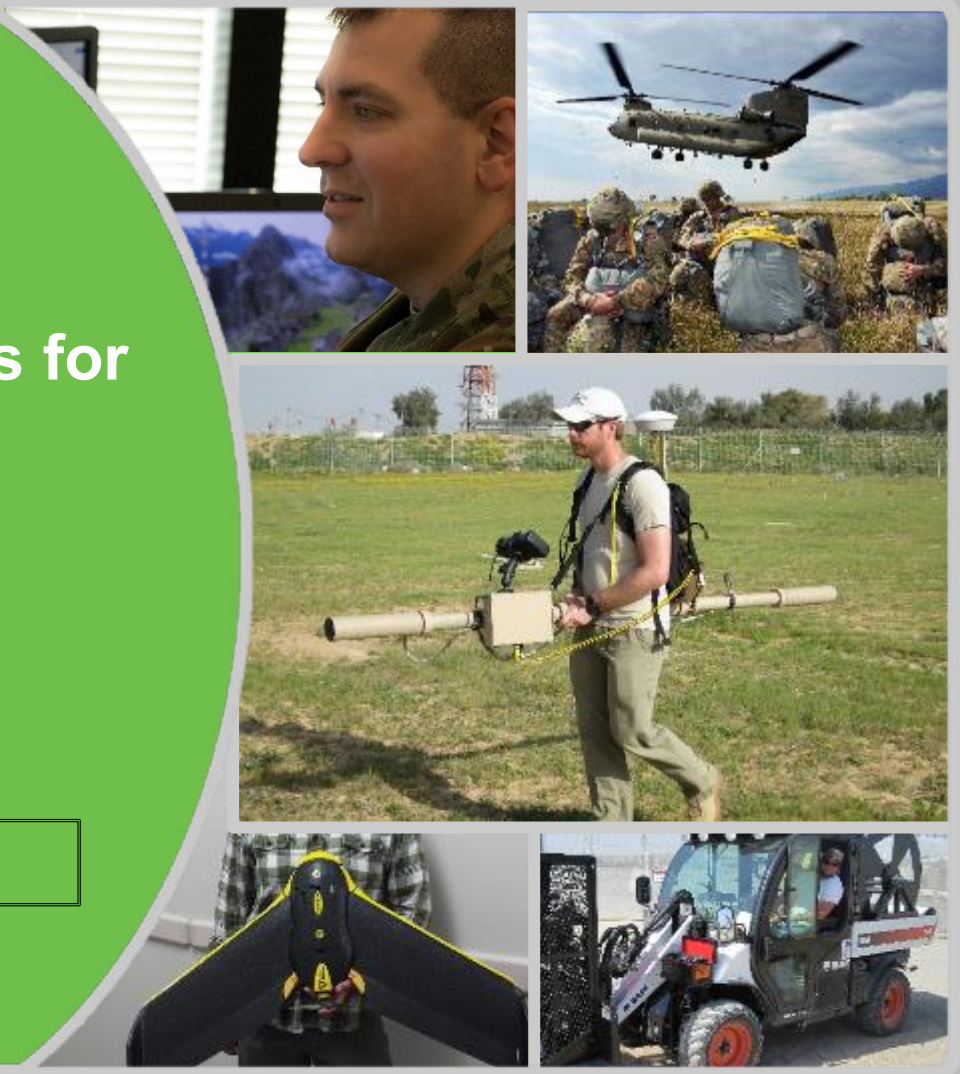


Presenters

Dr. Todd Swannack is the co-lead of the Integrated Ecological Modeling Team at the US Army Engineer Research and Development Center. He has over 15 years experience modeling complex ecosystem dynamics and has published 93 scientific articles. He is also one of the co-leads for *Benefits and Costs of NNBF* chapter in the upcoming publication *International Guidelines on NNBF for Flood Risk Management.*

Introduction to Quantitative Benefits Analysis for Ecosystem Restoration

Todd M. Swannack, PhD
Integrated Ecological Modeling
US Army Engineer Research and Development Center



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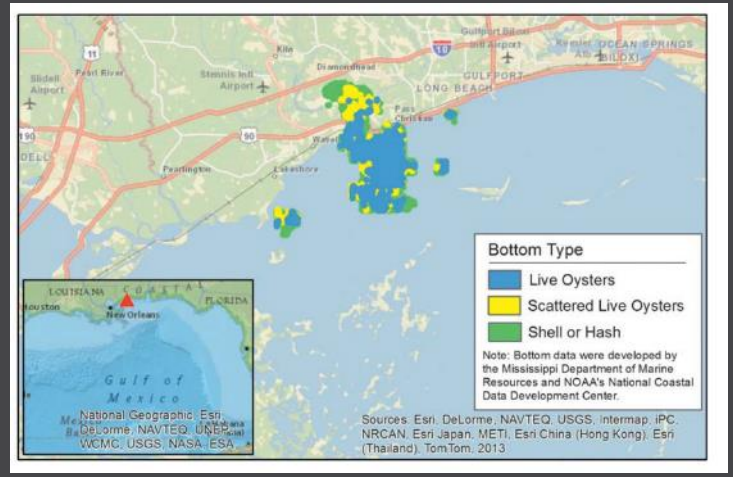
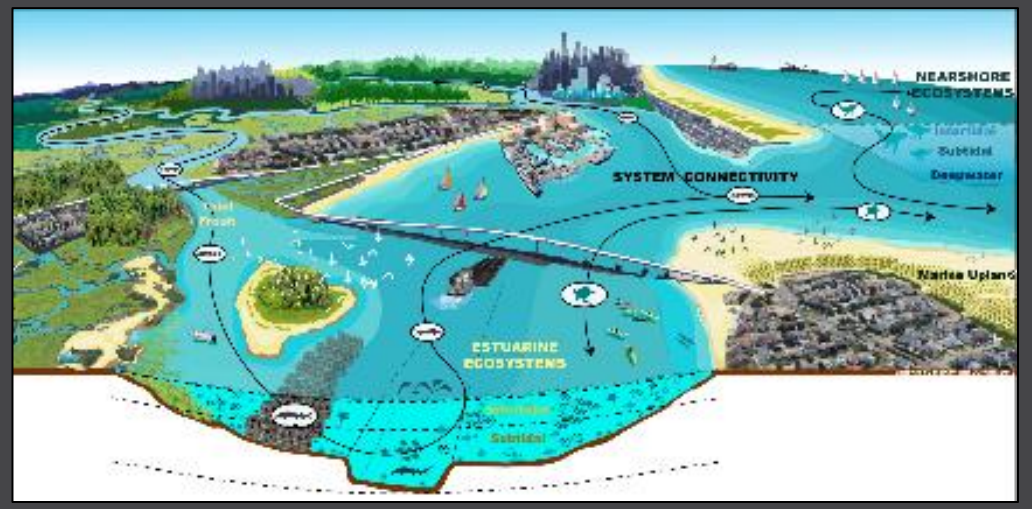
Environmental Benefits Analysis

- Quantifying and projecting environmental benefits is necessary to inform decision making for USACE planning
- Provides mechanism to forecast how project actions will change system in the future
- Benefits can range from amount of habitat restored to desired changes in indicator species/metrics (e.g., biodiversity, reduced property damage, increased recreation, etc).

General steps in benefits quantification

- Identify and engage stakeholders
- Identify objectives
- Conceptualize system & identify metrics
- Quantify
- Evaluate

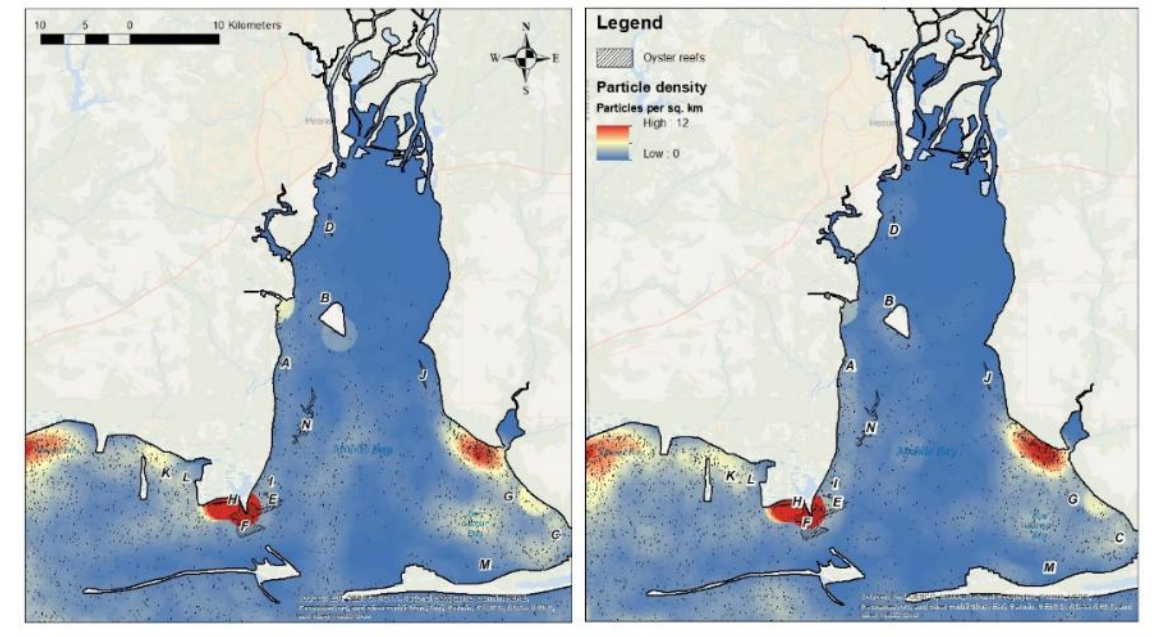




Stakeholder engagement

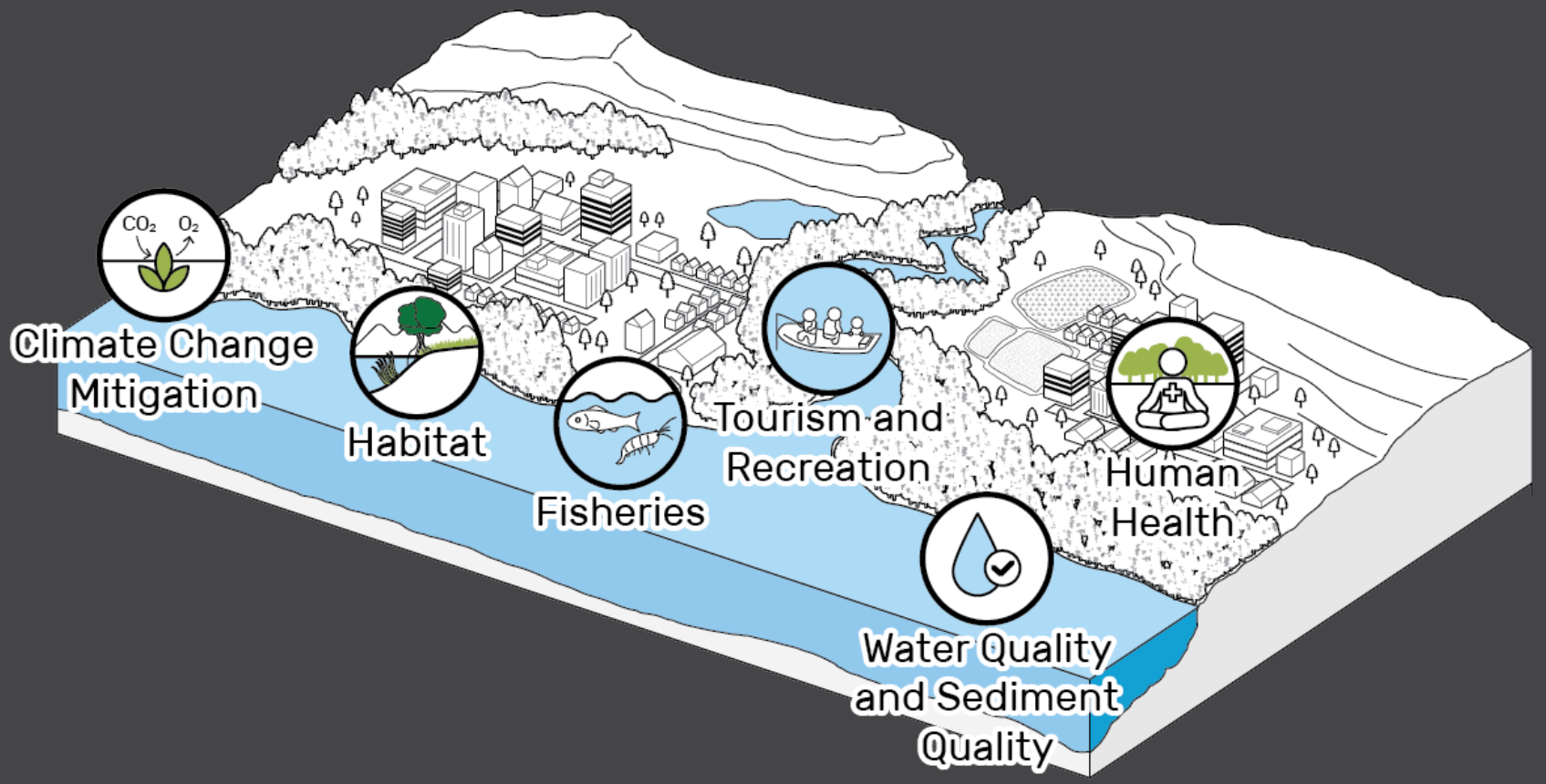
- Stakeholder engagement is critical for benefits quantification.
- Stakeholders have a connection to place that we don't have
- Stakeholders can include local sponsors, other local, state and federal agencies, academics, NGOs
- Engage early and often to increase transparency and ownership of project

Identify objectives

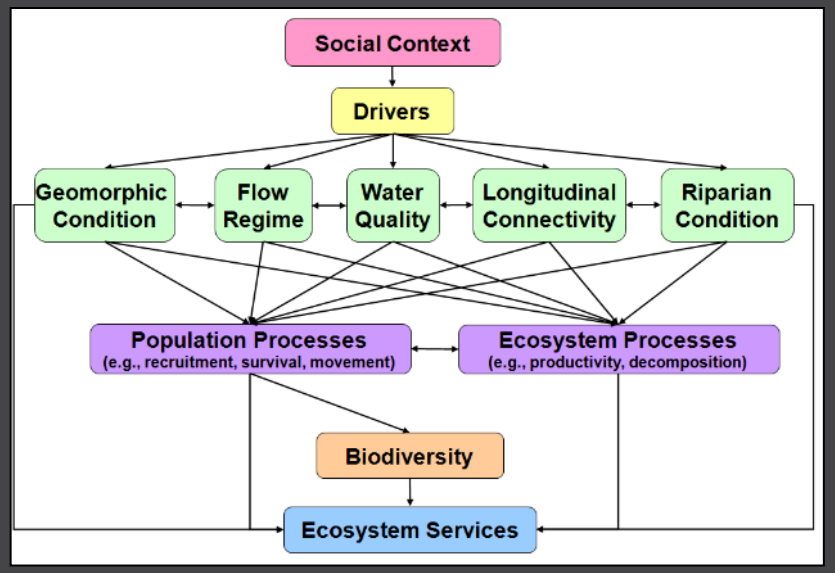


- Objectives must be clearly stated
- What is the purpose of the project?
  - *Reduce storm surge*
  - *Increase biodiversity*
- Are benefits related to objectives?
- Can co-benefits be identified?
- Stakeholders crucial at this stage

Stakeholder identifying key co-benefits



Conceptual models describe general functional relationships among essential ecosystem components. They tell the story of "how the system works." Can help identify metrics and benefits



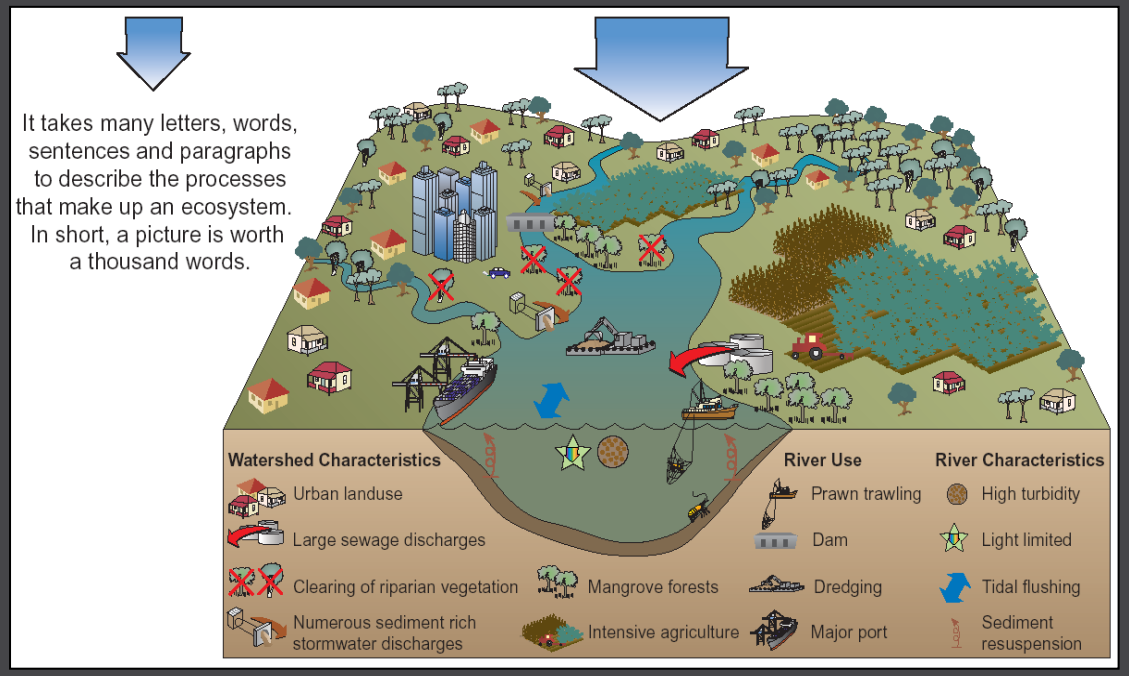
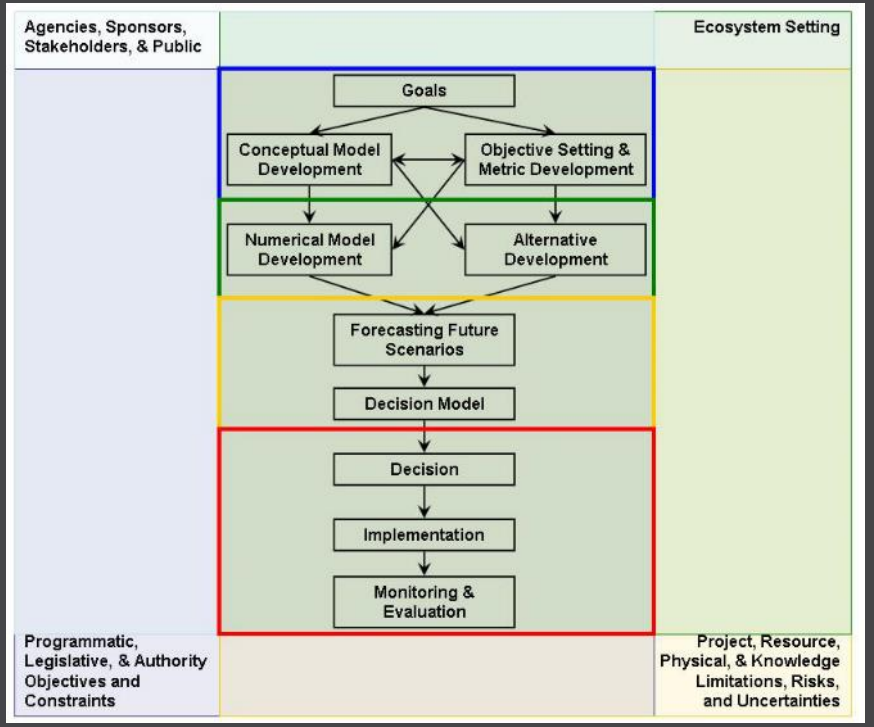


Figure: Wenger et al. (2009, JNABS)

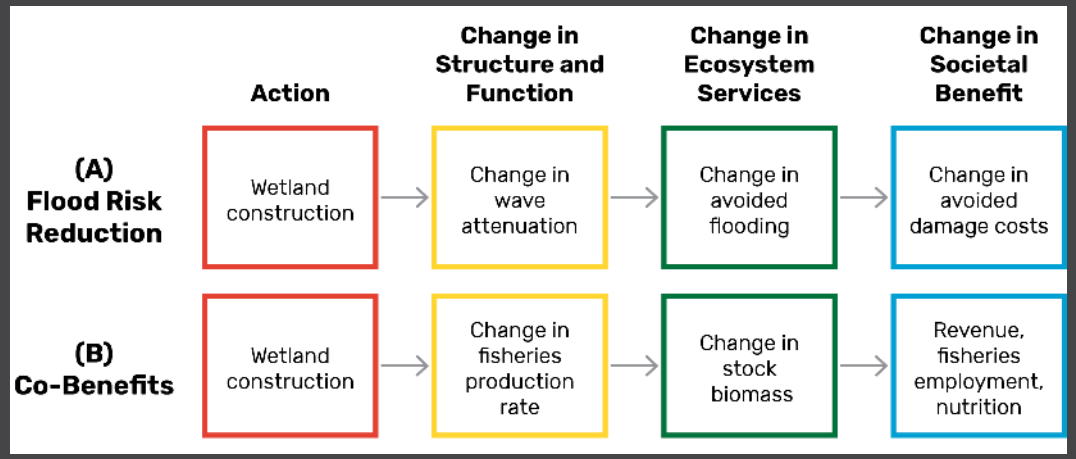
How are conceptual models used in benefits evaluation?

- Communicate *the process*
- Synthesize understanding of system function
- Understand and diagnose underlying stressors
- Develop a common "mental picture"
- Identify metrics and benefits for project planning, monitoring, and adaptive management

- Guide numerical model development
  - Guide and plan restoration alternatives
  - Identify R&D needs



Benefit identification

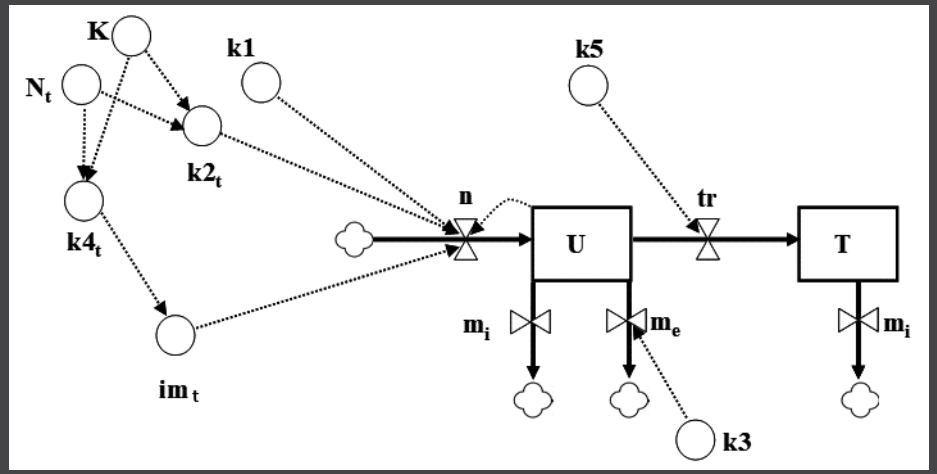


- **Benefits and co-benefits must be determined before project begins**
- **Recognize how project could lead to changes in ecosystem services within landscape**
  - ***Wetland restoration can reduce wave height, but can also increase fisheries and carbon sequestration***
- **General process: Identify change in function, change in service, change in benefits**

Quantify processes to project benefits changes

- Quantitative model should be developed to be able to assess numerically differences among project scenarios

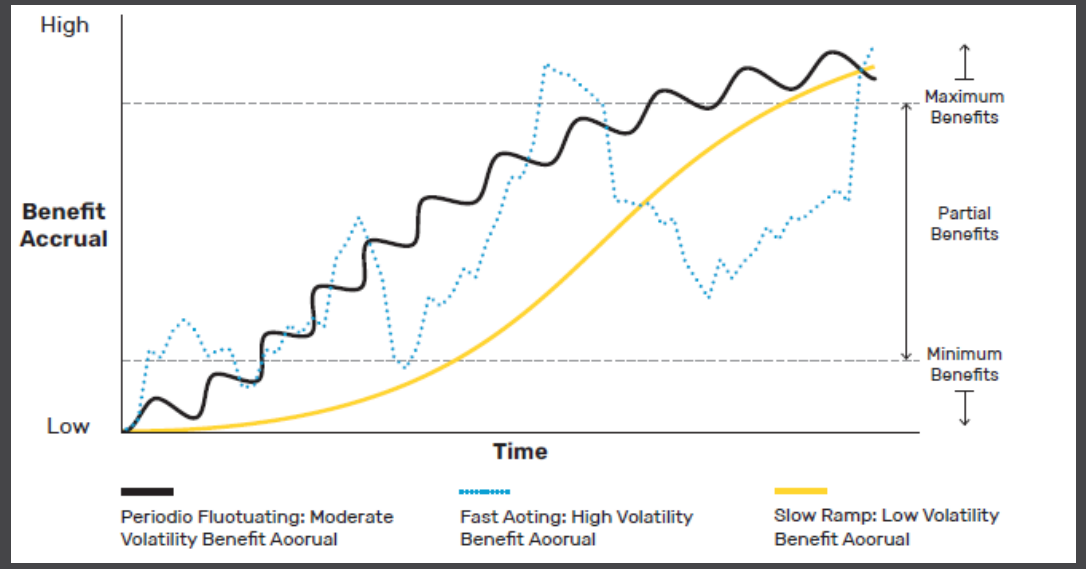
- Conceptual Model should be used a template
  - Equations should be tightly coupled with conceptual model
  - Helps with communication and transparency
  - Don’t hide behind the math/code
  - Increases transparency and defensibility

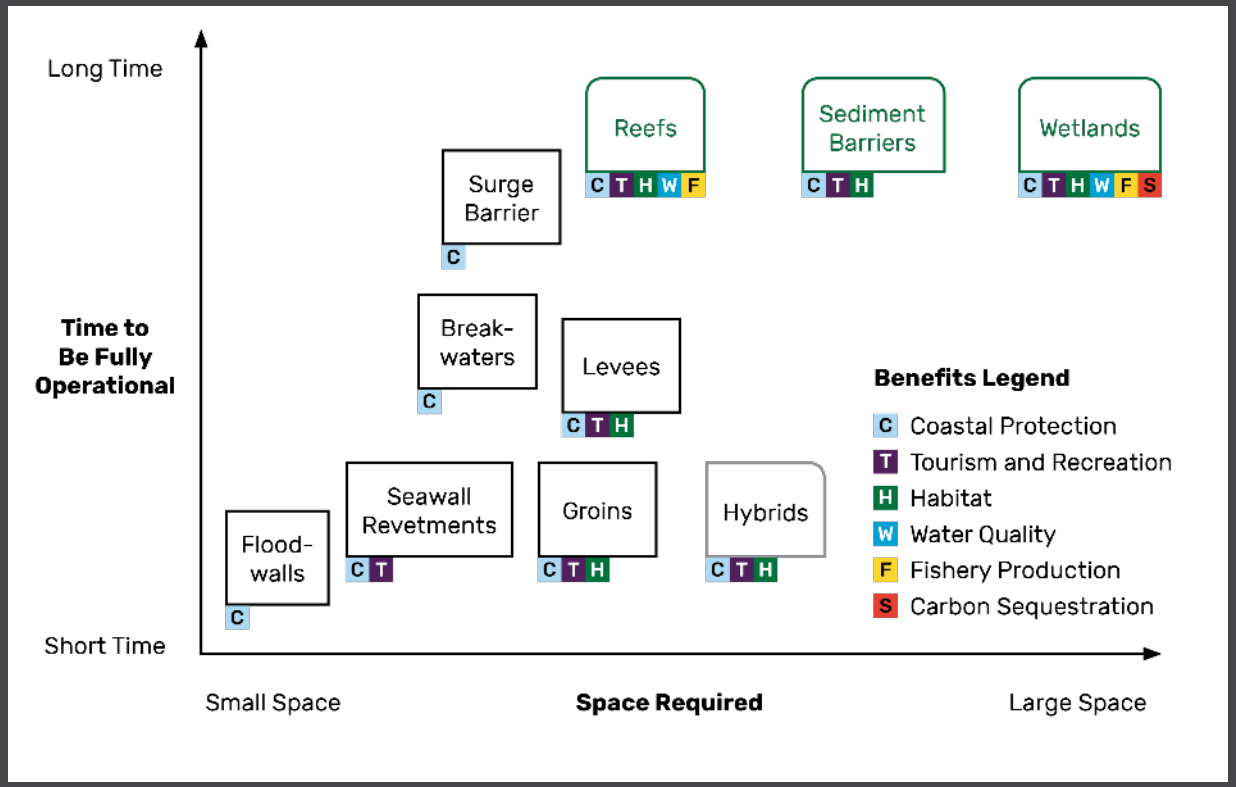


General approach

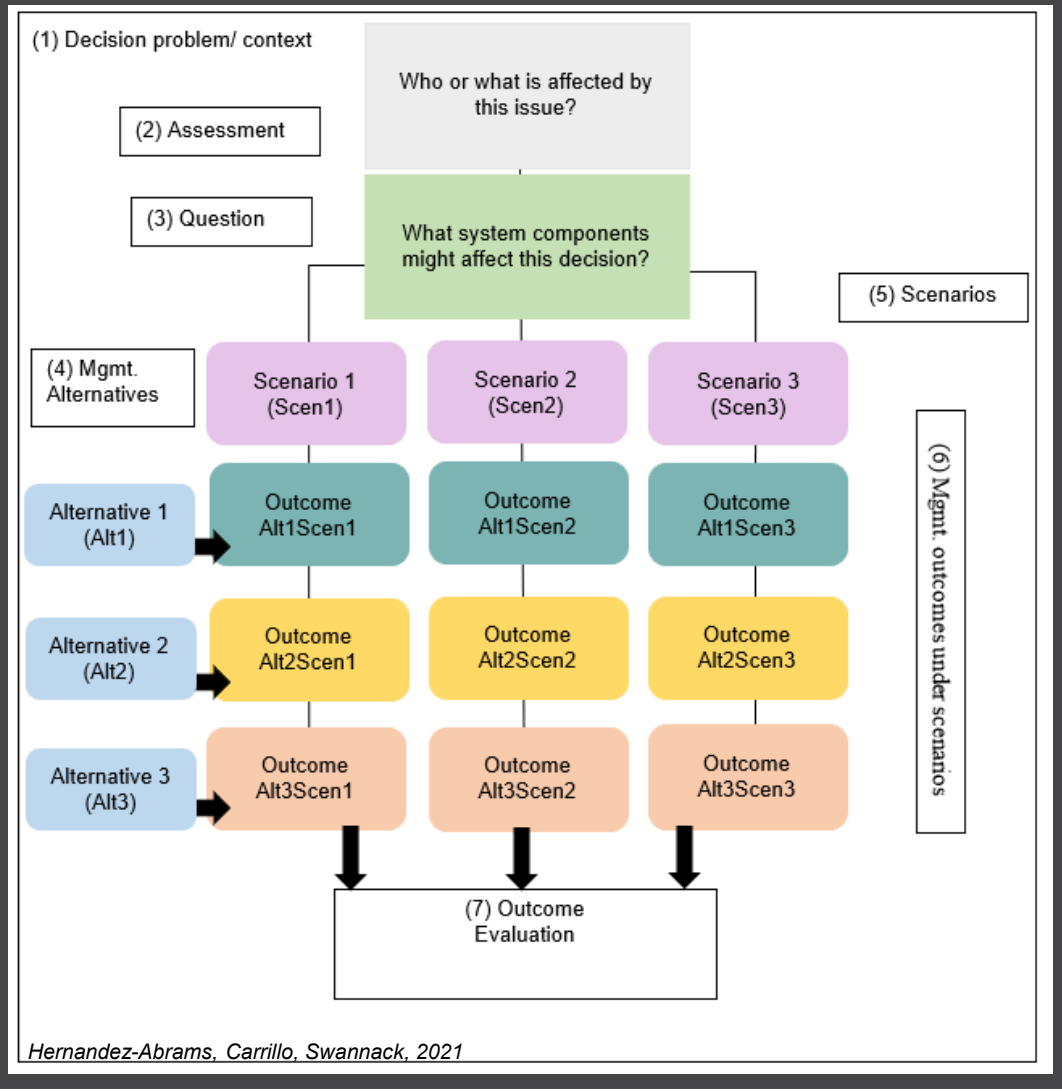
- Estimate physical drivers (e.g., hydrodynamics)
- Estimate effects of project on physical drivers
- Estimate with and without project effects (e.g., flooding, ecosystem connectivity, etc)
- Estimate expected damages with and without project (economic approach)
- Estimate how benefits and co-benefits change under each scenario

Benefits for natural systems can be difficult to quantify





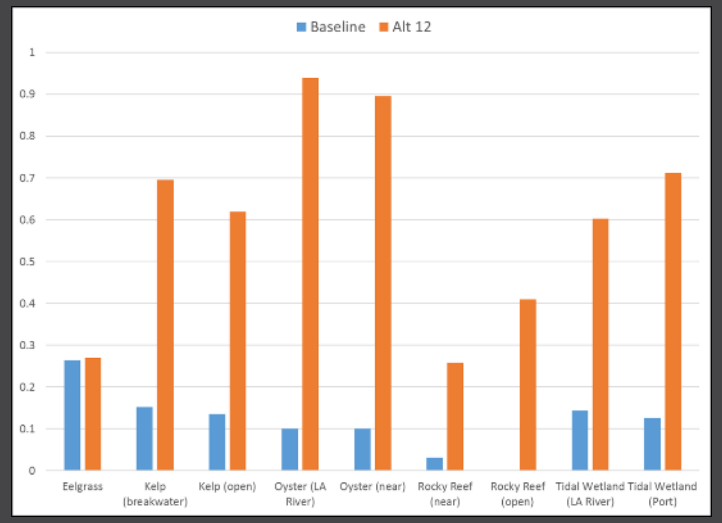
Scenario comparisons

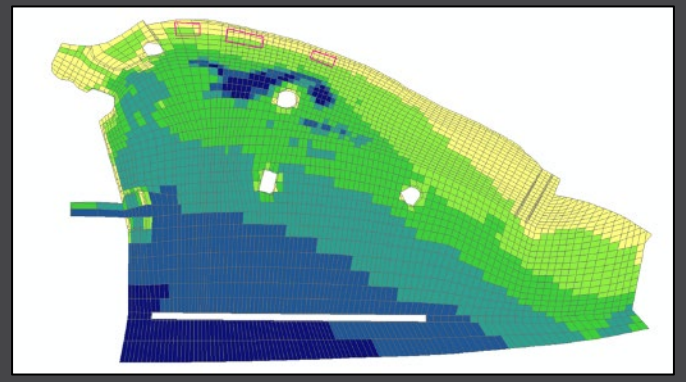


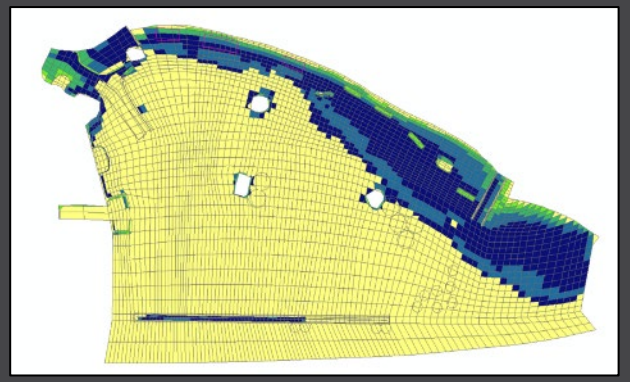
Evaluating results

- Quantitatively compare results from scenarios using metrics determined by policy or stakeholder group.

- Evaluation criteria *MUST* be decided before models/analysis are complete.
  - For example, for USACE planning, habitat units is a common metric
    - Compare habitat quality and quantify accrued under different scenarios







Evaluating results

- When evaluating benefits suites, habitat units does not present entire picture
- Ecosystems are complex and single metric reporting doesn’t capture that complexity
- Many benefits can be monetized, which makes is easier to defend project alternatives

Summary

- Ecosystem benefits are multi-disciplinary and should be identified with stakeholder groups
- Benefit identification depends on specific system/project.
- Benefits can be monetized
- Scenario comparisons are critical for distinguishing among project scenarios.
- Future videos will cover each aspect in more detail

Questions & Answers

Please post any questions to the “CHAT”.

Missed past webinars?

June 15th

Topic: Model to Assess Species and Habitat Migration Due to Climate Change

Speakers: Dr. Jacob Jung & Ms. Christina Saltus

June 29th

Topic: Monitoring Ecological Restoration with Imagery Tools

Speaker: Dr. Kristofer Lasko

August 17th

Topic: Review of Research into Ecosystem Goods and Services in USACE Decision-making

Speakers: Ms. Elizabeth Murray, Dr. Charles Theiling, & Dr. Lisa Wainger

August 19th

Topic: Brief Overview and Guide to Developing Monitoring and Adaptive Management Plans

Speakers: Dr. Brook Herman, Ms. Darixa Hernandez-Abrams, Mr. Michael Porter, Mr. Brian Zettle, and Mr. Andrew Loschiavo

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