

Communicating and Understanding Ecosystem Services Data with Coastal Stakeholders: Obstacles and Opportunities

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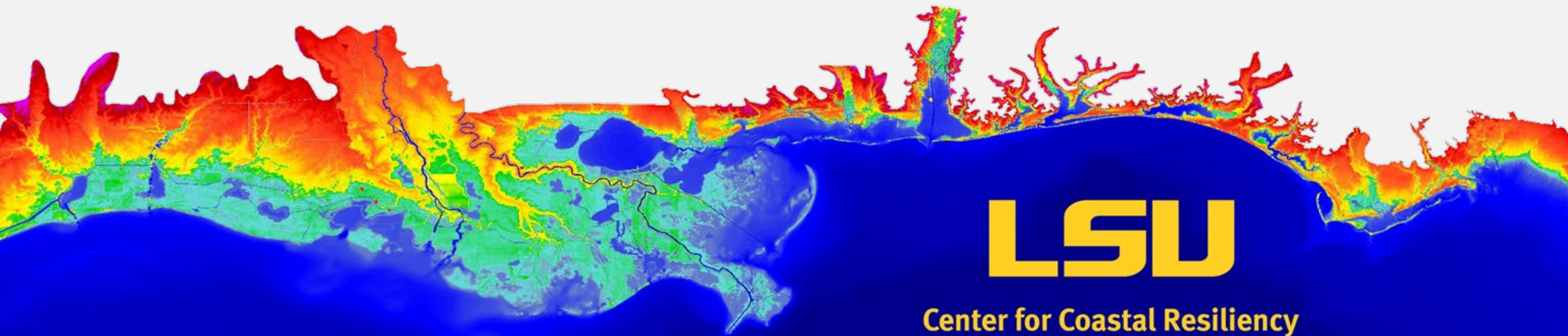
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Outline

- Introduction
 - Project overview
 - Definitions
- Stakeholder engagement
 - Workshops
 - Focus groups
 - Webinars
- Key findings
- Lessons learned
 - Future recommendations



Cartoon by Emily Greenhalgh
<https://www.climate.gov>

EESLR-NGOM (Northern Gulf of Mexico) Project

An EESLR-NGOM Story Map Facebook Twitter Link

Coastal Dynamics of Sea Level Rise: Simulated Storm Surge

Storm surge results in flooding and has a powerful effect on the coastal zone, but **how will storm surge look in the future?** What do we need to consider now to plan for future conditions?

The storm surge results highlighted in the sections below are simulations for four (4) sea level rise scenarios in the year 2100 for the northern Gulf of Mexico (MS, AL, and FL panhandle). Created as part of the Ecological Effects of Sea Level Rise in the northern Gulf of Mexico, or EESLR-NGOM, project, these storm surge simulation results incorporate waves and surge, land use changes, habitat changes, and shoreline, dune and barrier island morphology.

These results provide resource managers with the knowledge and tools to:

<https://goo.gl/kLVNrR>



Current Project Introduction and Overview

- Final year of multi-year, NOAA-sponsored EESLR interdisciplinary project:
Dynamic Sea Level Rise Assessments of the Ability of Natural and Nature-based Features (NNBFs) to Mitigate Surge and Nuisance Flooding
- Overall goal: to provide information to and learn from decision makers on NNBFs' ability to mitigate storm surge and nuisance flooding as sea level rises.

NNBFs are natural coastal landscapes—either naturally occurring or engineered to mimic naturally-occurring conditions.



Beach and Dune



Vegetated Feature (Marsh)



Oyster Reef



Artificial Reef



Barrier Island



Coastal Forest

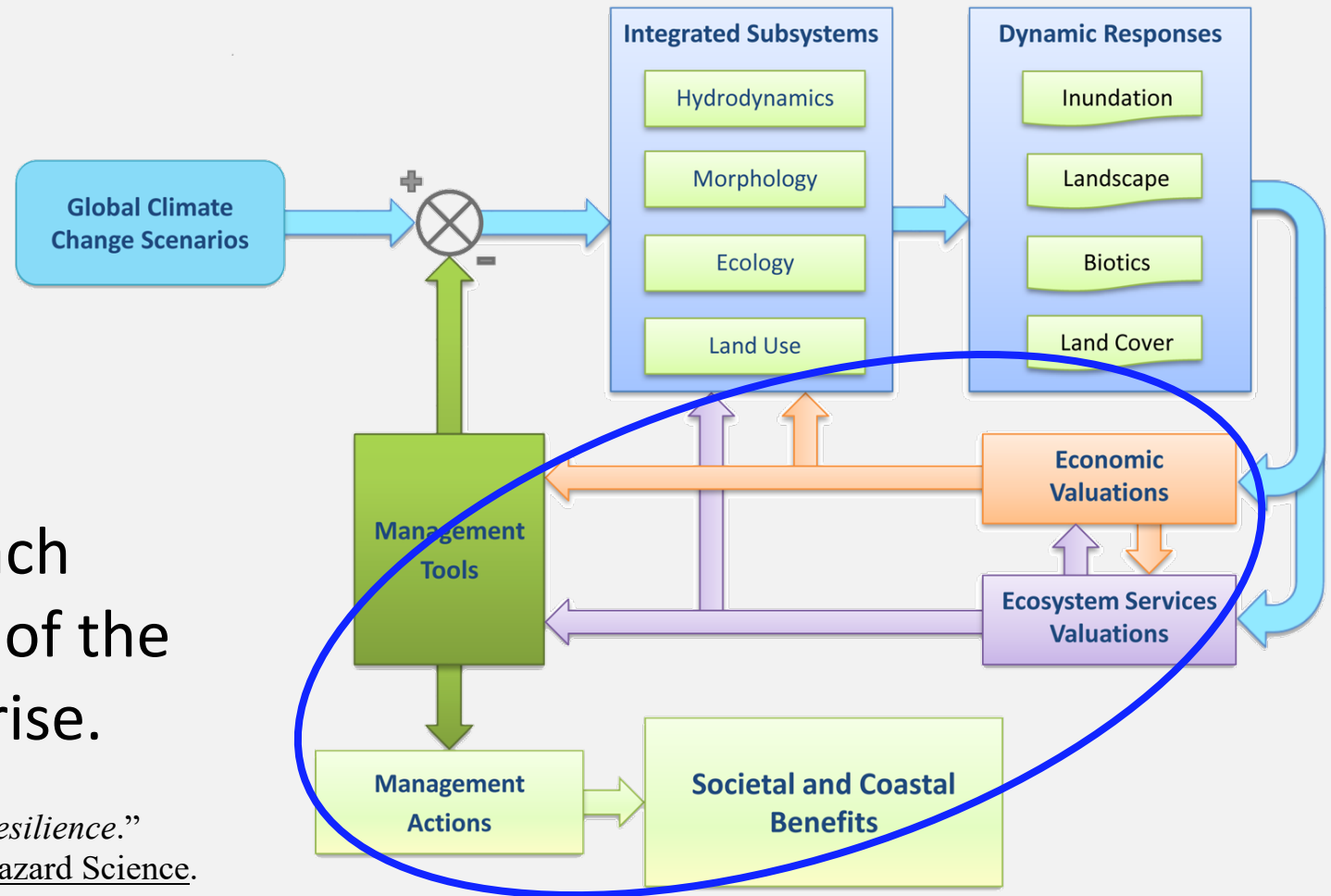
<http://www.nad.usace.army.mil/Portals/40/docs/NACCS/NNBF%20FINAL.pdf>

A Process Diagram for the System

We are continuing to shift the paradigm of how climate change in general and sea level rise in particular is assessed at the coastal land margin.

Our system of systems approach lets us evaluate more aspects of the coastal dynamics of sea level rise.

“Systems Approaches for Coastal Hazard Assessment and Resilience.”
in S. Cutter (Ed): *Oxford Research Encyclopedia: Natural Hazard Science*.
<http://naturalhazardscience.oxfordre.com/browse?t0=ORE> NHS:REFNHS063



Definitions

- **Economic Impact Analysis (EIA):** analyzes effects that bio-geo-physical changes to natural environments have on socio-economic metrics (e.g., jobs, income, etc.) and built anthropogenic systems. In this overall project, EIA is considered a tool to estimate impacts:
 - resulting from sea level rise, and
 - demonstrating further benefits from incorporating NNBFs (beyond reducing storm surge and nuisance flooding).
- **Ecosystem Services Valuation (ESV):** entails identification of benefits humans receive from the natural environment and their importance
 - Values can be expressed in both monetary and non-monetary terms.

Definitions

- **Ecosystem Services:** benefits received from the natural environment that impact human well-being including **security** (personal safety, resource access), **material** (livelihood, food, shelter), **health** (strength, feeling well, clean air), **social relations** (cohesion, mutual respect), and **freedom of choice and action** (opportunity to achieve what an individual values doing and being)

- From Yoskowitz et al. (2010):

“Decisions are incomplete and inefficient if they do not include all benefits and costs...”

“the direct or indirect contributions from ecosystems that help support, sustain, and enrich human life”

Focus Group Method and Participants

- Focus groups were conducted at annual stakeholder workshops to better understand perspectives on project topics, including EIA and ESV.
 - Qualitative social science interviewing technique
 - Captures diverse views and descriptive details
- 4 focus groups (2 concurrent/year):
 - Grand Bay NERR, Moss Point, MS in 2018
 - Weeks Bay NERR, Fairhope, AL in 2019
- Participants:
 - Management Transition Advisory Group members:
 - resource managers, restoration specialists, extension and outreach professionals
 - Stakeholders from workshop location:
 - community planners, other local decision makers



Familiarity with and Views on EIA/ESV

- Participants were generally familiar with EIA/ESV, some because of project workshops and webinars explaining and demonstrating these methods.
- They believe EIA/ESV can provide important and useful quantitative economic data for NNBF-related communication and decision-making.

“In our local environment, the economy is directly related to the natural resources so if we’re not understanding and protecting our natural resources then our economy is going to tank.”

Conceptualizations and Understandings of EIA/ESV

- Participants were not entirely clear or confident in their knowledge about EIA/ESV concepts and methods.
 - Their definitions of these terms were brief:
 - For EIA (e.g., ***“It means dollars,” “What’s the impact of a project you propose? Is this good for the economy or bad for the economy...if you put a marsh out there?”***)
 - For ESV (e.g., ***“It seems like it’s a big, catch-all term.”***)
- Some provided more contextualized understandings of EIA:
“...evaluating...the economic effects of infrastructure that would be affected in the sea level rise scenario. So not just what’s the cost-benefit of the natural and nature-based feature, but if sea level rise continues...This area is going to get flooded...So you do an economic valuation of those properties to demonstrate the effects of sea level rise.”

Perceived Calculation Challenges with EIA/ESV

- Participants thought EIA/ESV calculations were puzzling.
 - Indicated it was a common challenge in their professional arenas, particularly for quantifying intangible ecosystem services.
 - NNBFs can compound complexity of ESV calculations.

“...the thing I think is difficult with ecosystem services is...you can talk about how much does an oyster bag cost...but...let’s say you put in a living shoreline...when you can say, ‘If I implement this green infrastructure improvement relative to, say, a formal engineered improvement, then...I can mitigate some water quality’...but that’s not immediately quantifiable.”

Perceived Calculation Challenges with ESV

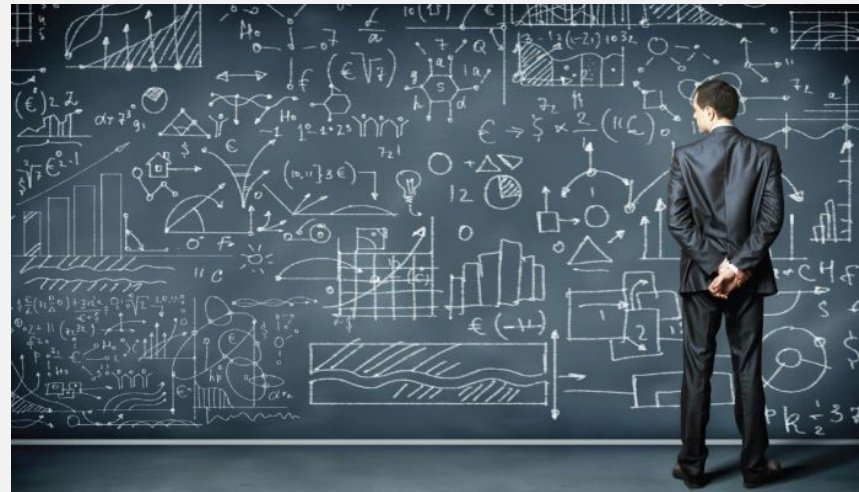
- Participants expected ESV to not be exact or definitive.
 - Yet had some skepticism and concern about lack of accuracy, especially in measuring intrinsic values of ecosystem services.

“I’ve always been kind of philosophically opposed to assigning very specific dollar values to those ecosystem services from the standpoint of you’re putting a line in the sand that it’s worth this to us. We don’t fully understand the biological or physical characteristics of these systems. What are we missing out on? What value?”

Communication Challenges with EIA/ESV

- Participants thought EIA/ESV calculation challenges and confusion could be problematic for stakeholder and public communication and support of coastal projects.

“I think one of the challenges is tying together the economics, the engineering, and the social side. To weave a story that shows the whole picture.”



Experiences with EIA/ESV

- Participants' experiences with EIA/ESV were varied but limited.

“We’ll use it in project proposals...to show what benefits you’re getting out of the results.”

“We share those numbers with Congress, so they continue to fund us.”

“I only have what I get when I come to these trainings so I try to focus as much as I can on the economic...it’s not part of my daily project management-type stuff.”

Expectations and Opportunities with EIA/ESV

- Most expected they would use EIA/ESV data in the future.
 - (e.g., to help in selecting projects, determining where to build, and establishing new regulations).
- Participants appreciated:
 - EIA/ESV data incorporated in project's research and modeling.
 - Providing input on the process and products.
- Thought project's resulting tools:
 - Would produce accessible and useful guidance for decision-making.
 - Perceived opportunities for multiple applications across various coastal contexts and scales.

Evaluation Findings from Workshops and Webinars

- Overall, stakeholder participants:
 - Have difficulty differentiating between type of information provided by EIA vs. ESV and when and how to use those outputs.
 - Generalize these two data types into an “economic data” category.
 - Lack confidence in EIA/ESV methods and outputs.
 - We believe this reflects they were somewhat overwhelmed by new concepts, definitions, and gaps in understanding of EIA/ESV processes.
 - But felt more comfortable with EIA/ESV after workshops and webinars.

Interdisciplinary Team Obstacles and Opportunities

- Our projects involve large interdisciplinary teams with numerous graduate students.
 - Everyone was learning as they were trying to communicate and contribute, and this was challenging on many disciplinary and pedagogical levels.
 - Success depends on how willing those involved are to learn from each other.
- There was use of inconsistent terminology. For example:
 - Economic Impact Assessment vs. Analysis
 - Ecosystem Services Valuation vs. Evaluation
 - Just the term “ecosystem services” has been challenging historically.

Stakeholder Engagement Obstacles and Opportunities

- EIA/ESV communication obstacles have methodological implications.
- Most non-practitioners think EIA/ESV is only about money.
- There seemed to be lack of clarity in distinguishing EIA data from the modeling/tools being produced and refined in this project.
- Nonetheless, progress was made in just two years as participants:
 - Were more comfortable discussing EIA/ESV topics.
 - Seemed better able to provide more descriptive examples.



“Don’t use science as your bumper!”

– Henk Ovink, Principal of Rebuild by Design and Dutch Special Envoy for International Water Affairs

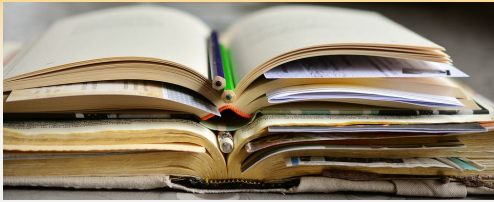
Future Recommendations

- ESV may best be referred to as “Benefits of the Natural Environment”
 - Though a longer phrase rather than a couple of words, it’s direct and easier for stakeholders and the public to understand.
- We started referring to our work as Ecosystem Service Assessment.
 - This term is more encompassing and can include monetary valuation but also many other potential measurements.
- Be careful and consistent in terminology/language.
- Encourage recognition of intrinsic ecosystem services.

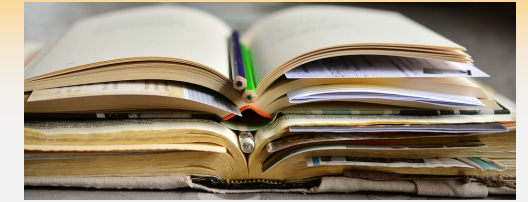
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