

Expanding the Benefit-Cost Analysis for Nature-Based Solutions: Workshop Summary

June 30, 2023

On Thursday, June 15, [Save the Sound](#), [Connecticut Sea Grant](#), [New York Sea Grant](#), [The Pew Charitable Trusts](#), and [Earth Economics](#) hosted an invite-only workshop, “Expanding the Benefit-Cost Analysis for Nature-Based Solutions,” which was attended by more than 50 professionals from federal and state agencies, municipalities, environmental NGOs, and engineering firms.

The workshop reviewed the results of an effort by Save the Sound and Earth Economics to identify opportunities for the Federal Emergency Management Agency (FEMA) and other federal agencies and funders to improve the ability of benefit-cost analysis tools to account for ecosystem-based benefits. The workshop covered the recent history and future directions of benefit-cost analysis (BCA) as a tool for evaluating, selecting, and securing funding for the construction of coastal resilience and climate change adaptation projects that propose to use nature-based solutions (NBS). Save the Sound and Earth Economics presented on these topics using a case study of a living shoreline project in Guilford, Connecticut. The group discussed ways to capture the case study's benefits and costs more fully through the lens of nature as critical infrastructure and with an eye on the local and regional context within which the project is being designed.

The following breakout room summaries reflect upon three key recommendations from the associated report, [Expanding FEMA's Benefit Cost Analysis: Chittenden Living Shoreline Case Study](#) (published June 2023).

Breakout Room #1: Deeper Dive into FEMA BCA Toolkit V6.0

With support from Sarah Schaefer-Brown (New York Sea Grant), Carson Risner (Earth Economics) provided a walk-through of the BCA toolkit in Excel. During the walk-through, the group discussed technical challenges and options for expanding the BCA. For example, depending on the project, elements such as modeling damages from a 100-year flood require additional technical expertise. Applicants are also encouraged to provide a narrative that explains and justifies any additional inputs used in the calculation. The group was fortunate to have staff from FEMA's Benefit Cost Analysis program join the discussion on the use of the Toolkit and FEMA's BCA Helpline. They also reminded participants that applicants should contact their local State Hazard Mitigation Officer with any questions about proposed activities and conducting a BCA.

Breakout Room #2: Making the Case for Nature as Critical Infrastructure

Sara Powell (New York Sea Grant), Elizabeth Hornstein (New York Sea Grant), and Zack Greenberg (Pew) led a discussion with participants concerning the many ways nature functions as critical infrastructure. The group discussed nature's essential services in the region and identified examples including, storm surge and flood mitigation from dunes, coastal bluffs, oyster reefs, and salt marshes; erosion control from native plants; transportation from waterways; heat reduction from trees; and the recreation and physical health benefits of natural spaces. The group concluded with reflections on how to increase the implementation of NBS in hazard mitigation planning by incorporating NBS into projects from the start, training engineers and other professionals on NBS, or sharing case studies and resources with local

government from the EPA and other federal agencies. The following resources were shared with the group:

- [Use Nature as Infrastructure - Scientific American](#)
- [Fact Sheet | Nature as Resilient Infrastructure – An Overview of Nature-Based Solutions | White Papers | EESI](#)

Breakout Room #3: Improving the Breadth and Accuracy of Ecosystem Service Values

Anthony Allen (Save the Sound) with support from Deborah Abibou (Connecticut Sea Grant) and Olivia Molden (Earth Economics) led a discussion on how to improve the breadth and accuracy of ecosystem service values in the FEMA BCA toolkit. The group discussed the role of nature as critical infrastructure in relation to FEMA’s mission as functioning alongside or enhancing the services provided by built infrastructure. In relation to questions on the breadth and depth of ecosystem services values in the toolkit, the group reflected on the need for more research to fill gaps. The group also discussed how accounting for beneficiaries may help with the analysis of ecosystem services. Relatedly, equity was a topic of discussion, and the group questioned how having standardized values nationally may help to level the playing field for applications. The room concluded that it may be more important to establish more comprehensive and accurate national values in the toolkit before advocating for the use of more regional values in BCAs.

Workshop Takeaways

FEMA is committed to supporting and advancing NBS applications. During discussion on the challenges associated with recording NBS project benefits within the BCA Toolkit, FEMA representatives indicated flexibility and the ability to make accommodations for NBS projects. For example, the living shoreline case study may protect a larger wetland complex that provides vast ecosystem services and flood protection for the surrounding community. Since this area was not considered part of the intervention strategy, it presented difficulties when attempting to integrate these benefits into the BCA toolkit. During discussion, FEMA staff explained that the wetland complex could be input as a “Property” with appropriate modelling and documentation to show that this ecosystem would be lost to erosion without the intervention. Doing so would more accurately capture the total value of the project and bolster its competitiveness. Also, if the wetland complex protects any surrounding built infrastructure, those could be included in the BCA too.

FEMA expects appropriate modelling efforts and additional documentation to support claims for less traditional project benefits, but they are willing and able to guide subapplicants through this process.¹ Considering this, applicants, subapplicants, and project partners should communicate early and often with their State Hazard Mitigation Officers (SHMOs) about submitting NBS-type projects for FEMA funding, and how these projects align with regional and national priorities. For example, subapplicants should ask about the scoring process for NBS projects in SHMO evaluations. The additional support required by NBS solutions may be provided by Capability and Capacity Building (C&CB) activities, which FEMA may provide to help integrate NBS in project scoping, provide technical assistance to states, and support multi-hazard mitigation planning.

Applications focused on advancing NBS for disaster mitigation can be viable and eligible projects for FEMA. As the case study shows, projects located remotely from people, property, and grey infrastructure may still be eligible so long as applicants clearly describe project beneficiaries. However, to fully capture

¹ For questions about the BCA toolkit, FEMA is available at bchelp@fema.dhs.gov or 1-855-540-6744.

the benefits of NBS in the BCA, further peer-reviewed research is needed to fill in gaps on the ecosystem services benefits for various landcover types (see Figure 2 in the report).

In summary,

- 1) FEMA is committed to advancing both NBS and equity. For example, FEMA's Alternative Cost-Effectiveness Methodology Test includes four criteria that help to include socially vulnerable communities, Tribal nations, and Economically Disadvantaged Rural Communities².
- 2) Capability and Capacity Building (C&CB) activities can help integrate NBS and equity in project scoping, provide technical assistance to states, and support multi-hazard mitigation planning.
- 3) Applications focused on advancing NBS for disaster mitigation can be viable and eligible projects for FEMA. Moreover, as the Chittenden site shows, projects located remotely from people, property, and built infrastructure may still be eligible, so long as applicants clearly describe project beneficiaries.
- 4) Applicants, subapplicants, and project partners should communicate early and often with their State Hazard Mitigation Officers about incorporating NBS projects in relation to regional and national priorities. Applicants should ask about the scoring process for NBS projects in SHMO evaluations.
- 5) With the lack of data for many landcover types and ecosystem services, researchers locally and regionally have an opportunity to help expand the set of ecosystem services values that can be included in BCAs. FEMA has indicated that these values will be updated every 3-5 years. Higher and more comprehensive valuations of ecosystem services by land cover type will make projects that incorporate NBS to improve resilience by restoring critical ecosystem function more competitive.

Support for this workshop was provided by The Pew Charitable Trusts. The views expressed during the workshop and in this document are those of the participant(s) and author(s) and do not necessarily reflect the views of The Pew Charitable Trusts.

² FEMA. October 6, 2022. Memorandum for: Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) Grant Program Applicants and Subapplicants
https://www.fema.gov/sites/default/files/documents/fema_alternative-cost-effectiveness-methodology-for-FY2022-BRIC-and-FMA.pdf