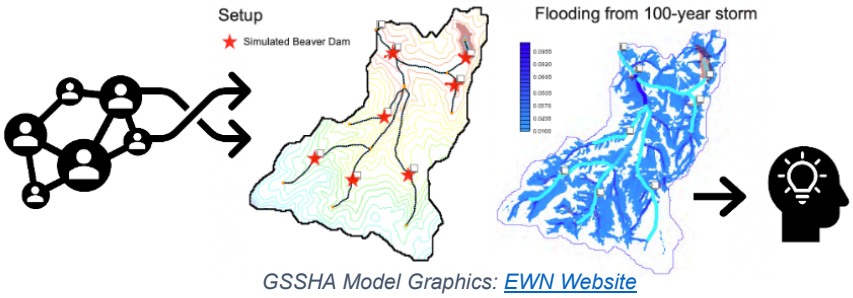
Visualization to Support Community Engagement on Nature-Based Solutions (NBS): Practical Insight from Practitioners

Overview



GSSHA Model Graphics: EWN Website

Coastal communities face varied and increasingly unprecedented challenges from natural hazards such as rising sea level, more frequent and more intense coastal storms, and resulting flood risk. Innovative nature-based solutions (NBS) are increasingly important components in coastal protection, restoration, and resilience initiatives. However, integrating NBS into sensitive coastal ecosystems is often challenging because community members unfamiliar with NBS sometimes resist its use. Therefore, more effective approaches for engaging with community members and communicating the benefits of NBS as part of coastal infrastructure resilience initiatives is critical for success.

Opportunity and Approach

Our opportunity was to explore **visualizations—illustrations, images, maps, graphics, models, and other visual techniques—to better engage and communicate with community members about incorporating NBS into coastal infrastructure initiatives.** Such visualizations and the supporting technologies to create and share them are becoming ubiquitous in modern society, and community members increasingly expect them. Practitioners, both within and outside of USACE, have begun using innovative visualizations to introduce, explain, and explore opportunities and potential solutions, including for NBS, with community partners.

As an extension of our leading practice report, *Informing the Community Engagement Framework for Natural and Nature-Based Projects: An Annotated Review of Leading Stakeholder and Community Engagement Practices* (ERDC Tech Report, TR-22-15), we preliminarily explored the use of visualizations. First, we conducted a high-level review of academic literature along with an environmental scan of USACE coastal project reports and websites, along with similar initiatives by external partners and nongovernmental organizations (NGOs). Subsequently, we had informal discussions with select practitioners, within and outside of USACE, and with a few academics who conduct research on visualizations and decision-making. **Our hypothesis was that effectively using visualizations, particularly at early phases of NBS projects in coastal environments, will help community members make better-informed judgments and decisions about the design and acceptability of such initiatives, which could lead to better outcomes for critical infrastructure solutions**. We tested this hypothesis in our discussions with community members, assessed the value of using visualizations, then developed practical insight for USACE practitioners working on a range of coastal resilience initiatives. We have identified key visualization practices, approaches, and technologies designed to engage community members (and other stakeholders); help them understand the need, opportunity, potential options, and impacts over time; elicit their input in a meaningful way; and, if desired, support the cocreation of sustainable solutions. From these discussions, we developed seven points of practical insight and principles, presented below.

Considerations and Next Steps

- Create a multimedia story map—This visualized presentation of project insights and a portfolio of concrete examples will make them easier to adapt and apply. The story map will be collaboratively developed to optimize its use by practitioners. We will explore opportunities for ongoing updates.
- Develop a Visualization Research Agenda—Itemizing potential future research priorities, opportunities, and projects will support, extend, and formalize visualization use and techniques across USACE.

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Practical Tips for Effective Community Engagement with Visualizations

Effective use of visualizations is critical to improving community engagement, particularly on NBS initiatives. Visualizations enable conceptualization, collaboration, exploration, synthesis of ideas, and cocreation of solutions. The following practical considerations result from exploratory discussions with field practitioners and with experts in visualization, communication, and decision-making.

1. **Integrate visualizations strategically.**

   Incorporate visualizations throughout coastal resilience initiatives to engage communities effectively. Select appropriate tools to communicate project goals and involve stakeholders in solution building early, from conceptualization to proposed solutions. Landscape architects are experts in using visualizations for such engagement.

2. **Incorporate visualizations early.**

   Deploy visualizations early in project conceptualization by using simple sketches or models. Early engagement fosters understanding and alignment, enhancing project outcomes.

3. **Select appropriate tools.**

   A spectrum of visualization methods and tools are available—from simple sketches, appropriate for early-stage activities, to high-quality, detailed landscape architectural renderings, 3D images, physical models, augmented reality (AR), and virtual reality (VR), sometimes most appropriate for later-stage design. The visualizations must fit the needs and interests of the community members and the objectives at each stage of the development process. High-tech ("cool") visuals are not always better!

4. **Use visualizations that connect with people's lived experience.**

   Tools and approaches should be based on community members' "mental models"—their perceptions of the geographical area, risks, benefits, options, potential cultural significance, and sensitivities. Wherever possible, put the visualizations in a local context—think of the power of "You Are Here" maps. Use local streets, buildings, beaches, and other landmarks to provide essential reference points that people can readily understand and interpret. Leverage the power of situational awareness to connect people with the opportunity at hand.

5. **Deconstruct complexity when visualizing project data.**

   Visualizations often need to show multiple, linked perspectives. Localized community and neighborhood maps and visualizations (photos, illustrations, and models) should supplement larger-scale regional maps, highlighting the local context. Local-scale visualizations can illustrate cross sections of various features, ground level and overhead views, and depictions of people interacting with the features. Visualizations can also demonstrate how NBS features evolve over time. Integrated graphics with an associated narrative help to explain the need, opportunity, and story of the initiative.

6. **Update the visualizations over the life of an initiative.**

   Initiatives evolve—our visualizations should too. USACE projects often span broad geographies and long timeframes. Visualizations can illustrate the project timeline, stages, options, upcoming decisions, changing threats from climate change, and the how NBS will adapt and evolve. Include evolving initiative visualizations in your community engagement plans.

7. **Always pretest your visuals!**

   Make sure that your visualizations are clear and share the message you intend to. In the field of risk communication, it is important to convey information to the public in a way that is easily understandable, akin to explaining a concept to an eighth grader. Do not assume that everyone understands maps, charts, graphs and other visualizations as you do!