

Understanding the Effectiveness of Coastal Nature-based Solutions:

Practitioner-based Learning

Summary of Findings

Nature-based solutions (NbS) are approaches that use nature and natural processes to address societal challenges and protect ecosystems. From a synthesis of the literature and interviews with practitioners and coastal management experts, we identified two main action areas for improving NbS implementation: understanding and evaluating effectiveness and identifying the challenges that can be overcome to accelerate coastal adaptation with NbS.

EVALUATING EFFECTIVENESS OF NBS PROJECTS

We found that effectiveness of NbS can be assessed using four components: physical, ecological, economic, and social considerations. All four must be integrated for a project to achieve coastal adaptation and societal goals.

- Physical effectiveness is the ability of an NbS project to mitigate physical risk and depends on the habitat type, its historic and current condition, the scale and type of climate hazards at play, the geology of the region, and specific biological factors.
- Ecological effectiveness means that the NbS project enhances habitat quality and extent, ability to provide ecosystem services, and/or benefits biodiversity.
- Economic effectiveness is the potential for a clear reduction in the damages and costs associated with impacts such as sea level rise and catastrophic storms, along with achieving co-benefits of NbS projects.
- Social effectiveness means that an NbS project is designed to address broader social concerns, such as quality of life, equity considerations, governance, and adaptive management.

IMPROVING IMPLEMENTATION OF NBS PROJECTS

We identified three specific bottlenecks that impede progress and where better outcomes can be facilitated:

Effective GOVERNANCE, or the interdependent policies, programs, and regulatory efforts of government and other related actors, is a foundational issue for enhancing NbS effectiveness. Suggestions

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include examining and addressing power/ decision structures and policies, especially those related to social and economic impacts; closely examining the distribution of costs and benefits; and working out regulatory barriers.

COMMUNICATION AND COLLABORATION are crucial factors in successful NbS projects, but this aspect of project implementation is often uncompensated. Building collaborative relationships is frequently the unpaid and invisible labor of NbS — and is a critical ingredient for success, especially at larger scales. Lack of collaboration is often cited as a significant limitation to progress. Finally, well-articulated, collaborative framing of goals, benefits, limitations, and uncertainty can reduce vulnerability to potential setbacks.

EQUITY is at the heart of effective NbS. Using an equity lens to identify and value co-benefits and evaluate effectiveness are critical to advancing equity. Equity and institutional power dynamics influence all aspects of NbS implementation. One concern that frequently emerges is that investment in NbS can lead to gentrification in areas currently underserved by natural amenities. Other equity issues identified in both “green” (NbS) and “gray” (traditional built structures) infrastructure include ignoring insights from traditional knowledges, and economic criteria and processes that limit opportunities for marginalized communities.

LEADING PRACTICES IN NBS PROJECT IMPLEMENTATION

Practitioners consistently identified six Leading Practices for NbS effectiveness:

1. Community-driven Processes
2. Clear and Achievable Goals
3. Planning at Landscape Scale
4. Planning for Changing Conditions/
Adaptive Baseline
5. Explicitly Addressing Tradeoffs and Hybrid
(green/gray) Options
6. Linking the Four Effectiveness Pillars and
Naming and Integrating Co-benefits

NATIONAL OPPORTUNITIES FOR NBS:

A national coordination system could address the challenges of NbS implementation by (1) helping to disseminate information about effective practices, (2) providing resources to support technical assistance, and (3) establishing a focused and accountable organization to evaluate alternative approaches and integrate learning. We believe such a national coordination system could contribute directly to the success of NbS specifically and to accelerating adaptation and resilience in the U.S. more broadly. Our report identified several discrete suggestions to support effective NbS implementation, including:

- Build capacity for peer-to-peer learning among practitioners, nationally and globally.
- Provide cross-disciplinary training to improve understanding of NbS across sectors.
- Include funding for relationship building and collaboration in NbS processes/ projects to advance equity.
- Develop outcome-based standards that account for context and local objectives.
- Support new approaches to benefit-cost analyses and improve valuation of co-benefits.
- Monitor effectiveness of NbS projects in the context of both natural and social systems.
- Pursue public-private partnerships that could encourage and support NbS projects.
- Fund research on the social and economic aspects of NbS.
- Encourage states to streamline legislative processes that support integrating NbS.
- Adopt a more adaptive and innovative approach to governance of NbS projects.
- Focus on supporting the people who need to make challenging transitions, and recognize the inherent trauma associated with relocation decisions.

For the full report, please visit bit.ly/coastal-nbs-report.