Policy Recommendations for Natural & Nature-Based Solutions

Although the first year of the Nature-Based Exchange did not devote an entire workshop to policy considerations for natural and nature-based solutions (NNBS), the topic came up repeatedly in each of the workshops. There are many groups actively interested in this topic and will be something the Nature-Based Exchange explores more deeply in subsequent years. The following are general considerations and recommendations discussed during Year 1 as well as several examples and resources from other states. This list is not exhaustive but meant to show a few examples. Additionally, the resources below have a heavy emphasis on flooding and stormwater; there is future opportunity to explore further policy recommendations for NNBS that provide benefits for other issues.

General Considerations

- Promoting NNBS requires policy and practices that affect both how we build and where we build. Community planning and regulations can direct development to areas that are less vulnerable to hazards, while site design practices and construction can be required to reduce those vulnerabilities.1
- Managing hazards and improving community resilience will require a variety of large and small policies and practices that occur at different scales and in different parts of the community.[1]
- Policies and practices will involve may different governmental departments and involve several different code sections. This will require comprehensive planning and coordination.[1]
- Increasing community resilience and effective NNBS is not easily done in an ad hoc or piecemeal manner. Instead, they should be incorporated into the most basic planning and decision-making activities of the community. [1]
- All policies and practices need to consider risk, adaptive management, and future conditions.

State Planning and Funding

South Carolina can incorporate NNBS approaches into resilience planning. The South Carolina Office of Resilience, established in September 2020, recently released the Statewide Risk Reduction and Resilience Plan[2]. This plan calls out NNBS in several recommendations, including establishing a resilience grant/loan program that would fund projects including NNBS, reviewing and removing barriers to permitting NNBS, and prioritize and fund land conservation that provides flood mitigation benefits.

Other states that have incorporated NNBS into resilience planning include[3]:

- Virginia (HB 516, 2022): Specified that the Virginia Coastal Resilience Master Plan must be updated at least every five years and must recognize the importance of protecting and enhancing natural infrastructure and nature-based approaches to flood mitigation when possible.
- California (AB 72, 2021): Required the Natural Resources Agency to explore and implement options to establish a more coordinated and efficient regulatory review and permitting process for coastal adaptation projects that use natural infrastructure.
- California (SB 170, 2021): Allocated funding to support regional climate adaptation planning and action plans. The bill specifies the plans shall use natural infrastructure to respond to climate vulnerabilities where feasible.
- Florida (SB 712, 2020): Required the Departments of Environmental Protection and Economic Opportunity, in cooperation with local governments in coastal areas, to develop a model stormwater management program that could be adopted by local governments. The program must contain ordinances that target nutrient reduction practices and use green infrastructure.

South Carolina is committed to land conservation and resilience through a suite of public programs and investments and a long-running conservation ethic among private landowners statewide. With 3 million acres conserved to date, South Carolina Governor Henry McMaster has staked a bold goal of doubling that number by 2050. SC Conservation Bank, established in 2002, invests in voluntary protection of private and public lands through a competitive grant

process guided by statewide prioritization mapping that incorporates resilience values. Additionally, the SC Department of Natural Resources owns and manages state Wildlife Management Areas and Heritage Preserves contributing significantly to the state's network of conserved and resilient lands. The SC Office of Resilience is empowered to support not only buyouts of properties with repetitive flood loss, but also floodplain restoration projects, and to invest in resilient land acquisition projects. For Fiscal Year 2023 – 2024, the South Carolina General Assembly, with support from Governor Henry McMaster, allocated $32.5 Million to the SC Conservation Bank for conservation project awards and $20 Million for habitat protection and land conservation acquisition to SC Department of Natural Resources. Additionally, the budget includes $200 Million to SCOR, which Governor McMaster describes as "for the purpose of identifying and preserving culturally or environmentally significant properties in which public access is in jeopardy of being lost forever due to development, mismanagement, flooding, erosion, or from storm damage."

Other funding mechanisms states have put in place to support NNBS projects include[3]:

- Arizona (SB 1740, 2022): Created a water conservation grant program to fund projects aimed at improving water use efficiency and reliability, including green infrastructure projects.
- The District of Columbia (D.C. Law 22-155, 2018): Created the Green Finance Authority to increase private investment in clean water, stormwater management and green infrastructure projects.
- Florida (SB 976, 2021): Encouraged new approaches and financing mechanisms for the protection of the state's wildlife corridor, including public-private partnerships, payments for ecosystem services, and blended financing for resilience and green infrastructure.
- Louisiana (HB 2, 2022): Appropriated over $3 million to the Lower Ninth Ward Green Infrastructure Project.
- Maryland (HB 653, 2022): Specified that the maintenance and repair of source watersheds, including the installation and maintenance of green infrastructure that improves water quality, is eligible for the same forms of

financial assistance as other water collection and treatment infrastructure. The bill also defined green infrastructure as "a land-based natural area or natural feature, or a system or feature designed to protect, mimic or enhance a natural function, that: absorbs and filters pollutants; protects communities from flooding or storm surge; reduces erosion; or sequesters carbon."

- The New Jersey Department of Environmental Protection and the state Infrastructure Bank partnered to administer the New Jersey Water Bank, which provides low-cost financing for water projects, including green infrastructure. The Infrastructure Bank was established under the New Jersey Infrastructure Trust Act as an independent state financing authority.

Local Plans, Regulations, and Incentives

- Local regulations, which require compliance, and incentive programs, which are voluntary, both play a key role in the utilization (or lack thereof) of NNBS – through both how we build and where we build.
- Regulations include codes and ordinances. Below are useful resources including model ordinances and policy examples from several cities around the country.
- Zoning ordinances specify the type of land uses and intensity uses allow on any given parcel.[4] Creating denser development and open space preservation may often be the most efficient and best way to promote overall resilience to flood hazards.[1]
- Street standards or road design guidelines dictate the width of the road for expected traffic, turning radius, the distance to other road to connect to each other, and intersection design requirements. Often, curb and gutter are required with road design which makes roadside infiltration swales and practices unfeasible and encourages pipe and pond collection systems.[4]
- Parking requirement generally set the minimum, not maximum, number of parking spaces required for retail and office parking. Setting minimums leads to parking lots designed for peak demand periods, which can create acres of unused pavement during the rest of the year.[4]

- Minimum setback requirements can spread development out by leading to longer driveways and larger lots. Establishing maximum setback lines for both residential and retail development brings buildings closer to the street, reducing the impervious cover associated with long driveways, walkways, and parking lots.[4]
- Model Flood Resilient Development and Building Ordinance -- augments the provisions of existing floodplain management regulations to enhance specific elements of residential building design in flood-prone areas. Specifically, it requires that structures built in Coastal A Zones meet the construction standards of Coastal V Zones. It also expands the regulations that are applicable in the 1% annual chance floodplain to the 0.2% annual chance floodplain. Under this ordinance, new structures associated with critical facilities cannot be located in the 0.2% floodplain. All new development must be built to an elevation that is 2 feet above the 0.2% flood elevation, measured from the bottom of the lowest horizontal structural member. Finally, it requires that real estate agents inform prospective buyers of the documented flood risk of the property.[1]
- Model Enhanced Stormwater Resilience Ordinance -- focuses on two elements that are generally not addressed in stormwater management regulations. The ordinance limits the amount of impervious cover that can be used in new development, based on the zoning classification of the project. It also mandates that stormwater from rooftop runoff be directed through an infiltrative area or structure before it is discharged into a conveyance system or a surface water body. These regulations enhance existing regulations by reducing stormwater runoff, and thus reducing the likelihood of flooding caused by peak flows that overwhelm the downstream infrastructure.[1]
- Model Tidal Flooding Resilience Ordinance -- recognizes that the most at-risk coastal properties are those that are vulnerable to damage from regular tidal flooding events. Therefore, it creates a regulatory district called the Area of Coastal Tidal Vulnerability (ACTV) in which there are additional land-use regulations, oversight over infrastructure investments, and investments in land conservation. The boundary of the ACTV is meant to be "rolling" in that

it moves upland as sea levels rise. Thus, in every new decade, an additional area is added to the ACTV based on the anticipated rate of sea level rise.[1]

- Green Factor Policy in Fife, WA -- In order to receive a project permit, new developments, redevelopments and construction sites must have a landscaping plan that achieves the green factor. Plans meet the green factor by implementing green factor elements, each of which have a score. The total green factor score that must be met is calculated by dividing "the green area factor by the lot area". Each green factor element has a correlated multiplier, which is used to calculate the green factor. The green factor elements include green roofs.[5]
- Policy for Construction of Vegetated Roofs in Devens, MA -- When building a green roof, a member of the construction team must be a Green Roof Professional (GRP). The policy requires that the vegetation on the roof not be an invasive species, and that it must be native plants with seeds appropriate to Devens' USDA hardiness zone (5b). Green roofs shall have a minimum of 4 inches of growing media that cover 40% of the roof area, with at least 80% coverage within three years of the date they are planted.[5]
- Sustainable Development Policy in Chicago, IL-- The Sustainable Development Policy requires that development projects earn a number of points by implementing select sustainable strategies. It applies to new developments, TIF funded developments receiving over $1 million, or multi-family housing projects over 5 units that receive specific financial assistance. All new developments are required to reach 100 points. The two compliance pathways are earning points from the strategies menu without building certifications or earning points from a building certification and earning the reset of the points from the strategies menu. The menu includes strategies in the following categories: health, energy, stormwater, landscapes, green roofs, water, transportation, solid waste, work force and wildlife. The green roofs will earn a project 10 points if 50-100% of the building's net roof area is covered with vegetation, or 20 points if it covers 100% of the net roof area. The net roof area is the gross roof area with the exception of the area for mechanicals, maintenance pathways, window washing systems, swimming

pools and skylights. More than 5 million square feet of green roofs have been implemented in Chicago to date as a result of its policy initiatives in support of green roofs.[5]

Incentives can be an important local tool for encouraging NNBS. Examples include[4]:

- Stormwater fee discount or credit – NNBS practices result in a stormwater credit and/or for those municipalities where there is a stormwater fee, NNBS practices receive a discount from the fee.
- Development incentives – Municipalities can offer incentives such as reduced permit fees, expedited permit process, higher density development allowance, and/or exemptions from permitting requirements if NNBS practices are used.
- Rebates and installation financing – Municipalities can offer grants, matching funds, low-interest loans, tax credits, and/or reimbursement when NNBS practices are used.
- Awards and recognition programs – Municipalities can recognize the people and places where NNBS practices are implemented. Recognition examples include newspaper articles, website announcements, notes in utility bill mailings, and/or NNBS-design contests.
- Monetary incentives – Incentives for landowners can include the outright purchase of land for protection or tax reductions for lands placed in easements.

Transportation[6]

There are two Federal requirements that could, in part, be addressed through the consideration and planning of nature-based solutions for coastal roads and bridges. There also is the option to create a programmatic mitigation plan, which can incorporate nature-based solutions.

- Discuss potential environmental mitigation activities and locations. The 20-year metropolitan transportation plan (MTP) and long-range statewide transportation plan (LRSTP) must include: "[a] discussion of types of

potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the [MTP and LRSTP]. The discussion may focus on policies, programs, or strategies, rather than at the project level. The [State and metropolitan planning organization (MPO)] shall develop the discussion in consultation with applicable Federal, State, regional, local and Tribal land management, wildlife, and regulatory agencies." As you are considering environmental mitigation activities and locations during transportation planning, consider their resilience functions. Are there natural areas that make sense to restore or protect because they are providing a resilience value to a road in addition to providing critical habitat?

- Improve the resiliency of the transportation system to natural hazards. 23 CFR § 450.206(a) calls for State DOTs and MPOs to "carry out a continuous, cooperative, and comprehensive statewide planning process that provides for consideration and implementation of projects, strategies, and services that will … improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation." NNBS can serve as a first line of defense and improve the resilience of roads in the coastal environment. For example, if properly designed, investing in the preservation, enhancement, and/or construction of natural shorelines can enhance the resilience of transportation assets protected by that shoreline.
- Consider developing a programmatic mitigation plan. Transportation agencies may choose to develop a programmatic mitigation plan in consultation with partner agencies with jurisdiction and special expertise in the resource areas, as part of the statewide and metropolitan transportation planning process. Programmatic mitigation plans address the potential environmental impacts of future transportation projects on a regional scale. These collaborative plans allow transportation and resource agencies to eliminate redundant investments, share data, and identify potential mitigation sites more effectively. The creation of this regional plan should reduce the level of coordination required on individual projects and reduce uncertainty around the level of effort needed to address potential ecological impacts. Another

benefit of programmatic mitigation plans is that the plan recommendations will be given substantial weight during the environmental review and permitting process. Consider identifying opportunities for nature-based solutions in a programmatic mitigation plan, which could make it easier to apply them to individual projects and reduce the need for offsite mitigation.

Agriculture[7]

Policy makers can enable the implementation of nature-based approaches through a variety of means including by law and regulation, economic incentives, capacity building, and communications.

- Governments, international agencies, businesses, and NGOs should support capacity and resources in agricultural extension services to advance the implementation of NNBS in agriculture in an inclusive and equitable manner.
- Policy makers should realign existing public subsidies and support for agriculture and fisheries, which total over $700B/yr globally with only 15% supporting the provision of public goods through NNBS. Public investments should support agriculturalists to produce food in ways that support nature and mitigate climate change. For example, the Conservation Title in the Farm Bill can continue to increase funding for source water protection activities that enhance water quality.
- Policy makers can also use innovative new approaches to provide bridge or transition funding to agriculture. These tools include agricultural lending, impact investing, and corporate investment incentives to benefit farmers who adopt NNBS practices.
- New insurance tools that reduce the risk to farmers for adopting NNBS or transitioning crop types or practices can help accelerate a transition to NNBS.

Equity

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As practitioners work to advance the use of nature-based solutions, it is imperative that projects are planned and sited to achieve equity. This can mean that all communities, regardless of wealth or resource levels, have access to nature-based options, and residents are able to help shape the planning and design process from the very beginning to make sure that a project suits the needs of their neighborhood.

Nature-based options can successfully mitigate climate impacts such as heat and flooding more effectively than grey solutions alone, are often less damaging for the local environment than grey solutions, and more cost-effective in the long run. Nature-based solutions often can mitigate multiple hazards at once, such as vegetated stormwater retention park that controls flooding while mitigating urban heat effects. It is therefore important that the benefits of these projects are justly distributed across communities to offset existing harms and disproportionate impacts. Due to historical patterns of racial and economic injustice, people of color and lower wealth households often face greater exposure to environmental harms.[8] Future increases in climate-driven flood risks, for example, are expected to disproportionately impact Black communities in the South.[9] Additionally, due largely to historic practices of redlining, neighborhoods of low wealth and more people of color tend to have fewer trees and green spaces to help mitigate heat, which puts these populations even more at risk to extreme heat health hazards.[10] If designed and planned appropriately, nature-based solutions can help communities mitigate these challenges.

It is also critical that the potential impacts of poorly sited nature-based projects are acknowledged and avoided.[11] Nature-based solutions could contribute to displacement or gentrification in a neighborhood if care is not taken to avoid such impacts[12] If a project is planned or designed without adequate community engagement that centers the actual needs of a given community, rather than the perceived needs, the project will be unsuccessful. It is critical that neighborhoods affected by a project have key seats at the table and in leading a nature-based project.[13]

When implementing nature-based solutions, equity must be a central consideration in order to prevent worsening injustices or contributing to displacement. The following are good practices for incorporating equity into nature-based project implementation:

- **Community-centered, place-based, community-led** efforts are necessary and will be most successful.
- **Nature-based solutions must be accessible to all communities**, not just wealthier communities with the resources to hire consultants. It will take the entire workforce of nature-based practitioners to fill these gaps.
- **Nature-based options should maintain community cohesion by avoiding direct and indirect displacement**[14] Some green construction has resulted in gentrification that has pushed low-income residents out of their homes. It is crucial to consider measures to keep communities whole. For example, heirs' property owners may not be willing to convert their land to a traditional conservation easement, but there are other options to maintain land ownership while installing a nature-based solution to protect that community from climate hazards.
- **Elevate local and Indigenous Knowledge in project design and planning**.[15] Communities know their land the best and have lived experiences that can guide the placement and design of a nature-based project. Additionally, many nature-based solutions are built around methods from longstanding Indigenous Knowledge, and some local tribes may wish to have a hand in the implementation of these solutions. Practitioners should center native and local knowledge sources in planning processes.

Footnotes:

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