



WORKSHOP 4 PROCEEDINGS // NOV 16TH, 2022

THE NATURE-BASED EXCHANGE

Funding NNBS: Navigating Grants, Risk Assessment, and Costs Benefit Analysis

The Nature
Conservancy



SURCULUS



School of
ARCHITECTURE
Resilient Urban Design



Biohabitats
SOUTHEAST ATLANTIC BIOREGION



Robinson
Design
Engineers

Acknowledgments

Planning Team: This workshop series would not have been possible without the time, effort, and expertise of the planning team. Their countless hours of work led to the formation of a robust workshop series that increased knowledge, spurred discussion, and produced tangible outcomes for South Carolina.

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Nature-Based Exchange compendium

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Nature-Based Exchange compendium design

Workshop Series Timeline

There is often a gap between conceptualizing ideas for natural and nature-based solutions (NNBS) and developing practical and solution-oriented plans using them. To close this gap, The Nature Conservancy, Clemson’s Resilient Urban Design Program, and the City of Charleston conducted a series of practical and outcome-based workshops that brought together a variety of local partners to discuss and develop NNBS. The goal was to synthesize existing knowledge and information on NNBS, align it with opportunities and barriers within the state of South Carolina, and create practical and equitable steps for implementation.

There are a total of seven workshops in the series. The first workshop served as a springboard for the rest of the series, offering an introduction to NNBS and gathering input from participants. The information gathered during that workshop informed the focal topics for the remaining workshops. Workshops 2 through 7 focused on one specific topic each to ensure a targeted conversation with produced outcomes.



WORKSHOP 1
Introduction to Natural and Nature-based Solutions
May 18th, 2022



WORKSHOP 2
Common Messaging on Natural and Nature-based Solutions
July 27th, 2022



WORKSHOP 3
Planning for Natural and Nature-based Solutions
September 14th, 2022



WORKSHOP 4
Funding NNBS: Navigating Grants, Risk Assessment, and Costs Benefit Analysis
November 16th, 2022



WORKSHOP 5
Equity in Natural and Nature-Based Solutions
January 18th, 2023



WORKSHOP 6 & 7
Design Standards for Natural and Nature-Based Solutions, Part 1 & 2
March 22nd, 2023
May 17th, 2023

Workshop 4: Funding Natural & Nature-Based Solutions

AGENDA ITEMS (9:00 am - 12:00 pm)

- Welcome and Introduction
- Plenary Presentation: Quantifying the Benefits of Nature-Based Solutions by Johnny Mojica, Radbridge
- Panel Discussion #1: “External” Funding – Bringing money into your community for planning and projects
- Panel Discussion #2: “Internal” Funding – Generating revenue within your community for projects
- Funding Resources & Wrap Up

The fourth Nature-Based Exchange workshop focused on funding natural and nature-based solutions. After a plenary presentation that delved into benefit-cost analysis (BCA) and how to quantify the benefits of nature-based solutions, the day was split between two panel discussions. The first panel was focused on finding ways to bring “external” funding (such as grants) into your community. The second panel was focused on using money that is generated within the community to support projects.

The speakers reminded us that while “external” and “internal” funding sources may be different, they can both be used to finance nature-based solutions. Identifying the best funding source for your project timeline and needs may be tricky, but there are many resources – including funding/agency experts, scientists, online databases, and past studies – that can provide you with the information you need to successfully fund your project.

Acronym Table

BCA	Benefit cost analysis
BRIC	(FEMA) Building Resilient Infrastructure and Communities
CDBG	(HUD) Community Development Block Grant program
DHEC	Department of Health and Environmental Control
(SC)DNR	(South Carolina) Department of Natural Resources
EIL	Environmental Impairment Liability insurance
FEMA	Federal Emergency Management Agency
HUD	US Department of Housing and Urban Development
IRA	Inflation Reduction Act
MS4	Municipal Separate Storm Sewer System
NCRF	National Coastal Resilience Fund
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Association
SRF	Single Resolution Fund

Quantifying the Benefits of Nature-Based Solutions

PLENARY PRESENTATION BY JOHNNY MOJICA, RADBRIDGE

Many communities have a desire to incorporate nature-based solutions into their resilience strategy, but they lack the capacity, resources, and/or technical expertise to successfully apply for and receive federal funding.


FEMA now allocates billions of dollars each year through its hazard mitigation assistance programs to reduce the risk of natural hazards to communities, including the impacts of climate change. Further, President Biden’s Justice40 initiative requires that 40 percent of this funding goes towards benefiting disadvantaged communities. Given that nature-based solutions tend to have more-equitable outcomes than grey infrastructure due to their multiple benefits and addressing societal challenges, they are the perfect fit to receive FEMA funding.

Oftentimes, the greatest hurdle applicants face when applying for mitigation funds is the benefit-cost analysis (BCA), the method of estimating and comparing the future benefits of a project with its costs. A BCA is required for nearly all FEMA grant applications, and projects must demonstrate a positive benefit-to-cost ratio (i.e., above 1.0) to be eligible for FEMA funding.

Quantifying the benefits of nature-based solutions can be particularly difficult in part due to the challenge of demonstrating the relationship between an on-site mitigation action and off-site project benefits. For instance, floodplain reconnection and restoration can provide an incremental decrease in flood elevations downstream, but the science, data, and modeling required to show this decrease can be complex and/or expensive.

Fortunately, FEMA has been working towards removing barriers to implementing nature-based solutions. Starting in 2013, FEMA adopted its first “ecosystem services” policy, which assigns monetary value to ecosystem services for their inclusion in the BCA, helping to level the playing field between nature-based solutions and traditional solutions in a BCA. Since then, FEMA has expanded the policy several times to include new value categories and eligible project types, including Floodplain & Stream Restoration, Aquifer Storage & Recovery, and Wildfire Mitigation. Though the FEMA application process remains

Speaker Bio



Johnny Mojica is a principal at Radbridge. Radbridge seeks to accelerate and expand investments in community resilience by helping them access federal funding for nature-based solutions. Johnny specializes in benefit-cost analysis for nature-based solutions, particularly those that reduce a community’s exposure to flood, fire, and drought. From project conceptualization to application submission, Johnny helps communities frame their resiliency projects to give them the best shot at grant award.

Table 1: FEMA Ecosystem Service Values

LAND COVER	\$/ACRE/YEAR	\$/ACRE/100YR
Urban Green Open Space	\$15,541	\$221,758
Rural Green Open Space	\$10,632	\$151,711
Riparian	\$37,199	\$530,802
Coastal Wetlands	\$8,955	\$127,781
Inland Wetlands	\$8,171	\$116,594
Forests	\$12,589	\$179,636
Coral Reefs	\$7,120	\$101,597
Shellfish Reefs	\$2,757	\$39,340
Beaches and Dunes	\$300,649	\$4,290,036

Source: Federal Emergency Management Agency (FEMA)

complex in many ways, FEMA’s new policies and pre-calculated values in the BCA have made it easier to quantify the risk reduction potential and co-benefits of nature-based solutions, reducing the burden on applicants and increasing the competitiveness of such projects. This is evidenced in FEMA’s BRIC program, which has now funded a number of projects incorporating nature-based solutions. Grown from the nonprofit sector, the team at Radbridge has been supporting FEMA policy and FEMA applications on the ground to help communities accelerate and expand investments in community resilience via nature-based solutions.

The team has also partnered with The Nature Conservancy’s California Chapter since 2019 to help address the challenges, barriers, and opportunities for nature-based solutions in FEMA’s hazard mitigation funding programs, which has led to a number of successes including \$37 million in funding for a wildfire mitigation project in California.

FEMA’s Building Resilient Infrastructure & Communities (BRIC) NBS Projects*



*The National Wildlife Federation (NWF) provided an analysis of projects including nature-based components that were funded by FEMA BRIC’s FY21 competition. Based on a best-judgement review of project summaries, NWF identified 10 projects that contain a nature-based solution as a primary or significant project component.

<https://blog.nwf.org/wp-content/blogs.dir/11/files/2022/09/BRIC-FY21-Analysis-Nature-Based-Solutions.pdf>

A Nature-Based Shoreline Adaptation Project *Location: Orange County, CA*
Funding: \$9.8M

Deployment of a hybrid, vegetated dune covering to raise shoreline elevation and restore habitat with native plantings.

B Bayside Community Resiliency: The Living Levee Project *Location: Imperial Beach, CA*
Funding: \$15.16M

Implement a living levee and stormwater retention and wetland system to mitigate current flooding hazards and future sea level rise hazards, and preserve coastal resources.

C Structure Relocation & Property Acquisition *Location: Lander, WY*
Funding: \$2.09M

Property acquisition and relocation to restore habitat and the natural floodplain functions.

D Building Removal & Greenway Development to Reduce Flooding Impacts & Improve Town Aesthetics *Location: Meriden, CT*
Funding: \$303,188

Demolishing and removing existing buildings and substructures that cause flooding, and deconstruction of paving and parking areas to construct a greenway and maintain the property as open space and public trail.

E Clinton Houses/East Harlem Community Stormwater Resiliency *Location: New York, NY*
Funding: \$8.36M

Detention and retention basins to manage up to 1.78 million gallons of rainfall runoff, and address extreme heat mitigation using multi-functional open spaces.

F Breukelen Houses Stormwater Protection *Location: New York, NY*
Funding: \$19.84M

Using innovative design to create multi-functional spaces, including providing a subsurface space to manage rainfall runoff, green infrastructure, and resilient plantings.

G Critical Infrastructure Restoration & Stream Protection *Location: Gastonia, NC*
Funding: \$5.98M

Using nature-based solutions and materials to stabilize and rehabilitate approximately 8,000 linear feet of Duharts Creek; using bio-engineered structural enhancements, natural fiber matting, and revegetation with native plants.

H Fair Bluff Park Phase 2 *Location: Fair Bluff, NC*
Funding: \$2.44M

Acquire and demolish 51 commercial properties and remediate the area to its natural hydrologic condition.

I Utilizing the Natural Environment & Parks for Flood Reduction *Location: Conway, SC*
Funding: \$2.17M

Implementing a 7.8 acre constructed stormwater wetland that will detain and retain runoff from the watershed; construct a community park to provide community amenities; floodplain restoration project to restore the Crabtree Swamp and its floodplain.

J Flood Mitigation with Living Levee, Shoreline & Pump Station Repairs *Location: South Florida Water Management, FL*
Funding: \$50M

Installed a living shoreline.

Panel Discussion

EXTERNAL FUNDING PANELISTS

Discussion moderated by Johnny Mojica, Radbrdige



Emily Bentley, Recovery & Mitigation Section Chief for S.C. Emergency Management Division



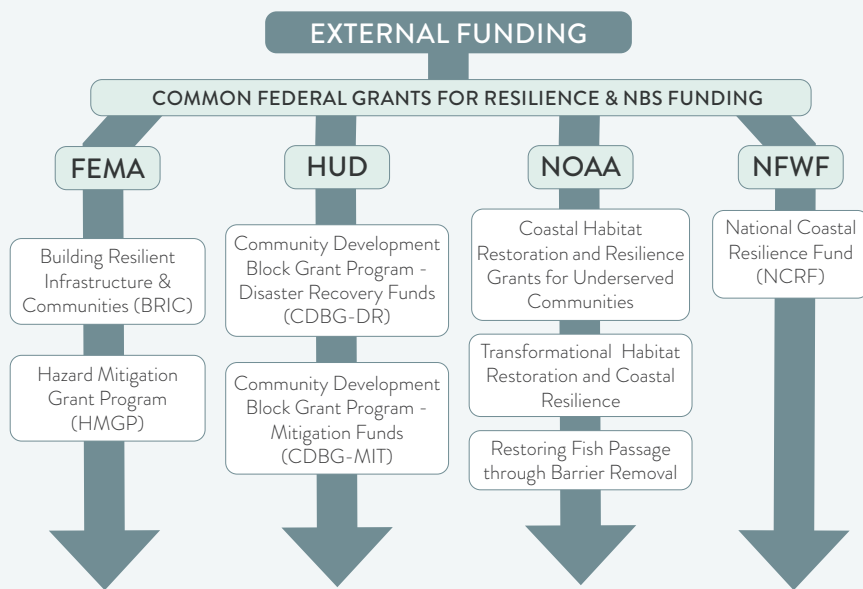
Eric Fosmire, Chief of Staff & General Counsel for the South Carolina Office of Resilience



Howard Schnabolk, Habitat Restoration Specialist for the National Oceanic & Atmospheric Administration's Fisheries Restoration Center



Joanne Throwe, President Throwe Environmental, LLC



(Above) A list of common federal grants for resilience and nature-based solutions that were discussed during the Nature-Based Exchange Funding Workshop. This is not a comprehensive list of all funding sources for resilience and NBS projects.

In the applications that you see, what commonalities makes an application successful? What are the pitfalls that make an application unsuccessful?

Pitfalls that may make an application unsuccessful include:

- Upfront scoping and design costs
- Match requirements
- Environmental and historical preservation reviews (which can require time and money to complete)
- Being an under-resourced community without access to additional capacity

Successful applications:

- Follow the instructions
- Answer all questions with clear and detailed language
- Bring in partnerships
- Consider community impacts

How does science and data play a role in the application process?

JOANNE THROWE: When designing these projects, science and data are very important, but I do want to add that stakeholder engagement at every step of the process – regardless of where you are in the pipeline – is just as important as the science and the data. And I want to make that point because many of these grants we're talking about – these project opportunities – really have to include multiple parts of the community. Getting

“If you start gearing our application proposal towards just research, it's not going to be as competitive.”

- Joanne Throwe

the science and the data, translating it to the community, and having it accepted and understood is an important piece of these project proposals.

EMILY BENTLEY: I would echo that, and I'll add that we've been looking at creating a consortium to help with the need for technical assistance. By drawing in our institution's higher education, we can target some expertise and analysis for some of the science and data to support the BCA or design of nature-based projects.

HOWARD SCHNABOLK: I'd say any time you can bolster your argument and back it up with some science and some data will allow the reader or agency to see where you're coming from with your ideas.

How do nature-based solutions fit into the funding stream for HUD?

ERIC FOSMIRE: Green is huge in resilience planning and the entire

approach to our resilience planning is to grow smart in the state. The scoring matrix for HUD is out of 100 points, with points awarded for green infrastructure, low-income communities, and a benefit-cost analysis. If you are a low-to-moderate income community and are proposing to implement green infrastructure, you're on your way to a successful project.

“It's about growing smart, and green is a huge part of it.”
- Eric Fosmire

What resources are available for communities to access?

Resources:

- Local experts
- Local agency representatives
- Past studies
- Field liaisons
- Websites
- Online maps and databases

JOANNE THROWE: The data and the research are often done; it's just a matter of citing that and having access. But it is available. And if you ever struggle, just pick up the phone and call your program manager or reach out to NFWF.

ERIC FOSMIRE: That whole piece of communication and making sure you

know what information is out there is really key. We have a social vulnerability index mapped out on our resilience plan. If you're one of those communities, you can look on the map and see where you are. If you're not familiar with it, I encourage you to talk with Dr. Susan Cutter at the Hazards and Vulnerability Research Institute at the University of South Carolina.

HOWARD SCHNABOLK: With our funding geared towards underserved communities, we don't ask for science and technical information. We know the community doesn't have the capacity to provide it, so the beauty of this funding is that we're asking those communities that need help to tell us how we can help build capacity. If you need to hire an economist or a planner or a grant writer to set you up to do restoration, you can apply for this funding. We've put our heads together to realize those communities don't fit into all our technical questions.

What is the role of elected officials in getting these projects moving along?

EMILY BENTLEY: They're obviously vital and I think different communities have different trajectories in terms of the learning curve to get elected officials on board with the benefits. In some cases, it may be a long-term education effort to help them understand the value not only for quality of life but also for hazard mitigation and financial value. **We know all these mitigation decisions primarily happen at the local level of government.** There may be federal dollars available or there may be federal guidance, but those local elected officials are key.

ERIC FOSMIRE: That education piece is really critical. We've run into issues where local governments don't want their citizens to be bought out because they think they're going to lose their tax base. They think any house you buy out is more dollars out of their annual budget and it's a difficult education piece to work through that.

HOWARD SCHNABOLK: We've had success in getting elected officials to come on the ground and see projects. I think no matter what their background or their philosophies – even if they don't like the word nature or green – if you can get them to the site to see it, and then speak their language (as in, speak in dollars), they can't say they don't like it. **So, get them on the ground, stand there, and then bring your partners and the community and spell out the dollar figures and the benefits.**

JOANNE THROWE: Don't not apply because you don't have a letter from an elected official to support your proposal. Don't do that; get the local organizations involved. Most elected officials don't say no to money coming in, especially when match is encouraged and not always required.

How are we getting word to underserved communities that funding is available?

Information about available funding is shared through:

- Email blasts to government officials
- Outreach with local community groups (such as the faith-based

community, long-term recovery groups, and volunteer organizations)

- Existing relationships with community leaders
- Big organizations (like The Nature Conservancy) who work in those communities
- Groups like Anthropocene Alliance and the Navigators

ERIC FOSMIRE: If you can get one leader out of the local community, even a neighborhood leader, it goes a long way. It's not about surging into the community but being present and being able to identify who in there might have a voice that would help you with the issue that you're dealing with.

HOWARD SCHNABOLK: We have to rely on partners to delve deeper into the community. They're waiting for funding opportunities and can reach out locally when funding becomes available. **It's hard for the federal government to find that small rural community that doesn't have a voice.**

Are there any sort of funding opportunities to support jobs that can grow young people's experience and allows them to stay in their community?

ERIC FOSMIRE: Not way off topic, SCOR intends to pursue a planning grant that, if successful, would allow us to hire young folks locally to work within the watershed on those kinds of issues. So that's kind of unique, but it fits exactly what you're saying. But other than just

having interns on board, we don't have that program yet.

EMILY BENTLEY: Under the mitigation programs we manage, we don't see a lot of that, but you could. You could have a project that involved interns or young professionals and that would be their work: to execute the project, learn about the needs of underserved communities and how to help them, and to provide the technical assistance for these kinds of projects. So, it's certainly possible, but we don't tend to see that used much.

JOANNE THROWE: Start thinking about what you are trying to do and work it in proposals as cultural assets. Funders are starting to think about the importance of having that knowledge come back in. We're working closely with tribes across the country and we're trying to change the way funders think about cultural aspects and giving back to generations.

Everyone is looking for resources. Why don't we have a database of resources to make it easier for people to find?

HOWARD SCHNABOLK: My quick reaction to your question is I feel we need human connection. Find that person; the data is out there, you don't need to collect it again, you just need to find the person.

EMILY BENTLEY: I think all organizations probably have resources on their websites, but I think that's one thing we could look at. We plan to update our mitigation resources to link

to some resources for nature-based solutions, partnership building, and capacity building. **When we each share the resources that we're aware of, we can then link to each other's resource databases, ideas, and case studies.** In that way we can do a better job of sharing the information across all these organizations.

ERIC FOSMIRE: For the resilience plan, one of the criteria that the legislature charged us with is identifying the data gaps relative to flooding and relative to resilience. One of the first steps was to collect the data and ask the data sources (especially the state agencies), "What is the data that you hold and that you rely on in deploying your mission?" And it was difficult because many state agencies want to hold onto their data since it becomes their mission and their power and their funding source. But it's just an identification of the data. But that communication piece about the data – it's about the human connection too; identifying where it is and at least having a sole resource.

HOWARD SCHNABOLK: This kind of ties back to our earlier question on a good proposal. **I think you find the funding source, then you find the agency, and then you find somebody there who can offer technical assistance on the ground.** I bet you can find them, and that person would want to help. Call the person; take them out to the site; scratch heads with them on how to do it. You'd be surprised how many people don't take advantage.

JOHNNY MOJICA: These agencies want to give the money out. They're not trying to hold on to it or eliminate you at

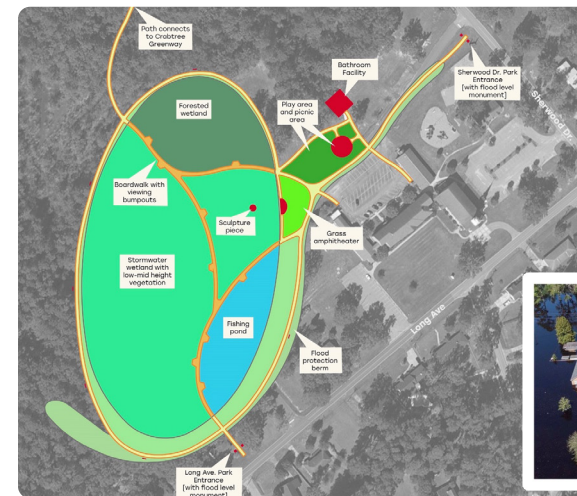
any point that they can. They do want to get the money on the ground.

Through your programs, do you have a successful NBS project in South Carolina?

EMILY BENTLEY: We have a really great one that FEMA has selected for further review under the 2021 BRIC Program, so it doesn't have money on the ground yet, but it has been selected for further review. It is a two-pieced project in Conway doing floodplain restoration. We'll create a 7- or 8-acre park with a wetland to increase flood storage capacity with a community park and greenspace. So that's one. I think two, we've always done a good number of residential acquisitions. While those are not the exotic and complex nature-based solutions, they are nature-based in the sense that those properties will never flood that way again and it creates green space that can't be built upon ever again.

ERIC FOSMIRE: The greenest thing we are doing right now are the buyouts following what Emily said. We have \$35 million in buyouts in our mitigation program and we'll probably do about \$2 million in buyouts in our Hurricane Florence housing recovery program.

HOWARD SCHNABOLK: We've done a lot of little projects all over. One that pops into mind that I think is easily accessible if folks want to see it is at **Plymouth Park** at the end of Plymouth Road and Riverland Terrace in Charleston. The city accessed money through NOAA with help from DNR and DHEC, and quickly put together a solution to an eroding shoreline there. The park at the end of the road was wasting away; these beautiful grand oaks were on the verge of falling into the river. Conventional wisdom says to put in a bulkhead, but we put an offshore sill there and created habitat behind it by putting in plants and oysters. The plants grew right back to the rock.



CHESTNUT BAY (CONWAY, SC) BRIC PROPOSED PROJECT





CHESTNUT BAY MITIGATION PROJECT RENDERING (CONWAY, SC)

In collaboration with The Nature Conservancy of South Carolina (TNC) and the City of Conway, Robinson Design Engineers (RDE) designed several flood mitigation projects located in a Conway neighborhood that has been repeatedly affected by **catastrophic riverine and stormwater flash flooding**. Many properties in this neighborhood were acquired by the City of Conway via **voluntary buyouts** facilitated by FEMA's **Hazard Mitigation Grant Program** (HMGP) and were identified by TNC and the City as prime locations to implement nature-based flood mitigation projects. RDE developed "shovel-ready" flood mitigation projects that can be implemented in the near-term, including a constructed wetland with pedestrian boardwalks that will make the restoration accessible to the public. RDE conducted community engagement sessions, performed design and engineering services, completed a master plan for the watershed, and has helped facilitate the process of applying for grants to fund the designed projects. This project has been selected for further review under the 2021 FEMA BRIC Program. The above image is a rendering envisioning what the wetland boardwalk may look like. (Image produced by Lucy Rummler, MLA)

Panel Discussion #2

INTERNAL FUNDING PANELISTS

Discussion moderated by Dale Morris, Chief Resilience Officer for the City of Charleston



Mark Belton, County Administrator for Charles County, MD



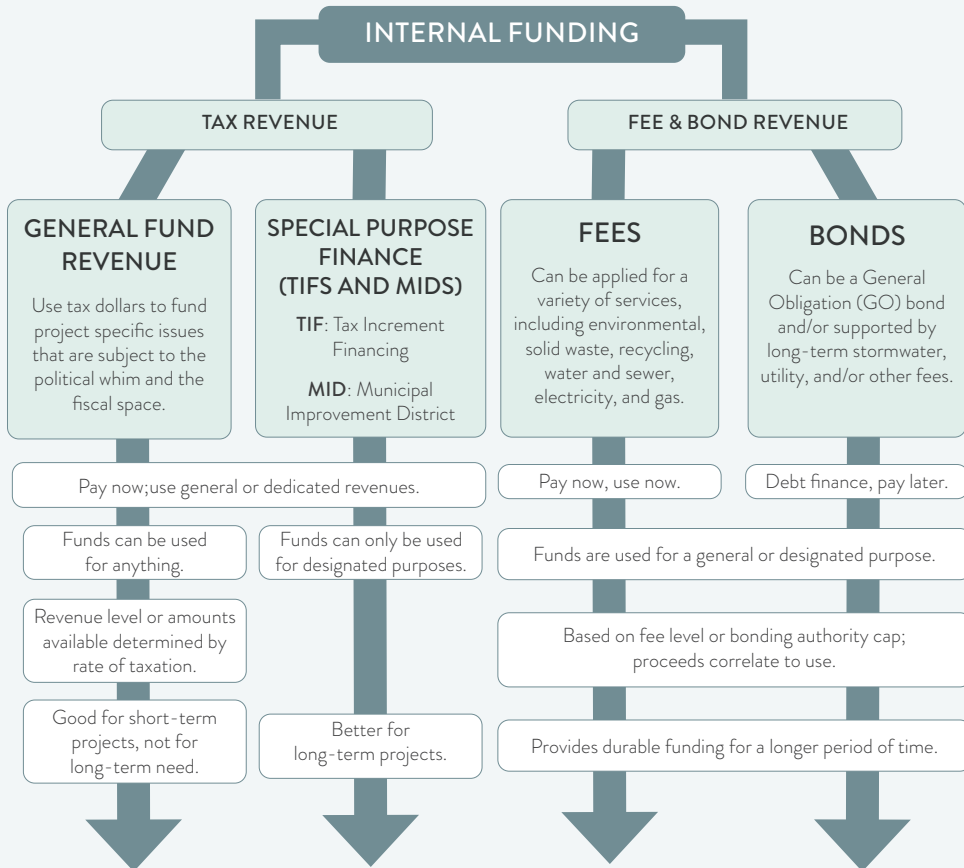
Tom Murray, Raleigh Stormwater Program Manager for WK Dickson & Co., Inc.



Keith Reading, Executive Vice President for Raftelis



Kate Schaefer, Director of Land Protection at the Open Land Trust



Introduce yourself and then talk about your experience and expertise with localities: **How are you funding nature-based solutions? What are the success stories?**

KEITH READING: The major sources of internal funding are going to be general fund dollars from ad valorem tax revenue or fee revenues from some kind of fee. With fee versus tax revenue there are significant implications for who the payer is.

EXAMPLES

TAX REVENUE

If water and sewer were funded with taxes, people who own big fancy things might pay a lot for water and sewer and it may not have to do with how much water they drink or how much sewage they generate.

FEE REVENUE

If water and sewer were funded with a bond, how much someone pays might have to do with how much water they use.

MARK BELTON: Charles County has undertaken an organizational innovation called a Resilience Authority. **It is a nonprofit organization that our board of county commissioners created called the Resilience Authority of Charles County.** The Resilience Authority provides some capabilities that the county government does not have by itself.



Charles County is in southern Maryland. It is a jurisdiction of about 175,000 people and acts as a suburb of Washington, D.C., with many residents traveling to work in the nation's capital.

For instance:

- It has its own bonding authority (i.e., it can borrow money for a resilience project that does not count against the county's debt ceiling)
- It can apply for foundation grants that county governments are ineligible for
- It has its own procurement rules
- Its board of directors can be populated with experts to offer capacity and knowledge

TOM MURRAY: One of the areas that we see funding community infrastructure is the **stormwater utility**. We've seen that grow particularly for MS4 communities where it has become almost commonplace to have a stormwater utility. But we're even seeing non-MS4 communities start to evaluate whether a stormwater utility meets their needs. Within those utilities, one way to get projects funded is by leveraging those fees to tap into some of the external funding opportunities we talked about in the first session. **Low-interest SRF loans have become very popular for many projects that have nature-based solutions and green infrastructure.** Sometimes these nature-based solutions get siloed within a stormwater utility when they should be expanded to the community as a whole.

When we talk about implementing nature-based solutions through other departments, this means **thinking about all infrastructure projects within your community**, not just thinking about stormwater management. An example would be a downtown redevelopment street-scaping project; those can generate a lot of interest within the community and are seen as economic drivers.

So, the question becomes how can we incorporate green infrastructure and nature-based solutions into those areas? We can see an example in the City of Myrtle Beach where they are currently working on redeveloping their arts and innovation district. Specifically, they are looking at significant pervious parking as part of that district and at green infrastructure retrofits within the streets. To build green infrastructure throughout your community, you should **work with water and sewer utilities more closely**. If you walk along a stream, you're probably going to see a sanitary sewer line. When you start to see erosion close to a sanitary sewer line the old approach was to throw in some rip rap to protect it. By working with other departments, we can now look at nature-based stream stabilization projects to redirect flows off the banks.

A **municipal separate storm sewer system (MS4)** is a publicly owned conveyance or system of conveyances (such as streets, ditches, curbs, gutters, storm drains, etc.) that are used for collecting or conveying stormwater that discharges to surface waters of the State.

KATE SCHAEFER: In Beaufort County we have the enviable position of having county funds available for land protection. **Our county has approved local funding via a property tax bond since 2002.** There have been five bond measures that have gone before Beaufort County voters to raise our property taxes for land protection and that can be for simple acquisition, for passive parks, or for conservation easements, which have a lot of benefits in terms of protecting the larger landscape.

Additionally, we just approved **\$100 million in sales tax revenue** to be collected over two years for land protection. This is a great opportunity and a gift from the voters to have funding for land protection, but voter trust is a fragile thing and spending this money well is now our burden and opportunity.

Our collective hope locally in Beaufort is that our local funding can be innovative, creative, and flexible. We want it to help support local match for state and federal funds and to address community needs. I think we'll start to see land protection as a resilience tool and a sustainability tool because land protection is an opportunity in our unbuilt environment to compliment nature-based solutions.

A lot of us understand what land conservation is. For a stormwater utility, their work is a much harder sell. And bringing in nature-based solutions with stormwater work is hard. Is it possible?

Talk about this challenge with stormwater infrastructure and going "green".

KEITH READLING: One of the things about a stormwater fee is it's harder to explain to the public than a fee for electricity or gas or water or sewer or solid waste. So, **education and outreach are key.** The other thing is, there's a cost to implement and maintain a new fee for anything. A common rate structure for stormwater fees is impervious area, but it costs money to determine how much impervious area everybody has.

In terms of nature-based solutions, one place to start is **multi-use, multi-function, multi-outcome.** If you think about land conservation in the past, there was a bond referendum for sales tax or general obligation (GO) bonds, which means you had to get a vote of the people. If you have revenue bonds, you don't have to have a vote, you can just decide to sell them. You go to the marketplace to sell them and you raise rates to cover the revenue requirement.

MARK BELTON: **Tying the innovation and the idea to a real problem that the elected officials have is a way to get over the initial reticence.**

TOM MURRAY: **One of the challenges that we've seen is the issue between public and private ownership.** A lot of stormwater utilities only operate in the public system. And so, your ability to find nature-based solutions is limited to within the right of way. The City of Raleigh, NC, completed a study on green infrastructure, and they ended up reevaluating their entire development

standards to promote more green infrastructure within the right of way.

KATE SCHAEFER: I think regardless of whether you're talking about land conservation or stormwater infrastructure or a more creative approach, **it comes down to communication and being able to tell a story and refer to a pilot project when you're talking about appealing to a voter or an elected official.**

Scale is easy when you're talking about big spaces. But it's harder when you talk about smaller projects and sites. Many solutions work when they have boundaries around them. The bigger the floodplain/project boundary, the more stackable the benefits become. How do we manage scale versus impact performance?

TOM MURRAY: A lot of what we're trying to do at the green infrastructure level is to intercept water where it falls to the extent possible. But when you do that, you are looking at a smaller scale – at private property impacts – and how to mitigate runoff at that level and how to maintain those sources. **Communities who are trying to address some type of impairment may have programs for private property owners to install green infrastructure** (such as a rain garden, rain spout disconnect, or rain barrel) **at the individual lot level.** An example of this is the City of Durham, NC, who has implemented a rain catcher program to install rain spout disconnects at a very small, localized level.

MARK BELTON: Maryland has a great land preservation program called Program Open Space that has resulted in parcels of preserved land in every county. When stormwater issues arise in neighborhoods that are adjacent to public-owned land, the opportunity arises for the two to work together to solve the problem. **Merging public and private interests makes it easier for small-scale projects to be accomplished.** Another option when faced with a small-scale project is to **change your perspective.** Maybe you don't have the data to show the quantitative benefit of a certain project by itself, but if you can connect the problem to a large-scale project or goal – such as accomplishing a certain percentage of restoration along a particular tributary – then that becomes a reason to do the project.

KEITH READLING: When you think about how to finance these activities, one of the advantages of fee funding is that you can design the right structure to encourage the thing that you want. You can also establish credit and incentive programs that go with the fee that encourage certain types of redevelopment (such as small green infrastructure projects).

Is there a state law in Maryland that allows that law to be developed?

MARK BELTON: Counties have certain authorities of things they can do and things they can't do. In 2020, with the help of Throwe Environmental, the state of Maryland passed Senate Bill 457 giving counties the ability to establish and fund a Resilience Authority.

Some local governments incentivize green infrastructure on private property. How is that incentivized?

TOM MURRAY: Usually most of the incentivizing are for non-residential owners. Most of it is more of a **cost-share program**, with the county or the city going out to the public and encouraging these types of activities. For instance, they may have rain barrels for a very low cost, or they may work with residents to install rain gardens and will bear some of that cost. But usually there is some cost on the individual private resident.

Does anyone have experience using climate change forecasts to quantify the cost benefits over time?

KATE SCHAEFER: The Nature Conservancy's Resilient Coastal Sites Analysis map layer is actually embedded into our land protection priority map at the county and regional levels. We use that to see what areas have been identified as marsh migration corridors, which helps provides data for us to advocate for conservation funds to be spent in that space.

MARK BELTON: I have an example of something that is on its way to working. A group of students conducted a stormwater management study in Waldorf, Maryland, a community where runoff is a real problem due to the high number of impervious surfaces. After studying data from the Maryland

Department of Natural Resources and the University of Maryland's Center of Environmental Science, the students concluded that we are not planning well enough for the speed and volume of water that we can expect to see in the future. As a result, we are now talking about changing the stormwater requirements for that community.

Are you pushing your engineering capacity to be more forward-looking?

TOM MURRAY: It depends on the individual community and what their goals and resources are. Most watershed planning will look at future built-out conditions, and the communities we work with typically take a fairly conservative approach toward evaluating from a future conditions' standpoint. I think from the climate resiliency standpoint, what we are seeing more frequently is looking at a higher level of service. This means that if the community currently requires a 10-year level of service, they are looking at what the additional costs would be and are designing for a 25- or 50-year level of service.

KEITH READLING: If you get down to the bottom of it, most everywhere we work seeks to slow the rate of degradation rather than make things better. My advisor at NC State said that when you're getting wet, there are three things you can do:

- 1) move the water away from you;
- 2) learn to live with it; and
- 3) move away from the water.

The first two options don't work. **What we really need to do is get out of the way and that's hard because a lot of stuff is already built.**

MARK BELTON: The developers aren't going to build anything that costs them extra money if it isn't required, right? With that mentality, eventually you get to the point where the new standard is what it needs to be. Maryland designated the Center for Environmental Science at the University of Maryland as the state expert in climate change and the entity responsible for projecting climate change impacts around the state. When they share data and guidance, then local jurisdictions have a hat to hang on changing the actual requirements for stormwater systems.

Could you talk more about the SRF and the opportunities to enhance nature-based solutions through some of the changes happening with the EIL and the IRA, including the rating agencies?

TOM MURRAY: We have several projects with nature-based solutions and green infrastructure that have been funded through SRF, both in North Carolina and South Carolina. **It's a great tool to get a low-interest loan and leverage your resources over a longer period of time.** The City of Myrtle Beach has a wetland restoration project that they are currently finishing design and permitting; we'll start construction early next year. They received a SRF loan that is really low, especially in today's standards.

MARK BELTON: In Charles County we're very fortunate to enjoy a AAA bond rating from Fitch, Moody's, and Standard and Poor. For several years now, Standard and Poor have pointed out our climate preparedness as reason for justifying renewing our AAA bond rate. They've pointed out our partnerships with the University of Maryland and others; our ability and our efforts to make a climate smart workforce by putting climate competency in certain job descriptions; by getting people credentialed through the Climate Leadership Academy; and by being innovative to create a Resilience Authority. **Getting a AAA bond rating is a real tangible benefit for local jurisdictions because you're going to get a lower interest rate, saving your citizens money when you want to do nature-based projects.**



Photo: Plymouth Park Living Shoreline project, City of Charleston, SC.

Workshop Takeaways

- Given that nature-based solutions tend to have more-equitable outcomes than grey infrastructure, they are the perfect fit to receive FEMA funding.
- Most FEMA applications **require a benefit-cost analysis (BCA)**, a method of estimating and comparing the future benefits of a project with its costs. To be eligible for FEMA funding, projects must demonstrate a positive benefit-to-cost ratio (i.e., above 1.0). If you can value an ecosystem good or service, you can include it in the BCA.
- Completing the BCA can be difficult for nature-based projects because of the **challenge of quantifying the benefits of nature-based solutions**, i.e., demonstrating the relationship between an on-site mitigation action and off-site project benefits. Fortunately, FEMA has been working towards removing barriers to implementing nature-based solutions through its ecosystem service policy, which assigns monetary value to ecosystem services.
- A **successful application** to fund nature-based solutions will:
 - Follow directions
 - Answer all the questions thoroughly, thoughtfully, and clearly
 - Be specific and detailed
 - Include partnerships
 - Consider community impacts
- **Stakeholder engagement** at every step of the process is just as important as the science and data behind the project's design.
- Do not be afraid to ask for help. If you do not know the answer to something, pick up the phone and ask an expert. There are a lot of people out there who would be willing to help you and provide the information you're looking for.
- Educating elected officials about nature-based solutions is vital for them to understand the financial value and impact of these projects. But you can **and should still apply for funding even if you are missing a letter from an elected official**, especially if other locals are involved and supportive of the project.
- The distribution of available funding will likely be suboptimal due to a lack of capacity in the communities who need it. Therefore, it is important for communities to use internal funds (i.e., fees and taxes) in creative, innovative, and flexible ways to support nature-based projects.
- Partnering with a nonprofit organization, such as Charles County, Maryland's Resilience Authority, can be extremely beneficial; these nonprofit allies can help counties by
 - Applying for grants that counties cannot;
 - Bringing in expert opinion through board appointments;
 - Freeing up funds (since spending does not count towards the county's debt ceiling).
- Communication is key for internal funds to be successfully leveraged for nature-based projects. Use charismatic examples as the foundation of education and outreach efforts; people must get hooked and remain excited for long-term and widespread buy-in to occur.



Thank you to our attendees...

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