



WORKSHOP 3 PROCEEDINGS // SEPT 14TH, 2022  
**THE NATURE-BASED EXCHANGE**

# Planning for Natural & Nature-based Solutions

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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**Contributors:** The successful execution of each workshop was due to our amazing contributors, including our speakers, panelists, and facilitators as well as those who worked behind the scenes to help us with planning and logistics, funding, and agenda-shaping.

**Riverbanks Zoo and Garden**  
*Host venue*

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**Black & Veatch**  
*Planning and facilitation*

**Robinson Design Engineers**  
*Nature-Based Exchange compendium*

## 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 3: Planning for Natural and Nature-based Solutions

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

- **Plenary Presentation: Design with Nature**  
Erin Stevens, RLA, LEED AP, Surculus  
Andy Sternad, AIA, AICP, Waggoner & Ball
- **Panel Discussion on Planning for NNBS**
- **Breakout Groups**  
Comprehensive Plans, Hazard Mitigation Plans, and Stormwater Plans
- **Optional Site Visit to Smith Branch Creek**  
Stream daylighting project in Columbia, SC BullStreet District

The third Nature-Based Exchange workshop focused on planning. Organized as a three-part approach that covered the **why, how, and what** of planning, the half-day workshop provided time for both education and brainstorming. By learning how the planning process works and what challenges and opportunities exist for integrating nature-based solutions into existing plans, participants were well-equipped to identify actionable steps to further this work.

Through this workshop, we were reminded that implementing nature-based solutions is a team effort that spans across many disciplines, requires support and partnership from people across public and private sectors, and relies upon collaboration and education to see long-lasting results. By having the foresight to insert nature-based solutions into our plans now, we can ensure these approaches are considered (and ideally implemented) in the future.

## Speaker Bios

### Erin F. Stevens, PLA, LEED AP



In her professional career, Erin has worked on a variety of planning and design projects including a federally-funded transit study for the Charleston region, the redevelopment of an environmentally sensitive low-impact residential neighborhood within a highly contaminated watershed, and development guidelines and public space design for multiple mixed-use and infill developments in the Charleston region. In 2016, Erin founded **Surculus**, a Charleston-based landscape architecture and urban design firm **focused on increasing resilience and effectively integrating ecologically sensitive systems into urbanized and other human-affected contexts**. In addition to her practice, she currently teaches a design studio within Clemson University's Master of Resilient Urban Design Program.

### Andy Sternad, AIA, AICP



Andy is an **architect and urban designer** and a **leader of Waggonner & Ball's environments practice**. He focuses on developing urban- and building-scale solutions that accentuate the character of place and integrate issues of climate, nature, economy, and people. Based in New Orleans, he has been an integral part of the firm's trademarked Dutch Dialogues and Living with Water efforts in cities across the U.S., including Charleston. He serves as project manager for Waggonner & Ball's leading role on the Charleston Water Plan team.

## Plenary Presentation: Design With Nature

Nature can play a role in protecting future planning efforts if we take the time upfront to design and implement nature-based systems. To accomplish this, it is imperative that the design approach starts with nature at its base, considering soil, water, and biodiversity before anything else. Landscape architectural firms **Waggonner & Ball** and **Surculus** have put this kind of thinking into practice in a variety of projects, including in the flood-impacted cities of **New Orleans** and **Charleston**. The outcomes of these projects have taught and reinforced valuable lessons, including the need to work across scales, the value of putting nature at the heart of a community, and the benefit of working in coordination with civil infrastructure.

Problems in our existing plans and methodologies have also been unveiled through this work, including the ease with which soft materials, such as landscaping, get cut from projects despite their immense contribution to the project's ultimate success. **Nature-based projects force us to change our perspective on long-held ideas around things like our definition of success, the presence of plants and water, and the role of infrastructure**. While challenging, steps are being taken to pursue this new model of thinking, as demonstrated by the City of Charleston's recent Land and Water Analysis (a part of Charleston's City Plan), which has been used to inform nature-based projects in the city. By considering nature first in our design, we can create systems that work in concert with the surrounding land, water, and vegetation to improve long-term resilience.

# Landscape Typologies



**COASTAL EDGE COMMUNITY**

Coastal Edge Community can tolerate salt air and occasional inundation from major storms; most durable for locations identified for likely marsh migration



**LOWLAND FLOODPLAIN**

Lowland Floodplain can tolerate periodic freshwater and / or brackish inundation; plants selected for tolerance of poorly drained soils due to soil composition or high water table (Hydrologic Groups C-D).



**UPLAND RIDGES**

Upland Ridges can tolerate periodic freshwater inundation if well-draining soils are present (Hydrologic Groups A-B)



**URBAN/SUBURBAN REFORESTATION**

Urban / Suburban Reforestation requires native species tolerant of poor nutrient soil, root restriction, and other urban / suburban conditions

As part of Surculus' work on the **City of Charleston Land & Water Analysis**, they developed a series of Landscape Typologies relevant to the specific geographic, soil, hydrologic, and saline conditions throughout the City. These typologies provide guidance for designers and developers on appropriate landscape interventions and introduced plant communities throughout the region.

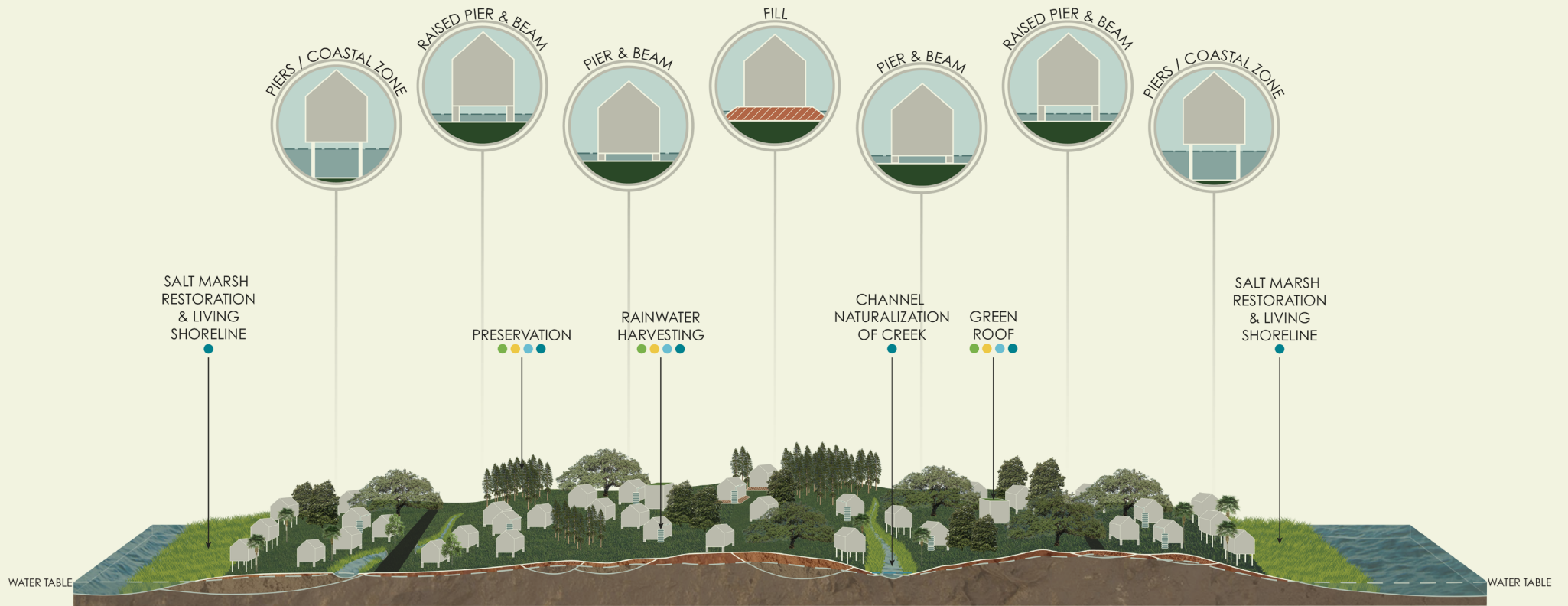
Graphics above are credited to Surculus.

# Case Study

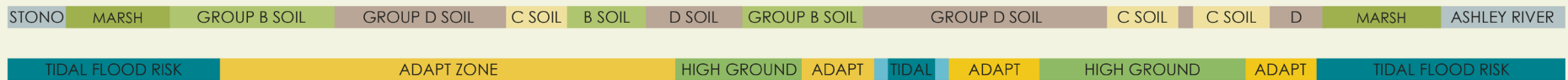


The **Bridgepointe Ecological Park**, which replaces 32 townhomes which were demolished after being repetitively flooded, design creates a series of wetland meadows to allow water to flow across and pool within the site. Native plant communities will be introduced to stabilize the soils and provide habitat for wildlife.

Graphics above are credited to Biohabitats and Surculus.



OUTER WEST ASHLEY TRANSECT



One deliverable of the **Land & Water Analysis** was a series of transects of the regions of the City of Charleston illustrating appropriate architectural, landscape, and water management measures. Surculus mapped the conditions specific to Outer West Ashley and identified which measures are most appropriate across the landscape.

Graphic is credited to Surculus.

# Panel Discussion

## Panelists



**Gregory Tucker**, Special Projects Administrator for the City of Columbia, S.C.



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



**Rob Merchant**, Planning and Zoning Director for Beaufort County



**Ken Dierks**, Senior Consultant for Fernleaf



**Hope Warren**, AICP State Planner for the S.C. Office of Resilience



## How do projects from your plans typically get funded and implemented?

**GREGORY TUCKER:** Often times, nature-based solutions have to find their way through the cracks to get into projects. I hate to describe it that way. The construction industry itself has been a very slow industry to adapt. The industry does not like change. **NBS projects are coming through owners, municipalities, and private developers who decide those designs are a cost-effective and environmentally conscious way to do development projects.**

**EMILY BENTLEY:** These federal grant funds are 75% federal share and 25% local match (meaning a local government

or state agency must come up with 25% of the funds). However, you can imagine smaller communities in South Carolina coming up with and being able to commit to a 25% match for a couple million-dollar project can be a significant hurdle. Our friends at the Office of Resilience often can help with a CDBG funded match for that 25% for certain counties.

Implementation can take years for mitigation projects. For some of our smaller communities, it's a challenge to understand where to start and then how to sustain that kind of long-term project. **Building Resilient Infrastructure**

and Communities is a great opportunity for large-scale projects. **We have set aside \$2 million in South Carolina that can be used for planning and project scoping.** The national competition has \$2.3 billion dollars available for state agencies, local governments, nonprofits, and individuals, which we hope to get for some more large-scale projects. It is a great opportunity for multi-jurisdictional projects, regional projects, and partnerships. **When there's better money on the table, we need to go get it before we have a disaster.**

**ROBERT MERCHANT:** **Comprehensive plans are infamous for being put on the shelf and ignored.** One of the things that we did with our latest update was to **very clearly identify actionable items that require specific steps.** When you look at the chapters of our comprehensive plan, there are objectives and policy statements that are important because they become a statement of value. They give our council a road map for how to make decisions.

We have a section of our plan called the Action Playbook which prioritizes each of the projects to short, medium, and long term, the level of difficulty, the level of funding necessary to make it happen, and by agencies or departments that are key to implementation.

**KEN DIERKS:** The good news is that there's a lot of money in the industry right now for the first time. Emily mentioned the CDBG Building Block Grant, but there are also other programs, some of which are at the state level, others are local or regional. United States

Department of Transportation has a huge program called the **Protect Program** that's got \$8.7 billion. It's not generally available to localities but localities can influence through their DOTs process to get projects funded in their locality of the region. EPA also has a series of water programs available for local grants, principally for water treatment and water quality projects. The Department of Defense is partnering with localities that have a military installation to do things like nature-based restoration projects.

We've seen in the last couple of years the emergence of state funded programs to assist localities undertaking Climate Risk and Vulnerability studies. But, **those studies are only as good as the ability to implement them.** We must be able to match the projects that are identified in those plans with the ability to fund them. One of the things that we generally look at when we work with localities is to try and match the project with the available funding sources to increase the likelihood that it's going to be externally funded through a grant program.

**HOPE WARREN:** Several funding opportunities currently going on at our office have been the **Infrastructure Bill** and **Inflation Reduction Act.** We are starting to see the community come to us with a resilience element request, but the problem is that the places that need these things most don't have plans in place to apply for funding. I'll add that even though our plan is not yet complete, we are starting to implement some of the things we found in our risk assessments at the local level.

## Are nature-based solutions a primary strategy in the plan that you work on? If not, what are the historical challenges to implementing them?

**GREGORY TUCKER:** My answer is yes and no. NBS projects are primarily in there because we have smart people with the city that sort of sneak them in. A lot of that has been implemented through back channels. A comprehensive plan is a major undertaking for the city of Columbia and there's absolutely no way to let everyone know how all decisions were made throughout the process.

**The public sector wants to see a solution to the project problem immediately.** So, some of this is taking leaps of faith with the public to understand that **NBS might not solve all the problems, but it is working towards the solution for all the problems.**

**EMILY BENTLEY:** The 2018 plan is the one that's currently in place and it doesn't really address nature-based solutions in any way that uses that phrase. The update we're working on now will address nature-based solutions in how we look at hazards as well as mitigation strategy. We're also addressing climate change much more comprehensively in this update. One challenge is getting the community to understand NBS – how it works and how long it takes to see an effect. **Education for managers and elected officials is needed; the goal is to provide them with guidance and examples of success.**

Additionally, we want to offer a

consortium approach at the state level for small communities to provide some technical assistance from higher education, private sector firms that do this kind of work, and state agency partners. How do we help them get to the point of mapping out what the project is going to look like? That is just one of the some of the key challenges we've identified and some approaches we want to take to address it.

**ROBERT MERCHANT:** I can't say that nature-based solutions are the primary focus or strategy, but I think one thing that's unique for Beaufort County is that we kind of woke up about 25 years ago when the islands had to close the shellfish beds. There was this realization that development was having a serious impact on the health of our waterways around the same time that we were developing our first comprehensive plan. I don't think that they were called nature-based solutions back then, but a lot of things were put into place because of trying to get ahead of a problem we didn't realize existed until that shellfish bed was closed.

I think it's just being able to take a very good look at all the tools in the toolbox. **What we've often observed is that nature-based solutions will rise to being the best tools, but they may not work in all cases.**

**KEN DIERKS:** Historically, there's been a lack of familiarity with nature-based planning approaches that work for both public works and utilities. Directors have traditionally not reached for nature-based solutions as the first option for dealing with any kind of transportation

or flood problem. Furthermore, there has also been a lack of good contractors and design engineers (although this is changing thanks to companies like Biohabitats). Another impediment is the federal benefit cost analysis (BCA) process does not accommodate the quantification of benefits associated with nature-based solutions. We are beginning to see federal agencies like FEMA relax their BCA standards so that they can integrate quantifiable attribute and benefits associated with nature-based solutions into the process and thereby make grant applications more competitive and drive those grant applications towards nature-based solutions.

**So, there are a number of historical impediments. But I think if you look across those impediments, you'll see that each one of those are now beginning to break down and there's an acceptance and push from localities, regional governments, and state governments to use nature-based solutions.**

**HOPE WARREN:** The good thing about our plan is that our legislation does specifically point out that recommendations should prioritize nature-based solutions. That's an item that we're going to bring out with all our sub-committees that are working on recommendations. **In terms of education, what our office has found in general is that areas in the Pee Dee region are generally familiar with nature-based solutions on the coast, but I think that's going to be more of a challenge in the upstate regions.**

## Where do you see the opportunities for integrating NNBS into the plans? What information and/or partnerships would be helpful?

**GREGORY TUCKER:** I really see the **greatest opportunities in the private sector.** As I mentioned, the city goes through its own process of updating comprehensive plans, stormwater plans, and things like that. A lot of people know that we don't have those capabilities in-house to totally to do these plans. So, we are reaching out to the private sector in many situations and we're taking advice from the private sector.

Joshua Robinson (of Robinson Design Engineers) helped us at Bull Street where we were daylighting a stream of Smith Branch. For those not familiar, there are areas in Columbia downstream of Smith Branch that face flooding issues. The work that Joshua did lessened flooding downstream and is helping people understand how things are connected, with one element affecting another one.

**EMILY BENTLEY:** In terms of the plans themselves and partnerships, I think these kind of networking opportunities are across the board. The local planning officials must be at the table, and we must do this long-term "bringing people along" effort. I think having common talking points is always helpful, but **you also need to work with the different communities and constituencies by identifying people who might be advocates for nature-based solutions and helping them integrate**



## Panel Discussion Summary

**NBS into what they're doing at whatever level they are**, whether it's private sector, local government, or state agencies.

**ROBERT MERCHANT:** As far as opportunities for integrating more nature-based solutions, that becomes **more communication with elected officials**. One of the advantages we have is that we've been working with South Carolina Sea Grant on different kinds of assessments of Beaufort County and looking at different necessary policies to be more resilient.

As far as partnerships are concerned, the number one need for the county is interagency. We can have really sophisticated stormwater standards for private developments, but if our public works department or engineering department are rolling their eyes and not following the county's stormwater requirements and other planning, then it just falls apart. The relationship between different jurisdictions is also important since stormwater doesn't stop at jurisdictional boundaries.

**KEN DIERKS:** I would emphasize again that working with South Carolina DOT and other state agencies for things like transportation projects, university and education projects, and correctional facility projects. **Anytime there is a major land acquisition in the capital budget, we can get involved and find out if there are opportunities to integrate nature-based solutions.**

A couple of other opportunities for partnerships would be with the organizations like The Nature Conservancy, who have design and

program expertise. Working with these groups will give localities and regional governments the benefit of their experience and will move the project a little bit faster. And finally, community organizations. Understanding who those organizations are, contacting them, finding out what they're interested in, and getting them involved in local projects (particularly if they are multiple benefit projects, especially stormwater projects).

**HOPE WARREN:** The good thing about how we're approaching our planning process is that we're organizing our recommendations into four buckets. We anticipate those recommendations will help with data, will anticipate future events that can absorb present storage capacity, and will help with recovery.

As far as partnerships, I know we said earlier there are so many people doing community engagement and **I think the partnerships between those groups doing engagement and those technical experts would be helpful**. There are a lot of groups, hubs, and organizations trying to get together and figure out what different organizations are doing and what they're going after as far as funding. I think that kind of partnership needs to continue after the fact to ensure that we are sharing the data and processes that are used. This will also help us overcome the initiated issue of having the data to back up the benefits.

### How do projects from your plans typically get funded?

- Building Resilient Infrastructure and Communities Program (BRIC)
- Hazard Mitigation Grant Program
- Community Development Block Grants (CDBG)
- US Department of Transportation Protect Program
- Local EPA water programs
- Department of Defense grants
- Infrastructure Bill
- Inflation Reduction Act

### How do projects from your plans typically get implemented?

- NBS projects are often implemented by owners, municipalities, and private developers who see NNBS as the best approach to solving a problem in a cost-effective and environmentally conscious way.
- The journey to implementation will be easier if actionable items with specific steps are identified in the planning process. Organizing and prioritizing projects by length, level of difficulty, needed funding, and partners can lead to more successful implementation.

### Are nature-based solutions a primary strategy in the plan that you work on?

- Nature-based solutions are not the primary strategy in many South Carolina plans. However, the knowledge of their benefits is increasing, leading to their incorporation into plans and projects more each year.

### What are the historical challenges to implementing nature-based solutions?

- The public's desire to see a problem solved immediately.
- Getting the community to understand nature-based solutions – how they work and how long it takes to see an effect.
- Limited community capacity, technical expertise, and funding.
- Historically, there has been a lack of familiarity with nature-based planning approaches and a lack of good contractors and design engineers.
- Benefit-cost-analysis processes have not historically accommodated the quantification of benefits associated with nature-based solutions.

### Where do you see the opportunities for integrating NNBS into the plans? What information and/or partnerships would be helpful?

- Private sector
- Local planning officials
- New and different communities and constituencies
- Elected officials
- Interagency
- Across jurisdictions
- State agencies
- Community organizations
- Engagement groups
- Technical experts

## Breakout Group Discussions & Brainstorming

### STORMWATER PLANS

Facilitated by Kim Jones, Town of Bluffton

### HAZARD MITIGATION PLANS

Facilitated by Kasey Henneman, Black & Veatch

### COMPREHENSIVE PLANS

Facilitated by Hope Warren, SCOR

This workshop sought to create actionable steps that could be used to advance planning for natural and nature-based solutions in South Carolina. Three types of plans were chosen for group brainstorming: stormwater plans, hazard mitigation plans, and comprehensive plans. Each group was assigned a plan to discuss, with attendees self-selecting their group based on their interest and/or expertise. Attendees were provided with a handout that contained resources for integrating nature-based solutions into the three types of selected plans as well as a worksheet to guide group discussion and record notes. The main objective for the breakout group portion of the workshop was for group members to discuss and share ideas of nature-based actions (projects, policies, strategies, etc.) to include in their assigned plan. Each group was facilitated by an expert on that plan.

Each group approached the objective differently, leading to plan-specific action steps. While these steps may require modification and time to be implemented, they are a good first step in getting nature-based solutions incorporated into local South Carolina plans.



Scan to view the Resources Handbook on Integrating NNBS into Hazard Mitigation, Stormwater, and Comprehensive Plans!

### STORMWATER PLANS

Facilitated by Kim Jones, Town of Bluffton

#### Key Themes

- Stormwater planning needs to be done through a more regional approach, with more cohesiveness, communication, and coordination among departments, municipalities, county, state, and regional planners.
- More watershed-based plans and approaches are needed to restore natural systems for the type of future we want.
- Stormwater should be viewed as a resource not an enemy.
- We need to get comfortable with the idea that some places may flood; design engineers, MS4 reviewers, and the public needs to learn and accept this. As planners, we need to educate and control public expectation that flooding is bad.
- Celebrate success.

#### How do we remove silos within stormwater work?

1. Establish a point person or organization that is cross-sectorial. This will improve coordination and communication among groups and will aid in holistic thinking.
2. Use a watershed basin approach to manage stormwater.
3. Share resources and knowledge, including GIS and university data. Rather than wasting and duplicating efforts among academics and consultants, partnering together to share ideas, money, and time will allow decisions to be made faster and with better information. Increased partnership will lead to increased communication and more trust across municipality boundaries.

#### How do we change our approach to stormwater?

1. **Design:** Alter design criteria so that construction is designed to withstand representative storms rather than building to the most extreme worst-case scenario. This will save money and reduce the time and stress associated with design.
2. **Research:** Spend time studying nature and water movement on non-rainy days. We need solutions that will be highly functional during critical moments but that are also beneficial during non-rain events.
3. **Perspective:** Change how we view nature and stormwater. We treat stormwater as a problem, and we do not trust nature to solve the problem for us because doing so would remove our sense of control. We cannot restore nature back to what it was; instead, we must restore the future. Rather than chasing what was, we should plan and design for what we want the future to be. We must get comfortable with the idea of water and, eventually, with the idea of retreat.
4. **Policy:** Mandate regulatory compliance for flood control and water quality. (Water quality benefits may ultimately lead to more nature-based solutions.)
5. **Communication:** Find synergy between government, higher education, and business can aid in improved coordination and communication.

## HAZARD MITIGATION PLANS

*Facilitated by Kasey Henneman, Black & Veatch*

### How does the concept of nature-based solutions get introduced and considered?

1) Start off actions with big picture thinking. Asking broad questions that consider wide spatial and time scales can make way for nature-based solutions to enter the conversation. These solutions can be missed if the goal is to solve one specific problem in one single location in a short time frame. But when broader, widespread problems are acknowledged, the benefits of these solutions are made more apparent.

2) Plans should dictate a suite of options for every project to consider. We tend to jump to certain solutions based on who is sitting at the table. If plans specify a suite of options for consideration, then project teams will be required to talk through every option before reaching a conclusion. Options should be taken to scale, to time, and to the desired audience early in the decision-making process.

a. **Scale:** Tie in examples from other areas of the state to demonstrate the effectiveness and success of nature-based solutions.

b. **Time:** Failing to integrate nature-based solutions early in the discussion will make it difficult to consider after a gray infrastructure approach has been chosen. In addition, defining the time frame for nature-based projects is critical in early stages as many local officials struggle to take a long-term view.

c. **Audience:** Engage the audience early on so they know that every option has been considered. Awareness and education are critical to gain buy-in from the audience. Often, more than one presentation is needed for effective outreach and education.

3) The state can provide a more detailed framework in its Hazard Mitigation Plan to guide and recommend the consideration and implementation of nature-based solutions. While the state cannot require the use of nature-based solutions, it can set the expectation that nature-based solutions are considered, and it can incentivize their implementation.

a. One way to incentivize the inclusion of nature-based solutions is for the state to structure actions in the SC Hazard Mitigation Plan that fit funding criteria specified by FEMA. FEMA currently awards points for actions that support nature-based solutions; by aligning state recommendations with FEMA criteria, not only will municipalities have a better chance of receiving FEMA funding, but they will also be simultaneously supporting nature-based solutions.

4) Promote forward-thinking actions by offering communities incentives to implement nature-based solutions (and other preventative actions) now as opposed to after a disaster is over.

a. This could be done through a Community Rating System.

b. Encourage communication among state, county, and municipality planners to ensure that decisions are not made in a vacuum but are connecting across plans, scales, and funding opportunities.

## COMPREHENSIVE PLANS

*Facilitated by Hope Warren, SCOR*

### Barriers

- There are no laws or regulations in South Carolina that compels counties, municipalities, and the state to work together. Nor is there any pressure for plans to be consistent across boundaries.
- Nature-based solutions perform least well on the day completed and become more productive over time.
- The data on nature-based systems does not align with the data needed for proof of validity.
- Long-term project monitoring can be a hindrance to smaller communities that don't have the bandwidth, capacity, or finances to support grant writers, monitoring agents, etc.

### Actions Needed

- Build performance change into project performance metrics. (Devise and implement new standards for nature-based projects.)
- Require data collection, benefit recording (to the project boundary and beyond), and funding tracking. (This will aid in enhancing funding for future projects and to increase understanding on performance.)
- Devise regulatory driver for long-term monitoring. (Monitoring needs to be required beyond the first year.)
- Require that monitoring information is translated into something communities can use (e.g., economic benefits).
- Increase capacity and budget to support grant writers, monitoring agents, and others to support nature-based projects in some communities.
- Create a resilience version of extension services to overcome silos and link planning efforts together.

### Takeaways

Comprehensive plans need to act as a driver for data collection and long-term monitoring for nature-based projects. This includes developing new standards for performance metrics; requiring data collection beyond construction that examines things like cost, benefits, and performance; understanding capacity limitations and need; analyzing data results and applying outcomes to next steps that the community or other nature-based project teams could use.

## Smith Branch Site Visit

Facilitated by Gregory Tucker, City of Columbia  
Special Projects Administrator and Joshua Robinson,  
Robinson Design Engineers

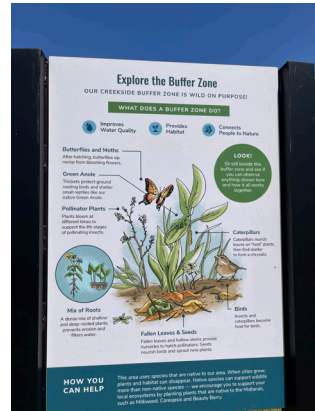


*After the workshop concluded, attendees were invited to participate in a site visit to the nearby Smith Branch.*

Joshua Robinson of Robinson Design Engineers (RDE) with Gregory Tucker (Special Projects Administrator for the City of Columbia) showcased a local stream daylighting and restoration project to workshop attendees. Since 2014, RDE has provided watershed-based planning, geomorphic assessment, hydrologic data collection, hydraulic analyses, regulatory coordination, engineering design, and construction monitoring for this urban creek in Columbia, SC. RDE leveraged existing infrastructure while restoring natural infrastructure to meet the project goals of improving water quality and providing a natural asset in the newly opened city park in the Bull Street District. Of the nearly 3,000 linear feet of stream located at the park, 2,000 had been piped underground since the 1950's. RDE's stream daylighting design restored the stream to the open air and revitalized the floodplain, now a key attraction of the public park. The remaining ~1,000 linear feet of stream were incised and degraded. After obtaining a Nationwide Permit 27 for Aquatic Habitat Restoration, Enhancement, and Establishment Activities, RDE restored this stretch of the creek to maximize habitat potential for the plant and animal life dependent on it.



Photos are credited to Robinson Design Engineers



Photos are credited to Robinson Design Engineers

## Workshop Takeaways

- When designing with nature, the design approach must start with nature at its base. This means paying attention to the soil, water, and biodiversity in the area and building the design around the existing natural elements.
- Designing with nature can require a change in perspective and a break from tradition. We cannot continue solely treating water as a problem; rather, we need to learn to live with, and work with, water.
- Nature-based planning often begins with a sketch which can inspire a generation of infrastructural work.
- Effective nature-based design must:
  - Work in coordination with civil infrastructure
  - Work across scales
  - Incorporate math and science from the beginning
  - Understand the existing landscape and community needs
  - Look beyond engineering solutions and consider non-traditional planning and adaptive solutions.
- Nature-based solutions are currently not a priority explicitly stated in many plans, but that is starting to change.
- Repeated education and outreach are needed for managers, planners, elected officials, and the public to learn, accept, and expect nature-based solutions.
- The historical challenges to implementing nature-based solutions may be widespread but so are the opportunities for partnerships and knowledge-sharing. Improving communication and coordination among departments and municipalities, higher education, and business could overcome many of these challenges.
- Big picture thinking is needed to shift thinking, plan, and implement nature-based solutions. This means we cannot focus only on the here and now, but we also need to consider large spatial scales and long timeframes.
- Plans need to create guidelines, provide options and recommendations, and establish expectations to increase the use of nature-based solutions.



## Thank you to our attendees...

Thank you to everyone who attended the workshop. These individuals contributed their thoughts, energy, and enthusiasm to the exchange and are responsible for the ideas and content produced in this compendium.

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