

**US Army Corps  
of Engineers®**



# Opportunities for Engineering With Nature

**Burton Suedel, Ph.D.**

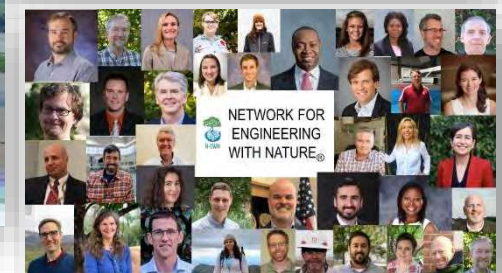
**Lake Red Rock Collaboration and Research Update Meeting  
Lake Red Rock Project Office, Knoxville, IA  
8 February 2023**

# Engineering With Nature.®

*...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaboration.*

## Key Elements:

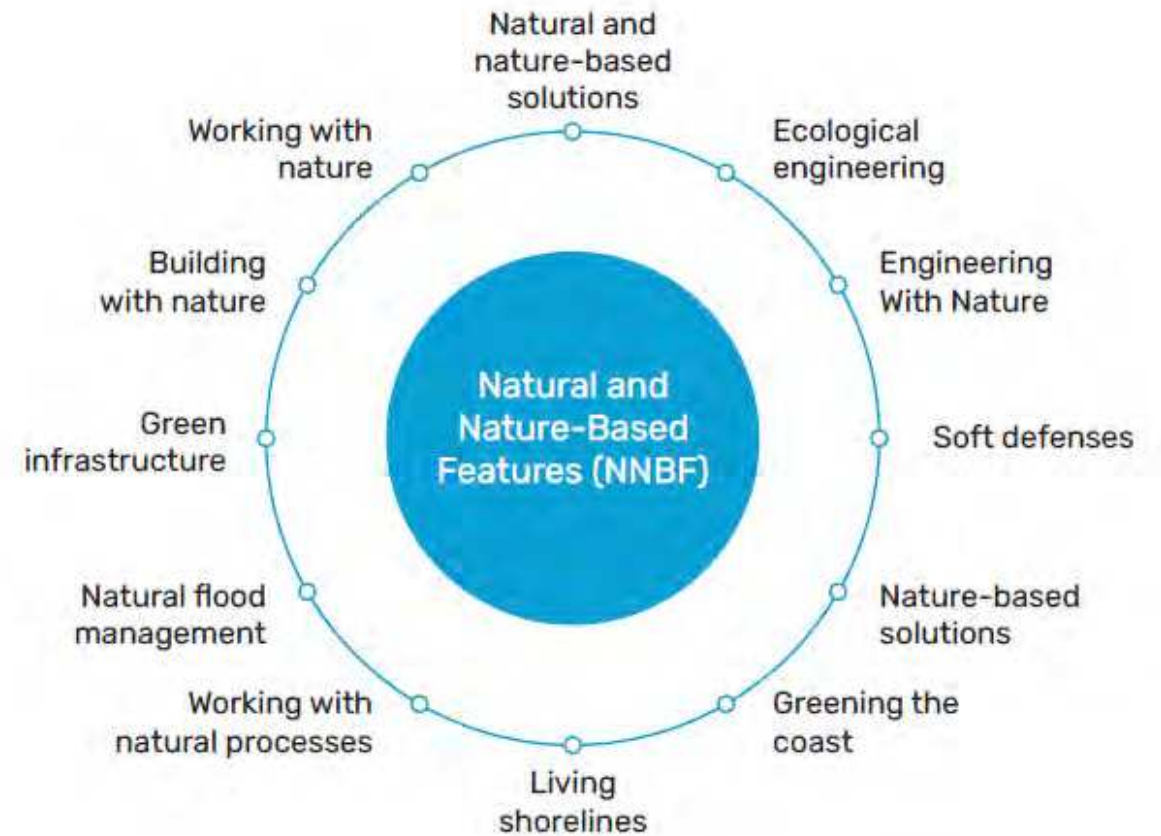
- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Increase and diversify infrastructure value
- Science-based collaboration to organize and focus interests, stakeholders, and partners



**“We absolutely want to do more engineering with nature everywhere we work across the Corps, you have my commitment.”**  
LTG Scott A. Spellmon, 55th Chief of Engineers to the House Committee on Transportation & Infrastructure,  
Water Resources & Environment Subcommittee (24 June 2021)

# Natural and Nature-Based Features (NNBF)

- Flood Risk Management refers to actions taken to reduce future damage to people and property caused by flooding and erosion in coastal and fluvial systems.
- NNBF refers to the use of landscape features to produce flood risk management benefits and other economic, environmental, and social benefits (known as co-benefits).
  - E.g., beaches, dunes, wetlands, reefs, islands, other







# EWN<sup>®</sup> ACROSS USACE MISSION SPACE



## Water Operations

- Shoreline stabilization using native plants
- Environmental flows and connectivity

## Navigation

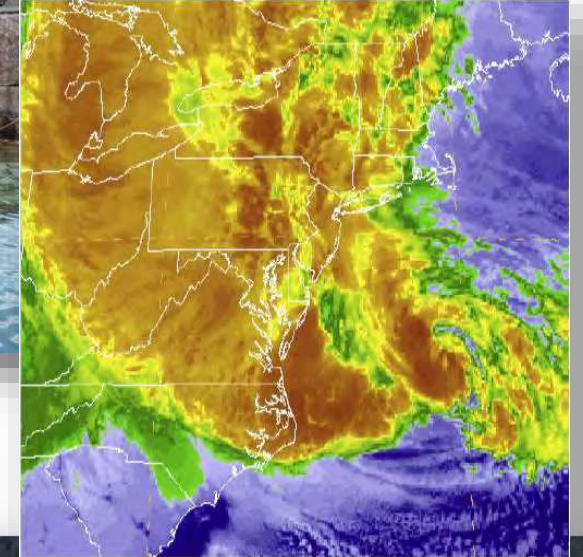
- Strategic placement of dredged material supporting habitat development
- Habitat integrated into structures
- Enhanced natural recovery

## Flood Risk Management

- Natural and Nature-based Features to support FRM
- Levee setbacks

## Ecosystem Restoration

- Ecosystem services supporting engineering function
- “Natural” development of designed features



# Nature-Based Solutions: A White House Priority



BRIEFING ROOM

Executive Order on Strengthening the  
Nation's Forests, Communities, and  
Local Economies

APRIL 22, 2023 • PRESIDENTIAL ACTIONS



BRIEFING ROOM

Executive Order on Tackling the  
Climate Crisis at Home and Abroad

JANUARY 27, 2021 • PRESIDENTIAL ACTIONS



OFFICE OF SCIENCE AND TECHNOLOGY POLICY

## WHITE HOUSE ROUNDTABLE – “KNOWLEDGE IN NATURE: HOW NATURE CAN HELP GROW A BETTER FUTURE”

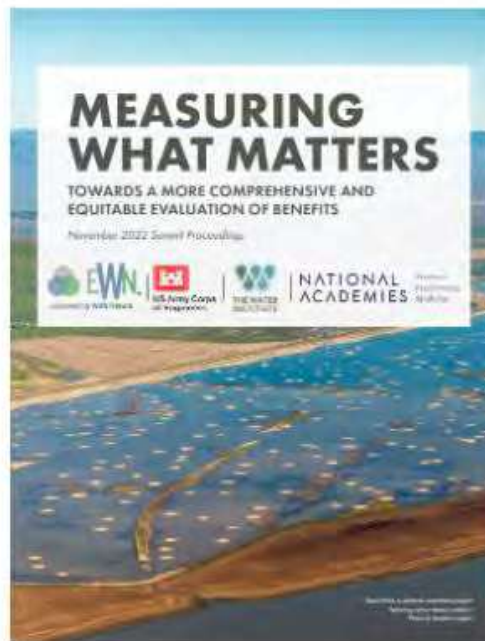
- EO 14072, Sec. 4. Deploying Nature-Based Solutions to Tackle Climate Change and Enhance Resilience:
  - “To further amplify the power of nature, including its ability to absorb climate pollution and increase resilience in all communities, today’s Executive Order calls for the following:”
    1. Report on Nature-Based Solutions
    2. Guidance on Valuing Nature
    3. First U.S. National Nature Assessment



## S5 E2 – Nature-Based Solutions from the Halls of the Exec Office of the President

What happens when a nation focuses on addressing the critical challenges posed by climate change by investing in nature? That's what we're talking about in Season 5, Episode 2, of the Engineering With Nature® Podcast.

[MORE](#)



[Final Proceedings \(pdf\)](#)

### Summit Proceedings

The Summit Proceedings capture the summary and highlights from keynote messages, panel discussions, and breakout sessions.

A capstone report, summarizing the EWN and The Water Institute's policy research effort, will be released in early 2023 and will reflect the study team's findings and recommendations.

[RECORDED SUMMIT](#)

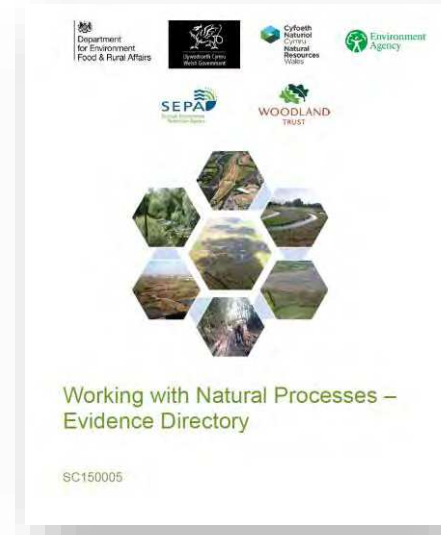
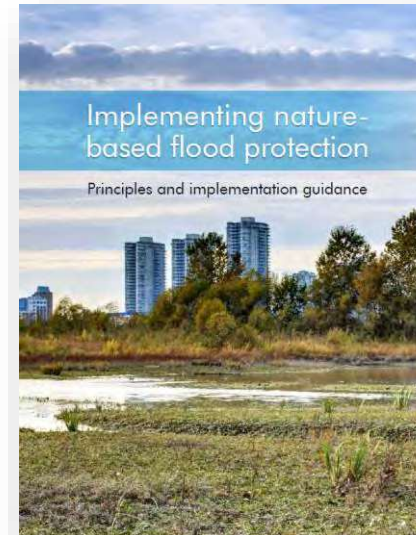
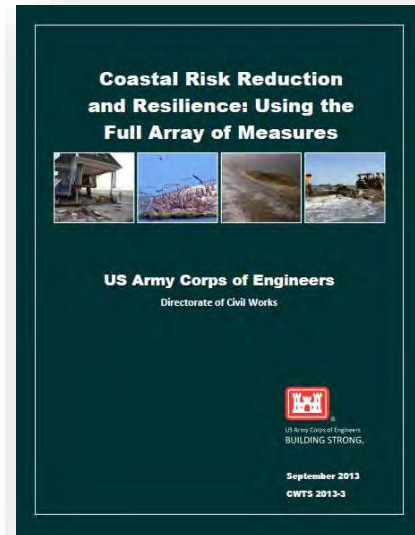
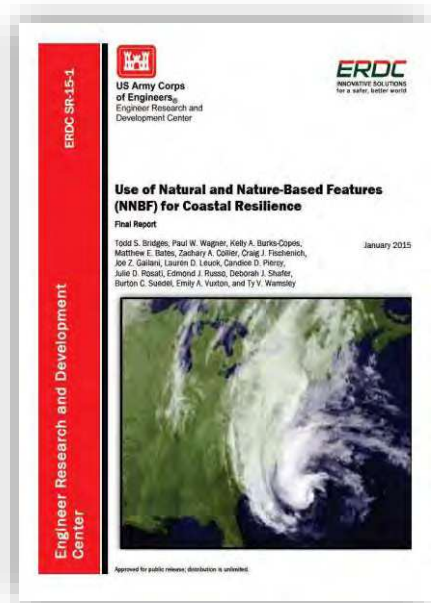
## OPPORTUNITIES TO ACCELERATE NATURE-BASED SOLUTIONS: A ROADMAP FOR CLIMATE PROGRESS, THRIVING NATURE, EQUITY, & PROSPERITY

A REPORT TO THE  
NATIONAL CLIMATE TASK FORCE  
NOVEMBER 2022



THE WHITE HOUSE  
WASHINGTON

# Nature-Based Guidance, Standards, Evidence to Foster Innovation





# EWN Website

One-stop shop for accessing all things related to EWN:

- What's new
- Tools
- Podcasts
- Proving grounds
- Current and past projects
- Publications
- Technical points of contact
- Links to related websites

[www.engineeringwithnature.org](http://www.engineeringwithnature.org)



## Our People

EWN's people include researchers, practitioners, district partners, and collaborators who provide information and assistance on various components of EWN principles and practices. Select a name to learn more about their work and to connect. If you cannot find who you need, please [contact us](#).

### Leadership



**Todd Bridges**  
National Lead,  
USACE EWN  
Initiative



**Jeff King**  
Program Manager,  
USACE EWN  
Initiative



**Amanda Tritinger**  
Assistant Program  
Manager, USACE  
EWN Initiative

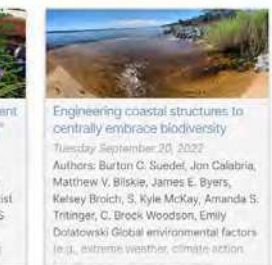


**Courtney  
Chambers**  
Communications  
Lead, USACE EWN  
Initiative

“These projects are delivering broad engineering, economic, environmental, and social value and demonstrate the potential and power of Engineering WITH Nature.”

— LTJ Scott A. Spellman, 55th Chief of Engineers, and Commanding General U.S. Army Corps of Engineers, EWN An Atlas, Volume 2 Book Launch Ceremony (7 April 2021)

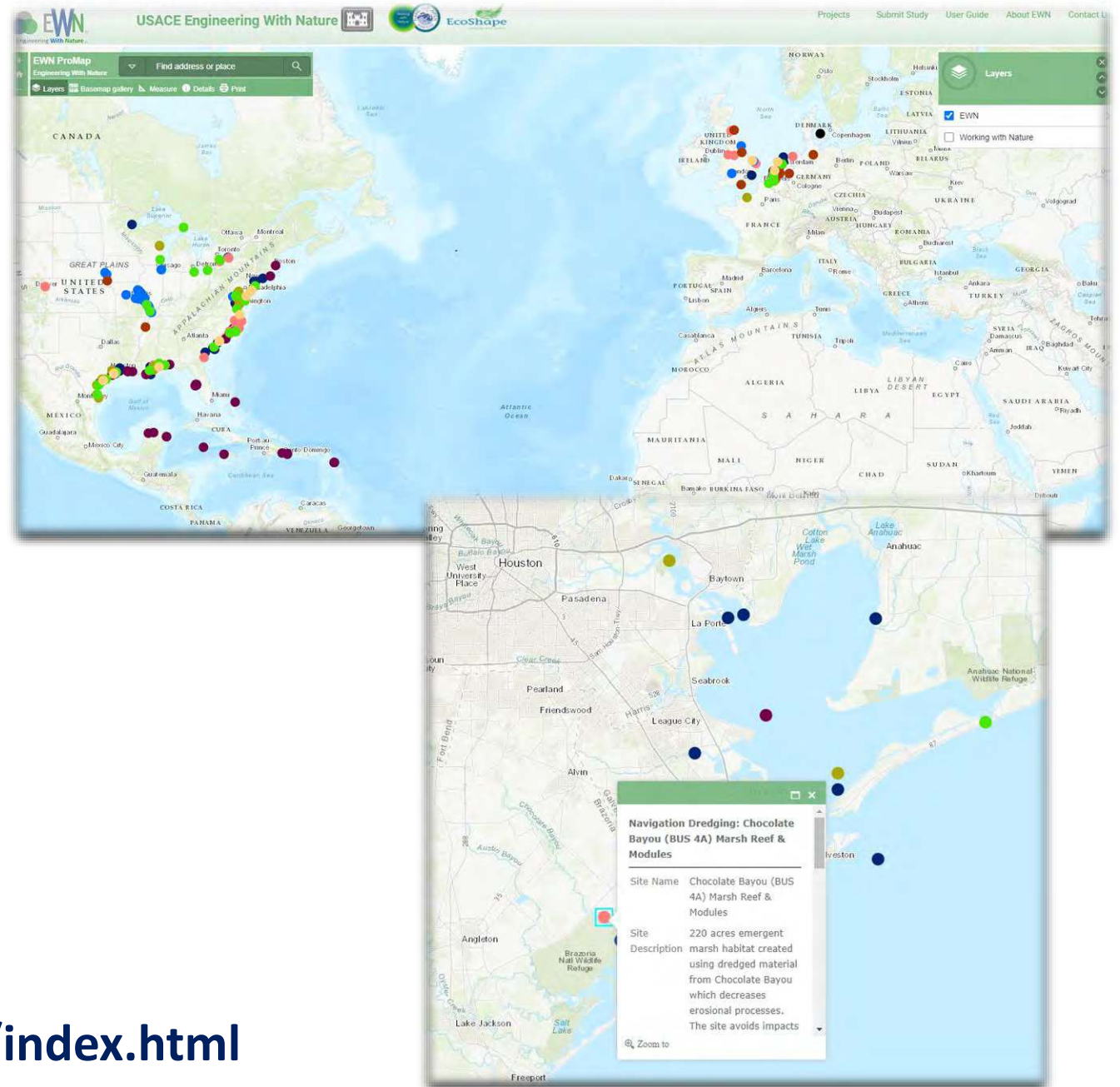
### EWN News





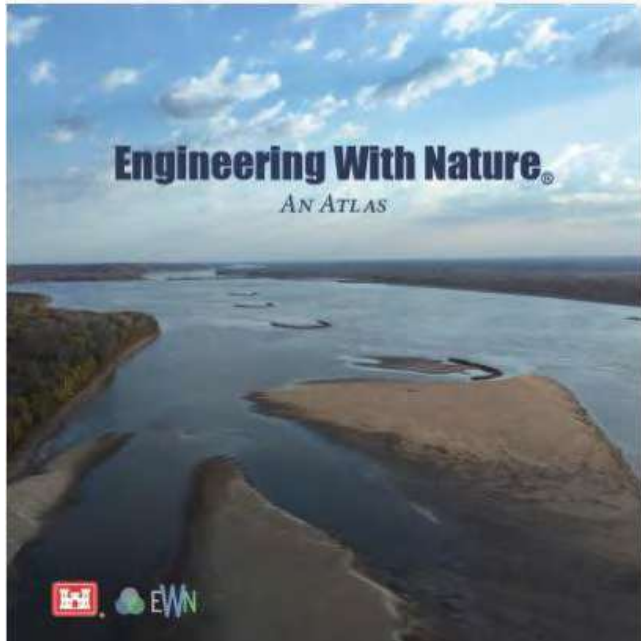
# EWN Project Mapper (ProMap)

- Geography-based data viewer presenting projects that exemplify EWN principles
- Presents information helpful in applying EWN elsewhere
- Projects can be viewed by infrastructure type (e.g., dredging project, breakwater) or by intended environmental or social benefits
- Incorporates Working with Nature (WwN) and EcoShape projects



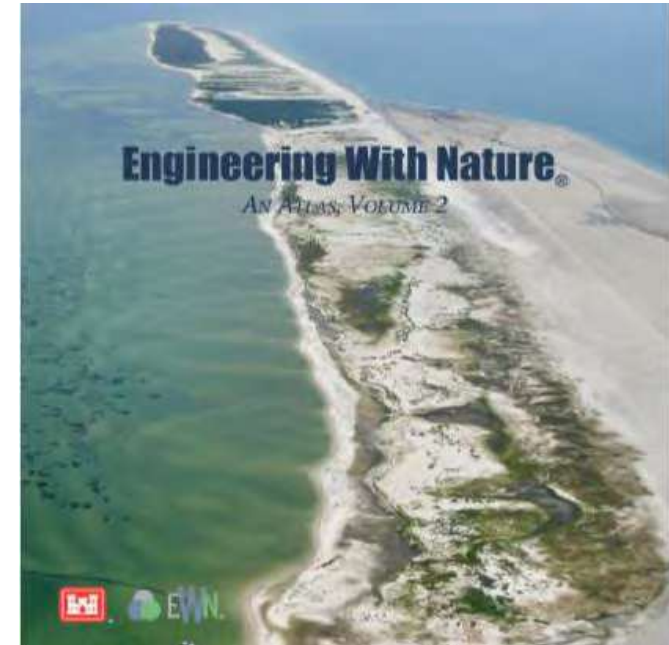
<https://ewn.el.erdc.dren.mil/ProMap/index.html>

# Engineering With Nature® Atlases



Volume 1  
56 Projects  
27 USACE

Volume 2  
62 Projects  
23 USACE



“The mission of US Army Corps of Engineers is to deliver vital public and military engineering services; partnering in peace and war to strengthen our nation’s security, energize the economy and reduce risks from disasters. **Engineering With Nature supports this mission which is why it will always be an important initiative for the Corps.**”

LTG Scott A. Spellman, 55th Chief of Engineers, Commanding General, USACE

[www.engineeringwithnature.org](http://www.engineeringwithnature.org)



# International Guidelines on Natural and Nature-Based Features for Flood Risk Management

## NNBF Guidelines Table of Contents

- Chapter 1. Introduction
- Chapter 2. Principles, Frameworks, and Outcomes
- Chapter 3. Community Engagement
- Chapter 4. Systems Approach
- Chapter 5. Performance
- Chapter 6. Benefits and Costs of NNBF
- Chapter 7. Adaptive Management
- Chapter 8. Introduction to Coastal Systems
- Chapter 9. Beaches and Dunes
- Chapter 10. Coastal Wetlands and Intertidal Areas
- Chapter 11. Islands
- Chapter 12. Reefs
- Chapter 13. Plant Systems
- Chapter 14. Environmental Enhancements
- Chapter 15. Introduction to Fluvial Systems
- Chapter 16. Fluvial Systems and Flood Risk Management
- Chapter 17. Benefits and Challenges of NNBF in Fluvial Systems
- Chapter 18. Fluvial NNBF
- Chapter 19. Fluvial NNBF Case Studies
- Chapter 20. The Way Forward



[https://ewn.ercd.dren.mil/?page\\_id=4351](https://ewn.ercd.dren.mil/?page_id=4351)

### NNBF Guidelines

- >1,000 pages, 5-year effort
- >70 multi-sector organizations
- >170 authors and contributors



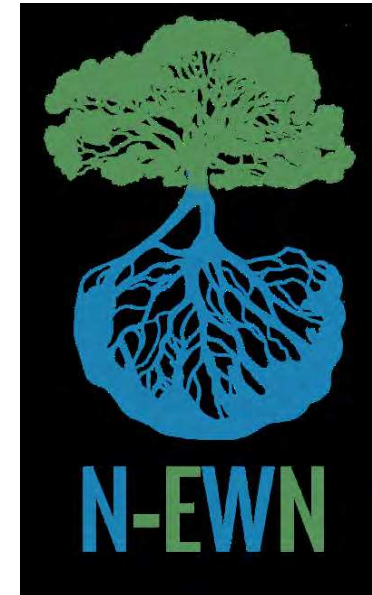
[www.engineeringwithnature.org](http://www.engineeringwithnature.org)



“The guidelines do not contain or represent the policy commitments or policy positions of the organizations that participated in their development. Policy development is the sole purview of each organization and the laws and procedures that govern their activities.” Pages xi-xii.

# Network for Engineering With Nature (N-EWN)

- Large scale network is needed for innovation / knowledge acceleration
- Driven primarily by research community
- Aligning research with the needs of practice
- Grounding research in real projects
- EWN education: curricula and training
- Experiential learning for students – systems thinking, cross-disciplinary training
- Types of partners
  - Research – academic, private
  - Industry practitioners
  - Users and project owners
- Freely flowing communication and knowledge sharing
- Shorten road to implementation



*Institute for Resilient  
Infrastructure Systems*  
**UNIVERSITY OF GEORGIA**



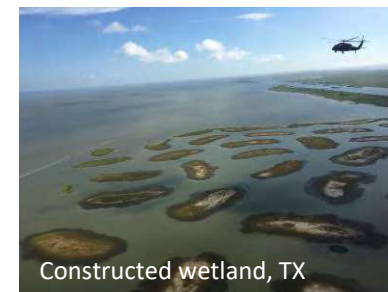
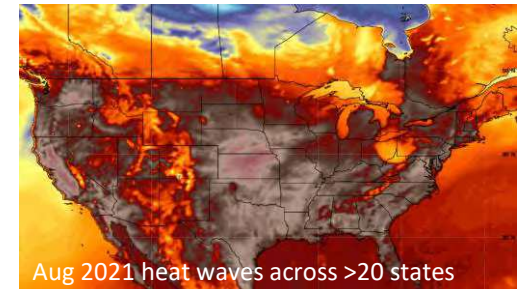
<https://n-ewn.org/>



# Nature-Based Solutions

*Conserving, restoring, and engineering nature for the benefit of people and nature*

- **Project delivery**—“faster, cheaper”
- **Project performance**—complete solutions
- **Adaptability**—scalable, phase-able, flexible
- **Sustainability**—self-repair
- **Value to the Nation**—multi-functional benefits
- **Diversified investment**—diversified value → diversified partnerships
- **Social license**—community and stakeholder support and participation
- **Regulatory efficiency**—resolving conflict through win-win solutions



# THANK YOU!

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