

SOUTH FLORIDA ECOSYSTEM RESTORATION PROGRAM: A PROVING GROUND FOR ENGINEERING WITH NATURE

Working Group/Science Coordination Group Meeting

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US Army Corps
of Engineers®



PRESENTATION OUTLINE



- What is Engineering with Nature?
- South Atlantic Comprehensive Coastal Study
- CERP Builds Resiliency
- Science Informs CERP Restoration
- Engineer Research & Development Center Field Visit
- Engineering with Nature Proving Ground
- **CALL TO ACTION**



ENGINEERING WITH NATURE (EWN)



Engineering With Nature® is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaboration.



The U.S. Army Corps of Engineers EWN Initiative enables more sustainable delivery of economic, social, and environmental benefits associated with infrastructure.

<https://ewn.erdcdren.mil/>



S5Ep6: A Conversation about Innovation and Leadership with LTG Spellmon



SOUTH ATLANTIC COMPREHENSIVE COASTAL STUDY (SACCS) INTERIM RECOMMENDATION

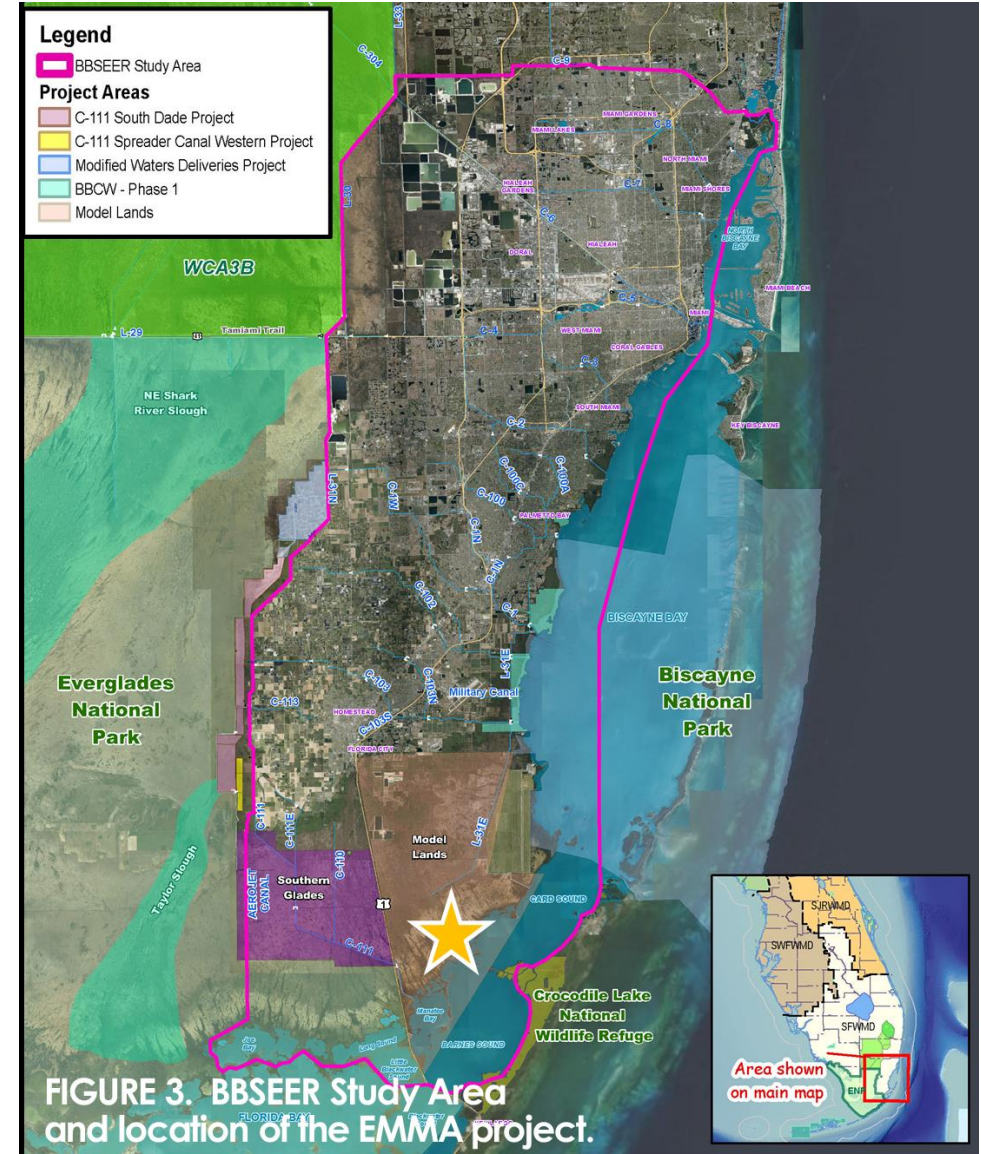


ACTION:

Accelerate planning and implementation of the Comprehensive Everglades Restoration Plan with special emphasis on the Central Everglades Project (all phases), Biscayne Bay and Southeastern Everglades Restoration Project, and Southern Everglades Study.

DESCRIPTION:

Leverage resiliency benefits provide by CERP to further reduce potential threats due to coastal storm surge, sea level rise, and saltwater intrusion. ***CERP utilizes a hybrid solution of structural/non-structure measures in concert with natural & nature-based features to build resiliency within the ecosystem, thereby providing direct benefits to the built community while providing NER benefits.***





SOUTH ATLANTIC COMPREHENSIVE COASTAL STUDY INTERIM RECOMMENDATION



ACTION: Advance understanding and implementation, as appropriate, of Natural and Nature Based Features (NNBF) to reduce coastal risk and provide co-benefits.

DESCRIPTION:

- **Improve understanding of scaling NNBF to achieve measurable benefits**
- Advance development and application of design guidelines
- Improve quantification of risk reduction benefits and co-benefits
- **Leverage existing programs such as CERP to promote enhanced use of NNBF.**



Dr. Mark Rains (FDEP) on spoil pile



Dr. Fred Sklar (SFWMD) viewing spoil pile from within Charley site



CERP BUILDS RESILIENCY



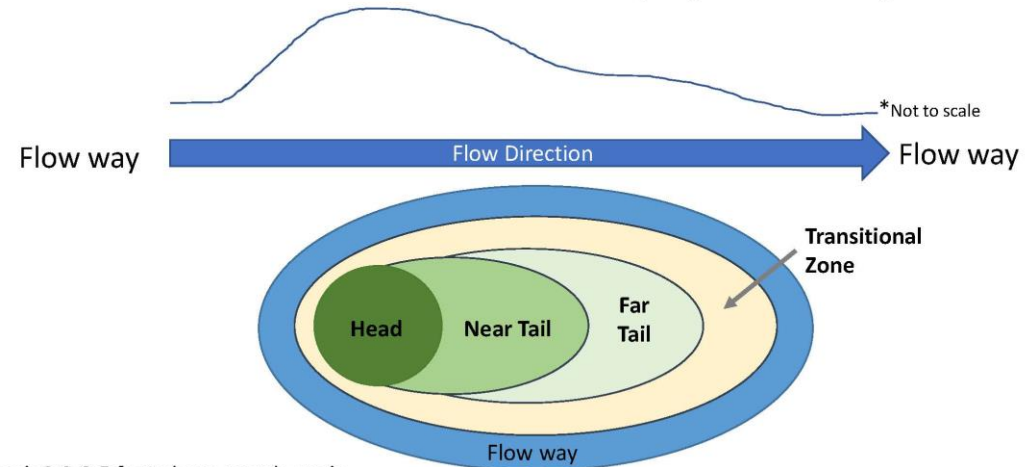
CERP Project	Project Description	Resiliency Components
Biscayne Bay Southeastern Everglades Project	BBSEER seeks to restore degraded ecosystem function, structure, and natural processes to a more natural condition to include: (1) increasing the total spatial extent of natural areas, (2) improving and restoring native habitats and the functional quality of the current landscape these habitats provide, and (3) improving native plant and animal abundances and diversity.	Enhance and direct transition of mangrove communities, reduce shoreline erosion, backfill coastal canals in order to prevent inland saltwater intrusion and reduce upstream effects of storm surge.
Biscayne Bay Coastal Wetlands	The BBCW project will restore wetland and estuarine habitats and divert an average of 59 percent of the annual coastal structure discharge into freshwater and saltwater wetlands instead of direct discharges to Biscayne Bay and Biscayne Bay National Park.	Increase spatial extent of saltwater wetlands and increase saltwater wetland function, providing a natural barrier to absorb negative effects of storm surge and prevent further coastal erosion.
Canal 111 Spreader Canal Western Project	The C-111 Spreader Canal Western Project will create a six-mile hydraulic ridge adjacent to Everglades National Park that will keep more of the natural rainfall and water flows within Taylor Slough.	Establishing more natural water flows in Taylor Slough will improve the timing, distribution, and quantity of water in Florida Bay, enhancing and restoring coastal wetland communities that reduce negative effects associated with storm surge and shoreline erosion.
Southern Everglades Project	This project will improve water deliveries to Everglades National Park including nearshore areas of Florida Bay through comprehensive seepage management along the eastern border of the Water Conservation Areas, further improvements in marsh, overland flow within the Greater Everglades, and storage features to provide carryover capacity to supplement dry season flows into Everglades National Park at the eastern border with Tamiami Trail.	Establishing more natural water flows will improve the timing, distribution, and quantity of water in Florida Bay, enhancing and restoring coastal wetland communities that reduce negative effects associated with storm surge and shoreline erosion.
Central Everglades Project	The Congressionally-authorized purpose of the CEPP Project is to improve the quantity, quality, timing, and distribution of water flows to the Northern Estuaries, Central Everglades (Water Conservation Area 3 and Everglades National Park, and Florida Bay to aid in restoring pre-drainage vegetative communities and habitat for fish and wildlife.	Establishing more natural water flows will improve the timing, distribution, and quantity of water in Florida Bay, enhancing and restoring coastal wetland communities that reduce negative effects associated with storm surge and shoreline erosion.
Picayune Strand Restoration Project	The restoration involves plugging 48 miles of canals, removing 260 miles of crumbling roads, and constructing three major pump stations, all of which will restore more than 55,000 acres of natural habitat. Wetlands will be restored in Picayune Strand (Southern Golden Gate Estates) and in adjacent public lands — including the Fakahatchee Strand State Preserve, Florida Panther National Wildlife Refuge, and Collier Seminole State Park — by reducing over-drainage, while restoring a natural and beneficial sheelflow of water to the Ten Thousand Islands National Wildlife Refuge.	Enhance and direct transition of mangrove communities, reduce shoreline erosion, backfill canals in order to prevent inland saltwater intrusion and reduce upstream effects of storm surge.



SCIENCE INFORMS CERP RESTORATION



Miami Canal Engineered Vegetated Hammock Design: Individual Hammock(S-8 to S-339)
COA1: Preferred Elevation Profile (“High” Hammocks)



**Loxahatchee Impoundment
Landscape Assessment
(LILA) informs Central
Everglades Planning Project
(CEPP) NNBF Features in
Miami Canal**

- Head: 3.0-3.5 feet above marsh grade
- Near Tail: 2.5-3.0 feet above marsh grade
- Far Tail: 2.0-2.5 feet above grade
- Transitional Zone: 1.5-2.0 feet above grade
- Flow way: 1.5 feet below grade (same as Miami Canal backfill)



SCIENCE INFORMS CERP RESTORATION: PROOF OF CONCEPT PHYSICAL MODELS



Photo Credits: <https://t1p.el.erdc.dren.mil/thin-layer-placement-spraying/>

Photo Credits: South Florida Water Management District

Everglades Mangrove Migration Assessment (EMMA) informs Biscayne Bay and Southeastern Everglades Restoration Project NNBF Features in Southern Coastal Systems



ENGINEER RESEARCH & DEVELOPMENT CENTER FIELD VISIT 9-12 JANUARY 2023



 **EWN** Engineering With Nature®

Special thanks to SFWMD,
Miccosukee Tribe &
Everglades Foundation!



SOUTH FLORIDA ECOSYSTEM RESTORATION PROGRAM: EWN PROVING GROUND



EWN Proving Grounds are USACE districts and divisions committed to the broad integration of EWN principles and practices into all business lines in the form of constructed projects. Proving grounds are places where innovative ideas are tested on the ground, throughout USACE missions. They document processes, project milestones, and lessons learned in the implementation of EWN measures so others can learn from their experience.



<https://ewn.erdcdren.mil/?p=11080>



SOUTH FLORIDA ECOSYSTEM RESTORATION PROGRAM: EWN PROVING GROUND



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CESAD- RBT(1165)

23 February 2023

MEMORANDUM FOR: SEE DISTRIBUTION.

SUBJECT: South Atlantic Division (SAD), Engineering with Nature (EWN) Proving Ground

1. Reference Water Resources Development Act (WRDA) of 2020, H.R.7575, Sections 113, 114, 115, 123, 124, 116th Cong. (2020).
2. Purpose: Articulate Command Support of SAD as an EWN Proving Ground.
3. Applicability. This Command Support statement applies to all SAD Civil Works projects and project delivery teams.
4. Discussion. Delivering infrastructure to sustain our communities, economy, and environment calls upon us to innovate, modernize, and even revolutionize our approach to infrastructure planning and development. Partnering with nature is a vital part of delivering bold solutions to combat uncertainty and achieve long-term and sustainable solutions. Recent advances in policy and quantitative methodologies can capture the comprehensive range of economic, environmental, and social benefits that nature-based solutions can provide.
 - a. EWN is the intentional alignment of natural and engineering processes to deliver economic, environmental, and social benefits efficiently and sustainably through collaboration. The USACE EWN Program works to better integrate traditional and nature-based infrastructure approaches by aligning engineering and natural processes for greater benefit. Incorporating natural and nature-based features into project scoping, planning, design, construction, and operations, from a foundation of inclusive and collaborative engagement, creates a broad array of opportunities to meaningfully strengthen community resilience into the future.
 - b. The benefits of employing natural and nature-based features are broadly recognized and specifically required by reference 1, which further directs USACE to consider their inclusion in project development. In addition to the requirements in WRDA, LTG Scott A. Spellmon, 55th Chief of Engineers, and Commanding General U.S. Army Corps of Engineers voiced his commitment in June 2021 to the House Committee on Transportation & Infrastructure, Water Resources & Environment Subcommittee that:

"We absolutely want to do more engineering with nature everywhere we work across the Corps, you have my commitment."

In addition, the Assistant Secretary of the Army for Civil Works, the Honorable Michael Connor, stated in his Intent for Civil Works in May 2022 that:

"...We need to take advantage of nature-based infrastructure and figure out how we can bring multiple benefits to our projects, so that we're not just doing flood risk and coastal storm management, but we are also helping to further environmental restoration and even augment water supply where we can."

Honorable Michael Connor Assistant Secretary of the Army for Civil Works



The desired outcome is to include EWN in in planning and design efforts to increase resiliency in communities (assuming urban and natural ecosystems) and allow for future adaptation.

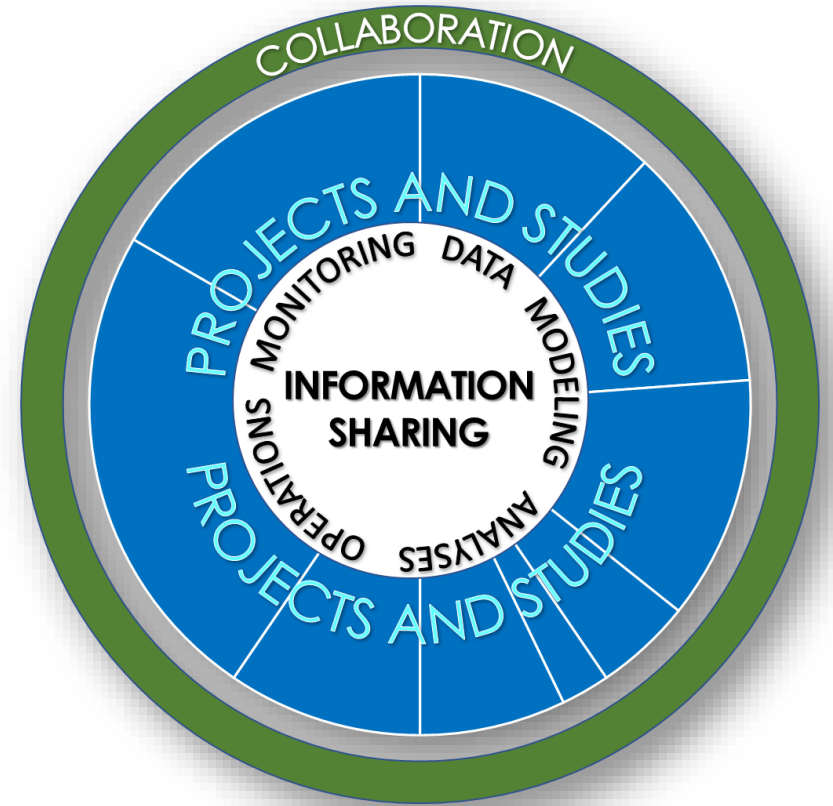


CALL TO ACTION: A COMPREHENSIVE AND COLLABORATIVE APPROACH



HOW DOES IT ALL FIT TOGETHER?

- CERP is a proving ground for EWN
- Sound Science Informs CERP implementation
- **Collaboration and Partnerships are Key**





THANK YOU