The USACE Engineering With Nature Program



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22 April 2015











Dredging Operations Environmental Research (DOER)

Mission: To support sound environmental management and operational practice by advancing science, engineering and technology applied to navigation dredging operations









DOER Programmatics

- Continuing program in O&M
 - ▶ Operating for >15 years
- Organized around Focus Area themes
 - ► Sediment and Dredging Processes
 - ▶ Dredged Material Management
 - ► Environmental Resource Management
 - ▶ Risk Management
- Finite-term research projects, e.g. 1-3 years in length
 - ► About 40 projects active in a given year
- Proactive R&D to shape debate and practice







DOER's Strategic Focus

- Increase understanding of key, fundamental processes
- Enhanced modeling capability to support engineering design and operations
- Science that reduces environmental testing burden
- Economical solutions for T&E species and Environmental Windows
- Engineering With Nature for sustainable practice



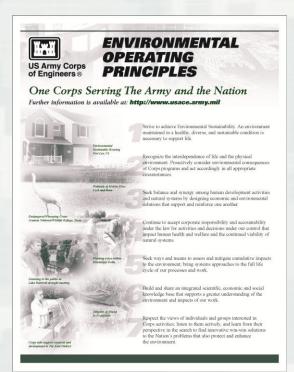








Advancing USACE Practice



Vision: "Contribute to the strength of the Nation through innovative and environmentally sustainable solutions to the Nation's water resources challenges."



Goals:

- More efficient, cost effective engineering and operational practices.
- More collaboration and cooperation, less unproductive conflict.
 - Sustainable projects. Triple-win outcomes integrating social, environmental and economic objectives.





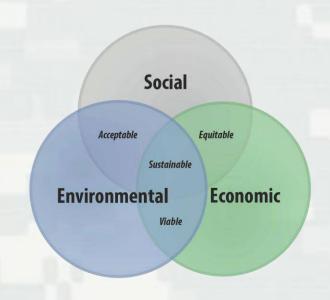


Engineering With Nature...

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

Key Elements:

- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Broaden and extend the benefits provided by projects
- Science-based collaborative processes to organize and focus interests, stakeholders, and partners





















EWN Status

- Engineering With Nature initiative started within USACE Civil Works program in 2010. Over that period, we have:
 - Engaged across USACE Districts (23), Divisions, HQ; other agencies, NGOs, academia, private sector, international collaborators
 - Workshops (>20), dialogue sessions, project development teams, etc.
 - USACE Business Lines engaged: Navigation, Ecosystem Restoration, Flood Risk Management, Water Operations
 - ► Implementing strategic plan
 - Focused research projects on EWN
 - ► Field demonstration projects
 - ▶ Communication plan
 - ▶ Awards
 - 2013 Chief of Engineers Environmental Award in Natural Resources Conservation
 - 2014 USACE National Award-Green Innovation









EWN Action Projects

- 1. Sediment Retention Engineering to Facilitate Wetland Development (San Francisco Bay, CA)
- Realizing a Triple Win in the Desert: Systems-level Engineering With Nature on the Rio Grande (Albuquerque, NM)
- 3. Atchafalaya River Island and Wetlands Creation Through Strategic Sediment Placement (Morgan City, LA)
- 4. Portfolio Framework to Quantify Beneficial Use of Dredged Material (New Orleans and New England)
- 5. Engineering Tern Habitat into the Ashtabula Breakwater (Ashtabula, OH)
- 6. Living Shoreline Creation Through Beneficial Use of Dredged Material (Duluth, MN)
- 7. A Sustainable Design Manual for Engineering With Nature Using Native Plant Communities
- 8. Landscape Evolution of the Oil Spill Mitigation Sand Berm in the Chandeleur Islands, Louisiana
- 9. Guidelines for Planning, Design, Placement and Maintenance of Large Woods in Rivers: Restoring Process and Function
- 10. The Use and Value of Levee Setbacks in Support of Flood Risk Management, Navigation and Environmental Services: A Strategy Document
- 11. Strategic Placement of Sediment for Engineering and Environmental Benefit: An Initial Guide to Opportunities and Practices







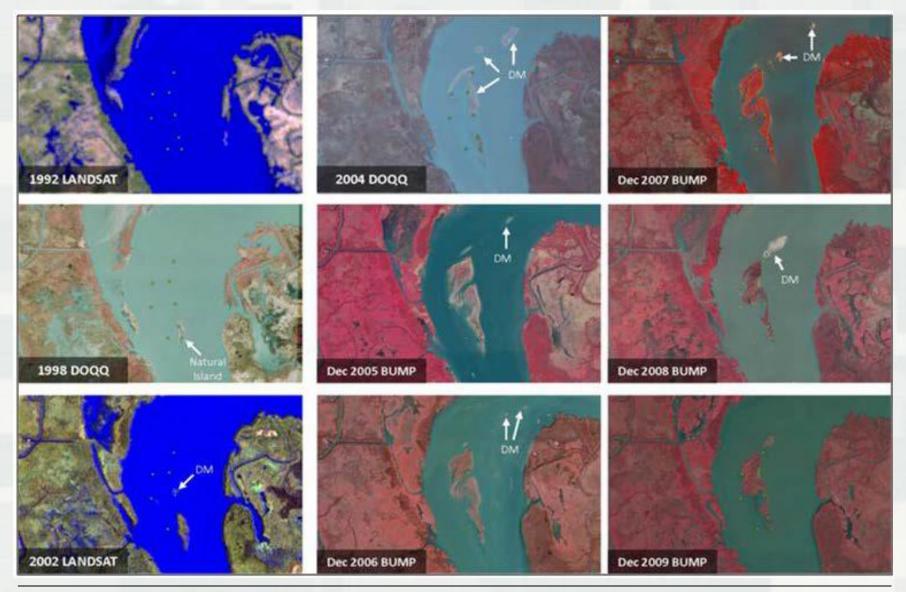








Atchafalaya River, Horseshoe Bend





A diverse assemblage of native plant and animal life has colonized the island.

Native American lotus

Juvenile Tricolored heron

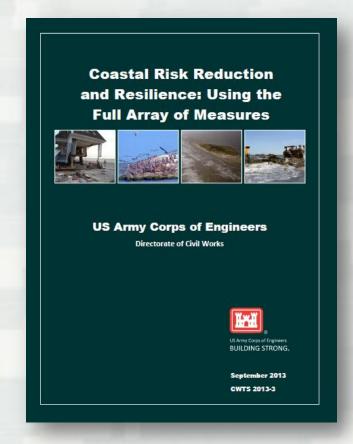




Juvenile Snowy egret

Systems: Coastal Risk Reduction and Resilience

"The USACE planning approach supports an **integrated approach** to reducing coastal risks and increasing human and ecosystem community resilience through a combination of natural, naturebased, non-structural and structural measures. This approach considers the engineering attributes of the component features and the dependencies and interactions among these features over both the short- and long-term. It also considers the full range of environmental and social benefits produced by the component features."









Natural and Nature-Based Features Evaluation and Implementation Framework **ORGANIZATIONA** ALIGNMENT ERDC Identify and Organize Stakeholders, Partners and Authorities Define Physical and Geomorphic Setting Assess Vulnerability and Resilience Iterate as Needed Identify NNBF Opportunities EVALUATION Formalize NNBF Objectives Identify NNBF Alternatives Define NNBF Performance Metrics **Evaluate NNBF Alternatives** Tier 1 Advance through Tier 2 Tiers as Tier 3 **Appropriate** Select NNBF Alternatives Design Implementation Plan: **MPLEMENTATION** Elaborate Operational and Engineering Practices Implement NNBF Alternative BRDC Monitor for Performance and Assess Ecosystem Goods and Services lutions for a saler, better world **BUILDING STRONG®** Feedback

Collaboration with USFWS on EWN and Endangered Species Act

- USACE spends \$300M per year on ESA compliance
- Combining ESA 7(a)(1)
 authority with EWN presents
 opportunity to reduce time
 and cost, while increasing
 benefits for species
 conservation





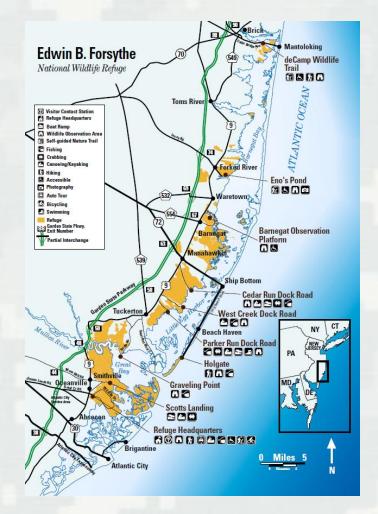






Forsythe National Wildlife Refuge

- Forsythe NWR: >40,000 acres of wetlands and other habitat
- Objective: Enhance resilience through engineering and restoration
- Means: Apply EWN principles and practices









Engagement with NGOs

- National Wildlife Federation
 - Use of EWN for conservation and **NNBF**
- Environmental Defense Fund
 - Coastal resilience investment
- The Nature Conservancy
 - ► Science for Nature and People (SNAP)- Integrating Natural Defenses into Coastal Disaster Risk Reduction
- National Fish and Wildlife **Foundation**
 - ▶ "Building Ecological Solutions to Coastal Community Hazards"
 - Collaboration with NJDEP, NWF, USACE, Sustainable Jersey, NJ Sea Grant Consortium











USACE Galveston and Buffalo Districts: EWN "Proving Grounds"

October and December 2014

~70 participants

 SWG, SWD, LRB ERDC, IWR and HQ

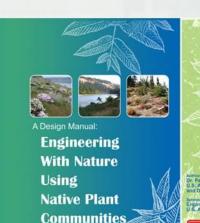
 Identified opportunities to implement EWN within current and future projects





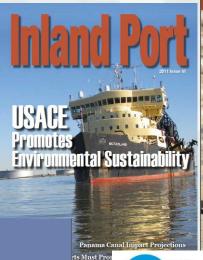


Publications and Recognition



wetland science practice





PIANC and



Technical Articles

and the 33" PIANC World Congress

"ENGINEERING WITH NATURE

ABSTRACT

With Nature" (EWN) initiative supports tainable development of infrastructure by advancing technical and communication practices in order to intentionally align natura and engineering processes to efficiently and ustainably deliver economic, environmental processes. The tools and projects that have en developed through EWN support. planning, engineering, and operational engineering and natural systems to produce

practical methods provides an achievable path toward an ecosystem approach to navigation infrastructure development. By combining sunication practices, the EWN initiative is project development, Engineering With Nature being pursued through innovative research learned, and active engagement with field practitioners across a wide range of organisations. The objectives of EWN are

World Association for Waterborne Transport nfrastructure (PIANC) and the "Building with Nature" initiative of EcoShape Foundation,

INTRODUCTION

best practices will involve identifying the practical actions that can be taken to bette align and integrate engineering and natura terms to produce more socially acceptable. economically viable and environmental sustainable practices, projects, and outcomes engineering processes to efficiently and

and social benefits through collaborative Above: Aerial photo of the wetlands at the Mississipp the Reneficial Use of Drestand Material Monitoring

Pursuing the objective of sustainable both challenges and opportunities for the US rmy Corps of Engineers (USACE). Advancing sustainable projects. Engineering With Nature (EWN) is a USACE initiative that supports more

Figure 1). The EWN initiative eloping practical metho achievable path toward an e perations that is applicable

projects within the EWN initia operational efficiencies su

2) natural processes to making

quality of project bene 3) approaches that will be seinclude substantiated eco 4) science-based collaborat

organise and focus int and partners to reduce s

ERDC environmental research supports USACE civi

develop sustainable solutions to the nation's

Welcome Yazmin Seda-Sanabria. High Water Mark Program Brings Awareness & Spearheads Action. 1964 Christmas Flood Awarenes



sorary assignment for the next three

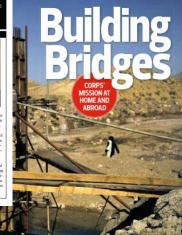
elated to Flood Risk Management aplementation of risk management ad resilience of USACE's Civil

Engineer Research and Developsent Center (ERDC) - as a research ructural engineer in the Geoscience

quarters in 2006 as the Executive Direction and Management, genera

Ms. Seda-Sanabria holds a bachelor'





TEAM STEM

U.S. ARMY CORPS

2014/2015 EWN-Sponsored Workshops

- Regional Sediment Management and Engineering With Nature Inland Working Meeting; 29 April – 1 May 2014; Omaha, NE
- Coastal Resilience: The Environment, Infrastructure and Human Systems; 21-23 May 2014; New Orleans, LA (partnered with USEPA and USDOE)
- Flood Risk Management and Engineering With Nature Collaborative Meeting; 10-11 June 2014; Vicksburg, MS
- Advancing Cost-Efficient and Effective ESA Compliance & Mission Sustainability through Engineering With Nature and ESA Section 7(a)(1) Conservation Plans: Opportunity Assessment Working Meeting; 3-4 September 2014; Atlanta, GA (partnered with USFWS Southeast Region)
- EWN in Water Operations; 31 March 1 April 2015;
 Vicksburg, MS





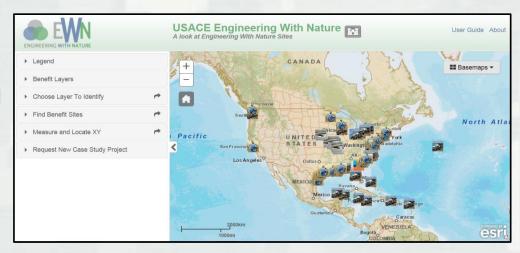


Past Engagements



EWN Project Mapping Tool (EWN ProMap)

- Online GIS database of projects illustrating EWN principles and practices
 - Illustrating the key elements of EWN
- Currently contains ~175 projects
 - Name
 - Manager/Owner
 - Description
 - Infrastructure association e.g., jetty, breakwater, channel
 - ► Benefits e.g., fish habitat, bird habitat, recreation
 - ► Links, reports, photos
- Designed to facilitate communication about opportunities, lessons learned, and good practices
- Projects examples can be added through a process of self-nomination and independent evaluation











http://gis2.sam.usace.army.mil/applications/opj/v013/







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ABOUT

RESOURCES

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ACTION PROJECTS

CONTACT US



WHAT IS ENGINEERING WITH NATURE?

The U.S. Army Corps of Engineers (USACE) Engineering With Nature (EWN) Program enables more sustainable delivery of economic, social, and environmental benefits associated with water resources infrastructure. EWN directly supports USACE's "Sustainable Solutions to America's Water Resources Needs: Civil Works Strategic Plan 2011 - 2015" and contributes to the achievement of its Civil Works Mission and Goals. EWN is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaborative processes.

UPCOMING EVENTS

11-15 May

Coastal Sediments 2015 San Diego, California

22-25 June

Western Dredging Association and Texas A&M Dredging Summit and Expo Houton, Texas

19-22 October Dredging 2015 Conference Savannah, Georgia

WHAT'S NEW

- Natural and Nature-Based eatures Report Newly Released EWN and Buffalo District aborative Meeting December
- FWN and Galveston District Collaborative Meeting October 2014
 Regional Sediment Management (RSM) and Engineering With Nature (EWN) Working Meeting July 2014
- More What's New

EWN NEWS



- Natural and Nature-Based Features Report Newly Released!
- More EWN News







www.EngineeringWithNature.org http://el.erdc.usace.army.mil/ewn

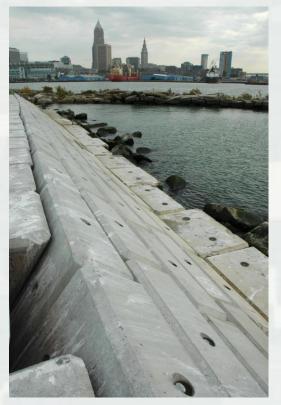


Creating Value for the Nation

- Value arguments resonate
 - Must take assertive control of the dialogue
- Correcting the hyper-focus on risk is achieved by giving more attention to compensating benefits
 - ► ...Not by giving more attention to risk
- There are potentially valuable allies in "unlikely" places
- Our projects produce multiple benefit streams, but you have to claim them!







Direct Technical Support



- A response can...
 - ▶ be initiated by submitting a request through the DOTS Tracking System http://el.erdc.usace.army.mil/dots
 - consist of up to 2 weeks of scientist or engineer time & travel expenses.
 - ▶ range from a phone call "one stop", to a technology demo, to a site visit.
 - result in products such as a technical documents or reviews.
 - ► Technical response statistics







