The USACE Engineering With Nature Program

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ERDC
Engineer Research and Development Center

Dredging Operations Environmental Research (DOER)

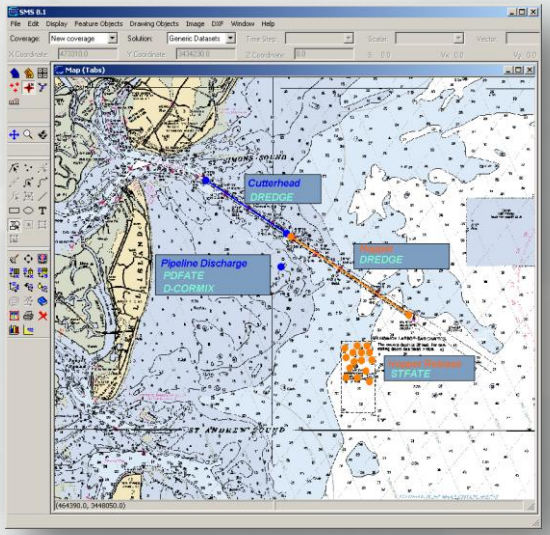
Mission: To support sound environmental management and operational practice by advancing science, engineering and technology applied to navigation dredging operations

DOER Programmatics

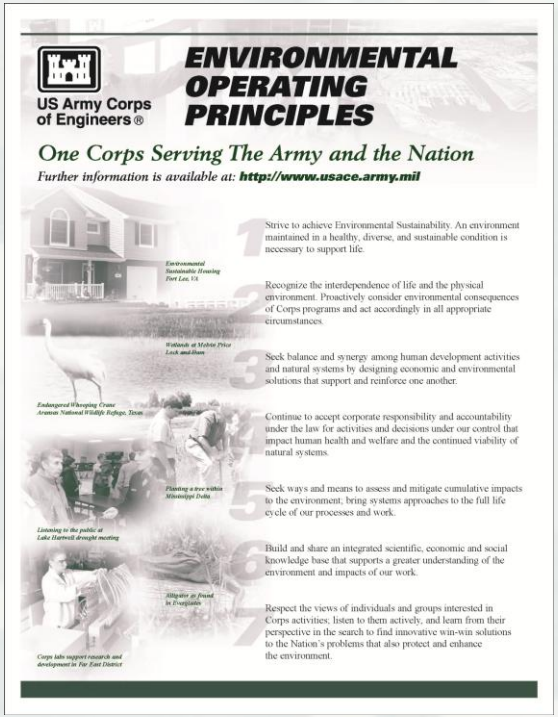
- Continuing program in O&M
  - Operating for >15 years
- Organized around Focus Area themes
  - Sediment and Dredging Processes
  - Dredged Material Management
  - Environmental Resource Management
  - Risk Management
- Finite-term research projects, e.g. 1-3 years in length
  - About 40 projects active 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:

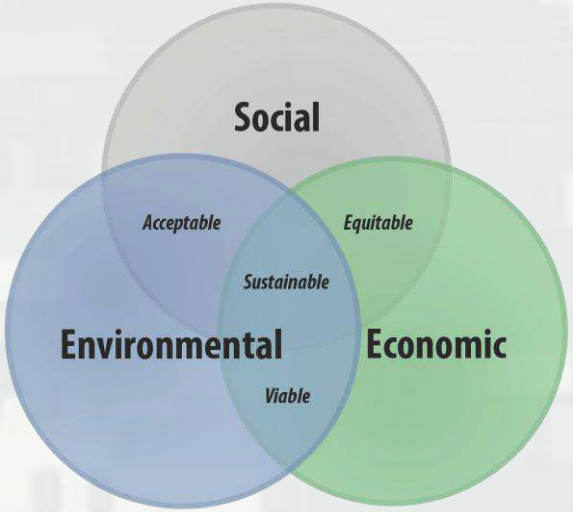
- More efficient, cost effective engineering and operational practices.
- More collaboration and cooperation, less unproductive conflict.
  - Sustainable projects. Triple-win outcomes integrating social, environmental and economic objectives.

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



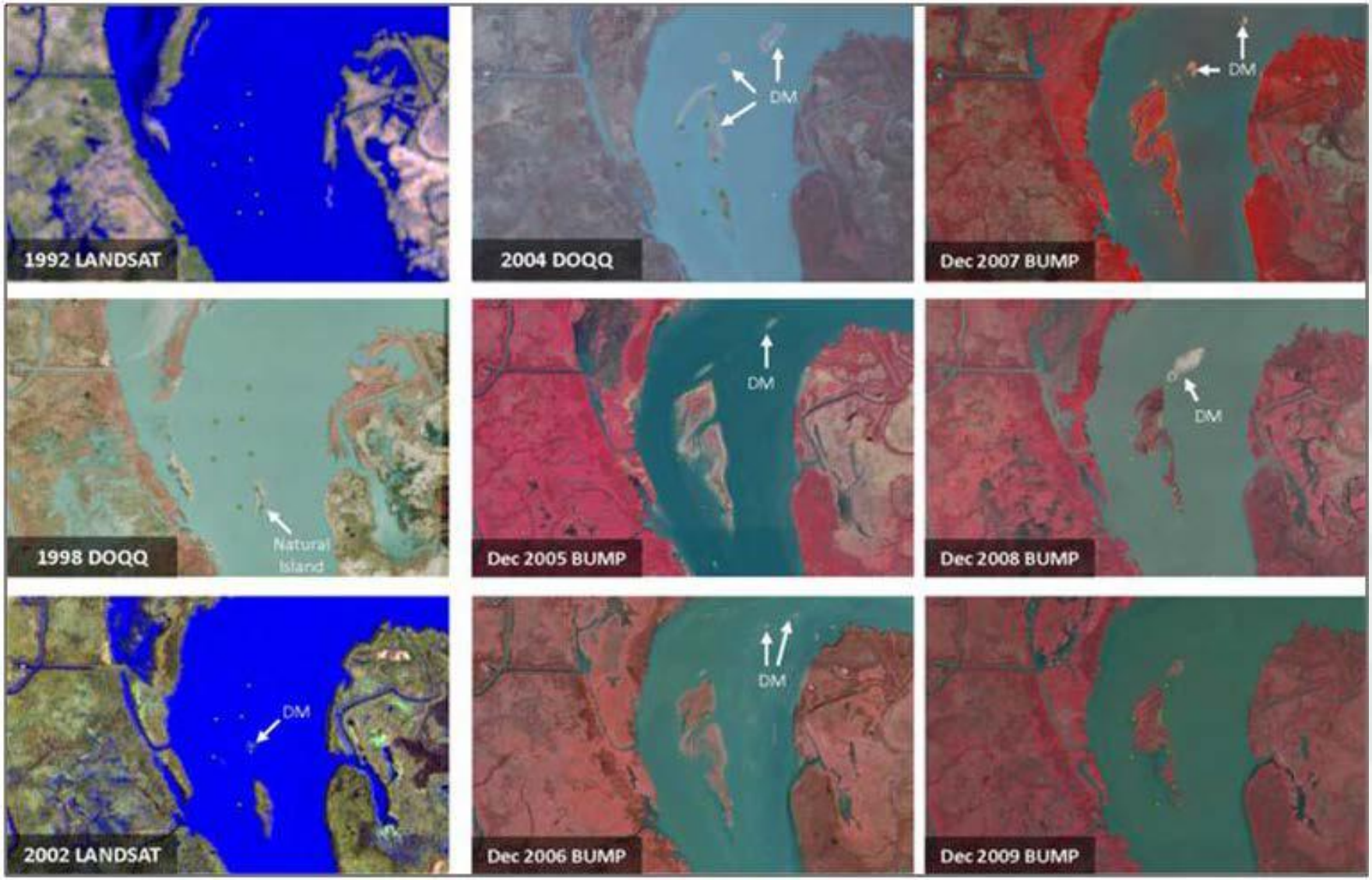
EWN Status

- *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)
2. 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.

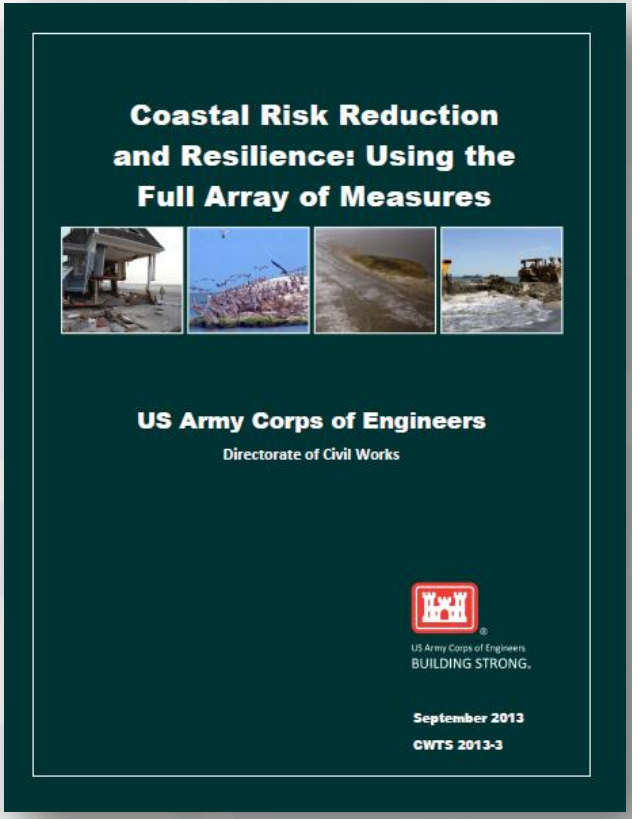
Native American lotus

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, nature-based, 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

ORGANIZATIONAL ALIGNMENT

EVALUATION

IMPLEMENTATION

Iterate as Needed

Identify and Organize Stakeholders, Partners and Authorities

Define Physical and Geomorphic Setting

Assess Vulnerability and Resilience

Identify NNBF Opportunities
- Formalize NNBF Objectives
- Identify NNBF Alternatives
- Define NNBF Performance Metrics

Evaluate NNBF Alternatives
- Tier 1
- Tier 2
- Tier 3

Advance through Tiers as Appropriate

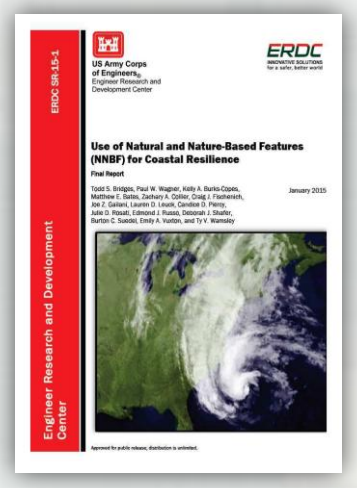
Select NNBF Alternatives

Design Implementation Plan: Elaborate Operational and Engineering Practices

Implement NNBF Alternative

Monitor for Performance and Assess Ecosystem Goods and Services

Feedback

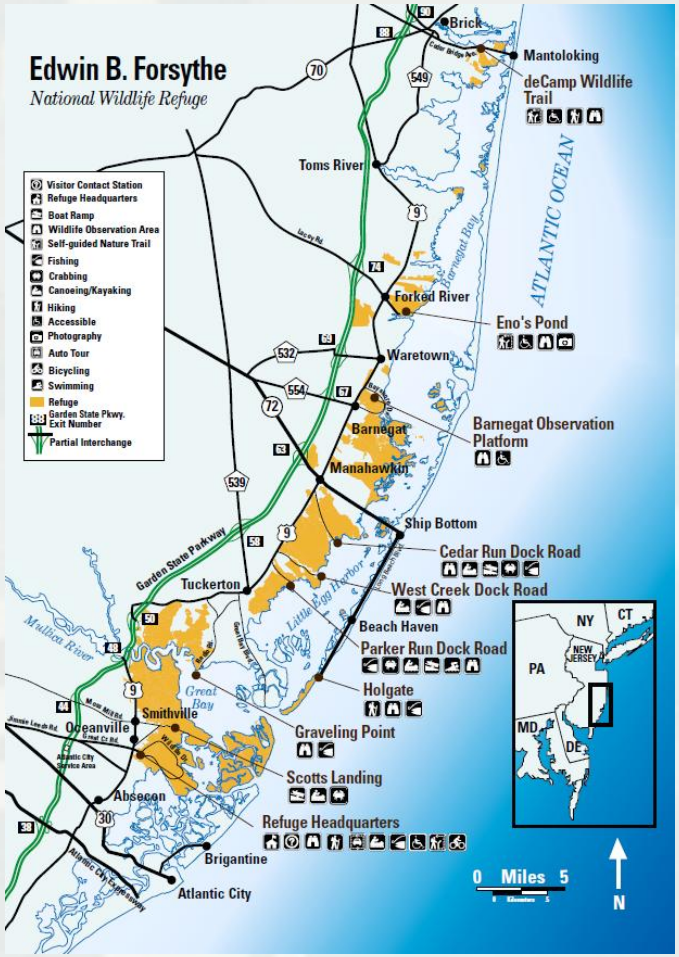


Collaboration with USFWS on EWN and Endangered Species Act

- 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

The Nature Conservancy
Protecting nature. Preserving life.

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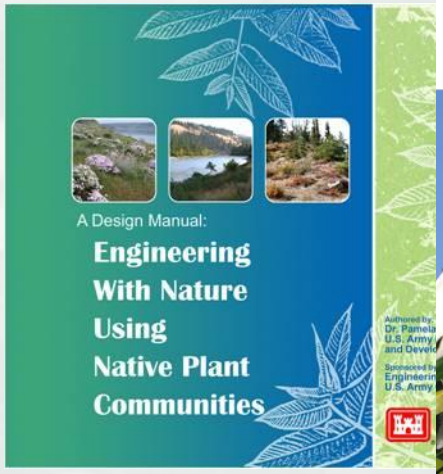
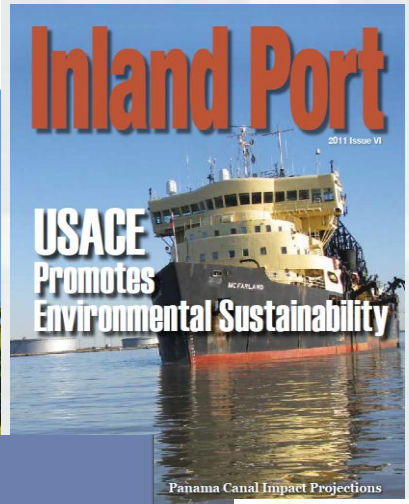
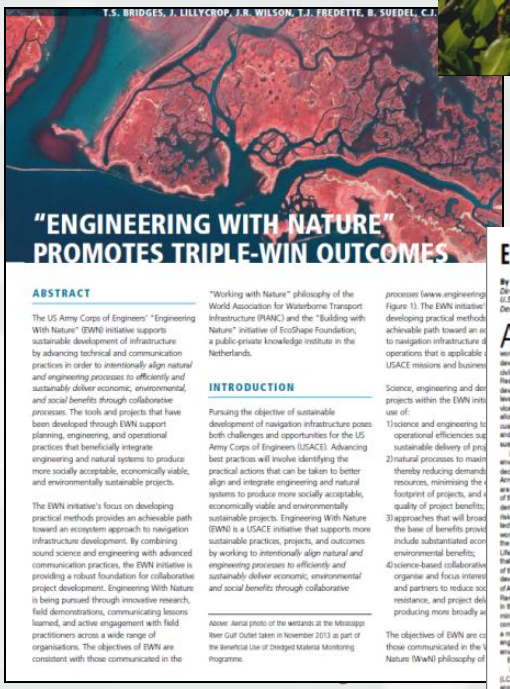
USACE Galveston and Buffalo Districts: EWN "Proving Grounds"

- 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



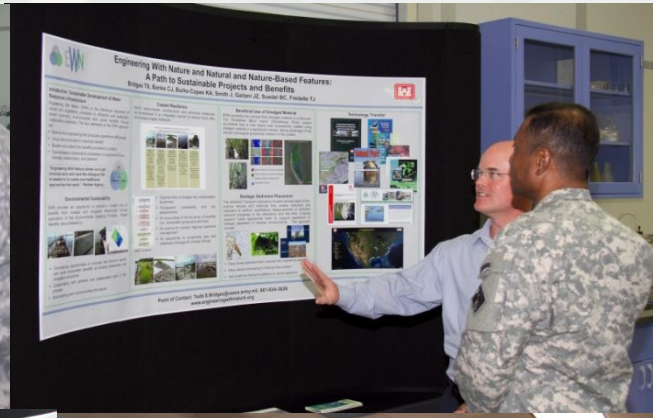


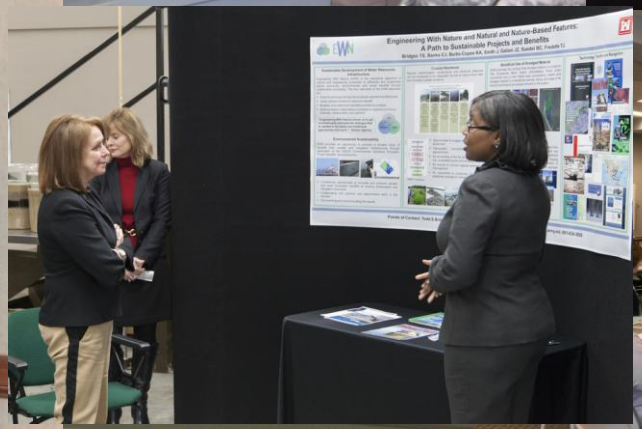


2014/2015 EWN-Sponsored Workshops

- 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

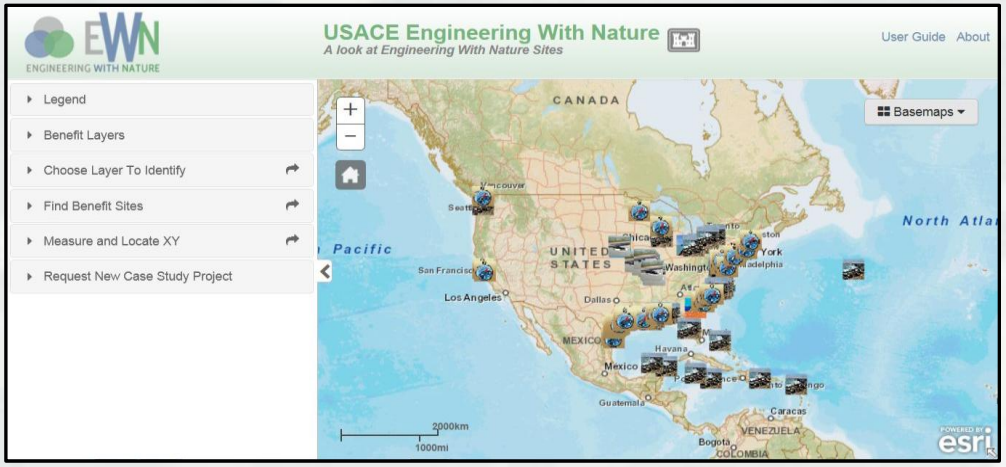
Past Engagements





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/

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

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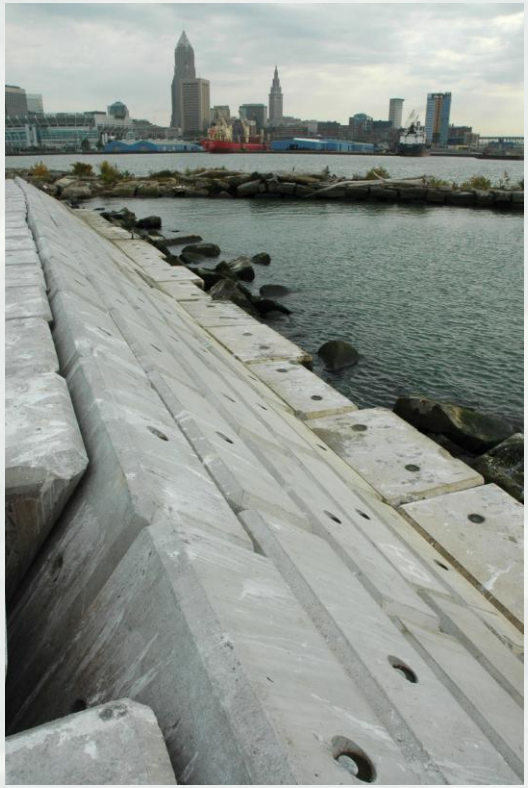
Creating Value for the Nation

- 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
    - FY14 - 54
    - FY15 - 39