

Engineering With Nature



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**BG Hill & SWD Commanders Visit
16 January 2015**

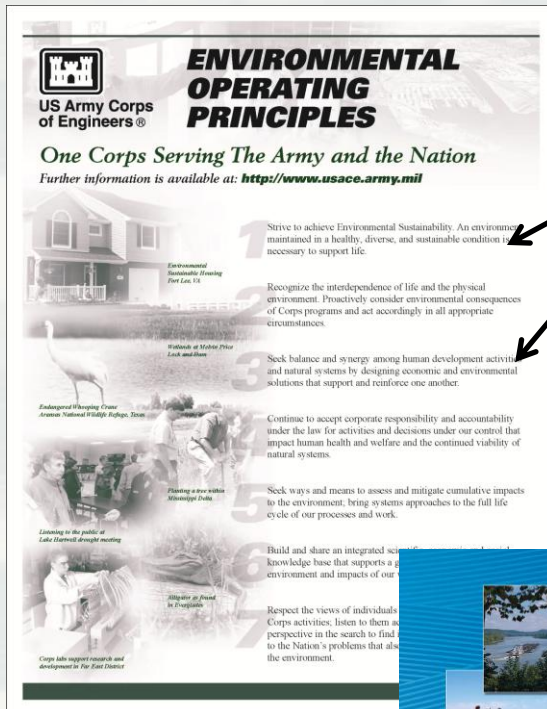
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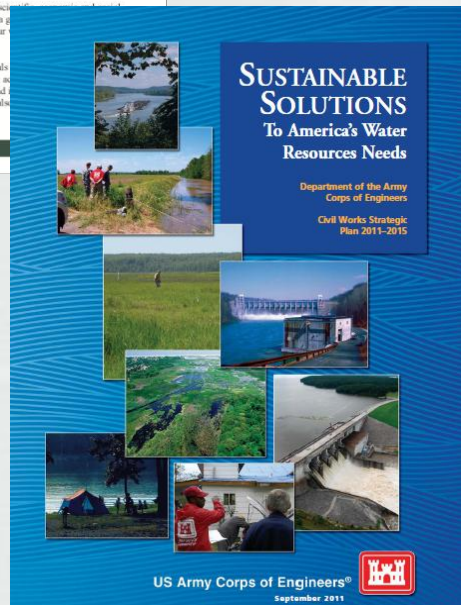
**US Army Corps of Engineers
BUILDING STRONG®**



Evolving USACE Practice



Sustainable Solutions 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.
 - ▶ Ports, commercial interests, regulators, NGOs, and others
- Sustainable projects. Triple-win outcomes integrating social, environmental and economic objectives.

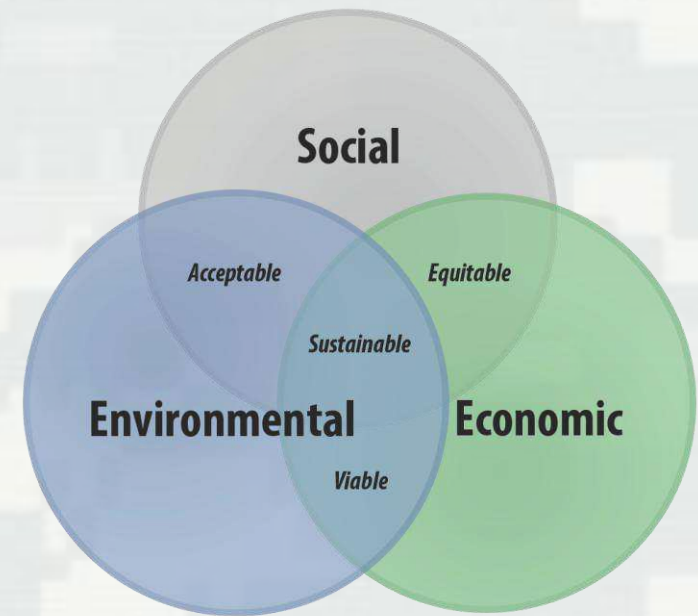


Engineering With Nature...

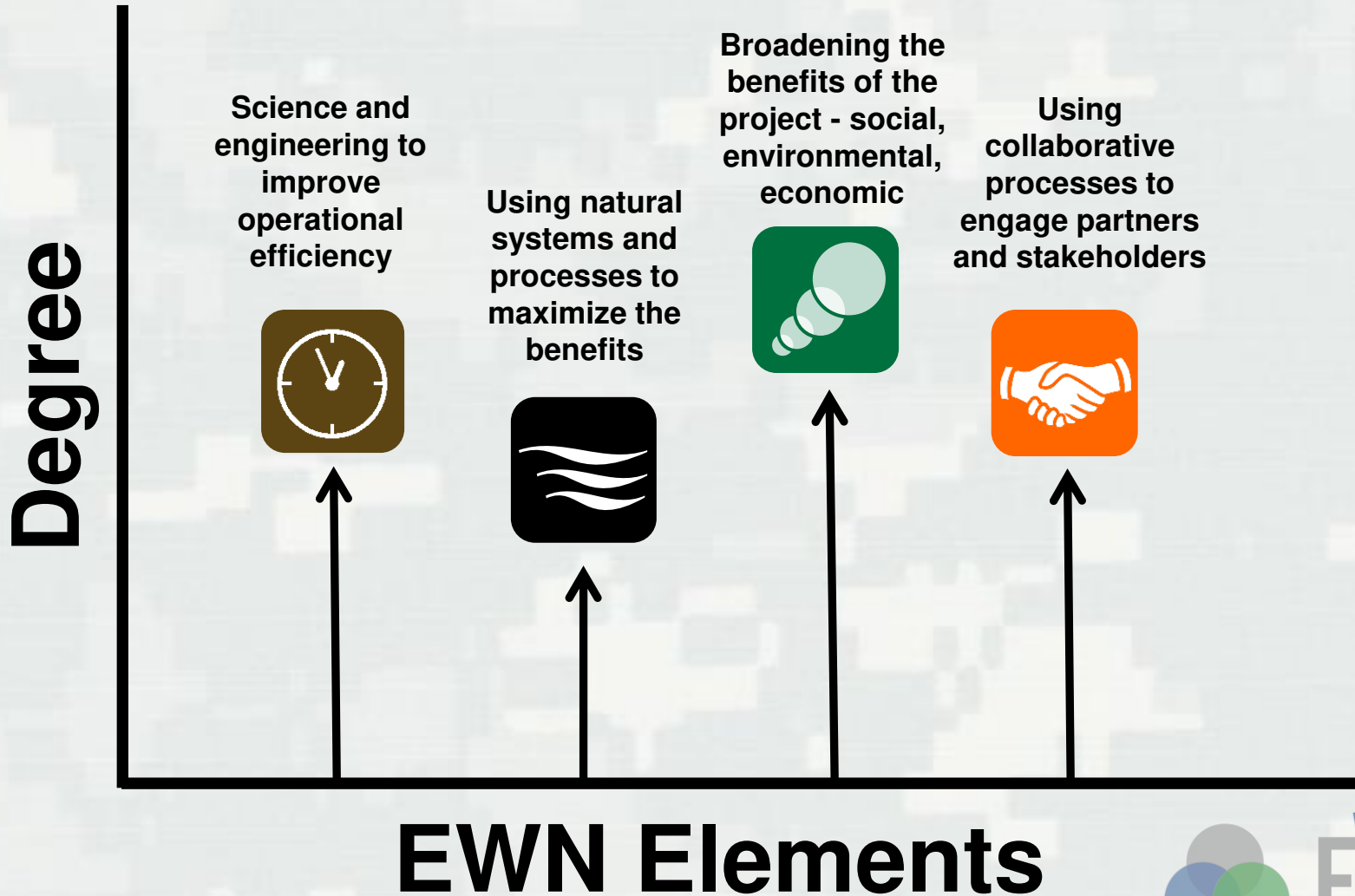
...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes.

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 Elements



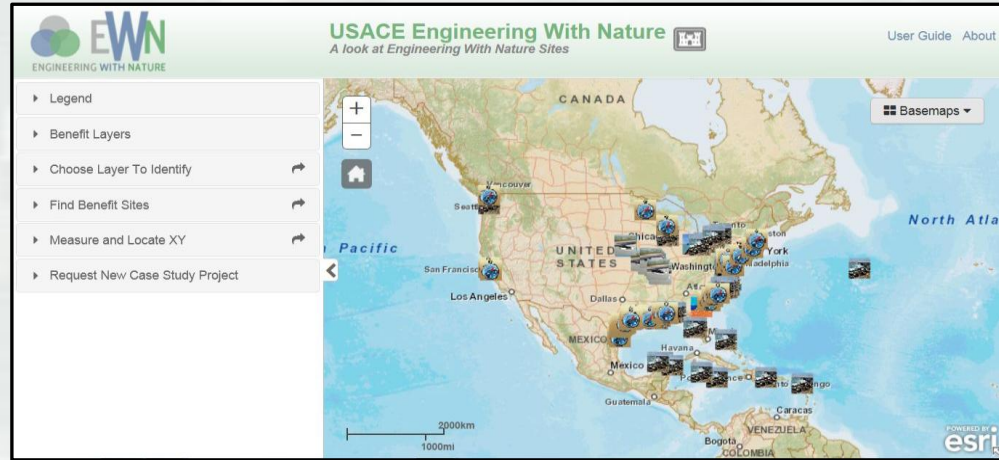
EWN Status

- *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.
 - ▶ Implementing strategic plan
 - ▶ Focused research projects on EWN
 - ▶ Field demonstration projects
 - ▶ Communication plan
 - ▶ Awards
 - 2013 Chief of Engineers Environmental Award (Natural Resources Conservation)
 - 2014 USACE National Award (Green Innovation)

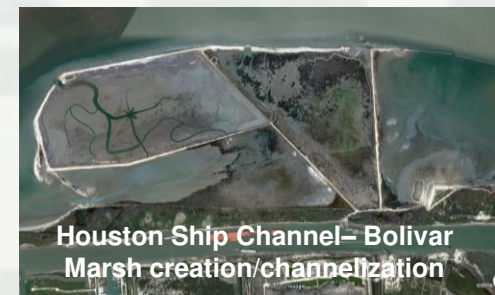


EWN Project Mapping Tool (EWN ProMap)

- 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



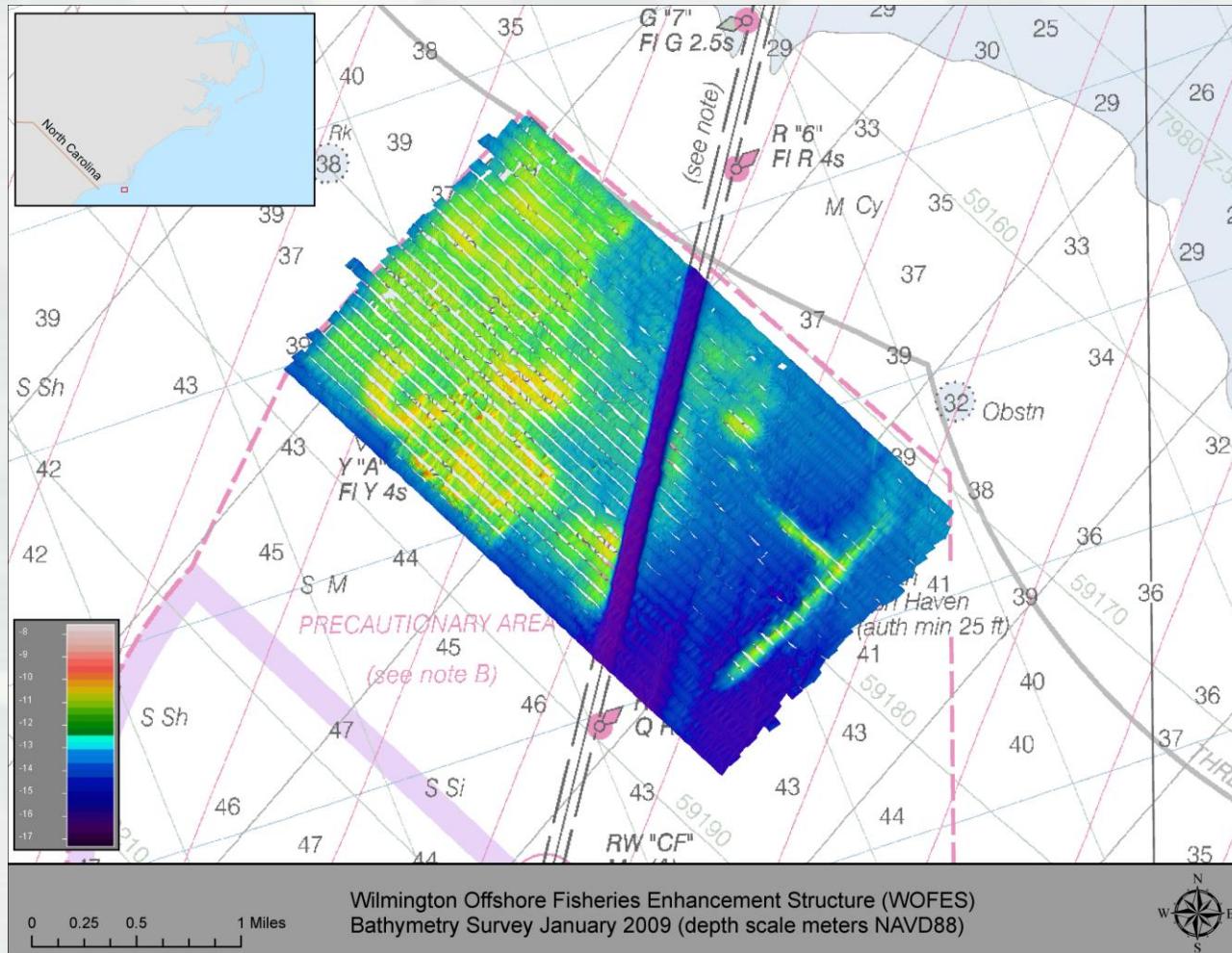
Example EWN Solutions



Notable SWG Beneficial Use Projects



Example EWN Solutions



Wilmington Offshore Fisheries Enhancement Structure



Example EWN Solutions

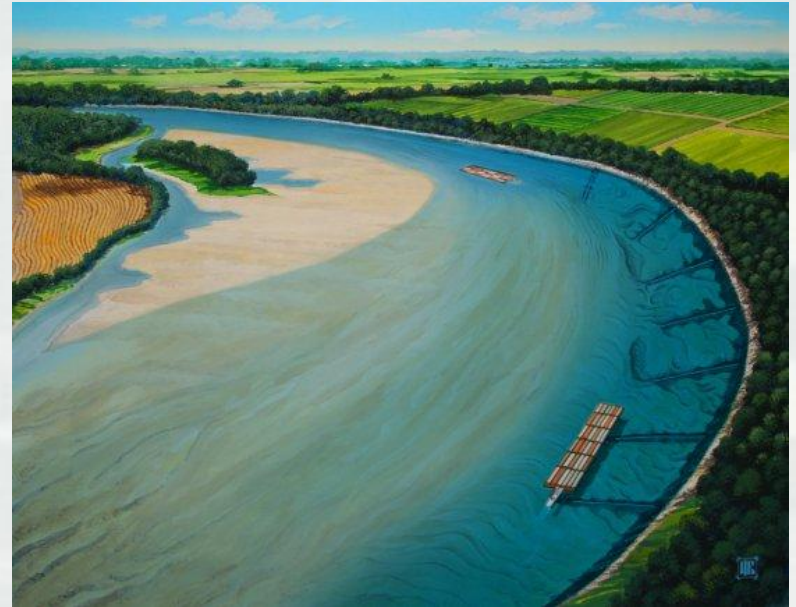
Ashtabula Breakwater Tern Habitat



Example EWN Solutions



**Upper Mississippi River Training
Structures: Chevrons**



River Bendway Weirs

2013 EWN Action Demonstration Projects

- 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)
- Atchafalaya River Island and Wetlands Creation Through Strategic Sediment Placement (Morgan City, LA)
- Portfolio Framework to Quantify Beneficial Use of Dredged Material (New Orleans and New England)
- Engineering Tern Habitat into the Ashtabula Breakwater (Ashtabula, OH)
- Living Shoreline Creation Through Beneficial Use of Dredged Material (Duluth, MN)
- A Sustainable Design Manual for Engineering With Nature Using Native Plant Communities



2014 EWN Action Demonstration Projects

- Landscape Evolution of the Oil Spill Mitigation Sand Berm in the Chandeleur Islands, Louisiana
- Guidelines for Planning, Design, Placement and Maintenance of Large Wood in Rivers: Restoring Process and Function (Collaboration with BoR)
- The Use and Value of Levee Setbacks in Support of Flood Risk Management, Navigation and Environmental Services (a strategy document)
- Strategic Placement of Sediment for Engineering and Environmental Benefit (an initial guide to opportunities and practices)



Engineering With Nature Across USACE

- Collaborating with NAP, LRE, SPN, MVN, on using sediment to enhance coastal resilience
- SWG and LRB serving as “proving grounds” for district-wide integration of EWN principles and practices



SWG: First EWN “Proving Ground”

- October 2014
- ~40 participants
- SWG, SWD, ERDC, IWR and HQ
- Identified opportunities to implement EWN within current and future projects



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



Engagement with NGOs

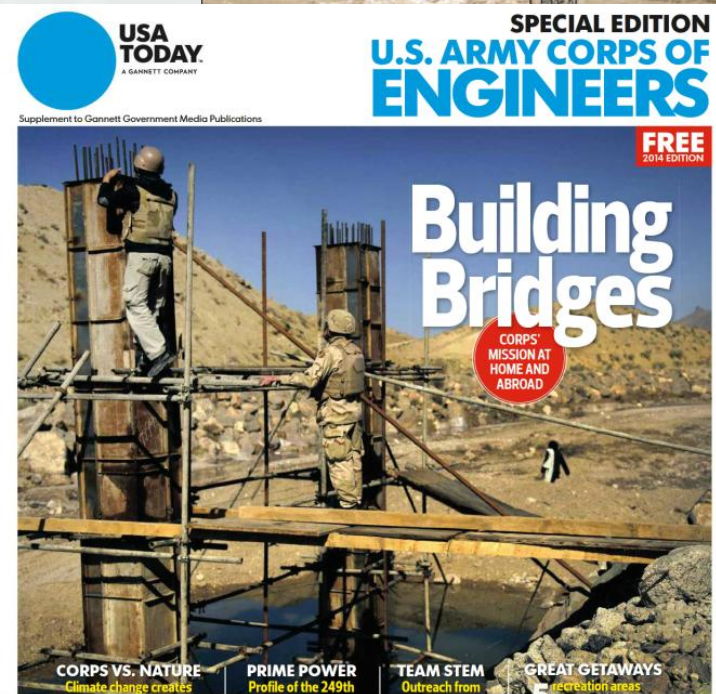
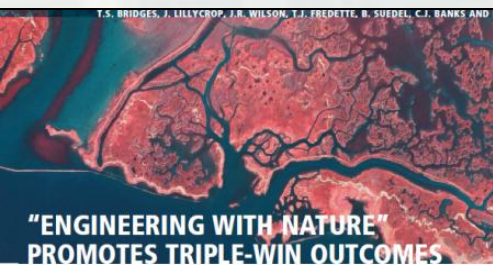
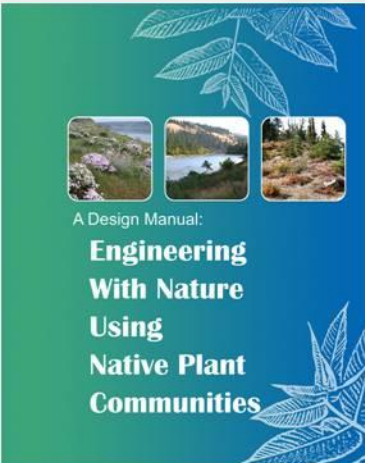
- National Wildlife Federation
 - ▶ Use of EWN for conservation and NNBF
- Environmental Defense Fund
 - ▶ Coastal resilience investment
- The Nature Conservancy
 - ▶ Science for Nature and People (SNAP)- Integrating Natural Defenses into Coastal Disaster Risk Reduction
- National Fish and Wildlife Foundation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



www.engineeringwithnature.org



Publications and Recognition



ABSTRACT

The US Army Corps of Engineers' "Engineering With Nature" (EWN) initiative supports sustainable development of infrastructure by advancing technical and communication practices in order to intentionally align natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaborative processes. The tools and projects that have been developed through EWN support planning, engineering, and operational practices that beneficially integrate engineering and natural systems to produce more socially acceptable, economically viable, and environmentally sustainable projects.

INTRODUCTION

Pursuing the objective of sustainable development of navigation infrastructure poses both challenges and opportunities for the US Army Corps of Engineers (USACE). Advancing best practices will involve identifying the practical actions that can be taken to better align and integrate engineering and natural systems to produce more socially acceptable, economically viable and environmentally sustainable projects. Engineers With Nature (EWN) is a USACE initiative that supports more sustainable practices, projects, and outcomes by working to intentionally align natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative

Above: Aerial photo of the wetlands at the Mississippi River Gulf Outlet taken in November 2013 as part of the Beneficial Use of Dredged Material Monitoring Program.

process (www.engineeringwith.com). The EWN initiative is developing practical methods for achieving a path toward an ecology to navigation infrastructure development operations that is applicable across USACE missions and business line.

Science, engineering and demonstration projects within the EWN initiative use of:

- 1) Science and engineering to support operational efficiencies supporting sustainable delivery of project;
- 2) Natural processes to maximize thereby reducing demand on resources and reducing the environmental footprint of projects, and the quality of project benefits;
- 3) Approaches that will broaden the base of benefits provided that include substantiated economic and environmental benefits;
- 4) Science-based collaborative problem organization and focus interests, and partners to reduce social and

The objectives of EWN are consistent with those communicated in the World Nature (WwN) philosophy of the

ERDC environmental research supports USACE civil works, military missions

A lot of U.S. Army Engineers Research and Development Center's (ERC) Environmental Laboratory (EL) work centers around and engineers were involved in the Gulf War. The center and military environmental chemists have been working to develop technologies to solve military challenges in the desert. This technology includes the use of plants to clean up contaminated areas, the use of bacteria to clean up contaminated areas, the use of plants to clean up contaminated areas, and the use of plants to clean up contaminated areas.

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of the Congressional, the Cleveland Mayor's Office will be recognized at the 33rd SPANIC World Congress in San Francisco in June 2014. The SPANIC World Congress is an international forum for scientists in collaboration with elected officials across the country to discuss the latest scientific research and its implications for policy. The Cleveland Mayor's Office is a partner for the DOE, Army and USACE that will reduce the costs for environmental remediation and improve the efficiency of the project's environmental results.

Development of a web-based ERIS database of more than 200 projects facilitating innovative environmental practice for water resources infrastructure.

- Initiating research to support resilient coastal systems in relation to climate change through the use of artificial and natural-based systems.

For more information on ERIS, please visit www.EngineeringWhisperer.org or contact Dr. Todd Bridges, senior research scientist for Environmental Laboratories, LLC. Dr. Bridges can be reached at 2014.TBridges@envi.com or [410-326-7000](tel:410-326-7000).

Environmental Laboratories, LLC was developed through environmental, LCA, green remediation technologies and engineering by USACE, the Army and DOE, and also have small affiliated projects by the USACE and DOE.

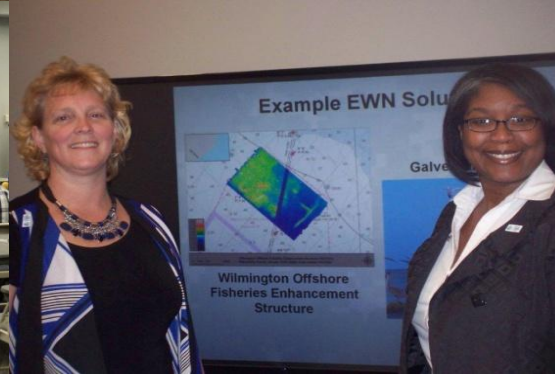
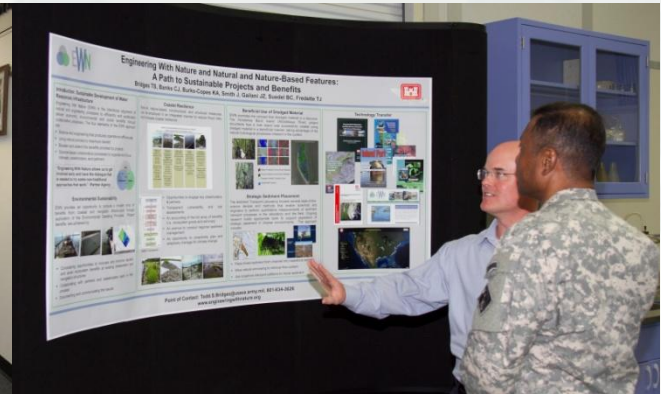
The Environmental Laboratory, in Rockville, MD, is a laboratory that leverages experts across disciplines, programs and geographic localities to provide innovative solutions to the world today. Our research is informed by the latest scientific research, the world's leading and the world's best. We are committed to providing innovative solutions for a safer, sustainable world.

CORPS V

TIME POWER

Great Getaway

Engagement and Workshops



Creating Value by Engineering With Nature

- Value arguments resonate
- Correcting the hyper-focus on risk is achieved by giving more attention to compensating benefits
- There are potentially valuable allies in “unlikely” places
- Our projects have the potential to product multiple benefit streams but we have to claim them and share the stories!



www.engineeringwithnature.org

