Moving Beyond the Status Quo

Needs:

- 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.

Sustainable Solutions Vision: “Contribute to the strength of the Nation through innovative and environmentally sustainable solutions to the Nation’s water resources challenges.”
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 Ingredients
- 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 was started within the USACE Civil Works program in 2010. Over that period we have:
  - Engaged > 300 ind. across USACE Districts (23), Divisions, HQ; other agencies, NGOs, academia, private sector, international collaborators
    - Workshops (10), dialogue sessions, project development teams, etc.
  - Developed a strategic plan
  - Initiated field demonstration projects
  - Focused research projects on EWN
  - Begun implementing our communication plan
EWN Project Mapper (ProMap)

- Online GIS database of projects illustrating EWN principles and practices
  - Illustrating the key attributes of EWN
- Currently contains >200 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 will be added through a process of self-nomination and independent evaluation

http://155.82.160.6/applications/opj/V013/public/viewer.swf
Lafitte’s Cove, TX

- Marsh sills created in front of bulkheads with cement bags
- Clean sand fill behind sill, *Spartina* planted
- Provide 14.7 acres of marsh
- Permit covers multiple properties on canal system
Alafia Banks Bird Sanctuary, FL

- 8000 lb reef module breakwaters (930 ft)
- Shore protection of Audubon bird sanctuary islands
- Help restore oyster populations
- Provide habitat

Example: [www.reefball.org](http://www.reefball.org)
Example EWN Solutions

Strategic Sediment Placement

Mobile Bay Thin-Layer Placement

North Tybee Island
Savannah, Georgia
Example EWN Solutions

Wilmington Offshore Fisheries Enhancement Structure

Wilmington Offshore Fisheries Enhancement Structure (WOFES) Bathymetry Survey January 2009 (depth scale meters NAVD88)
Example EWN Solutions

Upper Mississippi River Training Structures: Chevrons

River Bendway Weirs

Environmentally Enhanced Breakwater Toe Blocks
Example EWN Solutions

*Upper Missouri River Sandbar Habitat*

- $25 Million to construct 650 acres of sandbar
- 16,000 acres created by the flood of 2011

July 2009

November 2011

Courtesy: G. Pavelka
USACE, 2012
Example EWN Solutions

Loosahatchie Bar
Aquatic Habitat Rehabilitation
EWN Action Demonstration Projects

- Sediment Retention Engineering to Facilitate Wetland Development (San Francisco Bay, CA)
- Atchafalaya River Island and Wetlands Creation Through Strategic Sediment Placement (Morgan City, LA)
- Portfolio Framework to Quantify Beneficial Use of Dredged Material (New Orleans, LA 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
Process Research: Physical Processes within Wetlands

- **Problem**
  - Poor understanding of mixed sediment transport in vegetated regions with waves and currents
  - Unacceptable uncertainty when evaluating nearshore and wetland placement alternatives

- **Approach**
  - Laboratory experiments to quantify hydrodynamic and transport processes in vegetation
  - Laboratory experiments → 10’ flume; Investigated wave energy transformation and limited sediment studies
  - Field experiments (planned) → Tampa SAV, Fort Saint Phillip, Currituck Sound
Process Research: Sediment Processes in a Accreting Delta (Wax Lake, LA)
Facilitating Change: Dialogue Sessions on EWN

- 22 internal USACE stakeholders representing a diverse specialty areas and geography
  - Geographical Areas: Washington DC, Mississippi, Florida, New York, Massachusetts, Texas, Oregon, Alabama, New Jersey, South Carolina, Nebraska

- 34 external stakeholders representing a diverse population of organizations and regions
  - Geographical Areas: Those with responsibilities and expertise in coastal areas, rivers and lakes.
Barriers to EWN Adoption

External MM (n=34)
Internal MM (n=22) (Only common factors shown)
Overcoming Barriers to EWN

- Stakeholder Communication
- Collaboration & Partnering
- Demonstration Projects
- Leadership Support
- Increased Flexibility
- Address Policy/Process
- Address Uncertainty

External MM (n=34)
Internal MM (n=22) (Only common factors shown)
Engineering With Nature

- Expand the range of benefits provided through water-based infrastructure
  - Create value!
- Balancing consideration of environmental risks with project benefits
- A path to more sustainable projects
Engineering With Nature (EWN) is an initiative of the U.S. Army Corps of Engineers (USACE) to enable 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 - 2017" 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

21-23 MAY
USACE Coastal Resilience Conference: New Orleans, LA

1-5 JUNE
93rd EADC World Congress: San Francisco, CA

15-18 JUNE
Western Dredging Assoc. and Texas A&M University Conference: Toronto, Canada

WHAT'S NEW

Dr. Todd Bridges, Senior Research Scientist, describes how Engineering With Nature fits within the USACE Navigation mission.

FEEDBACK FROM OTHERS

"In the old days, the Corps would identify a problem and come up with a solution and approach fish and wildlife and its partners very late in the process after resources had been pretty much committed, especially in the design phase. But because it was so late in the process, there was never any discussion about alternatives and it was pretty much take it or leave it. Engineering With Nature allows us to get involved early and have the dialogue that is needed to try some non-traditional approaches that work." - Partner Agency
Questions?