

# Engineering With Nature

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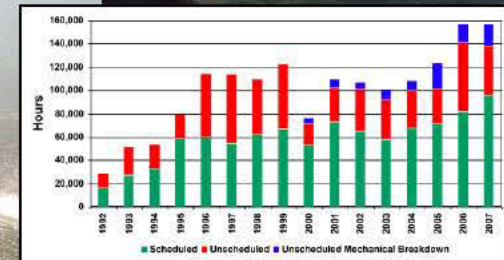
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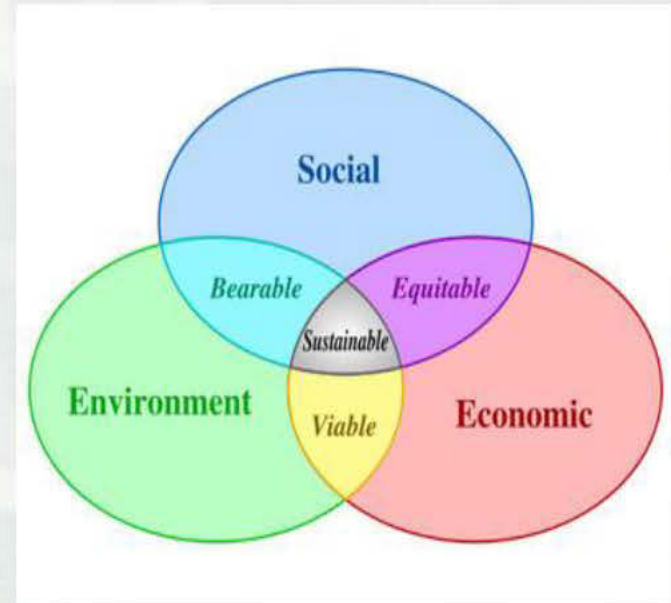
# The USACE Navigation Mission

To provide safe, reliable, efficient, effective and **environmentally sustainable** waterborne transportation systems for movement of commerce, national security needs, and recreation

# The Challenge

## *The Status Quo is Not An Option*

- USACE needs an efficient, cost effective way to achieve its missions, while simultaneously producing environmental and social benefits.
  - ▶ USACE infrastructure and operations are currently viewed as being in conflict with environmental and social interests
- We need to do this in a way that fosters collaboration and cooperation with our partners and stakeholders – Ports, commercial interests, EPA, NOAA, FWS, NGOs and others...
- ... While building respect and credibility for our program.

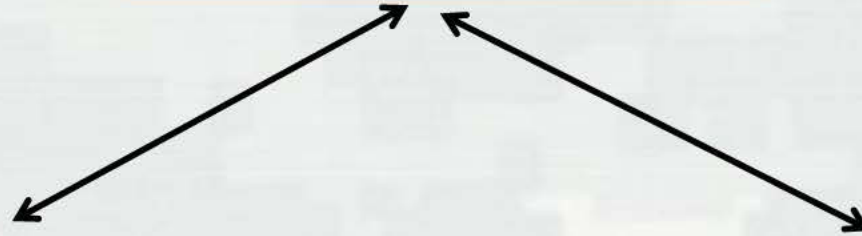


# Definition

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



***Working  
with Nature***



***Building  
with Nature***



***Engineering  
With Nature***



# Context

- The *Engineering With Nature* calls for an ecosystem approach whereby USACE (in collaboration with our partners and stakeholders) seeks to understand and use natural processes in order to achieve a broad range of project objectives within aquatic systems.
- An *Engineering With Nature* strategy for USACE will enable our navigation infrastructure development efforts to provide economic, environmental and social benefits – in a sustainable way – producing a “triple win”.
- EWN is consistent with and advances the USACE Environmental Operating Principles.

# Engineering With Nature

## *Guiding Principles*

- *Engineering With Nature* is:
  - ▶ A holistic, ecosystem approach for planning, designing, constructing and operating projects.
  - ▶ Focused on the long-term sustainability of the project and its benefits stream over time within the system.
  - ▶ Based on first understanding, then working deliberately with natural forces and processes to accomplish engineering goals.
  - ▶ Collaborative. It calls for effective stakeholder engagement from the initial stages of a project, through its completion.
  - ▶ Efficient and cost effective, reducing time and rework, while minimizing social friction.
  - ▶ Aligned with the values, interests and priorities of USACE, partners, stakeholders and society at large.
  - ▶ Provides a comprehensive framework and approach for pursuing effective beneficial use of dredged material
  - ▶ The right thing to do – socially, environmentally and economically.

# Engineering With Nature: *The Progression*

Inputs and Outputs  
*'Degree of'*

System Resilience

Efficiency

Benefits Related to the Project

**Outcomes**

**Inputs**

Communications and Technology Transfer

Technical Understanding

Innovation and Creativity

Diversity of Skills and Expertise

Stakeholder Engagement



Business  
as Usual

Understanding  
Natural  
Processes

Aligning  
Processes

Expanding  
Benefits

Enabling  
Self-Sustaining  
Benefits

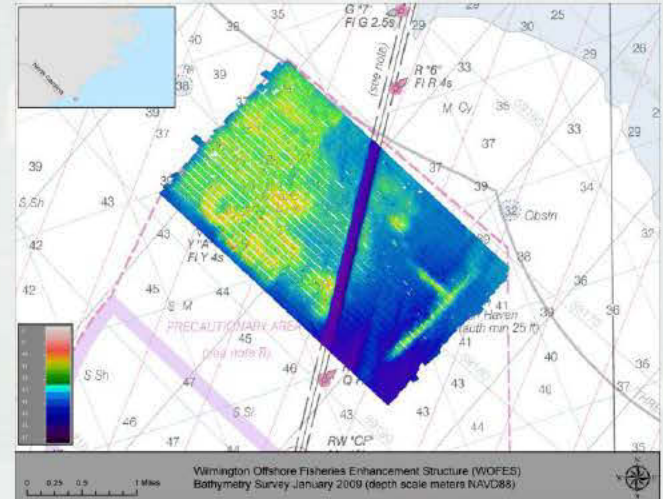
**STAGES**



# Other EWN Examples



**Poplar Island**



**Wilmington Offshore Fisheries Enhancement Structure**



**Photograph 2.12. A Series of Chevrons on the Mississippi River**



**Photograph 2.13. A Series of Chevrons Aligned To Split Flow Between the Main Channel and a Side Channel, While Protecting the Existing Shoreline**

## Upper Mississippi River Training Structures

# Engineering With Nature

## *Path Forward*

We will implement *Engineering With Nature* in the navigation program through a series of actions taken over the next year and 3-5 years:

1. Expand support and linkages within USACE
2. Engage external stakeholders through dialogue on EWN principles and opportunities.
3. Demonstrate the EWN approach through concrete case examples, which we will communicate broadly.
4. Focus R&D investments to expand technical and communication science capabilities required for successful EWN.
5. Establish leadership and partnerships on EWN through effective engagement and application