

# Engineering With Nature

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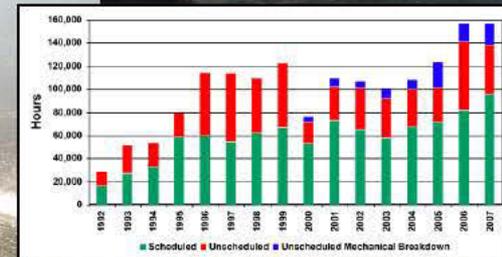
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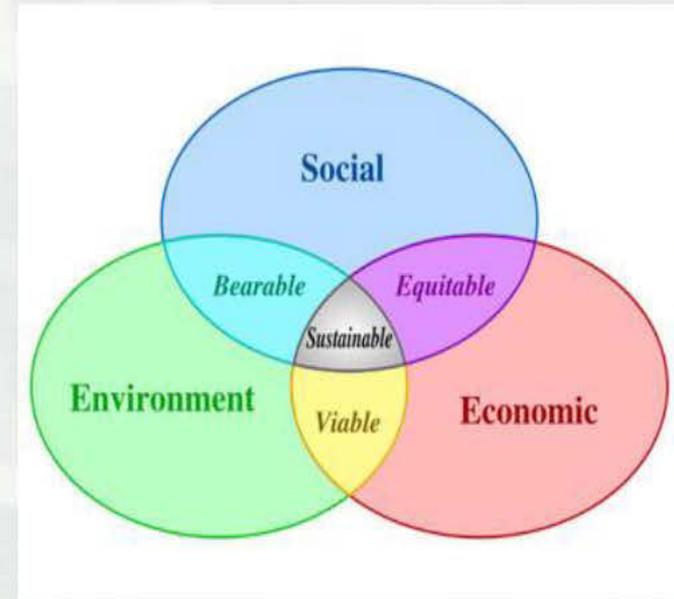
# The USACE Navigation Mission

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 USACE.



# Definition

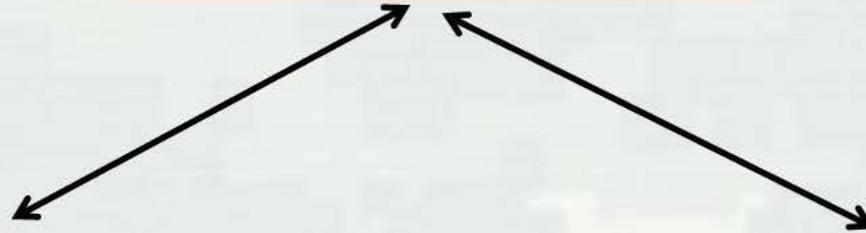
- *Engineering With Nature* is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits.

# 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.



***Working  
with Nature***



***Building  
with Nature***



***Engineering  
With Nature***



# 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**

# Project Perspective

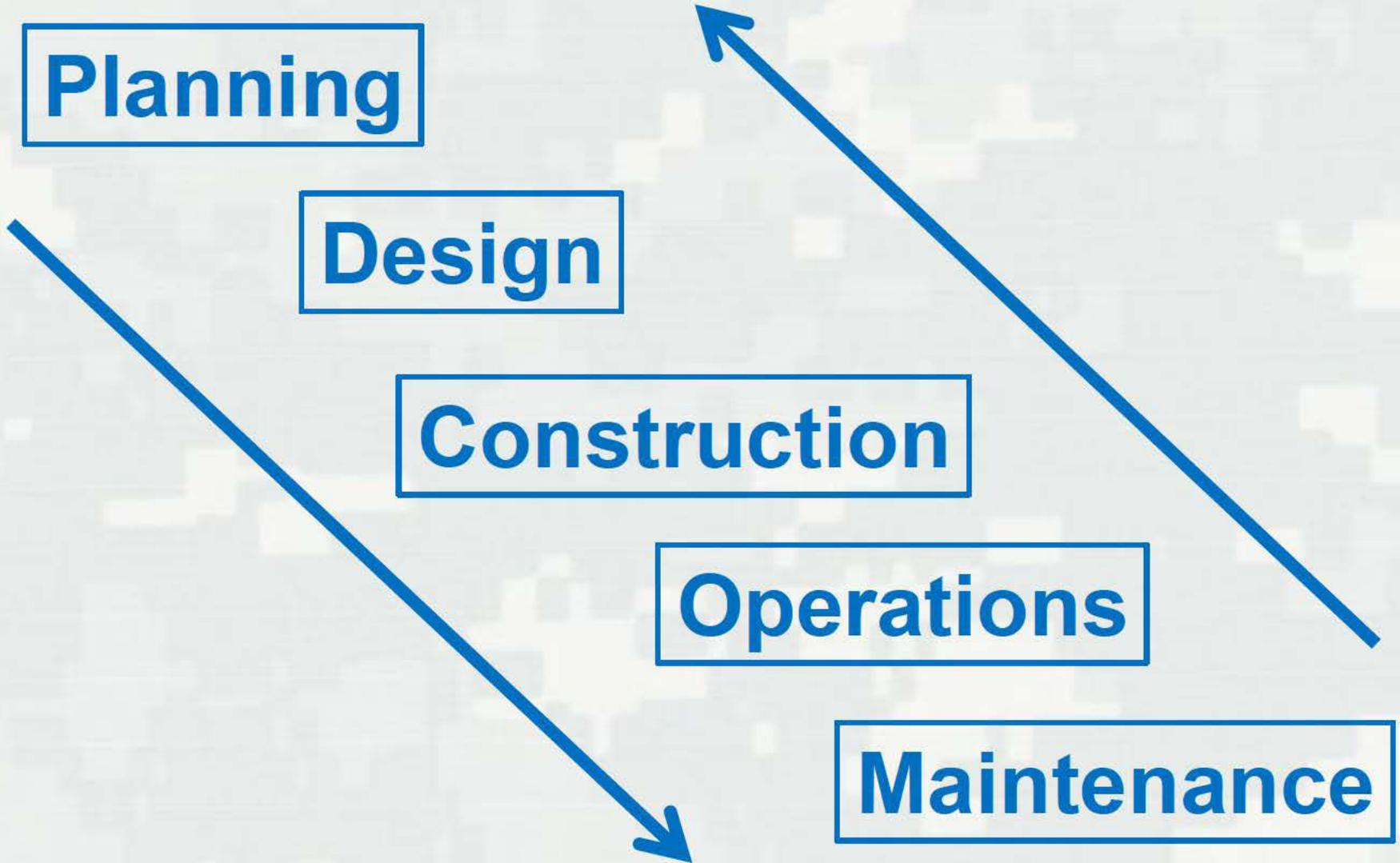
**Planning**

**Design**

**Construction**

**Operations**

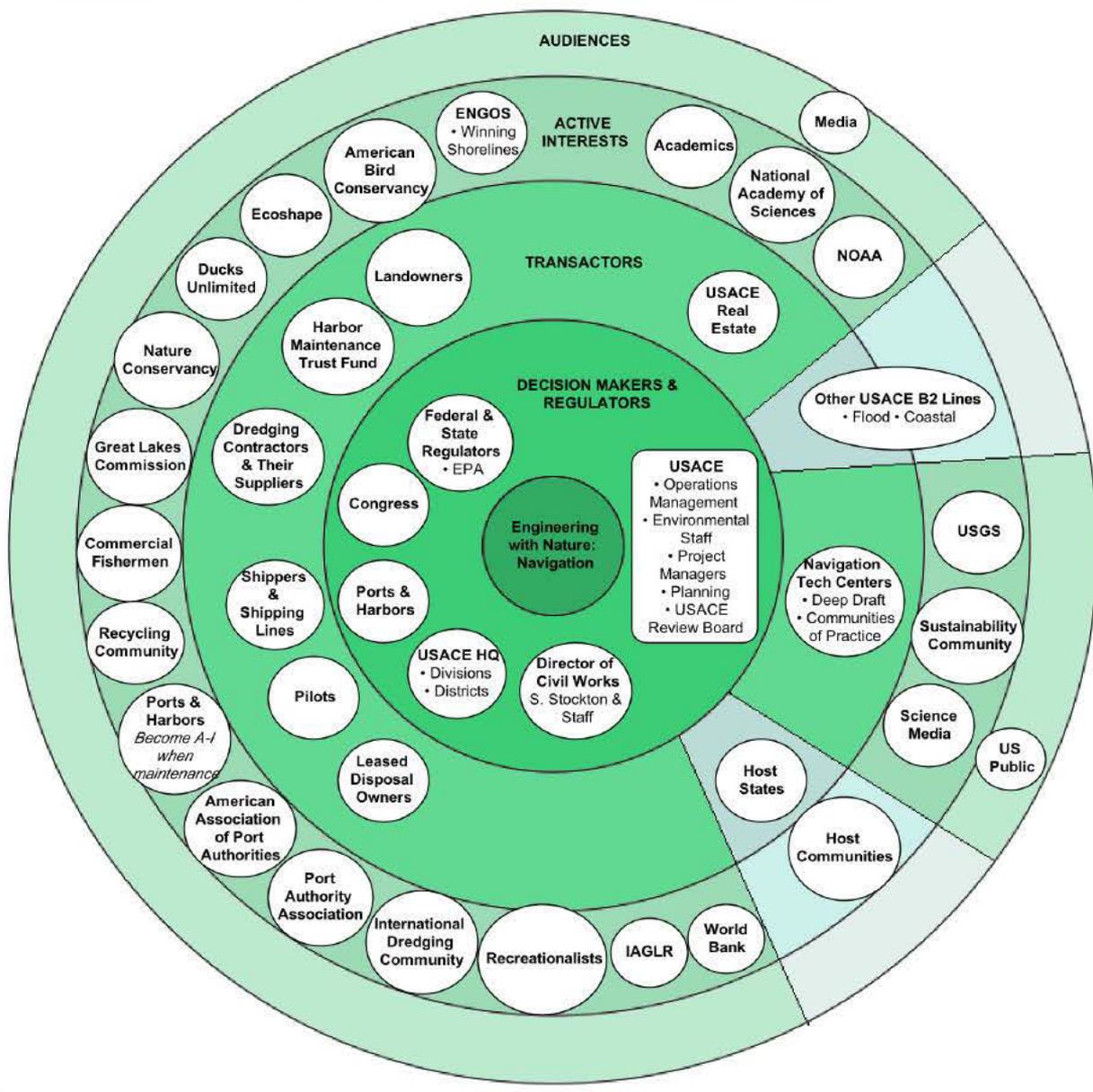
**Maintenance**



# Engineering With Nature Vision

- Starting in 2011, we will demonstrate this vision in action within our Navigation Program by working for increased environmental, economic and social value at the local, regional and system levels.
  - ▶ EWN is a cost effective approach enabling the navigation community to achieve...
    - Sustainable navigation systems,
    - Increased navigation safety and efficiency,
    - Expanded range of benefits
  - ▶ ...through the harmonious alignment of navigation, engineering and ecosystem functions.

# Engineering With Nature – Navigation – Draft Stakeholder Map



**Decision Makers / Regulators:** Stakeholders who have direct decision-making or regulatory authority.

**Transactors:** Stakeholders who are most affected by decisions regarding navigation and have some transaction (e.g., financial) in the decision-making process.

**Active Interests:** Individuals or groups who have a stake in navigation, but are not directly involved in the decision-making process.

**Audiences:** Individuals or groups that may have an interest in navigation, but are not directly affected by nor involved in the decision-making process.

# Engineering With Nature Path Forward

Over the next 5-7 years, we will implement *Engineering With Nature* in our navigation and dredging operations in three strategic waves:

1. Build our base of support within USACE and with key external stakeholders through dialogue on EWN principles and opportunities.
2. Focus R&D investments to expand technical and communication science capabilities required for successful EWN.
3. Demonstrate the EWN approach through concrete case examples, which we will communicate broadly.
4. Establish USACE leadership on EWN, while expanding our reach, capacity and evolution through a range of EWN applications.

# Immediate Next Steps – Wave 1

- Development and implementation of plans to build our base of support over the next 12 months include the following steps:
  - ▶ Agreement and alignment of navigation community on EWN opportunity – support for the principles and approach (e.g. USACE navigation leaders then National and Regional Dredging Teams and others).
  - ▶ A comprehensive EWN engagement and communications strategy developed by September, 2011 and followed by implementation. The strategy will include:
    - Broad outreach and communications within USACE to gain support within Operations and other business lines.
    - Engagement of USACE Districts, Divisions and Centers, including identification and engagement of early adopters.
    - Systematic engagement of key external stakeholders, starting with identification and engagement of early adopters within dredging contractor community, Port community, maritime and inland navigation, NOAA, EPA, FWS, States, USGS, etc.

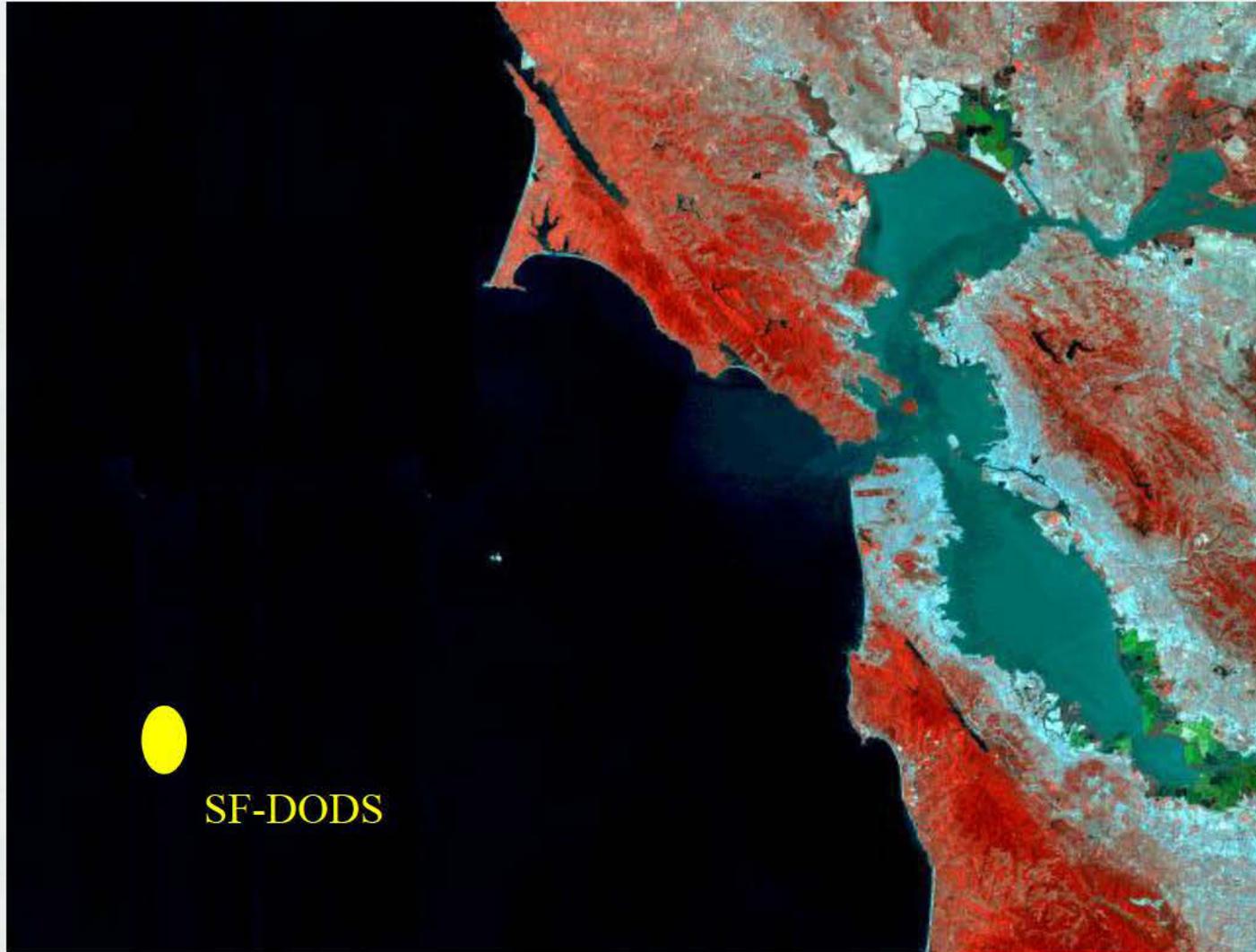
# Immediate Next Steps – Wave 1

- ▶ Develop a collaborative framework for EWN, integrating communications sciences with engineering and natural sciences.
- ▶ Begin to build social competencies – risk communications, behavioral communications, change management, etc. – within USACE.
- ▶ Initiate EWN projects using the new collaborative framework.
- ▶ Establish formal collaborations with international partners.

# Wave 1 – EWN R&D Requirements

- Over the next year, we will focus our R&D investments to expand our capabilities by:
  - ▶ Improving modeling and engineering capabilities for characterizing and using natural processes over the long term.
  - ▶ Defining informed processes, methods, tools and training to enable collaborative and constructive communications, action and outcomes among stakeholders.
  - ▶ Developing multi-objective system models and decision criteria frameworks.
  - ▶ Developing multi-metric benefits assessment tools.
  - ▶ Supporting structured demonstration and pilot projects.

The Poster-Child for EWN:  
*We need a better way to do business*



# Charge Questions

- What are the biggest opportunities for USACE to advance Engineering With Nature?
- What gaps in science, technology, engineering, or organizational practice should be addressed to advance Engineering With Nature?