



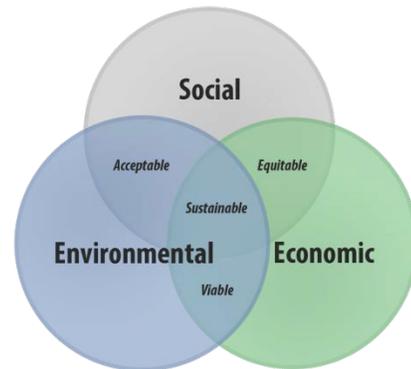
Sustainable development of water resources infrastructure is supported by solutions that beneficially integrate engineering and natural systems. With recent advances in the fields of engineering and ecology, there is an opportunity to combine these fields of practice into a single collaborative and cost effective approach for infrastructure development and environmental management. 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 – 2015" and contributes to the achievement of its Civil Works Mission and Goals.



*Strategic Placement: Nearshore placement of dredged material down-drift of Ft. Myers Inlet, FL. Waves disperse sediment and transport sand to the shoreline and fine sediment offshore.*

## What is EWN?

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



## The Elements of EWN:

1. Use science and engineering to produce operational efficiencies supporting sustainable delivery of project benefits.
2. Use natural processes to maximum benefit, thereby reducing demands on limited resources, minimizing the environmental footprint of projects, and enhancing the quality of project benefits.
3. Broaden and extend the base of benefits provided by projects to include substantiated economic, social, and environmental benefits.
4. Use science-based collaborative processes to organize and focus interests, stakeholders, and partners to reduce social friction, resistance, and project delays while producing more broadly acceptable projects.

## Moving Toward Sustainable Practices

Triple-win outcomes can be achieved through EWN by systematically integrating social, environmental and economic considerations into decision making and actions at every phase of a project. The result will be innovative and resilient solutions that are more socially acceptable, viable and equitable and, ultimately, more sustainable.



## EWN Guiding Principles

As a leading practice, EWN is:

- **Holistic** – an ecosystem approach for planning, designing, constructing and operating projects where social, economic and environmental factors are equitably weighed in the decision-making process.
- **Sustainable** – focused on the long-term sustainability and resilience of project solutions and the benefits streams provided by the system over time.
- **Science-based** – built on first understanding, then working deliberately with natural forces and processes to accomplish engineering goals.
- **Collaborative** – based on effective partner and stakeholder communication, engagement and collaboration through the entire life cycle of a project, beginning at the earliest conceptual stages.
- **Efficient and cost effective** – reducing time and rework, while minimizing social friction.
- **Socially responsive** – aligned with the values, objectives, interests and priorities of USACE, partners, stakeholders and society at large.
- **Innovative** – embracing new and emerging technologies and incorporating continuous learning, technology transfer and adoption of new and leading practices.

## Example EWN Opportunities

1. Strategic placement of sediments for beneficial use of dredged material – making use of hydrodynamics and natural transport processes to reduce shoreline erosion, provide storm protection, and build near-shore habitats.
2. Use of engineering features to focus natural processes to minimize navigation channel infilling, downstream degradation, and to transport and focus sediments for positive benefits.
3. Cost-efficient engineering practices for enhancing the habitat value of infrastructure.

4. Optimizing the use of natural systems, such as wetlands and other features, to reduce the effects of storm processes and sea level rise on shorelines and coasts.

5. Science-based communications processes to significantly improve stakeholder engagement, collaboration and communication.



*Stream and Bank Restoration: Understanding in-stream flow and vegetation dynamics to restore floodplain functionality while enhancing natural features*



*Passing sediments through reservoirs and dams restores sediment load downstream to reduce degradation and create/restore ecosystem and endangered species habitat*

## Implementing EWN

Advancing the use of EWN within current and future practice will be pursued through innovative demonstrations, communicating about lessons learned, focused research and development, and active engagement and collaboration with our partners and stakeholders.

**For More Information on EWN:** Please visit <http://www.engineeringwithnature.org> or contact Dr. Todd S. Bridges at [Todd.S.Bridges@usace.army.mil](mailto:Todd.S.Bridges@usace.army.mil).