# Engineering With Nature Geographic Project Mapping Tool (EWN ProMap)


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ERDC
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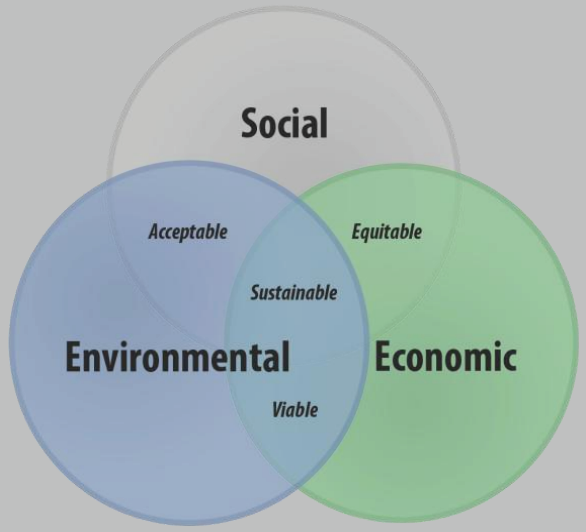


# Introduction

The EWN ProMap is an interactive on-line catalog of case studies that apply the EWN concepts for the purpose of informing existing and future water resource infrastructure projects or other project types. The primary objectives of the EWN ProMap are:

(1) to identify the types and geographic locations of existing projects,

(2) to assess the level of documentation that was available for projects related to their planning, project goals, design and assessment of success,

(3) to evaluate how well projects applied a set of criteria that have been developed to characterize EWN projects.

# EWN Key Elements

The four EWN elements have been rephrased as criteria that can be used to describe the degree to which a project applies the EWN concept. These criteria are:

Extent to which the project produces and makes use of efficiencies to contribute to sustainable delivery of project benefits, including consideration of how the project function is sustainable in the broader systematic context (e.g., regional watershed or sediment systems).

Extent to which natural processes are used to produce benefits and outcomes.

Extent to which the project and its configuration broaden the base of benefits provided (economic, social, and environmental).

Extent to which the project makes use of collaborative processes to organize and focus interests, stakeholders, and partners.

# Origin of EWN ProMap

- Initiated in 2010 as Environmental Enhancements and Navigation Infrastructure (EENI)
  - "A Study of Existing Practices, Innovative Ideas, Impediments, and Research Needs"
- Conducted literature and internet searches, telephone interviews, networking at technical meetings and conferences held with key individuals and groups to identify projects that successfully demonstrated EWN
- Particularly, web meetings with USACE district personnel utilizing Google Earth in an interactive mode to locate sites
- All of these efforts resulted in the development of a database of sites and related documentation.

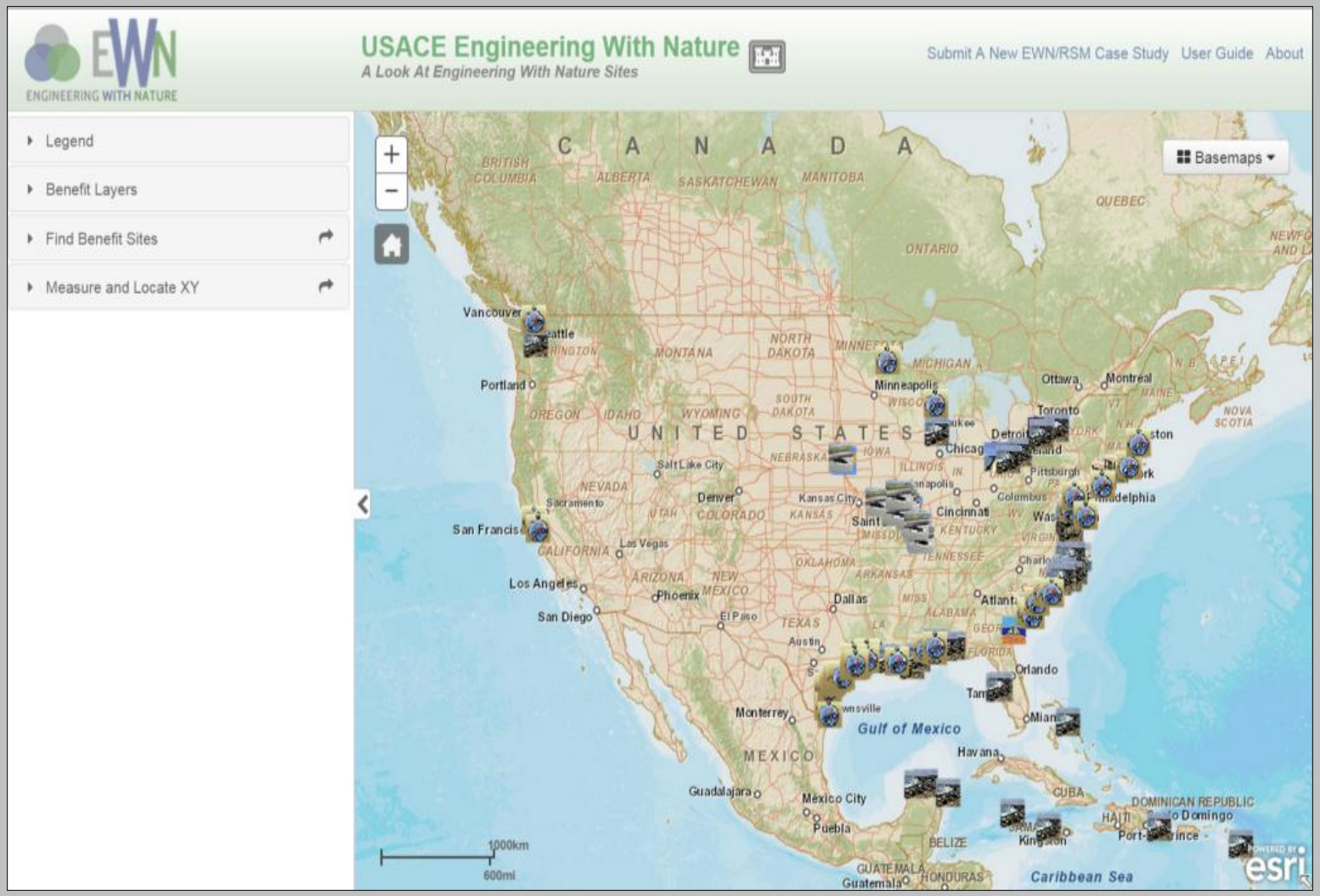
# Origin of EWN ProMap (cont.)

- To allow display and exploration of data and information associated with these projects, site information and location was initially gathered in a Google Earth project.
- The information in the Google Earth project was then developed into the EWN ProMap tool to provide users with greater functionality to screen the information of sites and to enable better search capabilities.

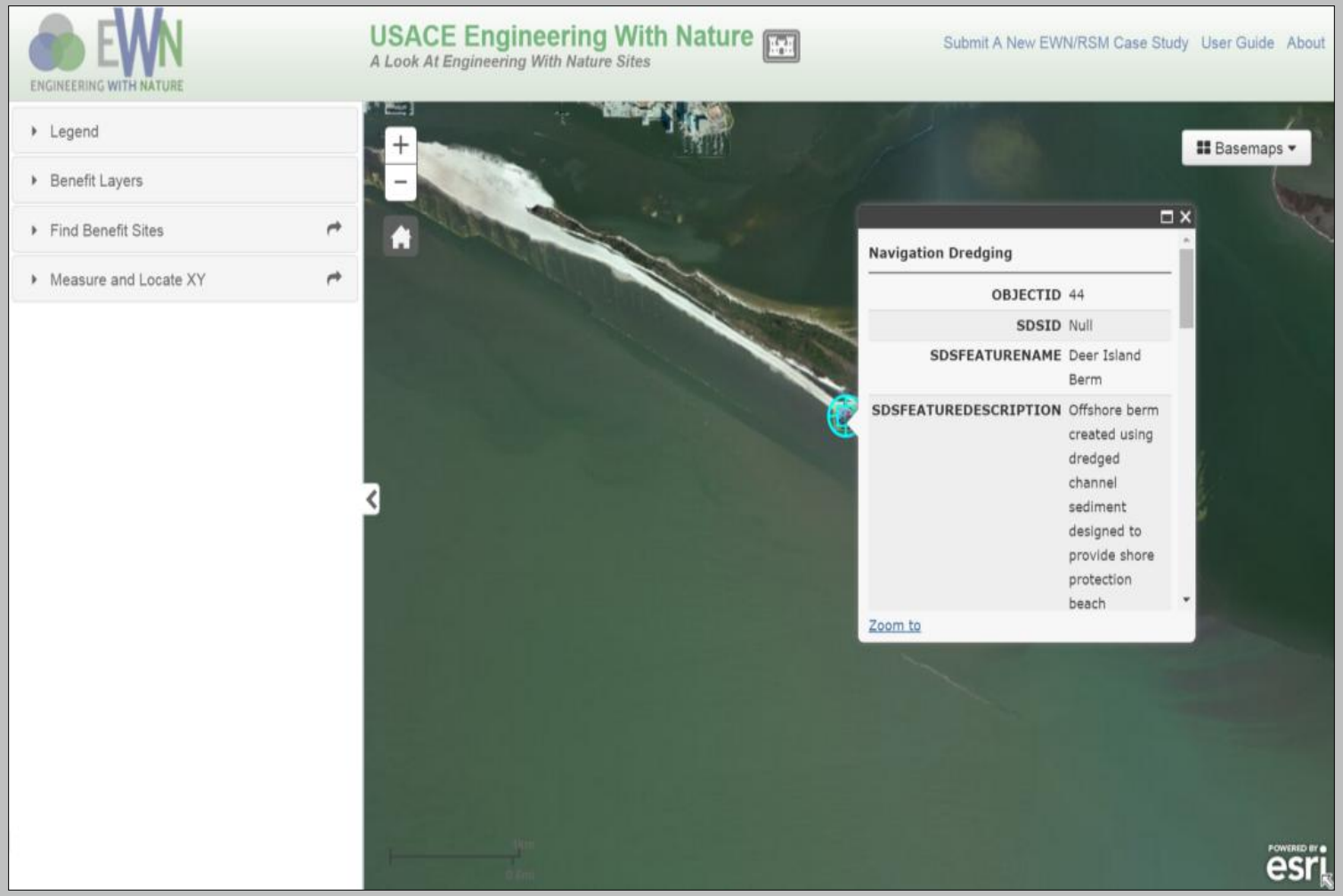
# EWN ProMap Evolution

- Previously based on
  - Esri's ArcGIS Application Programming Interface (API) for Flex 3.0
  - ArcGIS Online
- Currently based on
  - JavaScript architecture
  - ArcGIS Portal
  - Better Photo & Document Capabilities
  - Greater Collaboration Options
  - Easier Maintenance

# EWN ProMap Overview



# Example of EWN ProMap Zoomed to Project Scale



# Site Classifications Used in the Tool Panel

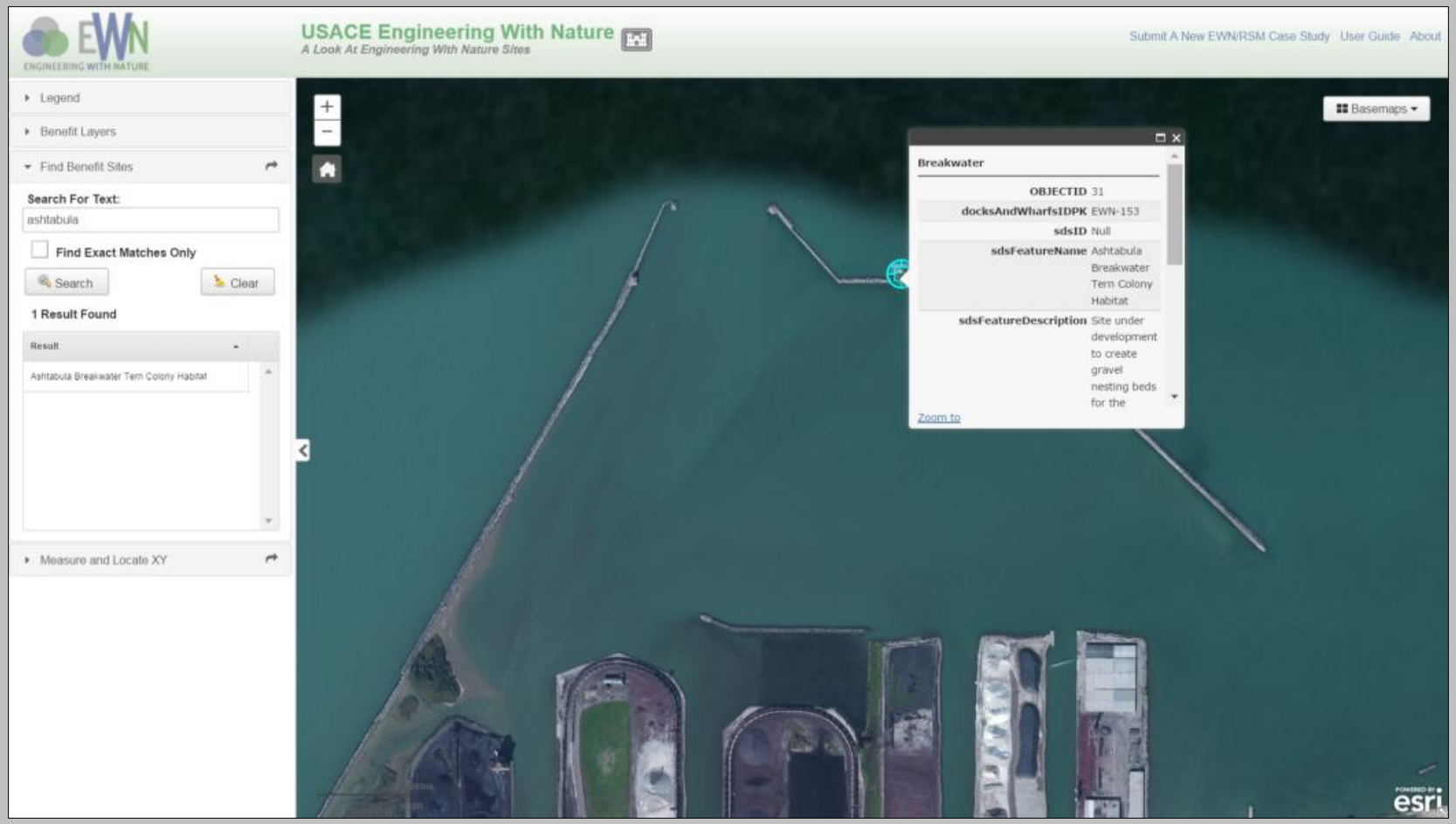
| Classification Acronym | Description | Information Content |
|---|---|---|
| **AIPT** | Associated Infrastructure Project Type | Defines the type of water resource project from which additional benefits are provided (Beach, Dike, Breakwater, Chevron, Pier, etc.) |
| **EWNB1** | Engineering With Nature Benefit 1 | Defines the first EWN benefit intended by project designers (Fish Habitat, Bird Habitat, Recreation, Beach Nourishment, etc.) |
| **EWNB2** | Engineering With Nature Benefit 2 | Defines the second EWN benefit intended by project designers |
| **EWNB3** | Engineering With Nature Benefit 3 | Defines the third EWN benefit intended by project designers |

# AIPT and EWN Benefit Selections Available in the Tool Panel

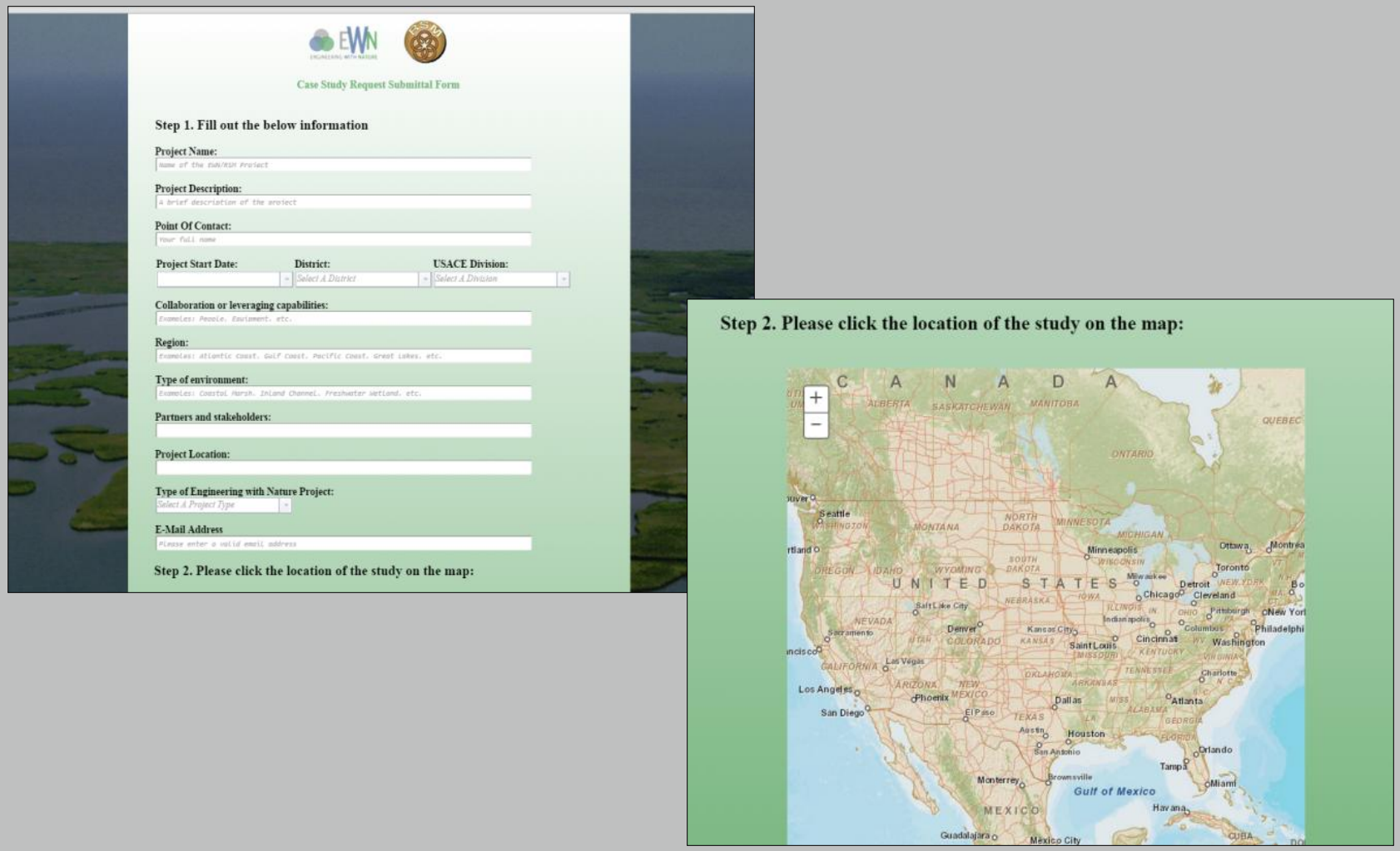
| Available AIPT Selections | Available EWN Benefit Selections |
|---|---|
| Breakwater | Aesthetics |
| Bulkhead | Beach nourishment |
| Chevron | Bird habitat |
| Dike | Fish habitat |
| Groin | Invertebrate habitat |
| Jetty | Island restoration |
| Multiple round point | Mammal habitat |
| Navigation dredging | Recreation |
| Pier/wharf | Reptile habitat |
| Revetment | Shore protection |
| Seawall | Vegetated habitat |
| Shore protection | |

# Tool Panel Site Selection Function

# Display of Site Name Search Feature



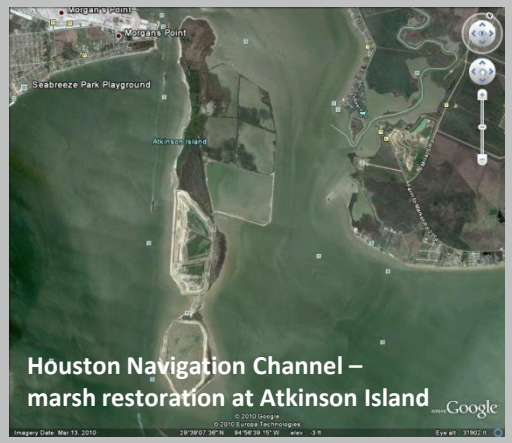
# Case Study Submission Process



# Case Studies Examples

- There are a multitude of existing projects that exemplify aspects of the EWN approach that meet one or more of the four criteria.
- Projects range from marine to coastal to riverine environments.
- Although multiple projects have been identified that met EWN criteria, documentation of goals and monitoring of success has been scarce.
- The case studies presented are those that best exemplify the EWN concept by meeting most of the EWN criteria.

# Notable Galveston District Beneficial Use Projects



Houston Navigation Channel – marsh restoration at Atkinson Island

Texas City Channel –1,000 acres of marsh in Lower Galveston Bay

Sabine-Neches Waterway– Bessie Heights Marsh

GIWW– Aransas National Wildlife Refuge – 1,600 acres of marsh

Brazos Island Harbor – 3,000 feet of beach nourishment at South Padre Island

Port Mansfield Channel – 3 acres beach nourishment

Chocolate Bayou – marsh creation

Houston Ship Channel – Evia Island – 6 acre bird nesting habitat

Houston Ship Channel– Bolivar Marsh creation/channelization

*Courtesy of Tricia Campbell*

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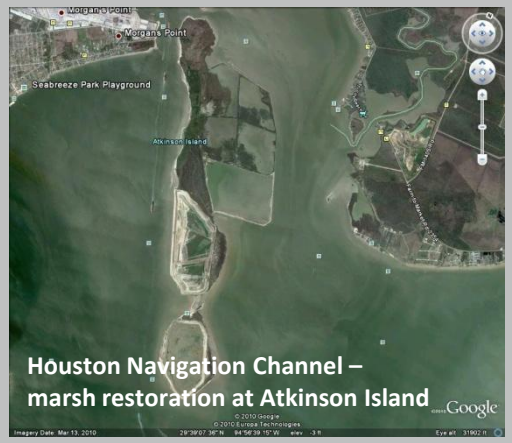

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Houston Ship Channel– Bolivar Marsh creation/channelization

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# Case Study #1

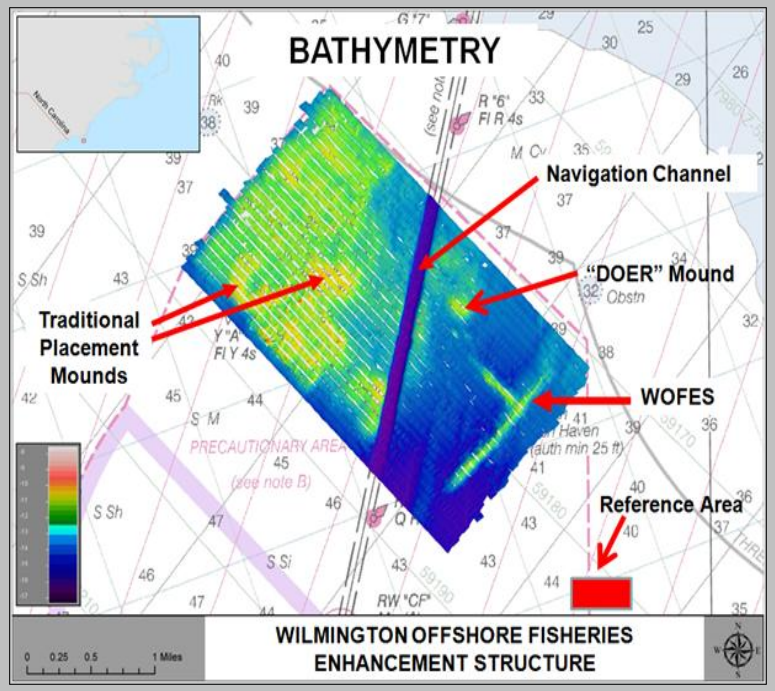
- Evia Island (Galveston Bay, TX)
- 6-acre island was constructed using sediment dredged during the deepening of the Houston Ship Channel in 1998
- Birds making use of habitat provided by the island
- Producing significant environmental benefits

# Case Study #2

- Island Creation along the Atchafalaya River, LA
- As placement sites continue to become exhausted, there was a need for more creative placement alternatives in the Gulf Coast.
- In 2002, strategic placement of the sediment dredged from Horseshoe Bend occurred at the mid-river open water placement area.
- Strategic placement of between 0.5 to 1.8 million cubic yards of sediment was conducted every 1-3 years developing  an ~35 ha island mid-river.
- Producing significant environmental and economic benefits

# Case Study #3

- Wilmington Offshore Fisheries Enhancement Structure (Wilmington, NC)
- Created in 1994-1997 from 764,600 cubic meters of limestone dredged as part of the Wilmington channel deepening
- Located three nautical miles off of the mouth of the Cape Fear River in North Carolina
- The location and design of the reef involved extensive participation by stakeholders, and the North Carolina Department of Environment and Natural Resources supported the project as a local sponsor.
- Produced significant social benefits as a popular destination for fishing tournament participants



# Next Steps

- Document, document, document!
- Future enhancements for EWN ProMap include:

(1) incorporating the ability to export information to other platforms such as Google Earth

(2) Integrate with other USACE enterprise systems such as CorpsMap. The Esri Portal software platform currently being used will facilitate these efforts due to its compatibility with these other systems.

# In Summary

- The EWN ProMap is an evolving tool.
- The EWN ProMap includes ~175 projects.
- We are continuously promoting and fully expect that users will become aware of the EWN ProMap in the future and will submit additional projects via the 'Submit a New Case Study' feature.
- The EWN ProMap is made available to any user with internet access (http://gis2.sam.usace.army.mil/applications/opj/v013/) without individuals needing an Esri ArcGIS license.

# Questions?

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