



U.S. ARMY

Engineering With Nature

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U.S. Army Engineer Research and Development Center

Infrastructure and Nature
November 5, 2020

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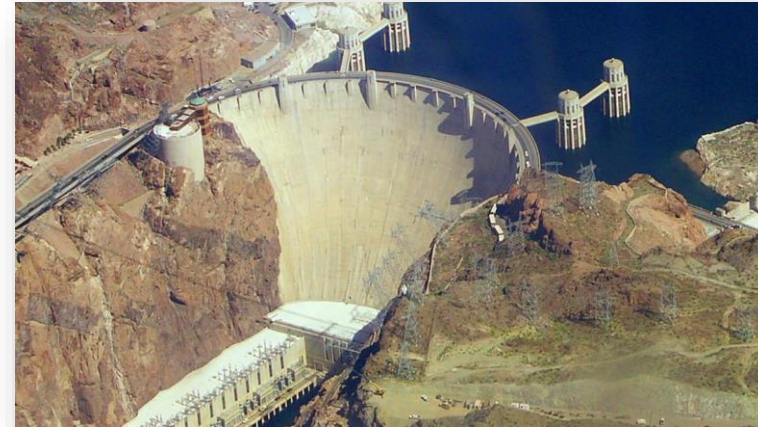
US Army Corps
of Engineers



EL. 279.00

1900-2000: The Century of Infrastructure (US)

- 4,071,000 miles of roadway
 - 47,182 miles in the Interstate system
- 149,136 miles of mainline rail
- 640,000 miles of high-voltage transmission lines
- 614,387 bridges
- 90,580 dams
- >30,000 miles of flood levee
- 155,000 public drinking water systems
- 4,500 military installations
- 926 ports, 25,000 miles of navigation channel



The Multi-Hazard World



David Johnston, USGS



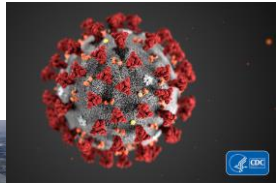
Mt. Saint Helens, 1980



San Francisco, 1906



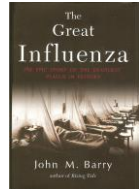
New Madrid Seismic Zone



COVID-19, 2020-X



HABs, Lake Erie; 2008-2017



H1N1, 1918-1919



Beirut, Lebanon; 2020



Fukushima, 2011



Three Mile Island, 1979



Deepwater Horizon, 2010



9/11



Civil unrest, 2020



Medfly "bio-attack"; CA, 1989



Dust Bowl, 1930s



Camp Fire; CA 2018



Offutt AFB, 2019



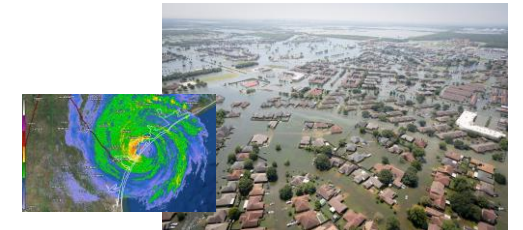
Banqiao dam failure; China, 1975



Hurricane Katrina, 2005



Tallulah, LA; 1927



Hurricane Harvey; landfall and Houston, 2017

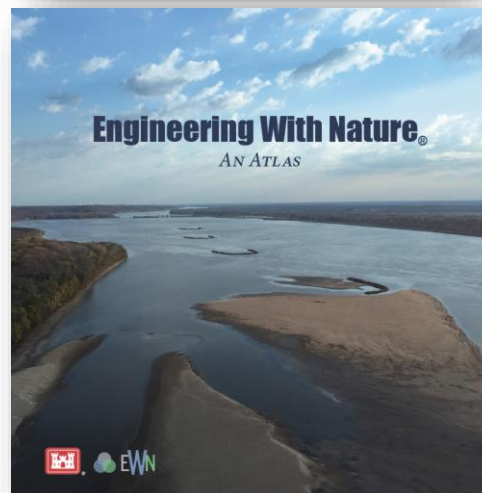
Engineering With Nature®

...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaboration.

Key Elements:

- 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

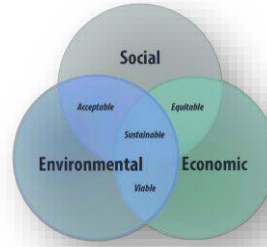
www.engineeringwithnature.org



EWN for Triple Wins

Multi-Function Benefits

- Engineering On or For nature becomes engineering With nature
- Bridging organizational missions and sectors to expand the value proposition for solutions
- Diversifying the financing of solutions to produce economic, environmental, and social value



Federal Register / Vol. 84, No. 206 / Thursday, October 24, 2019 / Proposed Rules 56977

PRESSURE CONTROL VALVE SETTING OR RELIEF VALVE SETTING

Maximum start-to-discharge pressure (psig)	Maximum permitted filling density (percent by weight)			
	Ethylene	Ethylene	Ethylene	Hydrogen
17				6.60
45				
75	51.1	51.1	51.1	32.5
10 psig	50 psig	50 psig	50 psig	12 psig
Maximum pressure when offered for transportation	Minus 200 °F	Minus 200 °F	Minus 155 °F	Minus 423 °F
Design service temperature Specification (see § 180.507(b)(3) of this subchapter)	1130K10W	1130I120W	1130I120W	113A175W, 113A120W

DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service

50 CFR Part 17
Docket No. FWS-R4-ES-2018-0002; FWS-113090000-178-FF0922000; RIN 1018-BC11

Endangered and Threatened Wildlife and Plants; Removal of the Interior Least Tern From the Federal List of Endangered and Threatened Wildlife

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to remove the inland population of the least tern (interior least tern) (*Sterna (now Sterna) antillarum*), from the Federal List of Endangered and Threatened Wildlife. The interior least tern is a bird that nests adjacent to major rivers of the Great Plains and Lower Mississippi Valley. This proposed action is based on a thorough review of the best available scientific and commercial data, which indicate that the interior least tern has recovered and no longer meets the definition of an endangered or a threatened species under the Endangered Species Act of 1973, as amended (Act). The review shows that threats identified for this species at the time of listing, i.e., habitat loss, curtailment of range, predation, and inactivity of regulatory mechanisms, have been eliminated or reduced, and the interior least tern has increased in abundance and range. We also announce the availability of a draft post-delisting monitoring (PDM) plan for the interior least tern. We seek information, data, and comments from the public regarding this proposed rule and the associated draft PDM plan.

DATES: We will accept comments received or postmarked on or before December 23, 2019. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for public hearings, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by December 9, 2019.

ADDRESSES: Written comments: You may submit comments on this proposed rule and the associated draft PDM plan by one of the following methods:
(1) **Electronically:** Go to the Federal eRulemaking Portal: <http://www.regulations.gov>. In the Search box, enter FWS-R4-ES-2018-0002, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rule box to locate this document. You may submit a comment by clicking on "Comment Now."
(2) **By hard copy:** Submit by U.S. mail to the Public Comments Processing, Attn: FWS-R4-ES-2018-0002, U.S. Fish and Wildlife Service, MS: BPHK, 5275 Leesburg Pike, Falls Church, VA 22041-3803.

We request that you send comments only by the methods described above. We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see Public Comments, below, for more information).
Document availability: The proposed rule, draft PDM plan, and supporting documents are available at <http://www.regulations.gov> under Docket No. FWS-R4-ES-2018-0002.
FOR FURTHER INFORMATION CONTACT: Stephen Raska, Field Supervisor, U.S. Fish and Wildlife Service, Mississippi Ecological Services Field Office, 6078 Dogwood View Parkway, Jackson, MS 39213; telephone (601) 521-1122. Individuals who use a telecommunications device for the deaf (TDD), may call the Federal Relay Service at (800) 877-8339.

SUPPLEMENTARY INFORMATION:
Executive Summary
Why we need to publish a rule: Under the Act, we are required to conduct a review of all listed species at least once every 5 years (5-year review) to review their status and determine whether they should be classified differently or removed from listed status. In the Act, the term "species" includes "any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate fish or wildlife which interbreeds when mature." Therefore, we use the term "species" to refer to the interior population of the least tern in this proposed rule. In our 2013 5-year review for the interior least tern, we recommended removing the interior least tern from the List of Endangered and Threatened Wildlife (i.e., "delisting" the species). However, to change the status of a listed species under the Act, we must complete the formal rulemaking process. Therefore, we are publishing this proposed rule in the Federal Register and seeking public comments on it. Within 1 year of the publication of this proposed rule, we will make a final determination on the proposed action to delist the interior least tern (*Sterna (now Sterna) antillarum*).
The basis for our action. Under the Act, we may delist a species if the best scientific and commercial data indicate

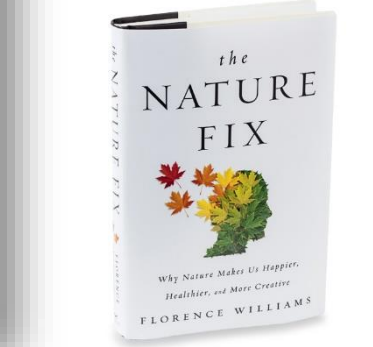
Mississippi Valley Division | Engineer Research and Development Center

US Army Corps of Engineers

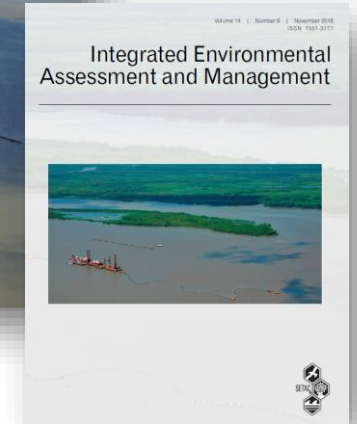
Conservation Plan for the Interior Least Tern, Pallid Sturgeon, and Fat Pocketbook Mussel in the Lower Mississippi River (Endangered Species Act, Section 7(a)(1))

MRG&P Report No. 4 - November 2014

MRG&P
Mississippi River
Geomorphology &
Potamology Program



Horseshoe Bend Island, Atchafalaya River



Quantifying Wildlife and Navigation Benefits of a Dredging Beneficial-Use Project in the Lower Atchafalaya River: A Demonstration of Engineering with Nature[®]

Christy M Foran,[†] Kelly A Burks-Copes,[‡] Jacob Berkowitz,[‡] Jeffrey Corbino,[§] and Burton C Suedel^{*‡}

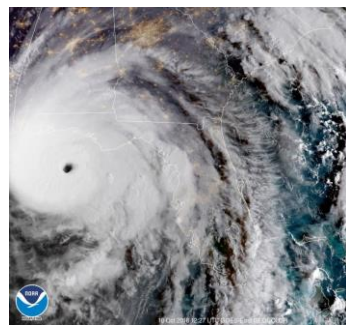


Project Awards:

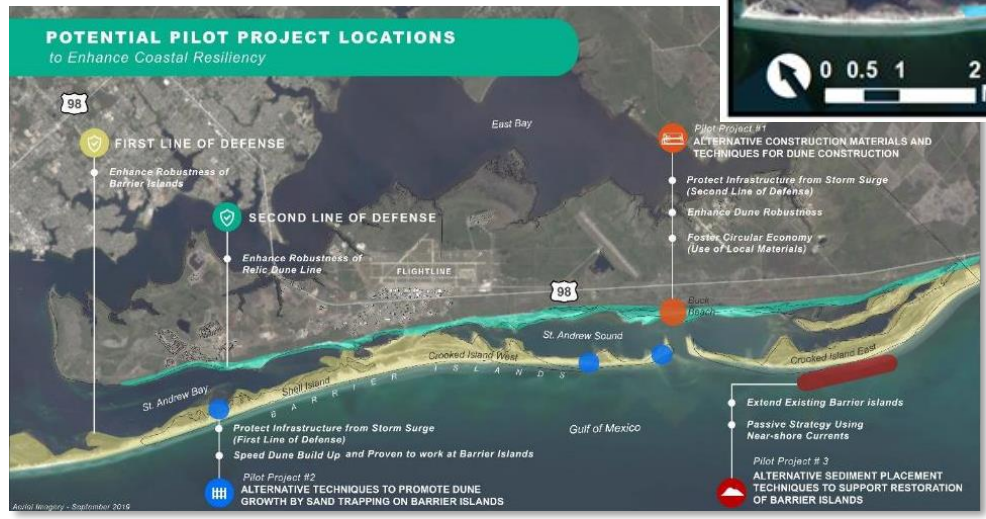
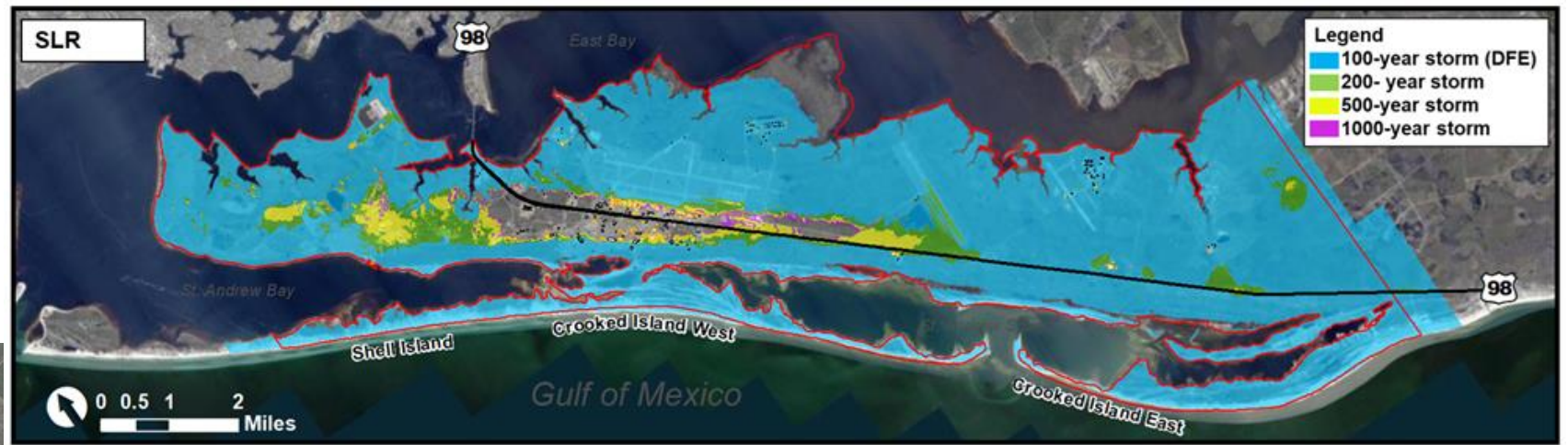
- 2015 Western Dredging Association Award for Environmental Excellence
- 2017 Western Dredging Association Award for Climate Change Adaption
- 2017 Dredging and Port Construction Award for Engineering with Nature
- 2020 USACE Green Innovation Award



EWN Applied to Tyndall Air Force Base Rebuild

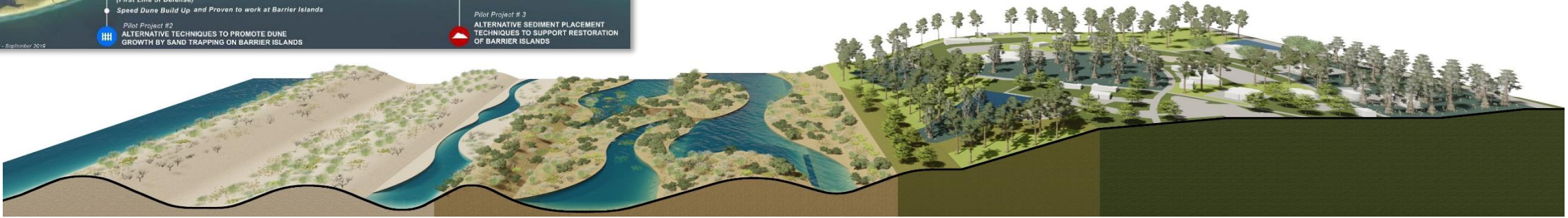


Hurricane Michael, 10-11 OCT, 2018



Tyndallcoastalresilience.com

EngineeringWithNature.org,
EWN Podcast Episode 3, BG Melancon

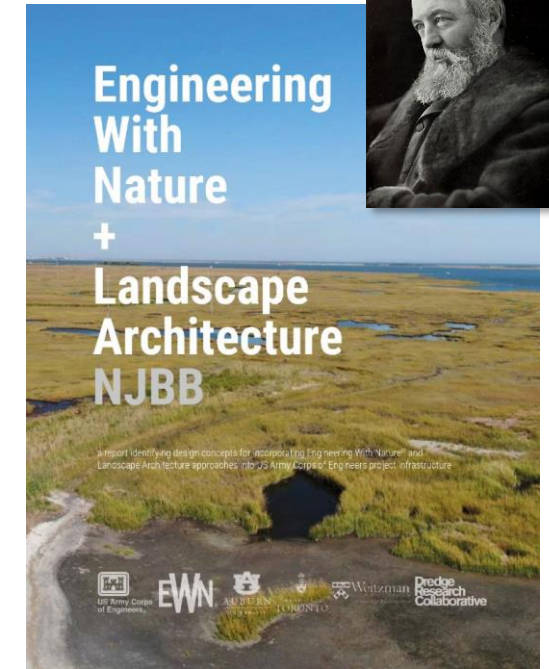
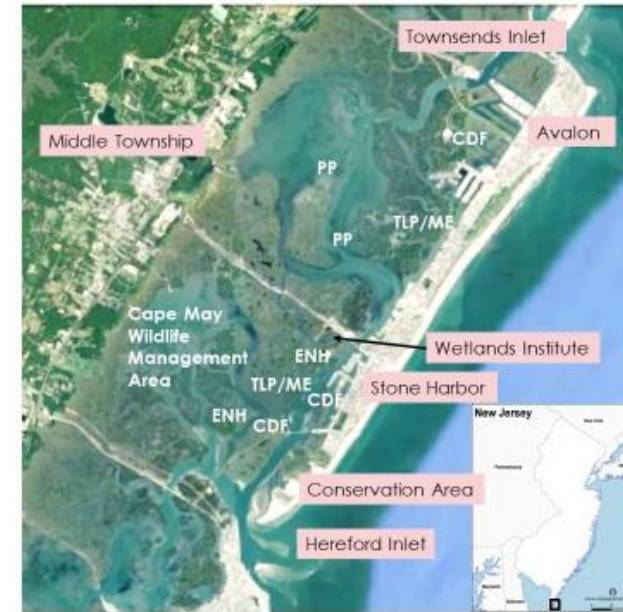


US Army Corps of Engineers • Engineer Research and Development Center

The Power of Co-Development and Demonstration

Seven Mile Island Innovation Laboratory

- Collaboration and partnership that is building first-of-their-kind NBS projects in coastal New Jersey
 - Began in conversation
 - Accelerated by a storm (Sandy)
 - Progressed through piloting
 - Now in full-scale implementation



US Army Corps
of Engineers®



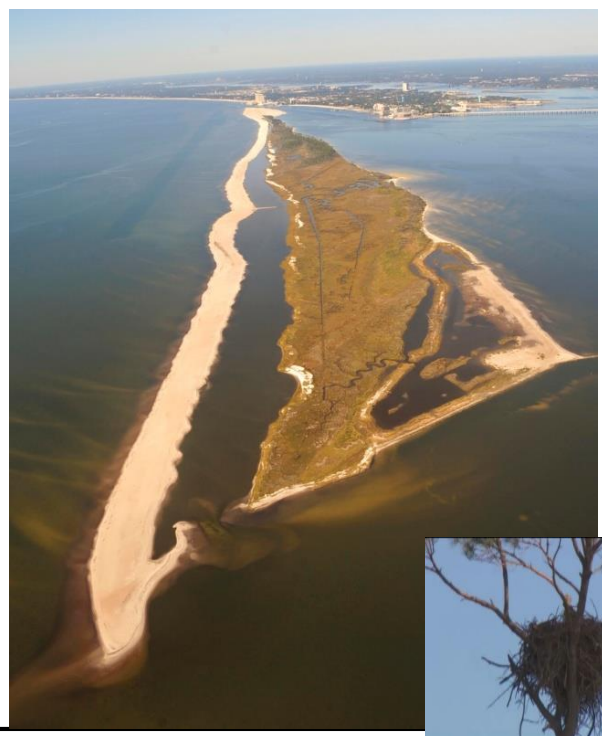
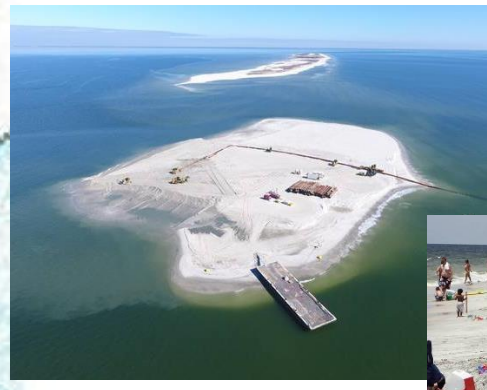
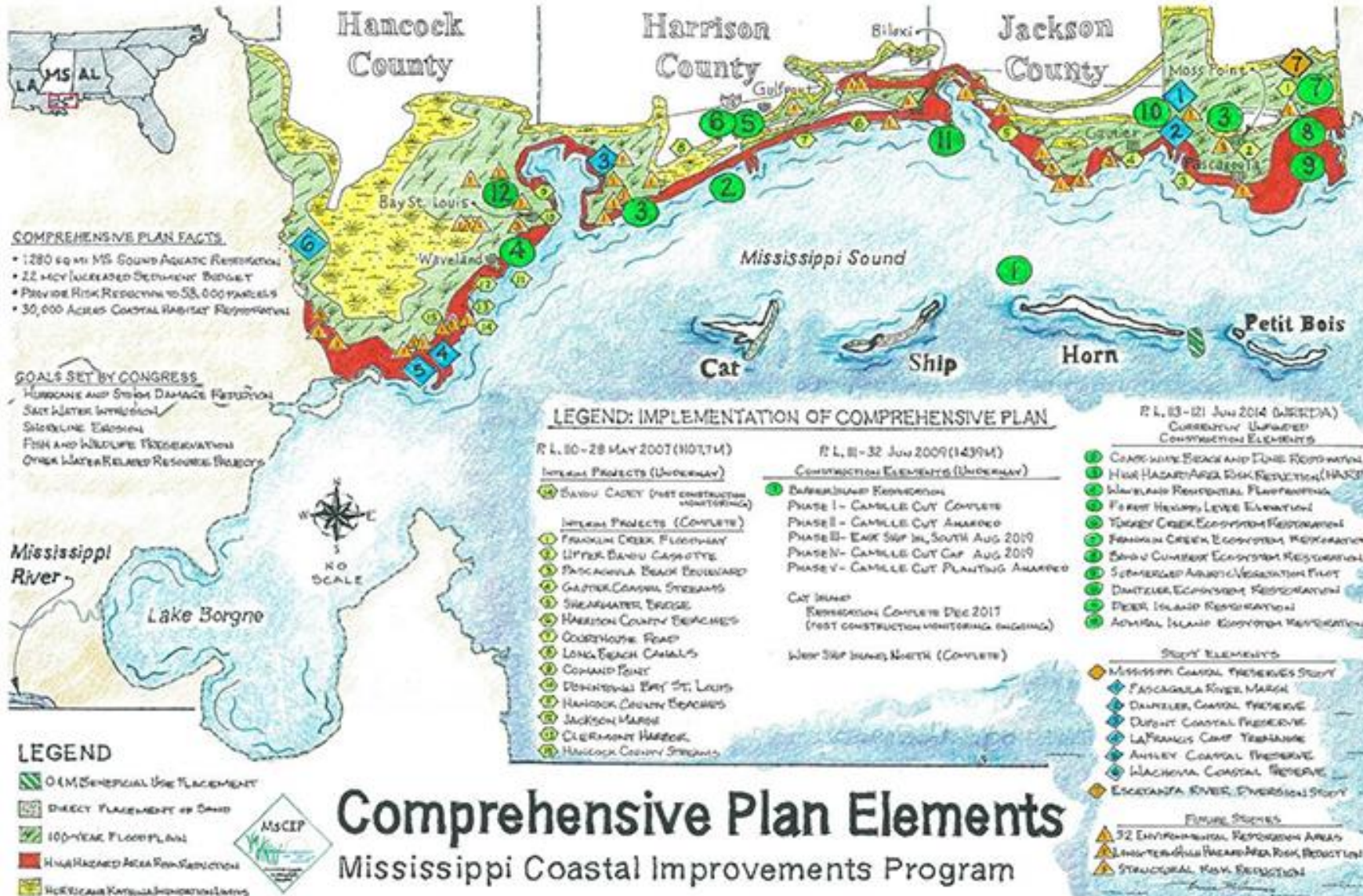
The Nature
Conservancy 
Protecting nature. Preserving life.



Wetlands
INSTITUTE

US Army Corps of Engineers • Engineer Research and Development Center

Nature-Based Solutions along the Mississippi Gulf Coast



Comprehensive Plan Elements Mississippi Coastal Improvements Program

US Army Corps of Engineers • Engineer Research and Development Center

The EWN Approach: Innovation in Practice



- **Policy development**
 - Engagement with policymakers
 - USACE policy/procedure development
- **Engagement, partnering, and teaming**
 - Within USACE, e.g., EWN Proving Grounds
 - With other organizations inside and outside government
- **Research**
 - Innovations in practice
 - Taking the “long view”
 - Establishing future targets and conditions
 - Tools for delivery
- **On-the-ground projects and demonstrations**
 - Across the spectrum of applications and project development (i.e., from planning to operations)
- **Strategic communications**
 - Individual research papers
 - Visionary products, e.g., EWN Atlas
 - Education, e.g., academic curricula, training



The Spectrum

“Wild and Free-Flowing Nature”

“Tamed and Constrained Nature”



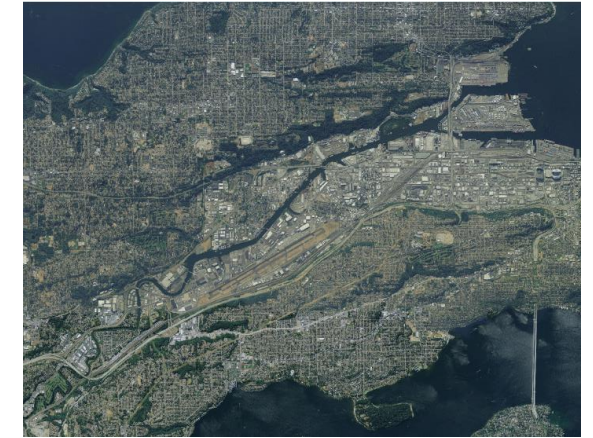
Duwamish River, WA 1800s



San Joaquin Valley, CA 1800s

Achieving Nature-Engineering Balance

- Societal values
- Policy legacies and time lags
- The process of innovation
- Collaboration across boundaries



Duwamish River, WA today



San Joaquin Valley, CA today