Large-scale Innovative Beneficial Use Projects in Coastal Louisiana: Three Case Studies

Photo Credit: PJ Hahn

Burton Suedel, Ph.D.

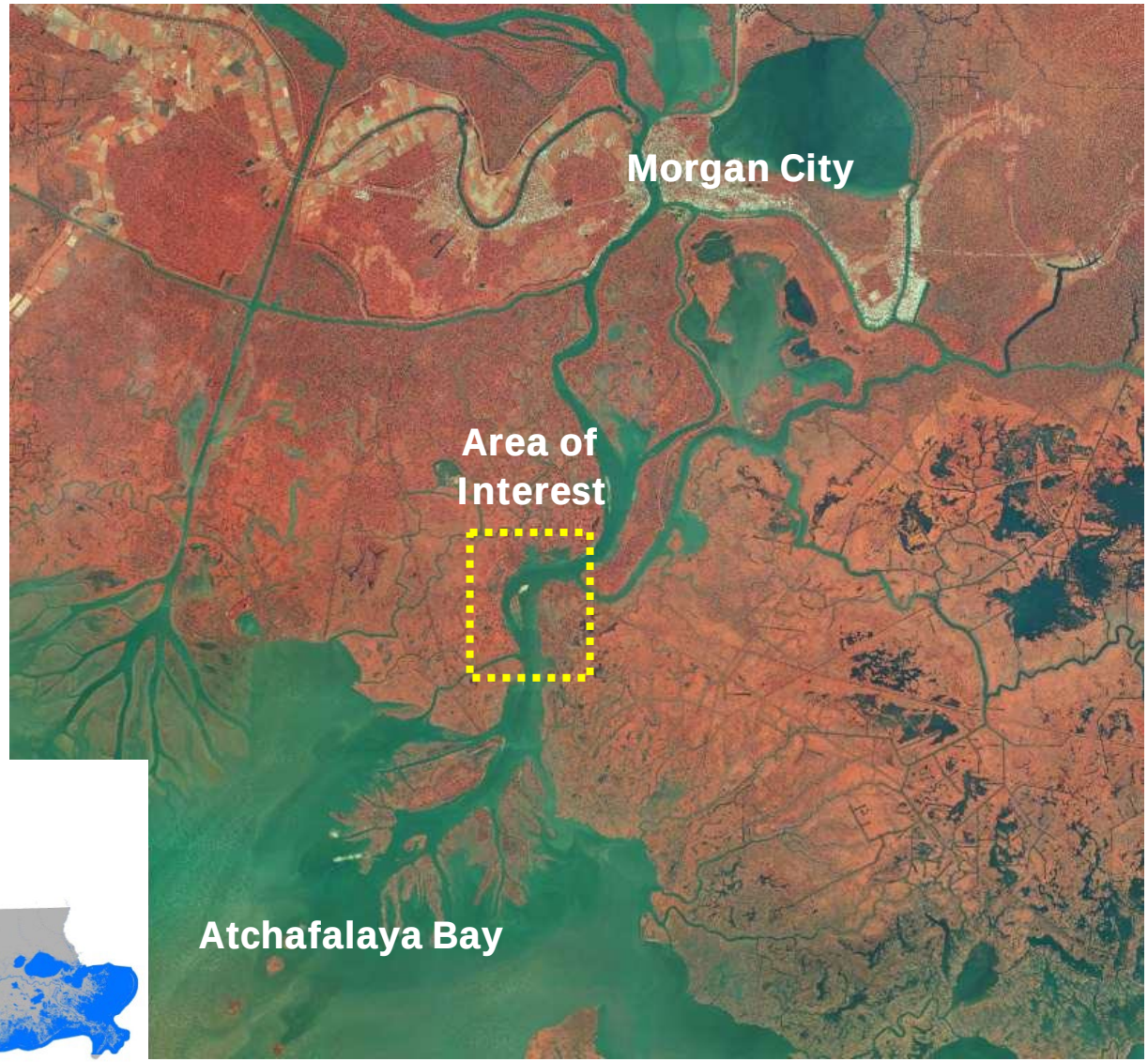
US Army Corps of Engineers

Engineer Research and Development Center

Vicksburg, Mississippi

2023 WEDA Las Vegas Plenary - Beneficial Use Innovation: Case Studies

Horseshoe Bend Island, Atchafalaya River, Louisiana

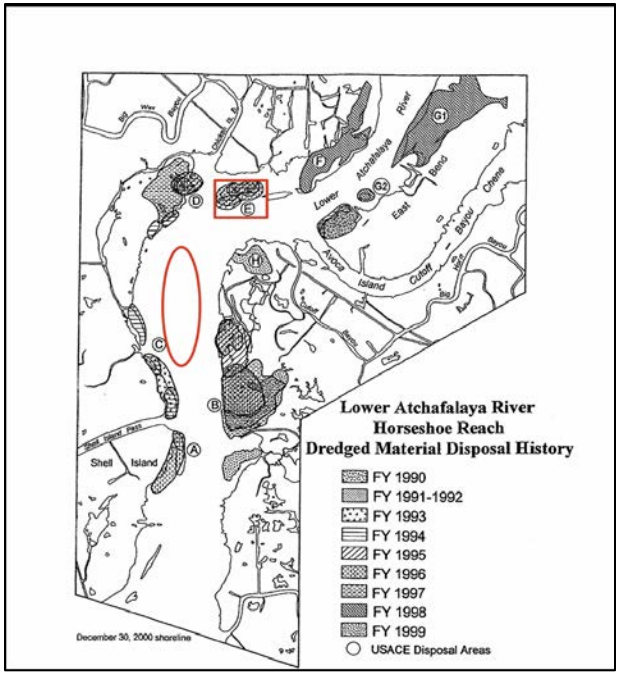


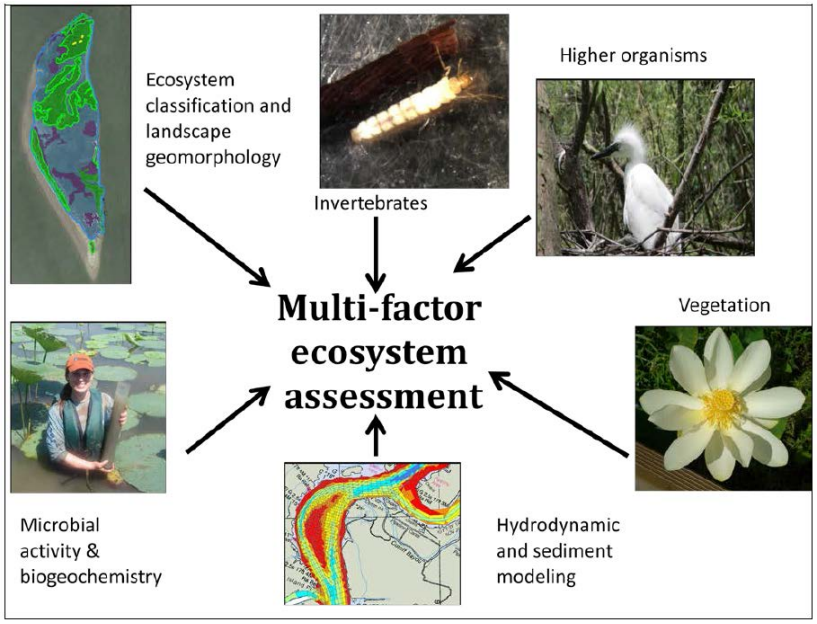
Horseshoe Bend

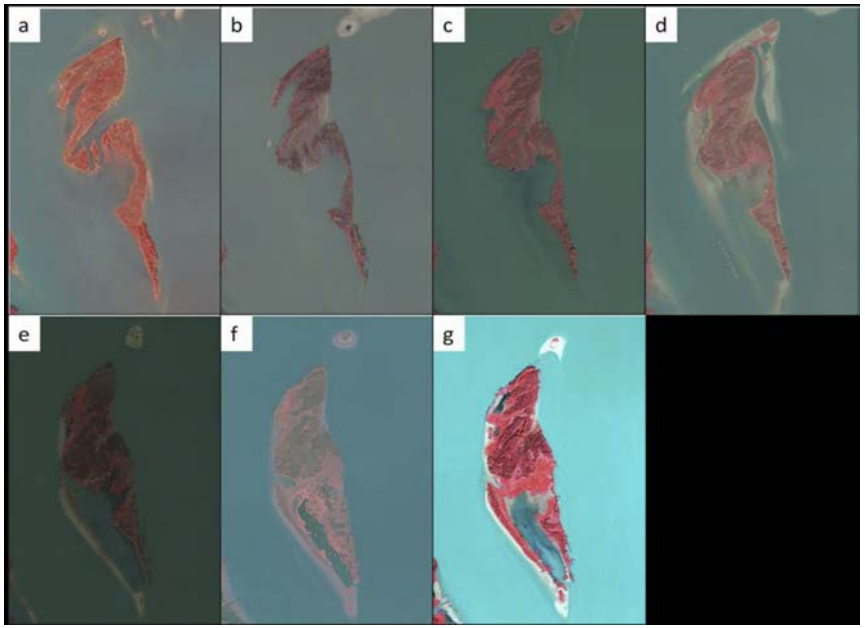
Problem: Limited options for dredged material placement alternatives

Solution: Innovative EWN placement technique created river island

Approach: Ecological assessment documented environmental services (ES) benefits







Horseshoe Bend

Problem

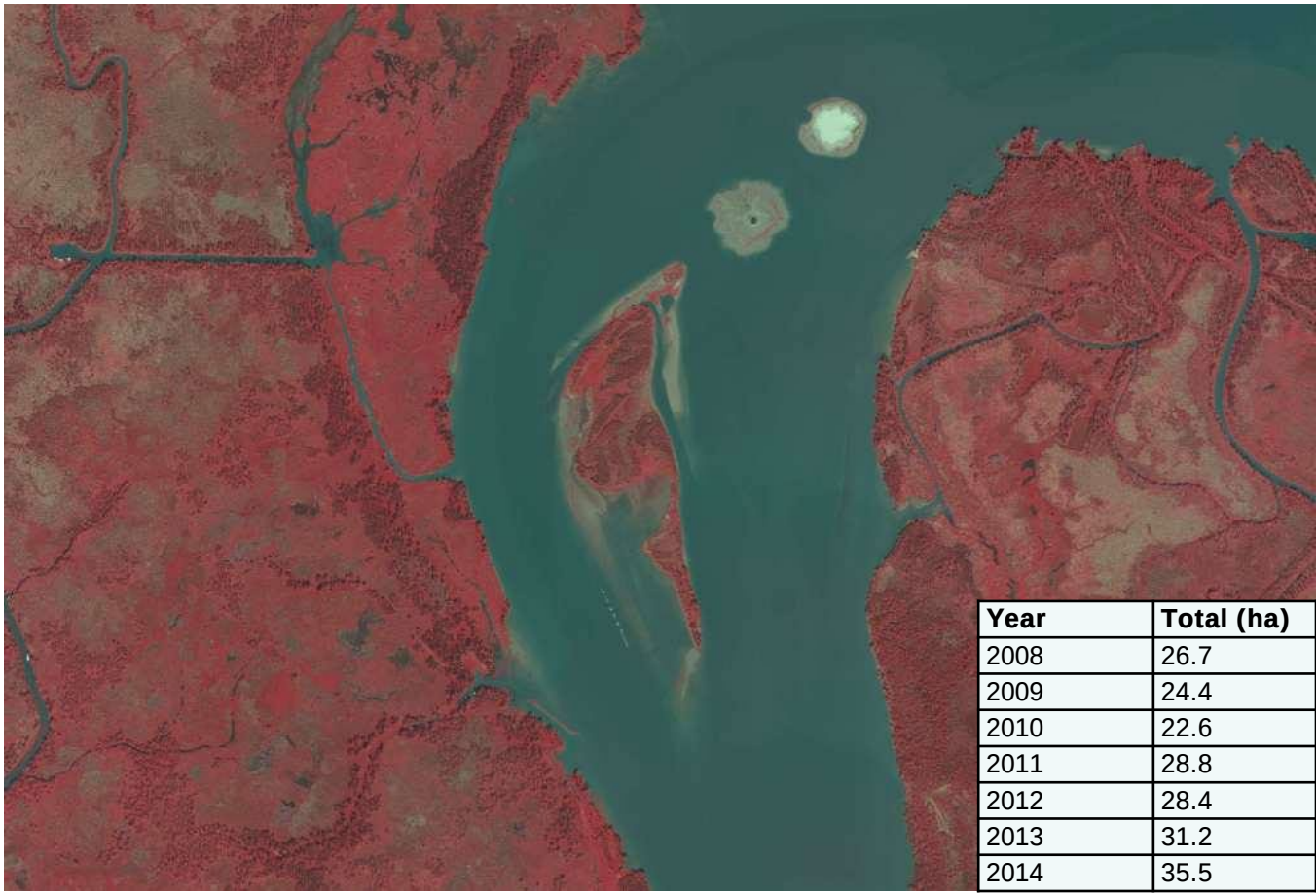
Capacity of Bankline Disposal Areas Exhausted

Preferred Alternative

Mid-River Mounding of Dredged Material (9 Placements over 12 Years)

~~**Conversion of Wetland Disposal Areas into Upland**~~

~~**Open Water Disposal in Atchafalaya Bay**~~

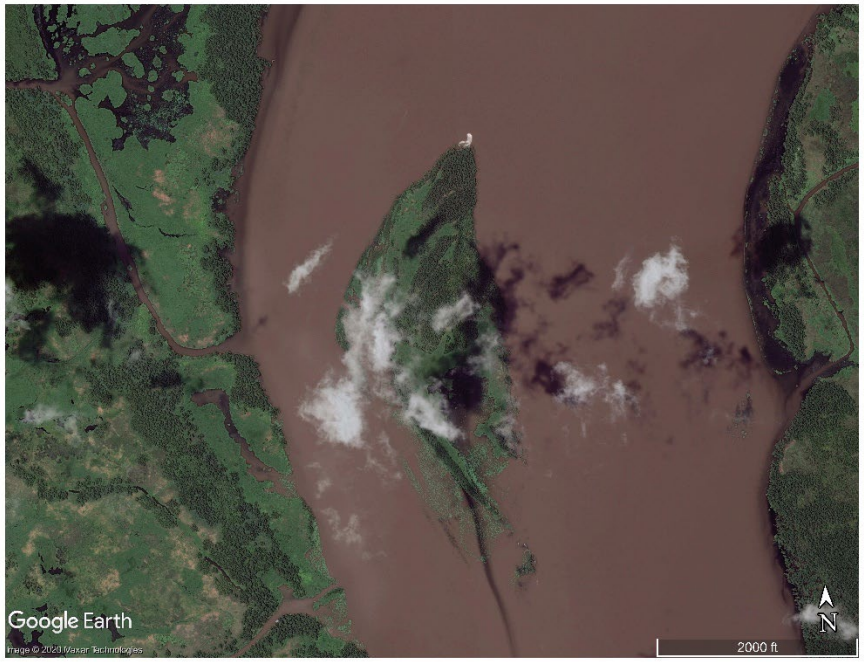


Year	Total (ha)
2008	26.7
2009	24.4
2010	22.6
2011	28.8
2012	28.4
2013	31.2
2014	35.5

Last dredged: 2014

915,000 cy Apr-May 2019

Photo: June 2019



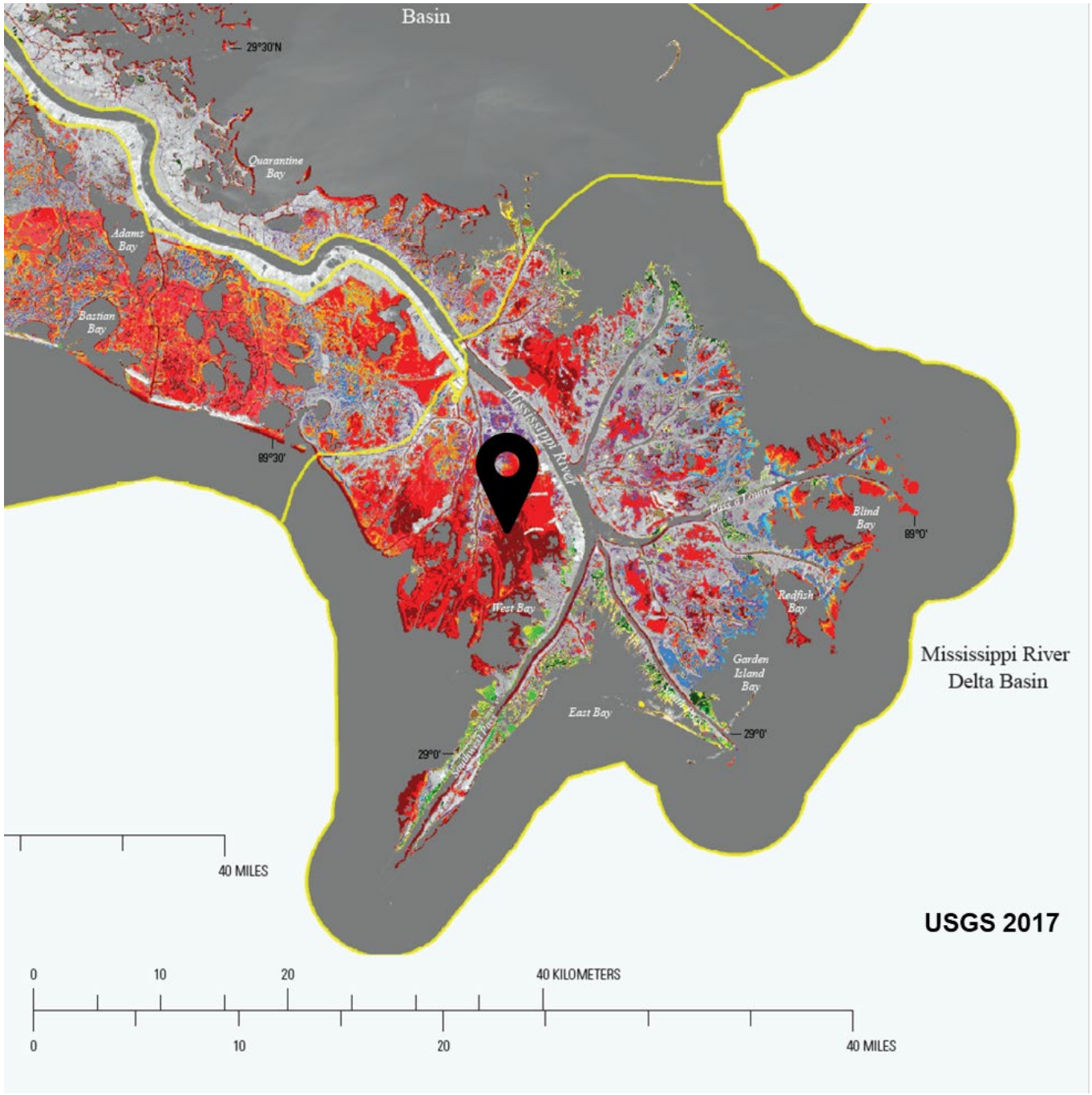
500,000 cy 10-21 Jan 2020

Photo: 30 Jan 2020

Results: Creating Present and Future Value

- Island formation reduced dredging requirements
- Natural channel formed east of the island due to self-scouring
- US Coast Guard realigned channel
  - channel length reduced
  - sharp bends eliminated
  - improved navigation safety
- Reduction in long-term dredging requirements
- Resultant carbon savings and reduced air pollution

West Bay, Louisiana



West Bay, Louisiana

Problem: Stability of Federal navigation bankline was threatened

Solution: Utilize innovative Dredge + Divert strategy for restoring coastal marsh

Approach: Document restoration strategies, changes in land classifications, and identify application of EWN concepts

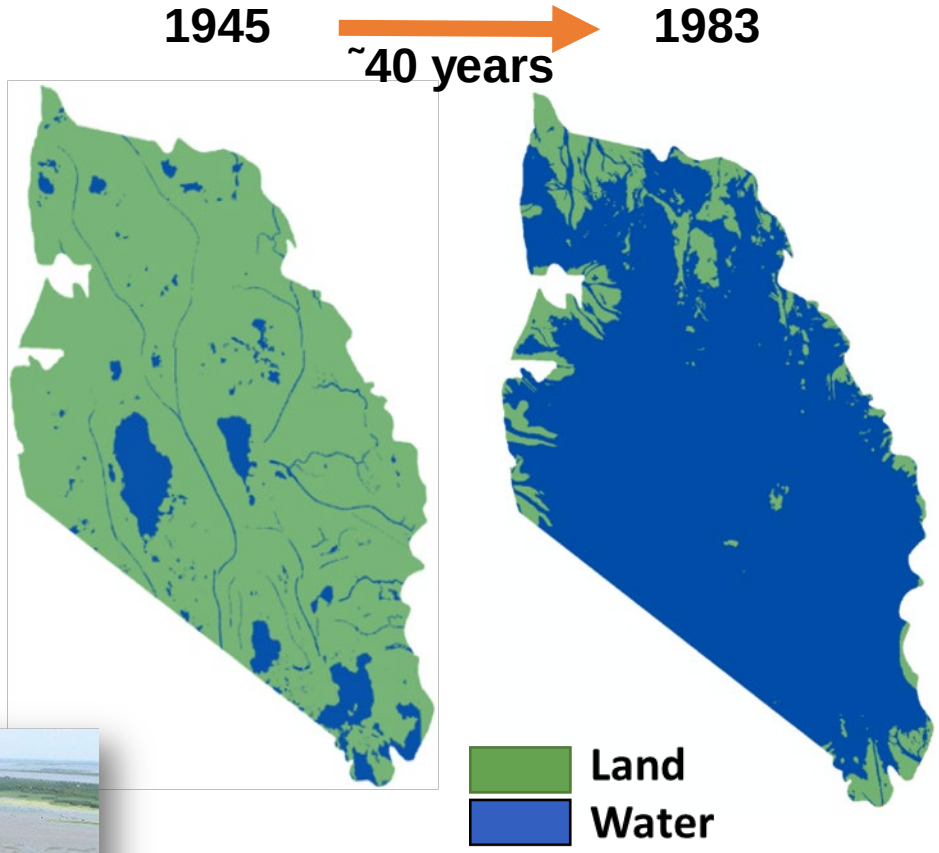
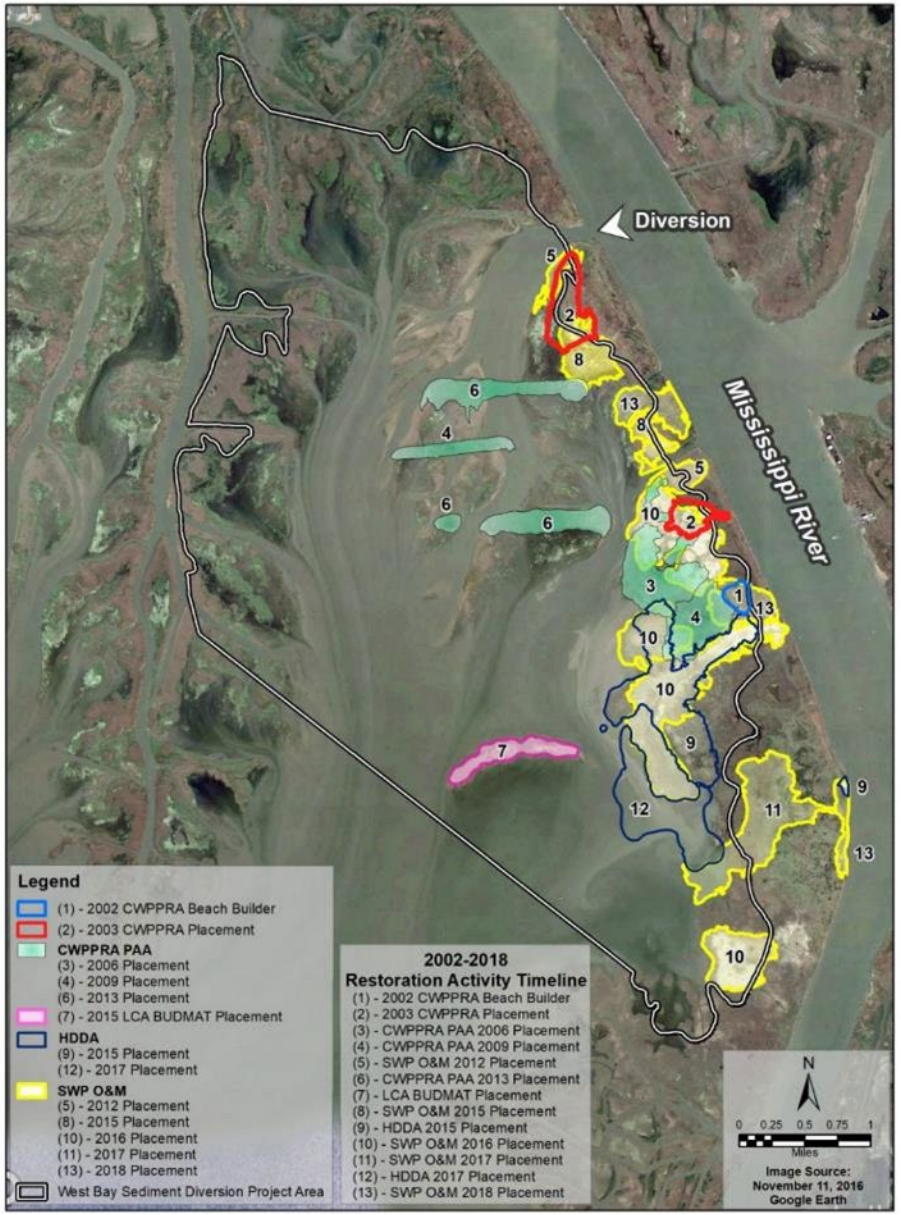


Photo by eustatic for healthygulf.org

West Bay, Louisiana

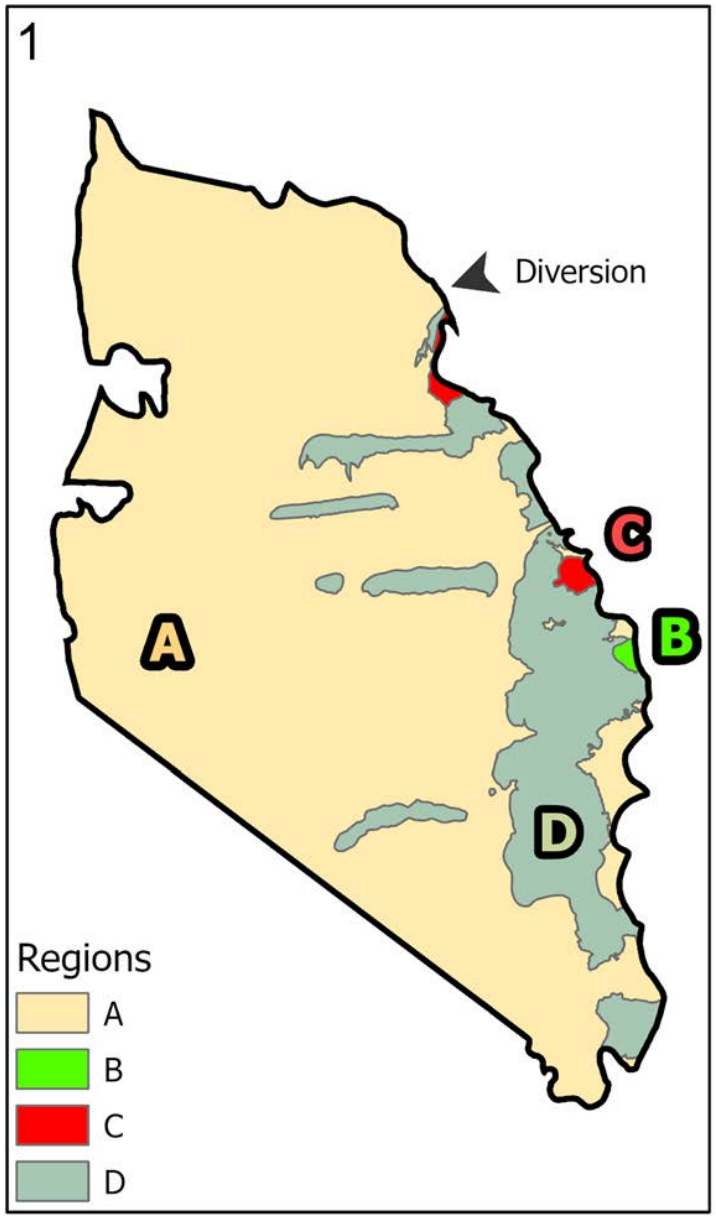
- 12,000 acre sub-delta at Head of Passes
- Lost >70% of land since the 1940's
- Stability of Federal navigation bankline was threatened
- Bank notched in 2003 to mimic natural crevasse
- First 5 years evidence of land building minimal
- Dynamic berms (SREDs): to increase sediment deposition
- Multiple direct and strategic placement events
- Restored 2,300 acres of land since 2005

Year	SRED	Cubic Yards of Dredged Sediment	Land Created (Acres)
2009	1	386,233	35
2013	2	1,325,614	97
	3	1,308,435	86
	4	328,567	13
2015	5	2,299,295	80



Results: Dredge + Divert Strategy

- No DM placement in this area
- Sediment-laden flows from MS River
- Trapping sediment by SREDs
- Diversion Benefits (2005-2020)
  - 700 ac (292 ha) diversion (A)
  - 1,600 ac (646 ha) DM placement (B, C, D)
  - Total combined land area: 2,300 (938 ha)
- For every 2 acre of land created by DM placement, 1 acre land created by the diversion



Baptiste Collette Bayou, Louisiana

Baptiste Collette Bayou, Louisiana

Problem: Maintain navigation channel for improved access to Port of New Orleans & ICWW

Solution: Utilize coastal engineering that can build and maintain coastal infrastructure to sustain wildlife and enhance habitats

Approach: Increase understanding how Baptiste Collette Bayou dredge islands and maintenance program is achieving environmental benefits, especially for birds

Gunn Island under construction in July 2016

Results: Sediment Management & Beneficial Use

- Over 1,000 ac coastal habitat created by DM placement during routine maintenance
- Annual sediment BU from channel maintenance via placement of dredged sediment in shallow open water on either side of channel
- Unconfined placement designed to create wetland habitat suitable for colonial nesting seabirds

- Allowing dredged sediments to flow outward unconfined from the island creates broad intertidal flats that serve as foraging areas for coastal birds

Results: Sediment Management & Beneficial Use

- To attract seabirds, plant overgrowth (usually *Phragmites*) intentionally covered with dredged sand to create large areas of bare ground necessary for breeding
- Both the intentional smothering of plant overgrowth and creation of tidal flats represent current state-of-the-practice and are management adaptions made from lessons learned over time

Gunn Island in May 2021 (left) before breeding by coastal birds had begun, and then later in July 2021 (right) showing dominant growth of *Phragmites* during the 2021 breeding season. (Photo Credits: Left, Michael Guilfoyle; Right, Jake Jung).

Building Progress

- Commit to innovation
  - **What would it take to get to 70% beneficial use by 2030?**
- Expand the “vision” to diversify BU project benefits
  - **Where will landscape features create the most value *in the future*?**
- Increase collaboration and cross-sector partnerships
  - **How can BU approaches be used to incentivize progress with regulatory and resource agencies?**
- Pursue realistic and affordable BU projects
  - **How can demonstration projects be used to promote innovation in engineering and design AND reduce project costs?**
- Document and communicate the value created
  - **How can developing a library of published BU case studies be used to build momentum?**

West Bay, Louisiana

Questions?

Burton C. Suedel

US Army Engineer Research and Development Center

3909 Halls Ferry Road

Vicksburg, MS 39180

Burton.Suedel@usace.army.mil