

Texas General Land Office : Developing an Offshore Sediment Inventory and Maximizing Borrow Area Usage; Lessons Learned from the McFaddin Project



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Need for an Offshore Inventory

Beach Placement in Texas

Beneficial Use of Dredged Material from navigation channel maintenance

- Many Texas beaches have benefitted or continue to benefit from this option
- Incremental cost is generally financially reasonable
- Timeline of placement is not dependent on need for nourishment
- Controlled by a 3rd party
- Federal standard may complicate or cancel restoration portion of the project
- Need to be adjacent to channel maintenance operations

Truck haul from an upland site

- Can be quite expensive
- Ideal for smaller restoration projects
- Can have a large environmental footprint during operations; i.e., abundant traffic on sensitive areas with multiple truck operations

Offshore borrow area

- Owner's best option
- Ideal for small or large projects
- Can be used if permitted whenever there is need and within permit limits
- Borrow area quality and proximity to restoration area is key



GLO Region 1 Need For Offshore Inventory Surveys

The Texas Shoreline is divided into 4 distinct regions for planning purposes:

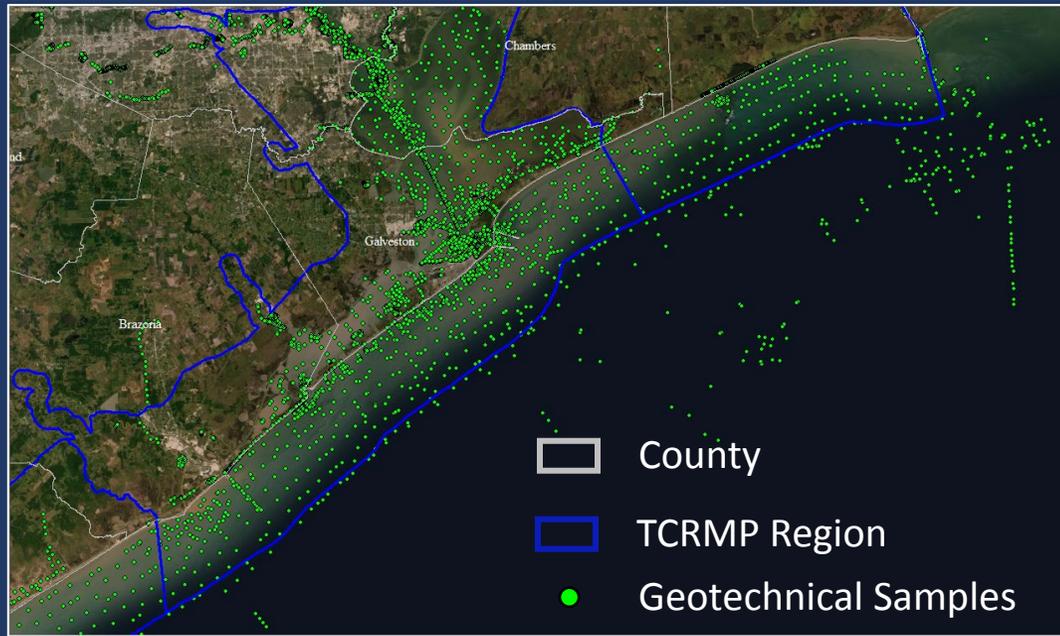
- Part of the Coastal Resiliency Master Plan is to establish a Sediment Management Plan coast-wide
- Updates to policies and databases (TxSed and CR Mapping Viewer)
- For establishing priority areas or areas of critical erosion, the GLO conducts monitoring of the shoreline using the Bureau of Economic Geology (BEG)

** Lidar and Digital Elevation Models help predict shoreline change on a long- and short-term scale

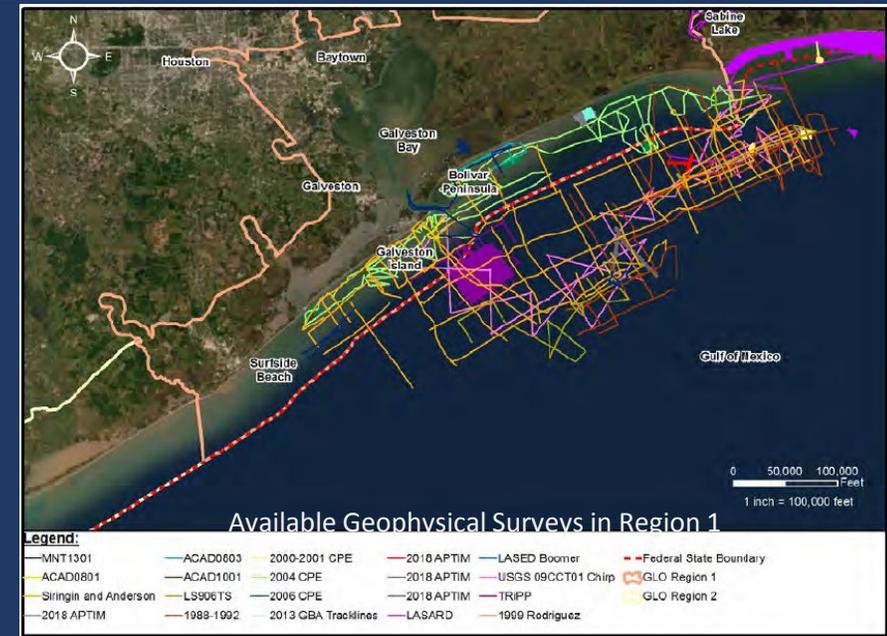
- GLO established Region 1A & 1B as a priority:
 - Most mileage of critically eroding shoreline and degraded habitat
 - Highest population rates for a coastal county
 - Large-scale restoration projects needing large volumes of sediment



GLO Region 1 Completed Preliminary Offshore Inventory Surveys

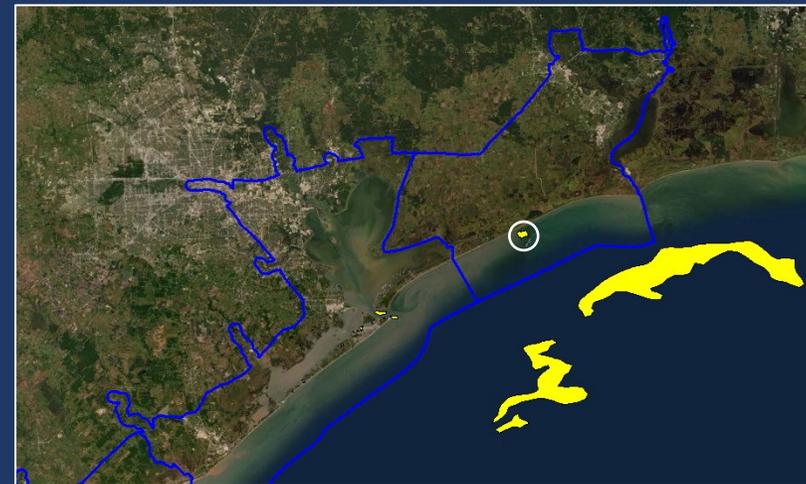


Geotechnical Samples in Region 1



Available Geophysical Surveys in Region 1

- One part of the SMP is to establish and expand the inventory of sediment sources offshore
- Also categorizing sediment sources in riverine, bay, and upland areas
- GLO contracted with geophysical service providers to survey offshore Region 1
- Currently available geophysical and geotechnical data was analyzed to plan the survey(s)

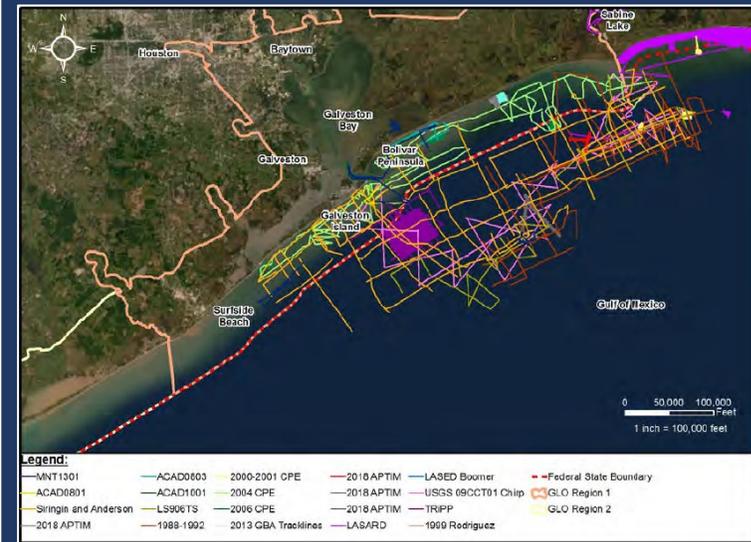


Permitted or Known Offshore resources in Region 1

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Case Study for Lessons Learned: McFaddin NWR Project Borrow Area



Geophysical Surveys in Region 1

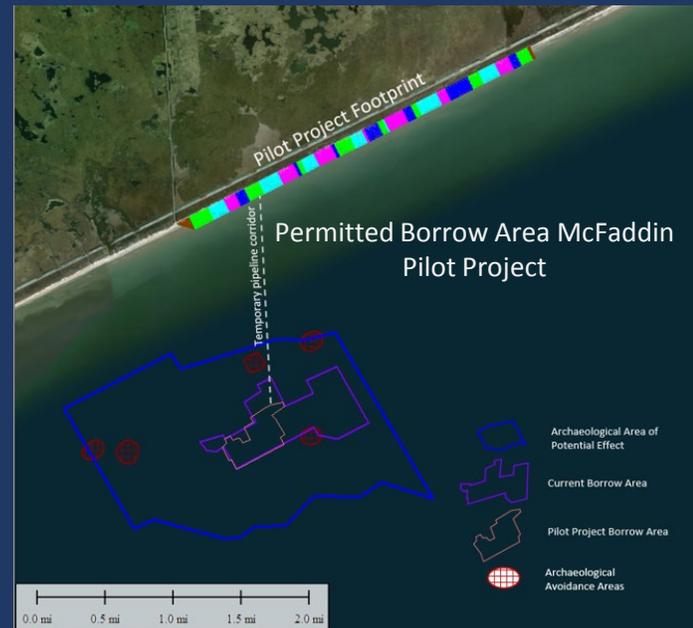


Preliminary Geophysical and Geotechnical Surveys



Design-level Geophysical Survey Lines and Geotechnical Core Locations

- Geophysical survey tracklines 35-75 ft spacing
- Geotechnical Core Locations 1,000 ft spacing



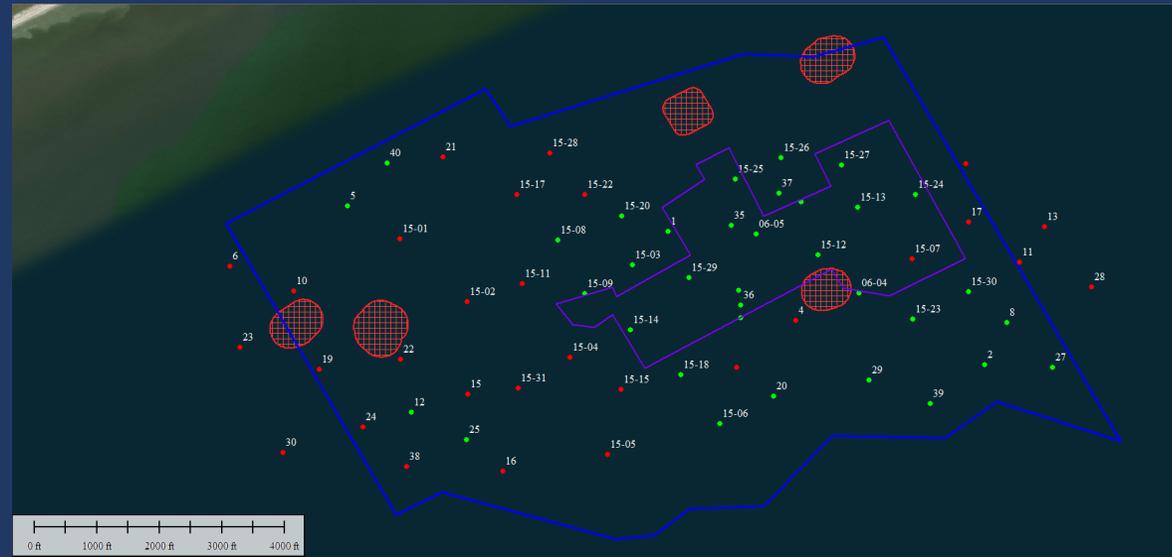
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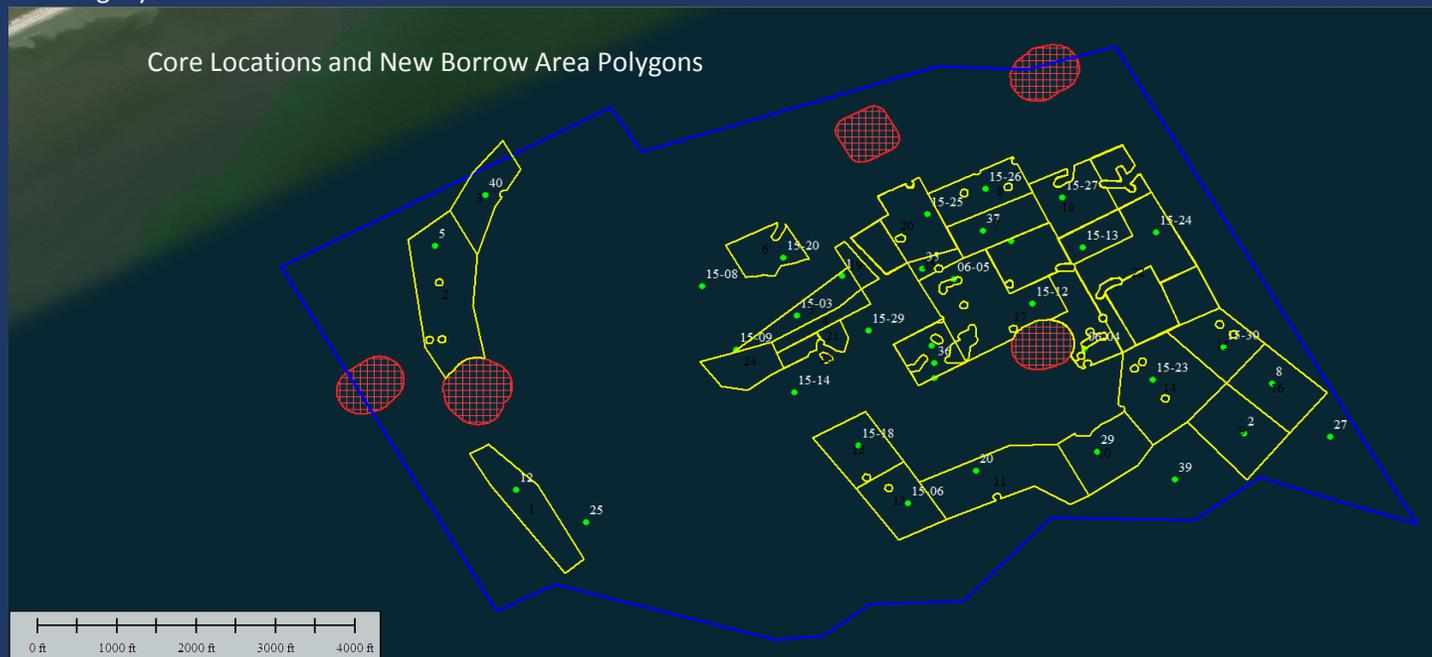
Case Study for Lessons Learned: McFaddin NWR Project Borrow Area



Legacy and Additional Core Locations



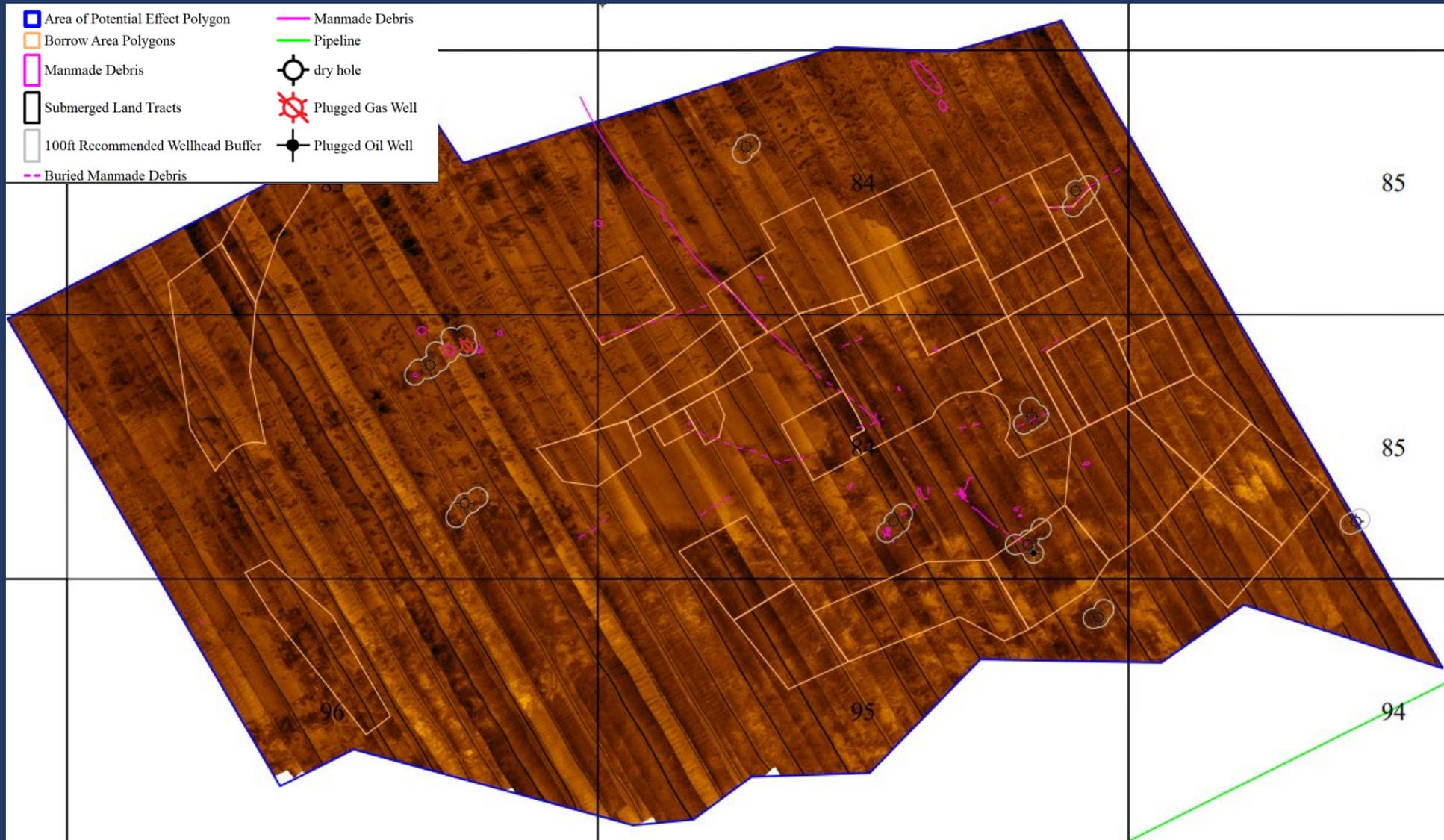
Core Locations and Sediment Quality



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Case Study for Lessons Learned: McFaddin NWR Project Borrow Area



Side-scan Sonar Mosaic used to categorize seafloor and buried hazards

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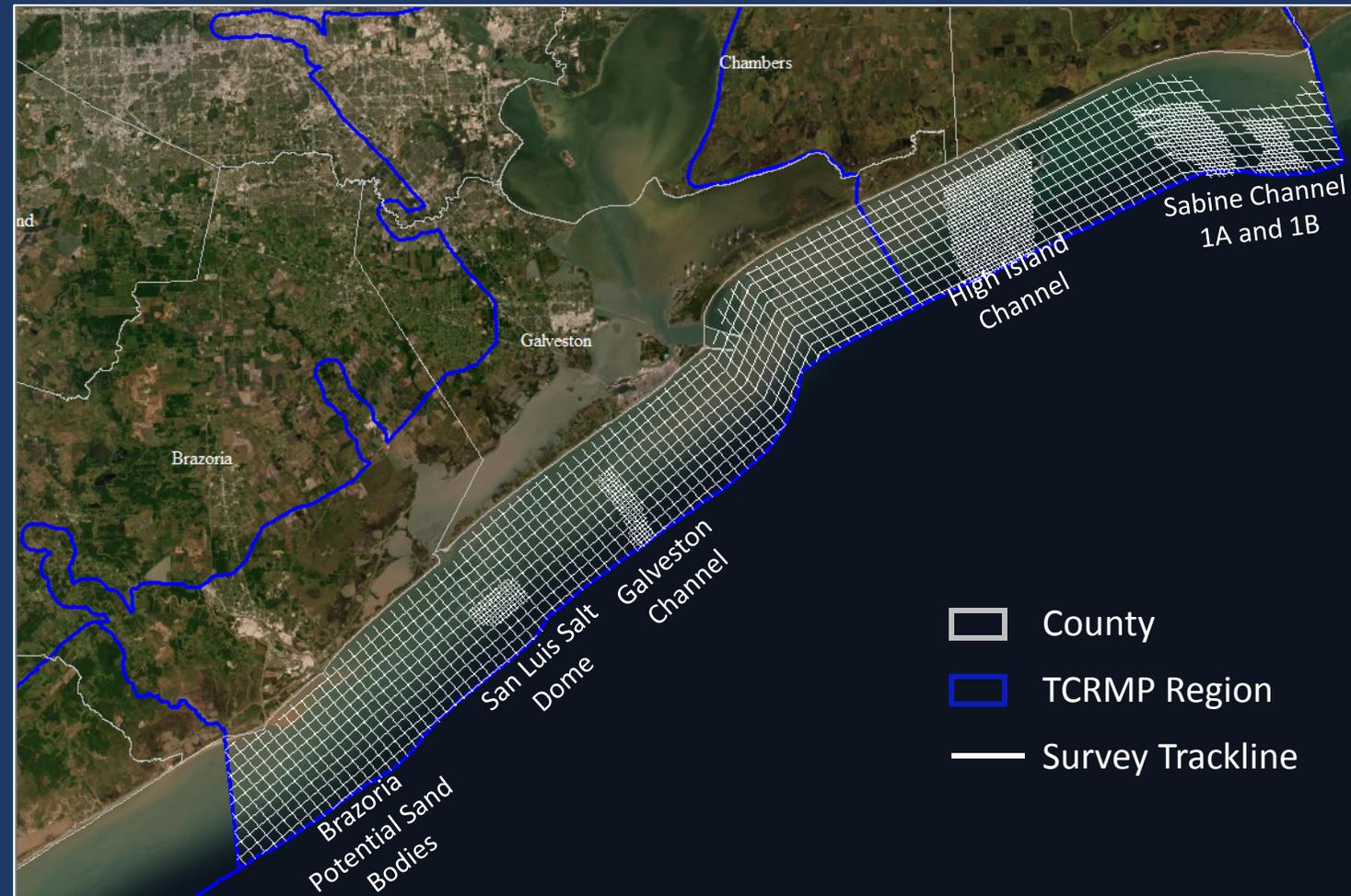


GLO Region 1 Completed Preliminary Offshore Inventory Survey

Region 1 Offshore High-resolution Geophysical Surveys

Contracted through APTIM, TWIG, CPE, and UTIG project teams

- Survey #1: APTIM with TWIG, CPE, UTIG
- 1-mile grid survey offshore Region 1 in state waters
- Survey was completed on 10/16/2020
- Successfully acquired 2,200 nm and located numerous large-scale potential sand bodies
- High potential to still discover other smaller-scale potential sand bodies
- Survey is focused on identifying potential sand bodies, channels or features indicative of sand that are cost-effective for recovery
- small amounts of overburden
- thick enough to develop
- close to shore but not within the confines of the shoreline's sand system



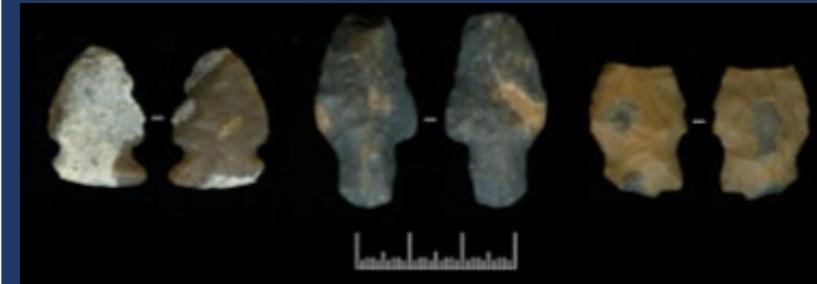
High-resolution geophysical survey tracklines and zoom-in lines

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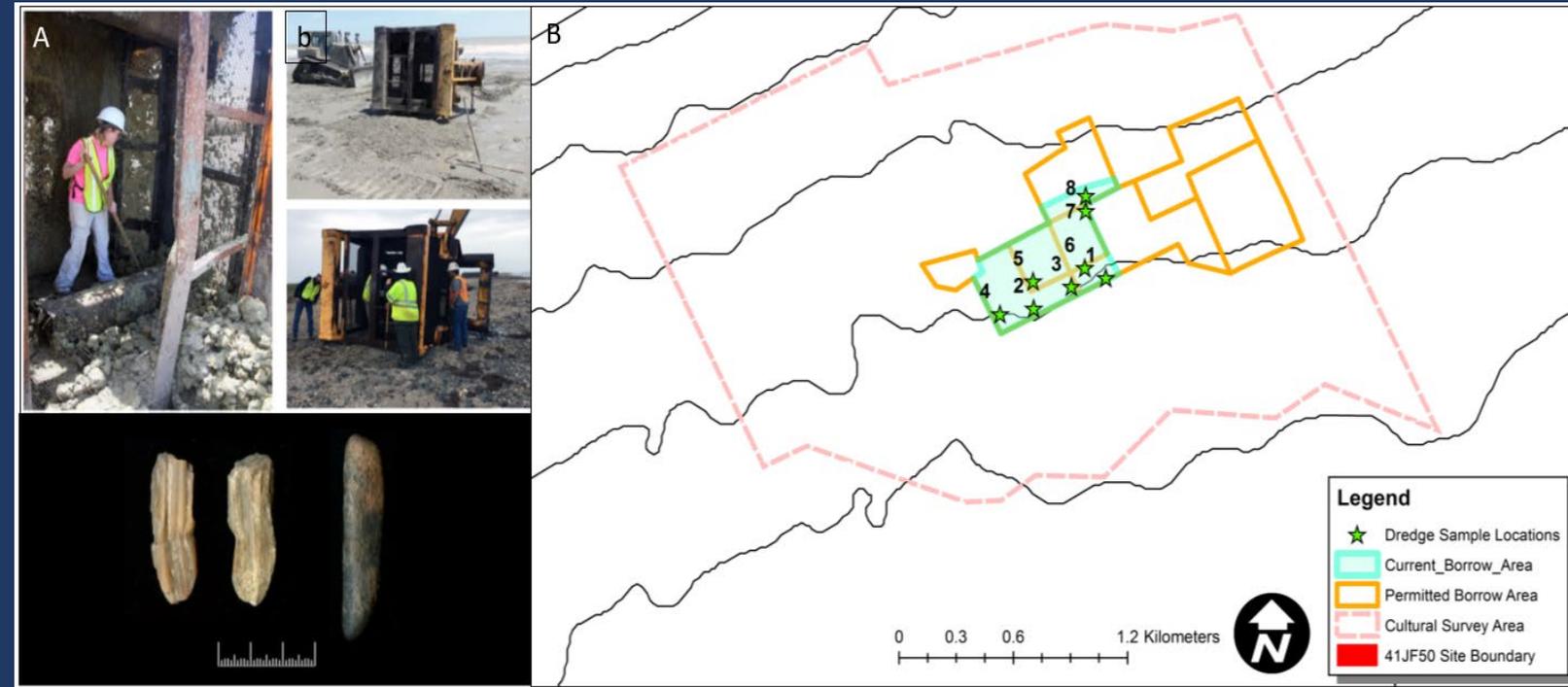


Case Study for Lessons Learned: McFaddin NWR Project Borrow Area

Permitting

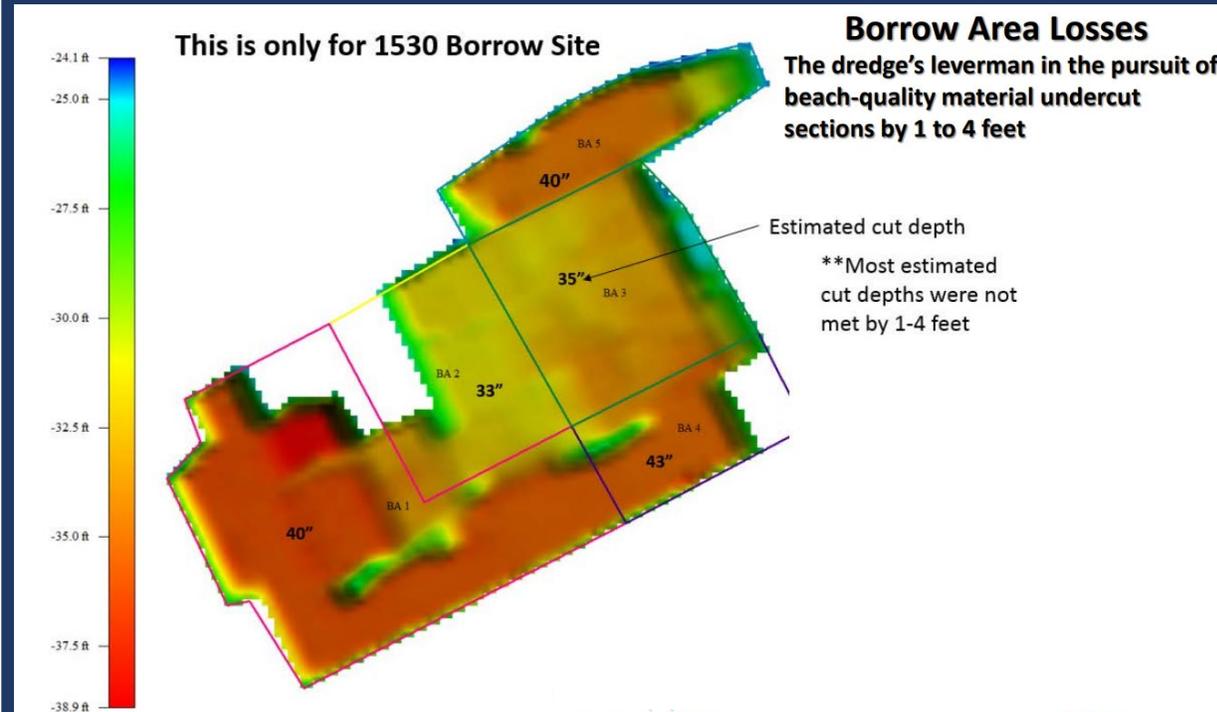


Clovis Points recovered in the area

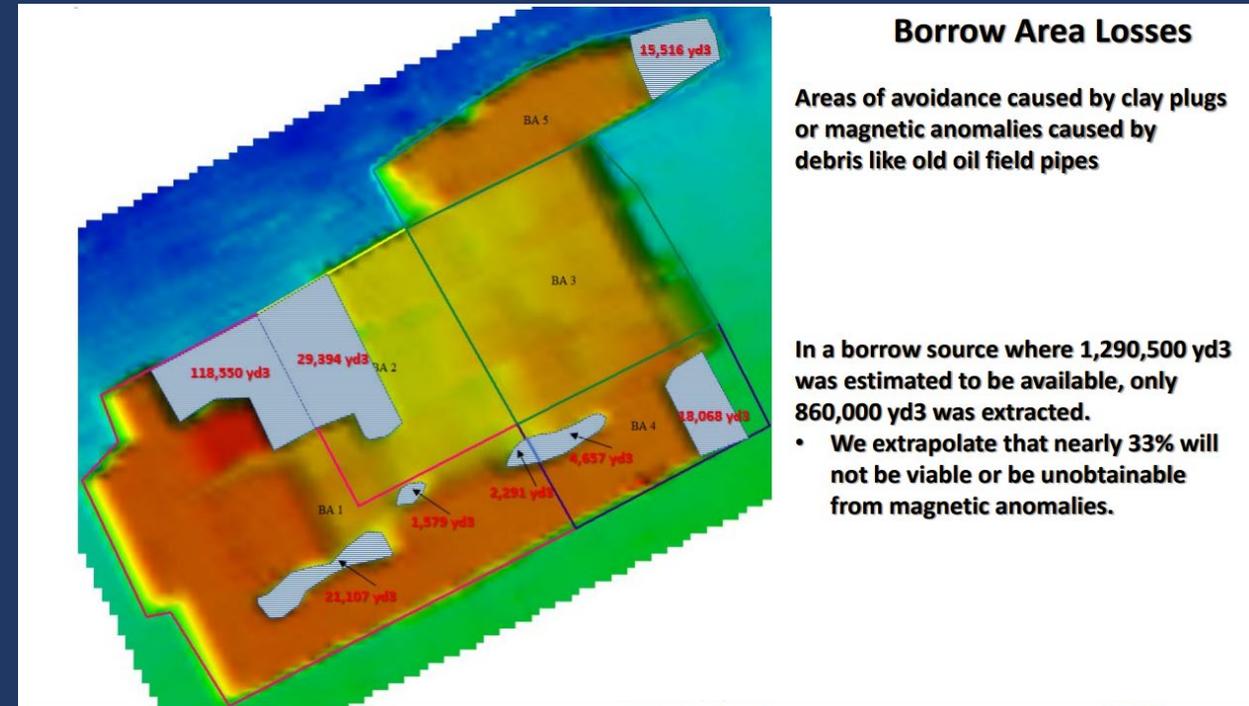


Mammoth teeth, Dredging sampling operations, and sampling locations within the borrow area

Borrow Area Performance



Post-dredge bathymetric survey



Post-dredge survey with estimated volume loss



Magenta line illustrates seafloor debris evident on sss mosaic

Dotted magenta line illustrates potential buried seafloor debris

Side-scan sonar mosaic with interpretation of seafloor hazards

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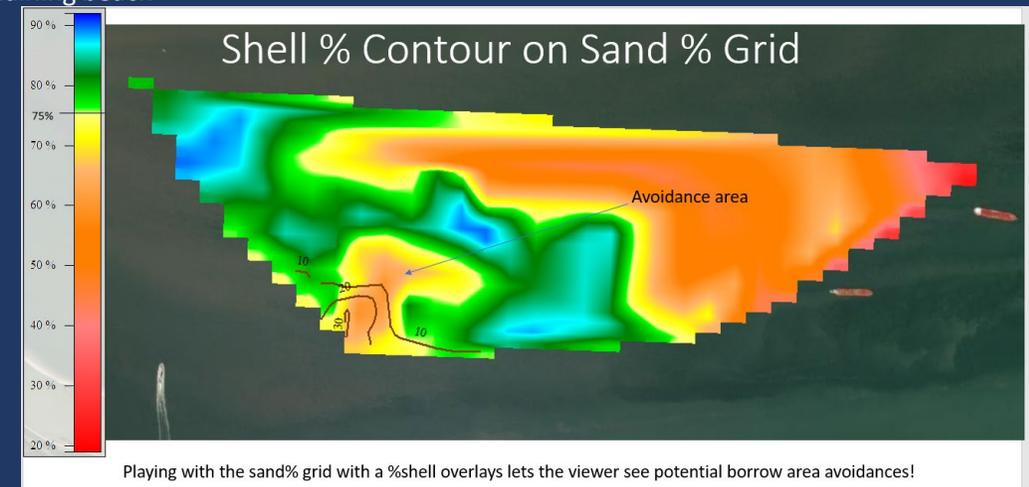
Case Study for Lessons Learned: McFaddin NWR Project Borrow Area

Borrow Area Performance

- Offshore borrow areas are largely non-regenerative
- Texas will need to investigate new ways to utilize all sediment in borrow areas for maximized placement and effective use
- Swap measured-in-place nourishment for pay-by-the-cut nourishment
- Investigate easier methods for maintenance like depocenter/nearshore feeder berm placement with longshore transport



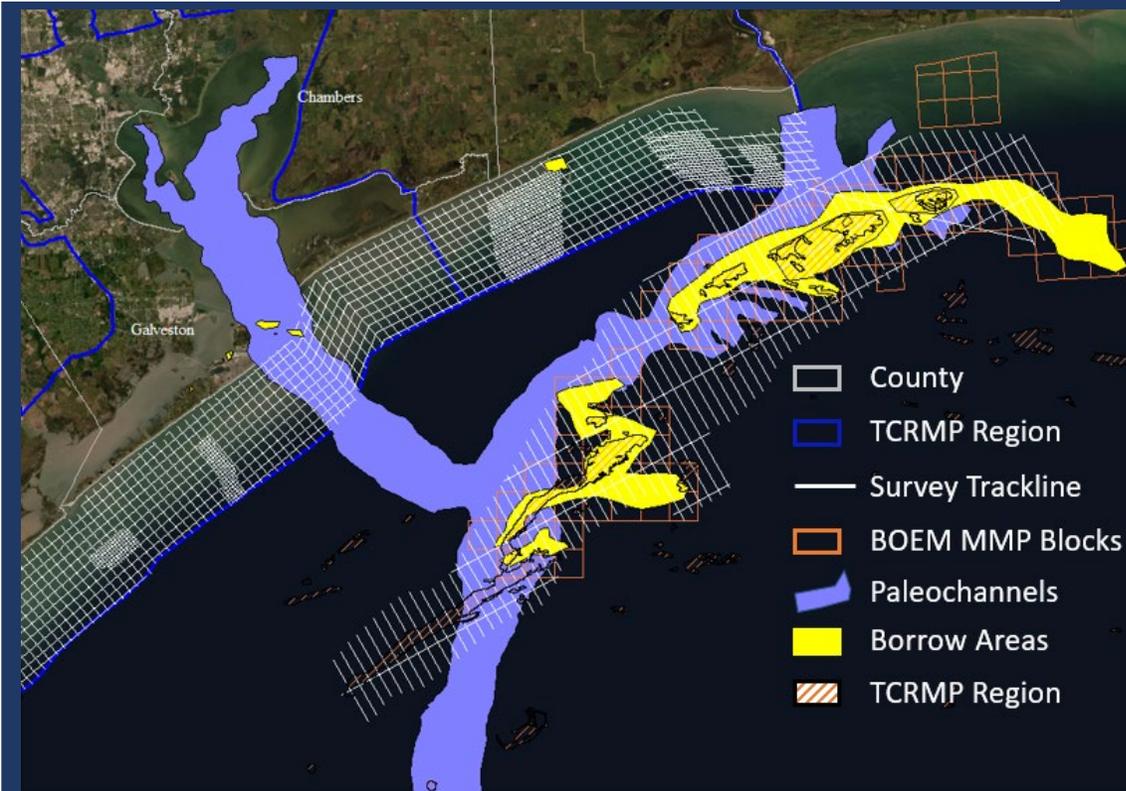
Typical beach placement operations where additional losses may occur especially in areas with little to no remaining beach



Analyzing current borrow areas in the ship channel can also shed light on better use for material placement



What's next for the GLO?



Survey #2: UTIG

- Trinity River paleovalley survey was conducted in April and May of 2021
- Survey focused on the paleochannels shown here and any tributary systems mapped during the APTIM-led survey that was recently completed
- Continue to develop discovered sand bodies into permitted borrow areas through secondary geophysical surveys and geotechnical surveys



- GLO and BOEM entered into a cooperative agreement to collect additional mileage in outer continental shelf waters associated with the Sabine and Heald banks area
- Survey initiated on 10/23/2020 and was completed on 11/14/2020
- Project team successfully tracked an additional paleochannel feature from state waters into federal waters
- BOEM survey was focused on gaining better knowledge of the offshore banks and any depositional features around the banks that could be developed for coastal restoration projects like Coastal Texas Study
- The Sabine Bank will be used as the borrow area for the upcoming beach nourishment at Texas Point National Wildlife Refuge

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Questions?

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