



LEGACY WETLANDS

ATKINS

Member of the SNC-Lavalin Group

Alternatives Analysis for the Legacy Wetlands at Sullivan Ranch

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Draft

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Introduction

Galveston Bay is the largest and most productive estuary on the Texas coast. Galveston Island contributes to this highly productive estuary providing habitat for countless fish and wildlife, including migratory birds. Subsidence, sea level rise, land use practices and development have contributed to drastic reductions in highly productive habitats across the bay system, including Galveston Island. Between 1950 and 2002, Galveston Island lost 32 percent of its estuarine marsh, tidal flats were reduced by 61 percent, palustrine marshes were reduced by 50 percent, and beaches have decreased by 30 percent (White et al. 2004). The loss of these habitats results in decreased habitat availability and a loss in productivity for the countless animals.

In 2017, the Texas General Land Office (GLO) conducted the Galveston Upland Sand Source Assessment Feasibility Study to identify potential sources of sand sources suitable for beach restoration projects on the island. Property owned by the TNI Investments, LTD (Sullivan Ranch) was identified as a viable sand source for beach restoration projects on Galveston Island. The study estimated that over one million cubic yards of beach quality sand is potentially available on the property, which is currently a working cattle ranch.

In 2022, the Sullivan Ranch embarked on the journey to create the Legacy Wetlands at Sullivan Ranch to design and permit activities that could provide beach quality sand for beach restoration activities conducted by the GLO as well as create and conserve habitats in critical need on Galveston Island. Part of this process aimed to assess which threats were currently impacting wetlands and other wildlife habitat on the Sullivan Ranch and create a plan to address those impacts. The Sullivan Ranch aims to conserve and create valuable barrier island nontidal, freshwater wetlands and brackish water wetlands as well as create and enhance upland habitats. These habitats are key resting and feeding areas for a variety of coastal birds including waterfowl, wading birds, and neotropical migrant bird species.

Project Criteria for Success

For the Legacy Wetlands at Sullivan Ranch Project to be viable, the project must address the following issues:

- Prevent habitat degradation caused by extreme tidal events on the Sullivan Ranch
- Provide habitat for a variety of wildlife, including wading birds, shore birds, and waterfowl as well as a source of water for upland animals
- Protect and enhance non-tidal, freshwater wetlands
- Enhance existing saltwater fringe marsh to act as a buffer to high tides and storm surge
- Provide 1 million cubic yards of beach quality sand for beach nourishment activities

The project plan must

- Minimize impacts to wetlands to the maximum extent practicable
- Be economically viable
- Protect and enhance existing wetlands

The analysis of potential alternatives must consider the least damaging practicable alternative. As part of the analysis, a No-Action Alternative and three other alternatives were evaluated.

Alternatives

No-Action Alternative

If no action is taken to protect and enhance wetlands on the Sullivan Ranch, the impacts of nuisance tides, saltwater intrusion, subsidence, and grazing land use practices will continue and the overall health of the wetlands on the Sullivan Ranch will continue to degrade. Galveston Island has lost at least 32 percent of its estuarine marsh, 61 percent of its tidal flats, 50 percent of its palustrine marshes, and 30 percent of its beaches since the mid-1950s (White et al. 2004). If this is allowed to continue, it will result in further loss of marshes, tidal flats and beaches.

Therefore, the No-Action Alternative is not a viable alternative. Choosing this alternative would result in continued loss of sensitive habitat on Galveston Island which would have lasting negative effects to fisheries and wildlife. The No-Action Alternative does not constitute the least damaging practicable alternative.

Alternative 1

Alternative 1 consists of two ponds, one north of Homrighaus Rd. and one south of Homrighaus Rd. The average depth of the northern-most ponds is 20 feet while the average depth of the southern-most ponds will be 10 feet. This alternative would provide approximately 880,866 cubic yards of sand for beach nourishment activities. Geotechnical analyses for the ponds support 4:1 side slopes which means each pond will have an approximate 15-foot emergent marsh around its perimeter. Berms will be constructed around the ponds to prevent nuisance tides from inundating the created wetland habitat with saltwater. In total, this alternative will impact approximately 18.29 acres of estuarine elustrine wetlands, approximately 5.00 acres of estuarine scrub/shrub wetlands, and approximately 5.70 acres of existing open surface waters. This alternative would create 3.01 acres of estuarine elustrine wetlands along the pond edges. This alternative was not selected because it will not create as many acres of wetlands and has less freshwater wetland habitat as the preferred alternative. It also does not meet the sand volume success criteria.

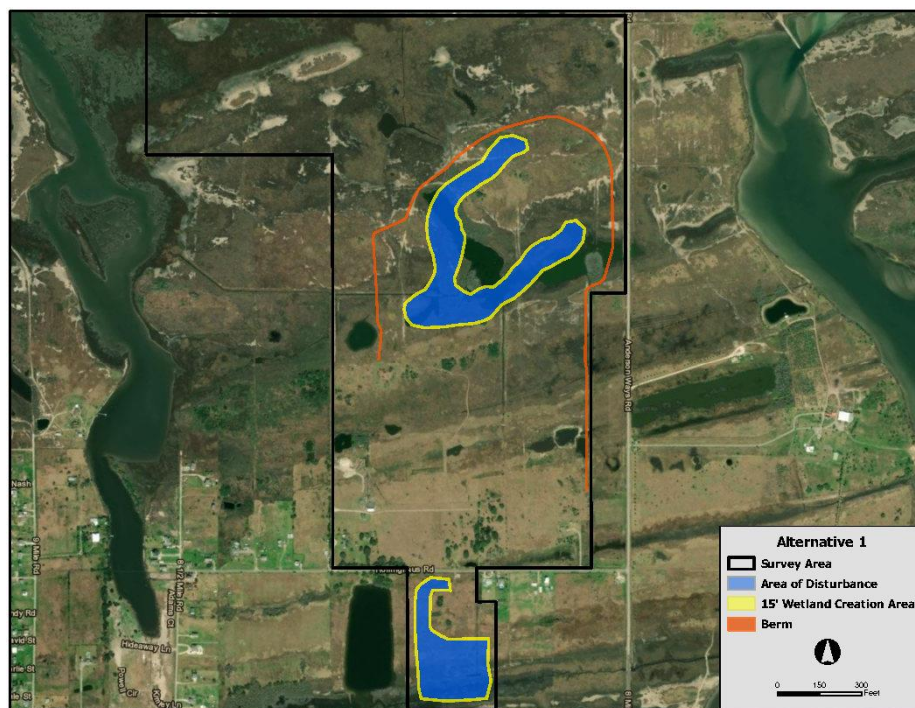


Figure 1 - Alternative 1

Alternative 2

Alternative 2 consists of four ponds, two north of Homrighaus Rd. and two south of Homrighaus Rd. The average depth of the two northern-most ponds is 12.5 feet while the average depth of the two southern-most ponds will be 15 feet. This alternative would provide approximately 1,035,419 cubic yards of sand for beach nourishment activities. Geotechnical analyses for the ponds support 4:1 side slopes which means each pond will have an approximate 15-foot emergent marsh around its perimeter. Islands were added to maximize the amount of marsh edge habitat. Berms will be constructed around the ponds to prevent nuisance tides from inundating the created wetland habitat with saltwater. In total, this alternative will impact approximately 35.16 acres of estuarine elustrine wetlands, approximately 4.89 acres of estuarine scrub/shrub wetlands, and approximately 10.32 acres of existing open surface waters. This alternative would create 3.80 acres of estuarine elustrine wetlands along the pond edges. This alternative was not selected because it will not create as many acres of wetlands or provide sufficient freshwater wetland habitat for wildlife as the preferred alternative.

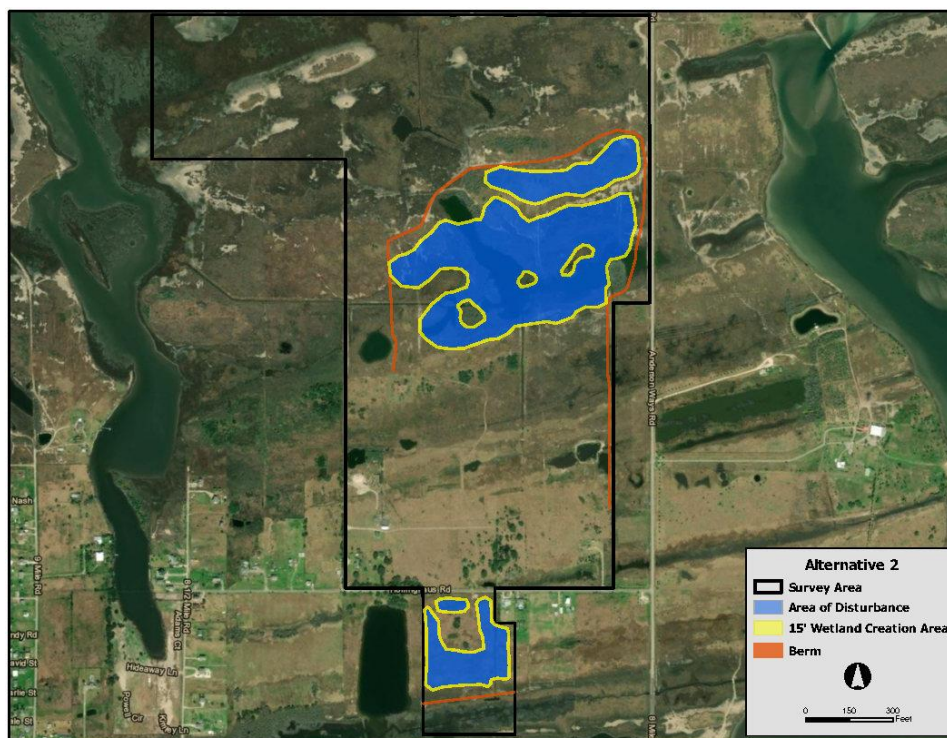


Figure 2 - Alternative 2

Preferred Alternative

The Preferred Alternative consists of four ponds, all north of Homrighaus Rd (Figure 3). The average depth of the two northern-most ponds (Pond 1 and Pond 2) is 20 feet while Pond 3 is approximately 10 feet deep with a shallow vegetated shelf and Pond 4 is 5 feet deep with a shallow vegetated shelf. This alternative would provide approximately 1,035,419 cubic yards of sand for beach nourishment activities. Geotechnical analyses for the ponds support 4:1 side slopes down to 10 feet and 6:1 side slopes below that. Ponds 1 and 2 will have an approximate 15-foot emergent marsh shelf around its perimeter. Ponds 3 and 4 have more gradual side slopes and wider plantings. In addition, approximately 37.10 acres will be converted to fresh/intermediate marsh via marsh management. Berms will be constructed around the ponds to prevent nuisance tides from inundating the created wetland habitat with saltwater. In total, this alternative will impact approximately 57.45 acres of wetlands and 0.26 acres of open water will be impacted under this alternative. 22 acres of tidal fringe marsh will be enhanced through thin layer placement of dredge material to protect against sea level rise and storm surge. 63.52 acres of wetlands

and 13.11 acres of open water will be created with this alternative. In addition, this alternative will prevent impacts from nuisance tides. Of the 63.52 acres of wetlands created, over 50 percent will be fresh or intermediate marsh in the moist soil management areas and within Ponds 3 and 4. This is the preferred alternative because it meets all of the stated success criteria.

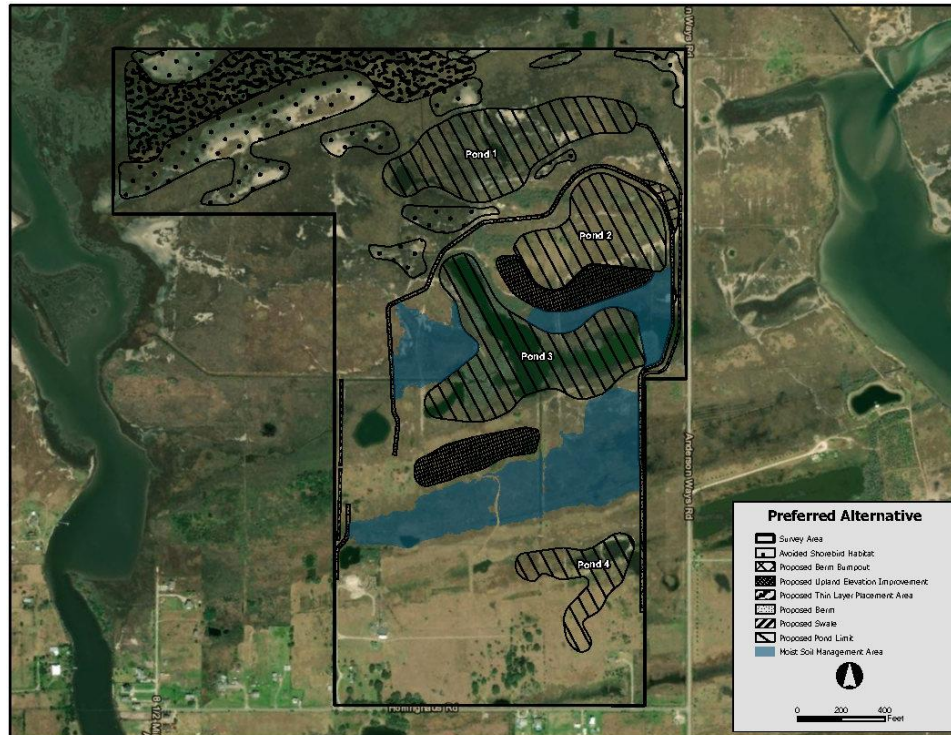


Figure 3 - Preferred Alternative

References

White, W. A., Tremblay, T. A., Waldinger, R. L, and Calnan, T. R., 2004, Status and trends of wetland and aquatic habitats on Texas Barrier Islands, Upper Texas Coast, Galveston and Christmas Bays: The University of Texas at Austin, Bureau of Economic Geology, Final report prepared for the Texas General Land Office and National Oceanic and Atmospheric Administration under GLO Contract No. 03-057, 67 p.



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