

Elba's Wetland Creation Project

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Introduction



Who is Southern Liquefied Natural Gas (SLNG)

- ⤴ SLNG is a subsidiary of Southern Natural Gas Company (SNG) an El Paso company
- ⤴ SNG has over 13,500 miles of pipeline and transports over 3 BCF of natural gas across the southeastern United States
- ⤴ SLNG is one of only four LNG receipt terminals in the United States
- ⤴ LNG is vaporized from -260°f to ambient temperatures and compressed into SNG's system
- ⤴ SLNG has been expanded to store 7.3 BCF of natural gas in liquid form and capable of sending out 1215 MMCF/D of natural gas

Introduction

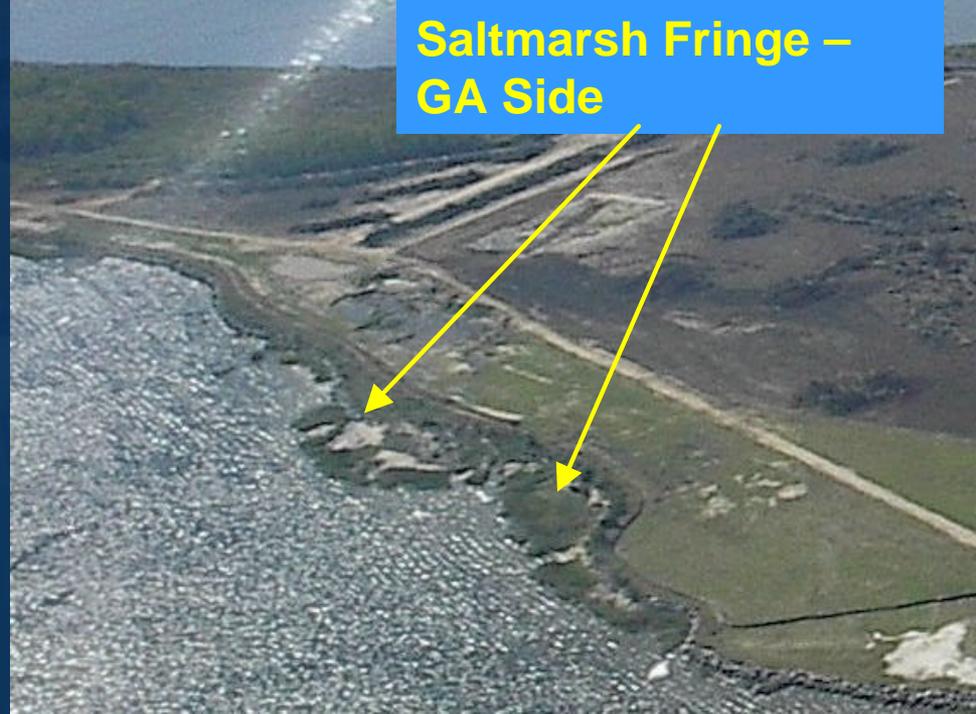
So what is the connection between SLNG and the creation of a saltmarsh?

- ⤴ In 1999, SLNG increased its ship turning basin
 - Result in the loss of 0.65 acres of tidal marsh
- ⤴ In 2001, SLNG proposed an expansion of its facilities including the creation of a new slip
 - Result in the loss of 2.64 acres of tidal marsh and 0.80 acres of estuarine mudflats
- ⤴ Both projects required compensatory mitigation

Looking Across the Turning Basin - Facing North towards SC



Saltmarsh Fringe – GA Side



Regulatory Agencies – Multi-tier



- ^ Federal Energy Regulatory Commission (FERC)
- ^ US Army Corps of Engineers, USCOE
 - Both Charleston, SC and Savannah, GA Districts
- ^ EPA
- ^ US Coast Guard
- ^ US Fish and Wildlife Service
- ^ National Marine Fisheries Service
- ^ Georgia Department of Natural Resources
 - Georgia Environmental Protection Division
 - Coastal Resources Division
 - Georgia Historic Preservation Division
- ^ Chatham County



Major Problem

- ^ SLNG was required to provide 1.3 acres of saltmarsh compensatory mitigation for the Charleston District COE, and
- ^ 21.1 credits of saltmarsh compensatory mitigation for the Savannah District COE
- ^ NO SALTMARSH MITIGATION BANKS
- ^ SLNG was in a difficult situation with only one possible solution



Solution – Create a Saltmarsh



- ^ SLNG owns Elba Island
- ^ SLNG can use an upland portion of the island and create a mitigation site



Improved Upland Buffer

Area to be converted to tidal marsh



SALTMARSH DESIGN



- Install hydrological monitors and piezometers to determine tide and flood elevations
- Survey and study existing topography and hydrology to design your grading plan



Tidal staff gauge for piezometer reference



Using survey-grade GPS to determine elevations of restored marsh



Transit for elevating tidal staff gauge

Clearing & Grading



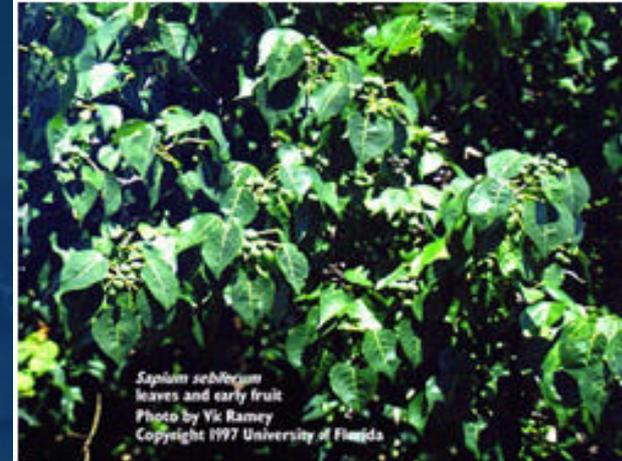
- Clear vegetation
 - Nuisance species were burned
 - Roots and seed-bank were deeply buried
- Survey and stake designed elevations
- Use highly skilled equipment operators



Melia azederach, Chinaberry



Solanum sisymbriifolium, Sticky nightshade



Sapium sebiferum, Popcorn tree



Burning removed exotic vegetation

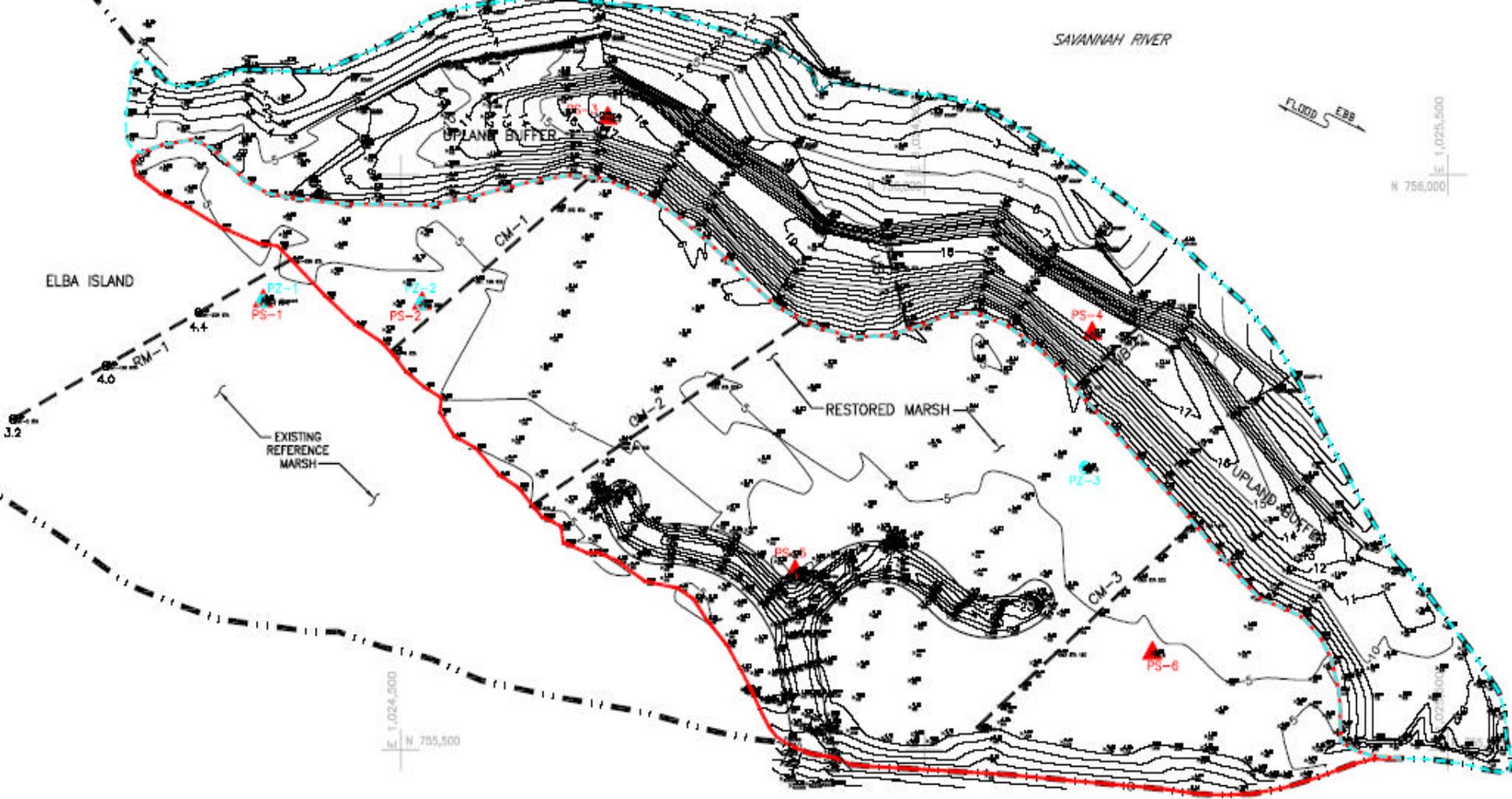


Dredging feeder creek



Revetment installation at mouth of constructed feeder creek

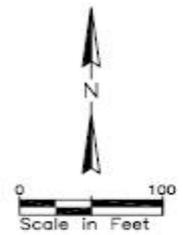




LEGEND

- 1 — AS-BUILT 1' CONTOUR
- 5 — AS-BUILT 5' CONTOUR
- LIMITS OF RESTORED MARSH (6.54 AC.)
- - - - - LIMITS OF UPLAND BUFFER (5.10 AC.)
- - - - - APPROXIMATE SHORELINE LOCATION
- PZ-1  PIEZOMETER LOCATION
- SG-1  STAFF GAUGE LOCATION
- PS-1  PHOTO STATION LOCATION
- - - - - QUADRAT LOCATION

Contour Map As-Built Drawing February 17, 2004



Planting



Soil auger and plants in restored marsh

- Planted smooth and saltmeadow cordgrass (*Spartina* sp.)
 - Nursery grown containerized stocks (1.75")
 - Placed on 2 foot centers
 - Except for 3 rows of one gallon or larger containers at water's edge



Spartina alterniflora being planted

- Planted 3000 lowland maritime forest species on the upland buffer
 - Trees - oaks, maples, pines, gum, elms, etc...
 - Shrubs - yaupon, wax myrtle, saw palmetto, button bush, fetterbush, etc...



Augered holes and newly planted *Spartina alterniflora*

Site Completed July 16, 2003



SUCCESS AND MONITORING



- ^ COE permit condition required 7 years of success monitoring
 - Success Parameters
 - ^ Successful native vegetation
 - Saltmarsh most important
 - ^ Wildlife usage
 - ^ Hydrologic parameters
 - Water levels and flooding frequencies
 - Success parameters are measured against existing reference marsh adjacent to the mitigation site

Plant Growth November 2003



Plant Growth November 2004



Plant Growth September 2005



Successful Vegetation

Saltmarsh

^ Transect Measurements

- Species diversity
- Individual plants
- Plant stems
- Plant rhizome spread

^ Run statistical analysis for diversity, frequency, and density

^ Compare data against reference marsh

^ 1st & 2nd Year Conclusion

- Saltmarsh is evolving into a viable marsh system



WILDLIFE USAGE

- ^ Numerous species observed directly and indirectly
- ^ Lost mudflat habitat for wading birds has been restored
- ^ Created site is utilized by upland, high and low marsh species



Fiddler crab in restored marsh



Alligator in restored marsh



Turtle in restored marsh



Raccoon tracks in restored marsh



Wading bird in restored marsh

Elba Dolphins

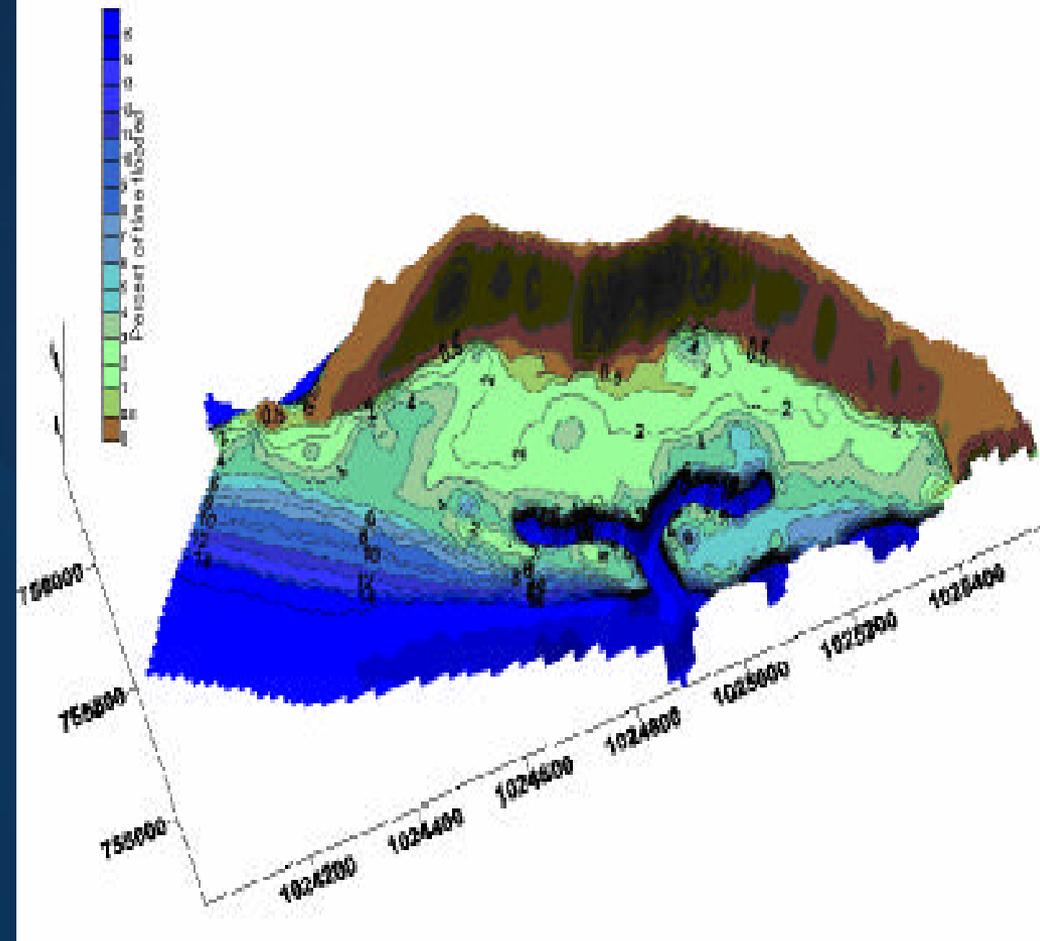


HYDROLOGY



- Staff gauges and piezometers continuously record water levels and water table
- Measurements indicate that a diverse marsh system is being created
- Maximizes the opportunity for greater numbers of species to establish
- Overall hydrology is consistent with the reference marsh
- SUCCESS!!!

• Figure 10. Flooding Frequency Contours for Elba Island Mitigation Site, View 1 (1 July to 31 December 2003)



Elba Scientific & Education Outreach





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