



36TH INTERNATIONAL CONFERENCE ON COASTAL ENGINEERING 2018

Baltimore, Maryland | July 30 – August 3, 2018

The State of the Art and Science of Coastal Engineering

North Breton Island Restoration, Designing to Increase a Barrier Island's Habitat And Longevity



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North Breton Island NRDA Phase III Early Restoration Project Team



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OUTLINE

Introduction

Data Collection

Development of Alternatives

Alternatives Analysis

Recommended Restoration Plan

Path Forward



Introduction

ICCE
2018

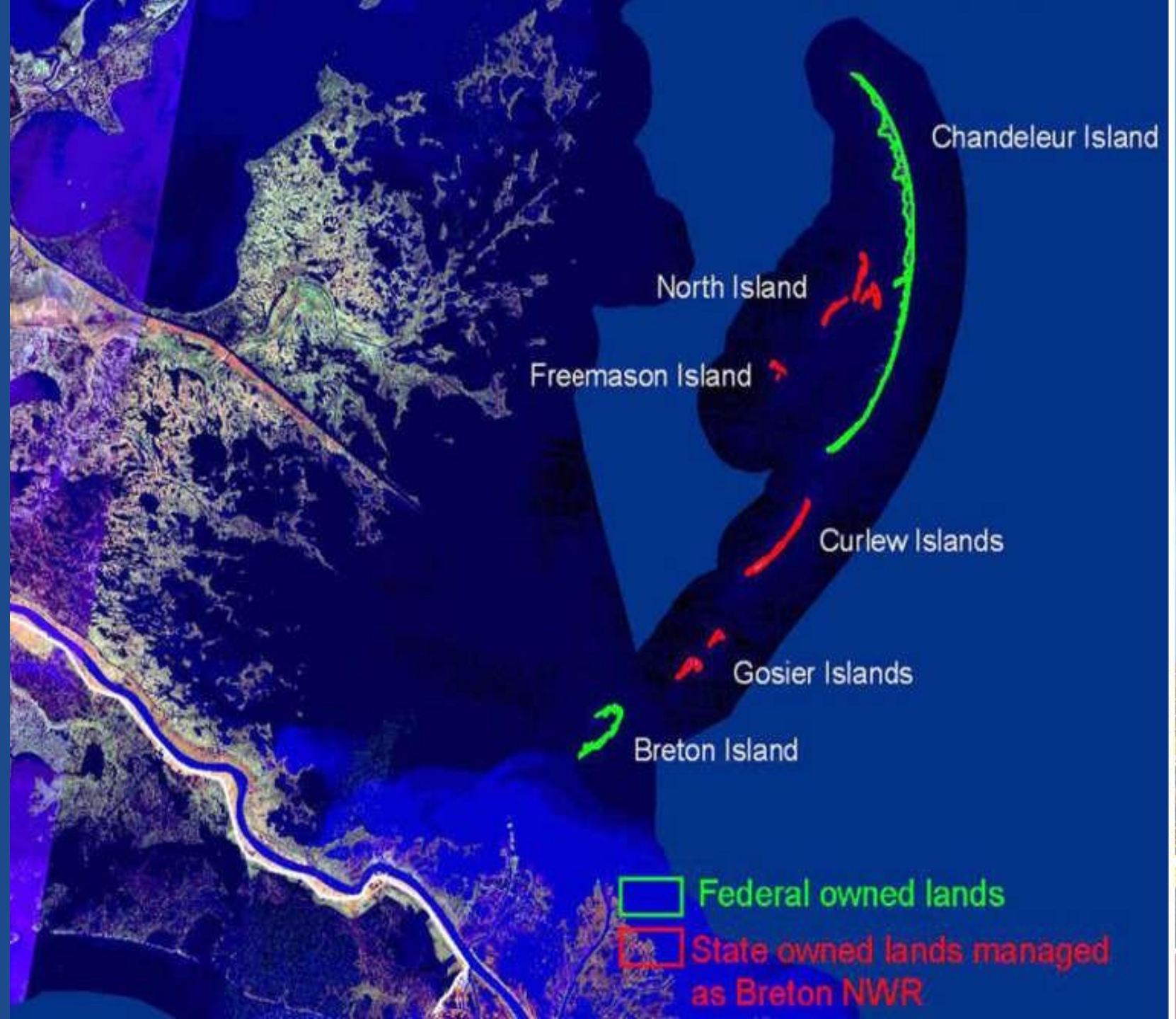
Deepwater Horizon Early Restoration Phase III

*Louisiana Outer Coast
Restoration Project*

Goal: *restore beach, dune, and back-barrier marsh habitats* to support breeding birds (*brown pelicans, terns, skimmers, and gulls*) and to help compensate the public for spill-related injuries and losses to these resources



Breton NWR Map



North Breton Island

Refuge established on October 4, 1904 by an executive order of President Theodore Roosevelt. This is the 2nd oldest refuge in the country and the only refuge known to have been visited by President Roosevelt in 1915.



ICCE
2018

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Island Restoration Concept

Habitat	Approximate Area
Beach	76.2 Acres
Dune	138.7 Acres
Marsh	137.3 Acres
Total	352 Acres

Approximately 76 acres of beach, 139 acres of dune, and 137 acres of back barrier marsh habitat

Total island width of 1,100 feet, bounded by sloped foreshore and back barrier marsh

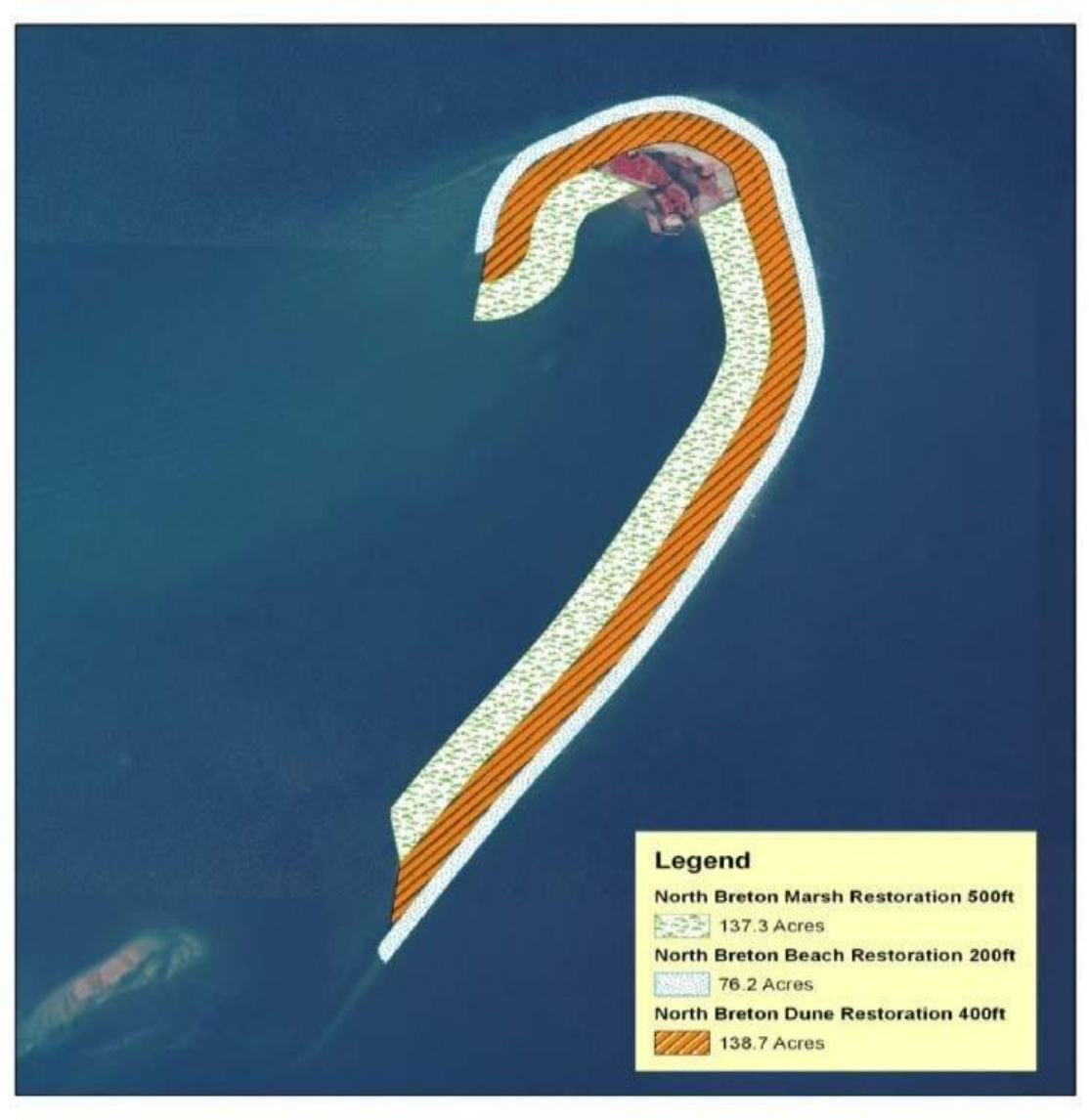
Total island length of 16,000 linear feet

500 ft. wide back barrier marsh platform built at approximately +3

Ref: Phase III Early Restoration Plan and Programmatic Environmental Impact Statement



Conceptual Design Map



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North Breton Island Historic and Supplemental Reports

CONTRACT NO. DACW29-97-D-0017
DELIVERY ORDER NO. 13



U.S. Army Corps of Engineers
New Orleans District

REMOTE SENSING SURVEY OF THE MISSISSIPPI RIVER GULF OUTLET, OCEAN DREDGED MATERIAL DISPOSAL SITE, PLAQUEMINES PARISH, LOUISIANA


Final Report
May 2001

Coastal Environments, Inc.
1260 Main Street
Baton Rouge, Louisiana

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Distribution Unlimited

Prepared for:
New Orleans District
U. S. Army Corps of Engineers
New Orleans, Louisiana

20010817 047



science for a changing world

In cooperation with the U.S. Fish and Wildlife Service

Sand Resources, Regional Geology, and Coastal Processes of the Chandeleur Islands Coastal System: an Evaluation of the Breton National Wildlife Refuge



Scientific Investigations Report 2009-5252

U.S. Department of the Interior
U.S. Geological Survey

MRGO ECOSYSTEM RESTORATION FEASIBILITY STUDY
CHANDELEUR AND BRETON ISLANDS

Prepared for:
URS Group
And
U.S. Army Corps of Engineers
New Orleans District

Prepared by:
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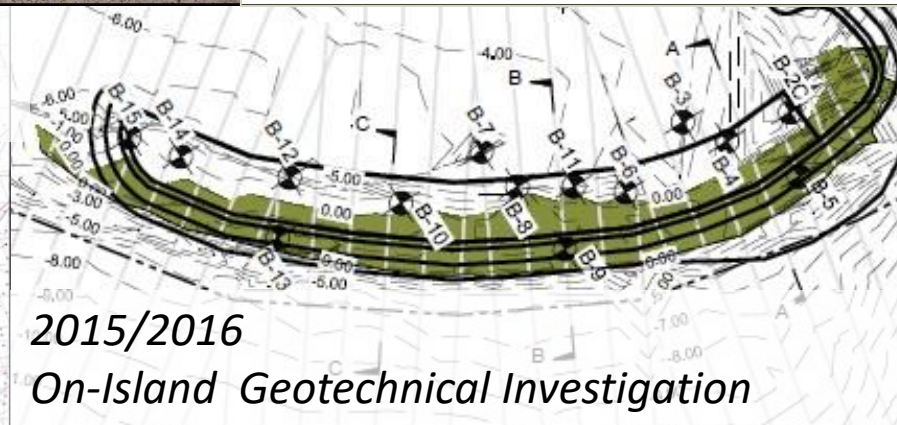
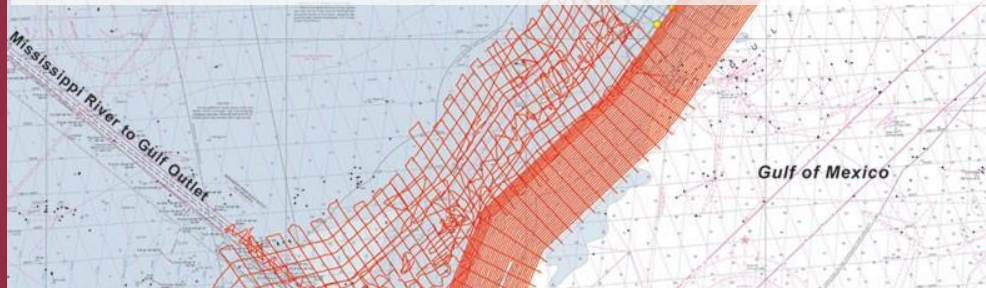



Gordon Thomson, P.E.¹
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David Swigler, M.Sc.¹


Recommended Citation: Thomson, G., Miner, M., Wycklindt, A., Rees, M., Swigler, D., 2010. MRGO Ecosystem Restoration Feasibility Study - Chandeleur and Breton Islands. Boca Raton, Florida: Coastal Planning & Engineering, Inc. 122p. (Report prepared for USACE under contract to URS)

December 2009
Rev May 2010

Assessing the Resilience of a Vital Barrier Island Chain (USGS 2007)



2015/2016 On-Island Geotechnical Investigation

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Borrow Area Detailed Geophysical and Cultural Resources Survey

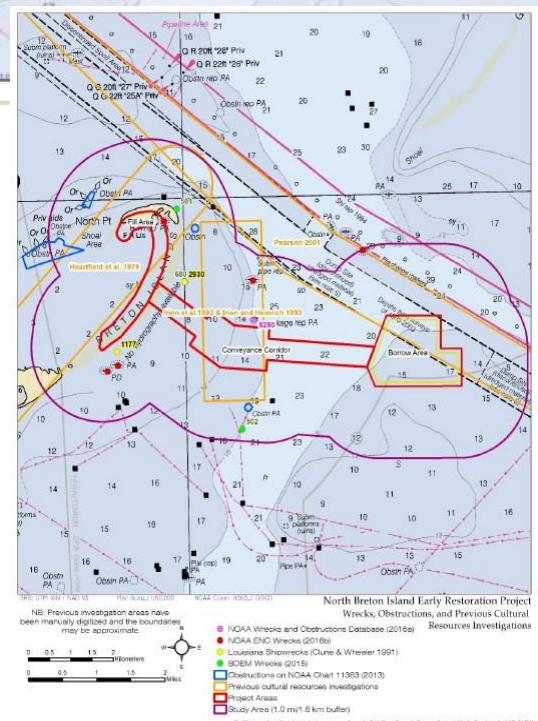
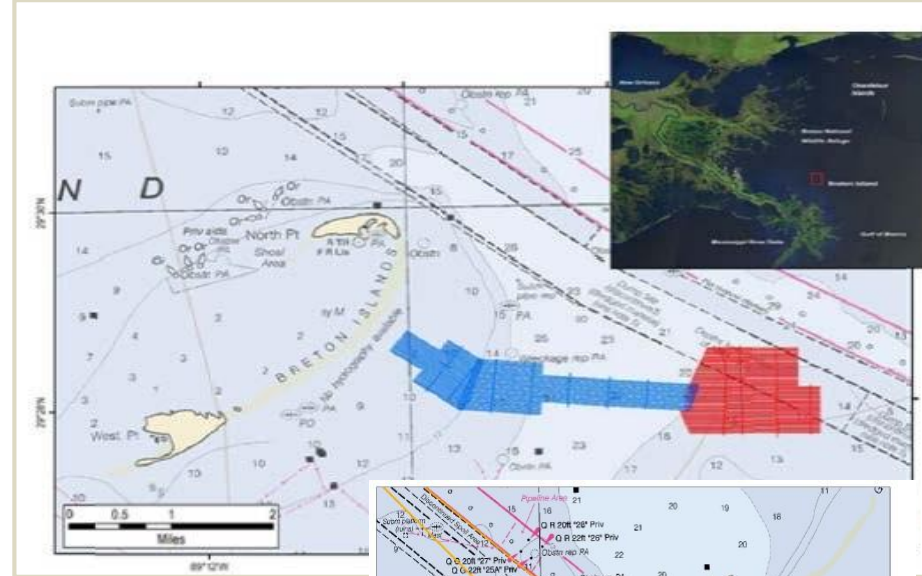


Figure IV-1. Wrecks, obstructions and previous cultural resources investigations within 1.0 mile (1.6 km) of the North Breton Island survey area.

Survey Summary Report

North Breton Island Early Restoration Project
Marine Geophysical and Hydrographic Survey Report

June 2016



DRAFT REPORT

JANUARY 2017

PHASE I SUBMERGED CULTURAL RESOURCES ANALYSES FOR THE NORTH BRETON ISLAND RESTORATION PROJECT

1 | Page

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Concept Plan Development

Three primary design approaches

- Programmatic Environmental Impact Statement (PEIS)
- Geomorphic & Ecologic Form & Function (GEFF)
- Feeder Beach

Application of Coastal Louisiana Barrier Island Restoration Design Principals

Meet and exceed PEIS target restoration acres



Design Iterations

CONCEPT	BEACH WIDTH (FT)	BEACH HEIGHT (NAVD88, FT)	DUNE WIDTH (FT)	DUNE HEIGHT (NAVD88, FT)	BACK BEACH WIDTH (FT)	BACK BEACH HEIGHT (NAVD88, FT)	MARSH WIDTH (FT)	MARSH HEIGHT (NAVD88, FT)	VOLUME (CUBIC YARDS)
1A	200	3	100	9	NA	NA	500	3	3,121,000
1B	200	3	100	9	NA	NA	500	3	3,403,000
2A	290	4.5	100	6.5	100	4.5	800	3	3,986,000
2B	200	4.5	100	6.5	100	4.5	800	3	3,506,000
2C	200	4.5	100	6.5	100	4.5	800	3	3,485,000
3A	200 PLUS FEEDER	4.5	100	6.5	100	4.5	800	3	3,556,000
3B	500 PLUS FEEDER	3.5	NA	NA	NA	NA	800	3	3,563,000

Conserve volume throughout design iterations (same order of magnitude as construction budgets)

Consider protecting existing healthy marsh

Consider containment dike constructability

Capitalize on coastal forcing (net transport)



Concept Plans Selected for Modeling



Concept Plan #1A: PEIS



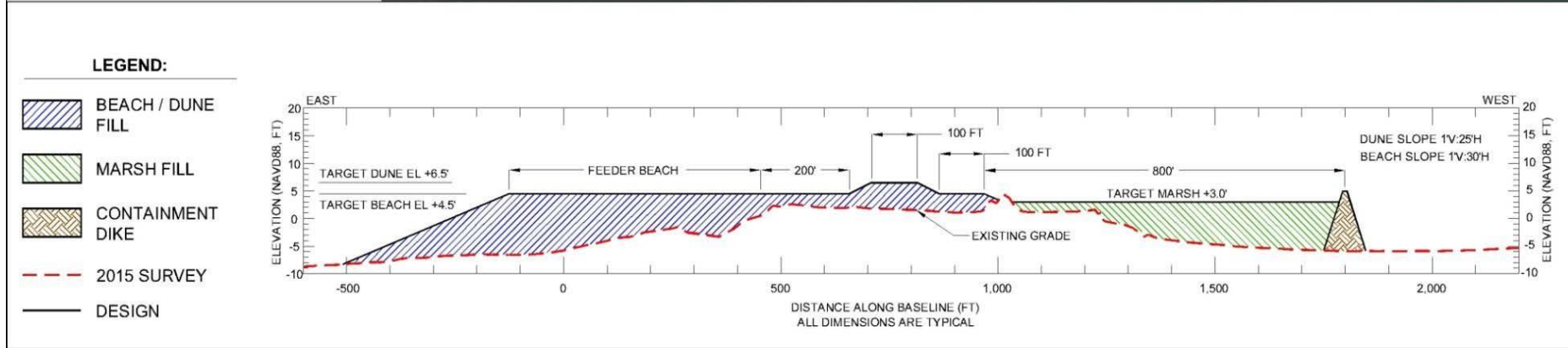
Concept Plan #2C: GEFF



Concept Plan #3B: Feeder Beach



Concept Plan #4A: GEFF Plus Feeder Beach





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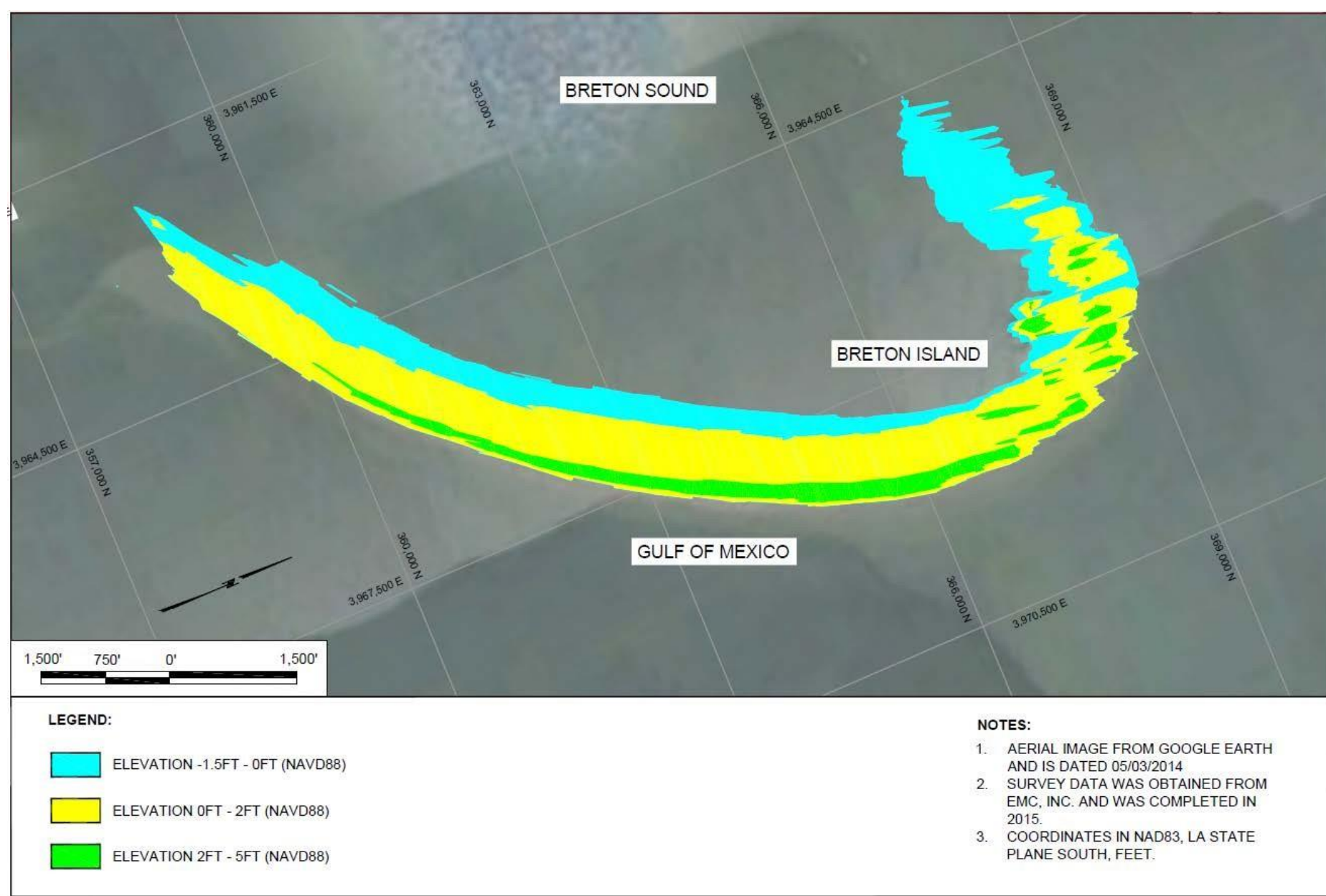
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Existing Conditions Review



North Breton Island Existing Habitat Acres



Dune (+5.0 and above)	0 acres
Supratidal (+2.0 to +4.9)	32 acres
Gulf Intertidal (0.00 to +1.99)	32 acres
Bay Intertidal (0.00 to +1.99)	150 acres
Subtidal (-1.5 to 0.00) Bayside Only	119 acres

(Calculated from EMC 2016 Design Survey)

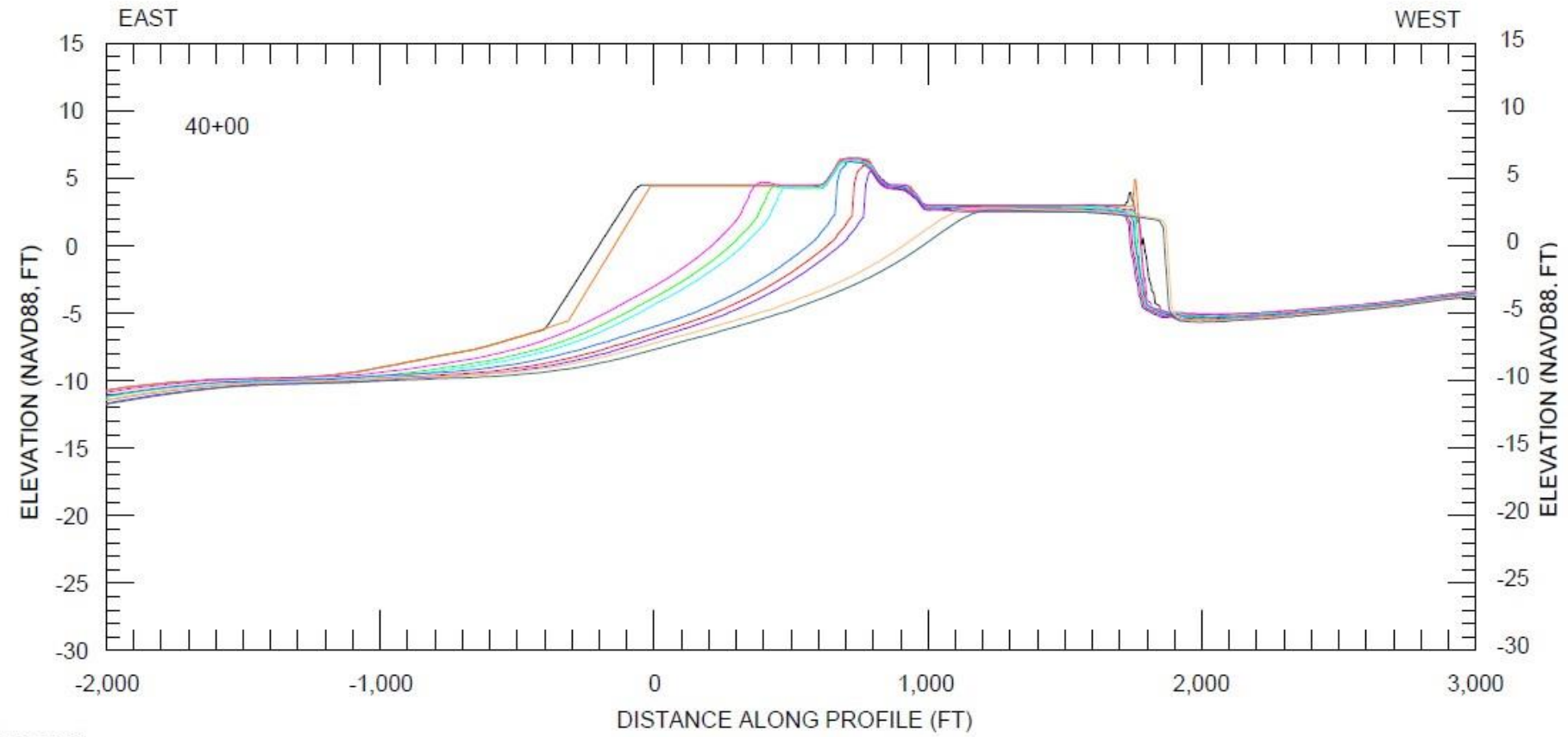


Coastal Processes and Forcing Functions

	(ft/yr)	(m/yr)
Gulfside Erosion	33.3 to 20.2	10.2 to 6.2
Bayside Erosion	3.3	1.0
RSLR (Subsidence and SLR)	0.04	0.01
Storm Erosion and Overwash	per numerical modeling	



All Profiles



LEGEND:

- | | |
|-----------------------|-----------------|
| TY0 POST-CONSTRUCTION | TY7 POST-STORM |
| TY2 PRE-STORM | TY10 |
| TY2 POST-STORM | TY12 PRE-STORM |
| TY5 | TY12 POST-STORM |
| TY7 PRE-STORM | TY15 |

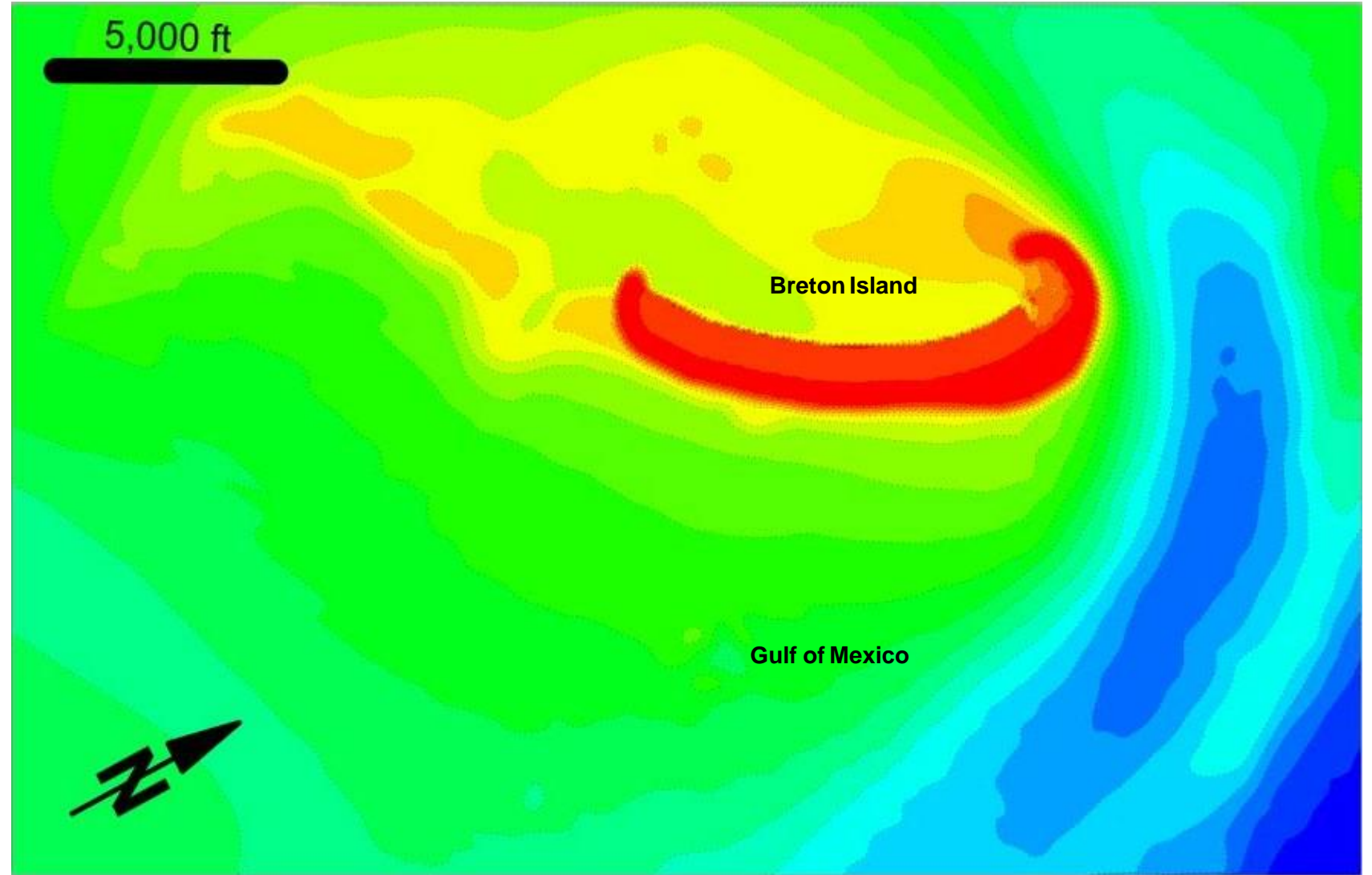
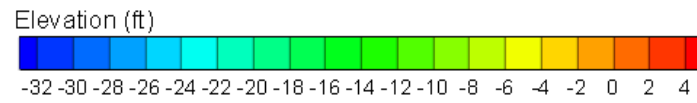


Habitat Acres

Time Period	Acres Intertidal (0 - 2 ft)	Acres Supratidal (2 - 5 ft)	Acres Dune (+5 ft)	Total Acres
Existing	153.4	25.8	0.0	179.2
TY0 (Post-Construction)	41.9	358.2	59.7	459.9
TY2 Pre-Storm	43.6	336.3	59.2	439.1
TY2 Post-Storm	71.8	280.0	56.9	408.7
TY5	66.8	269.0	33.3	369.1
TY7 Pre-Storm	64.7	257.1	24.2	345.9
TY7 Post-Storm	184.6	148.9	13.4	346.9
TY10	155.5	147.1	3.1	305.7
TY12 Pre-Storm	155.0	129.4	0.2	284.6
TY12 Post-Storm	164.4	47.1	0.0	211.5
TY15	134.3	32.8	0.0	167.1



TY0 Post Construction

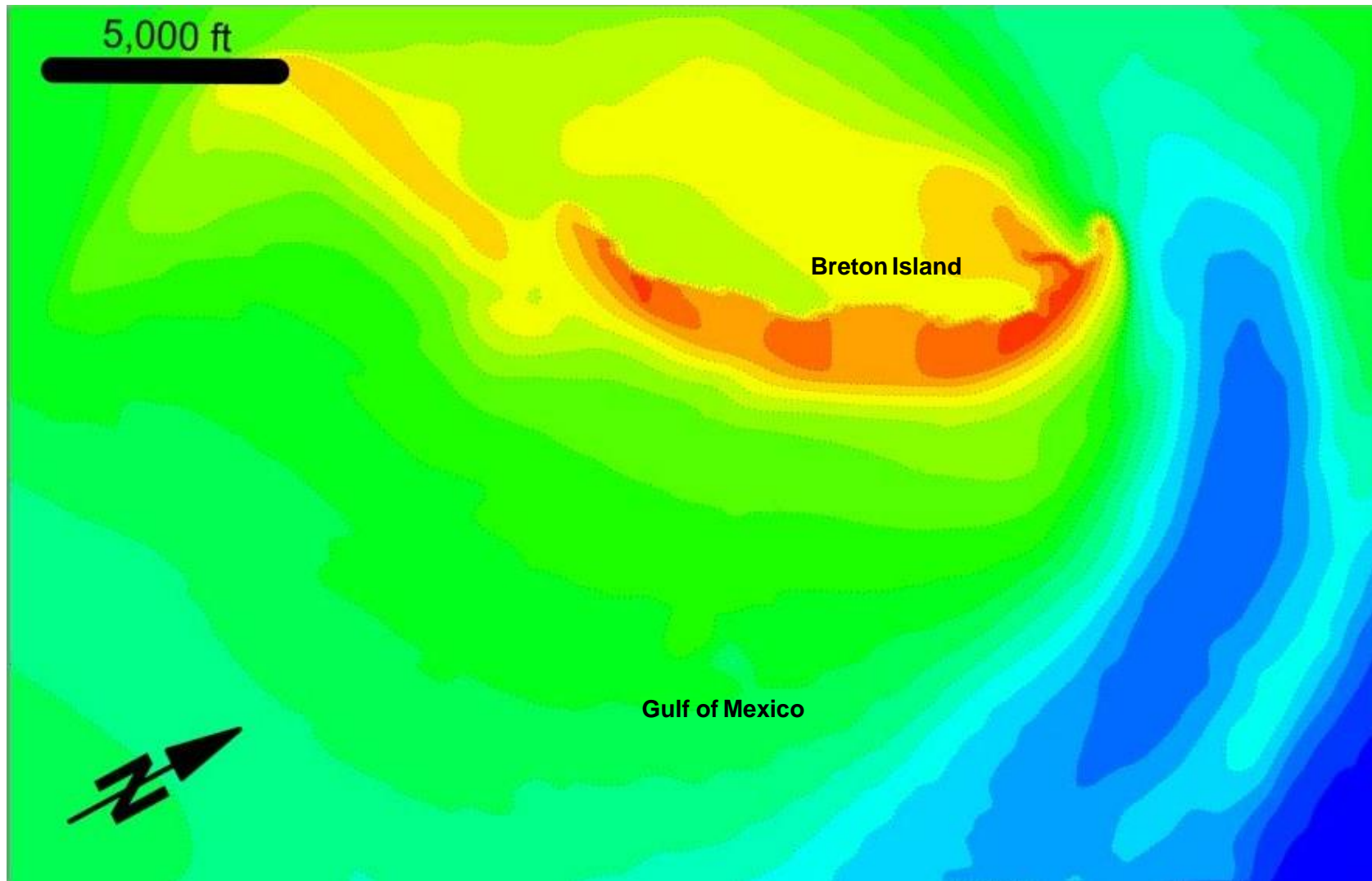


Elevation (ft)



-32 -30 -28 -26 -24 -22 -20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4

TY15



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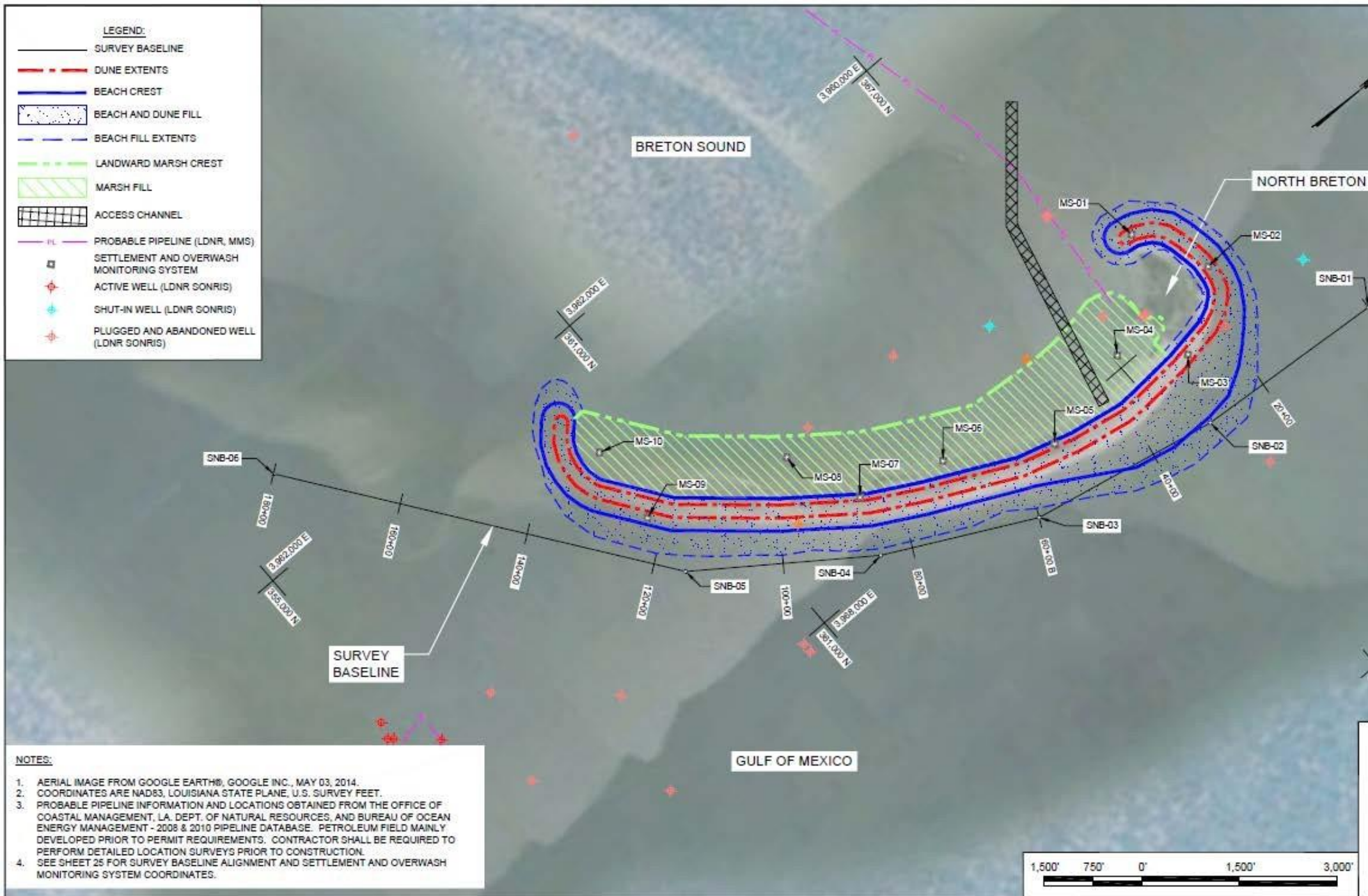
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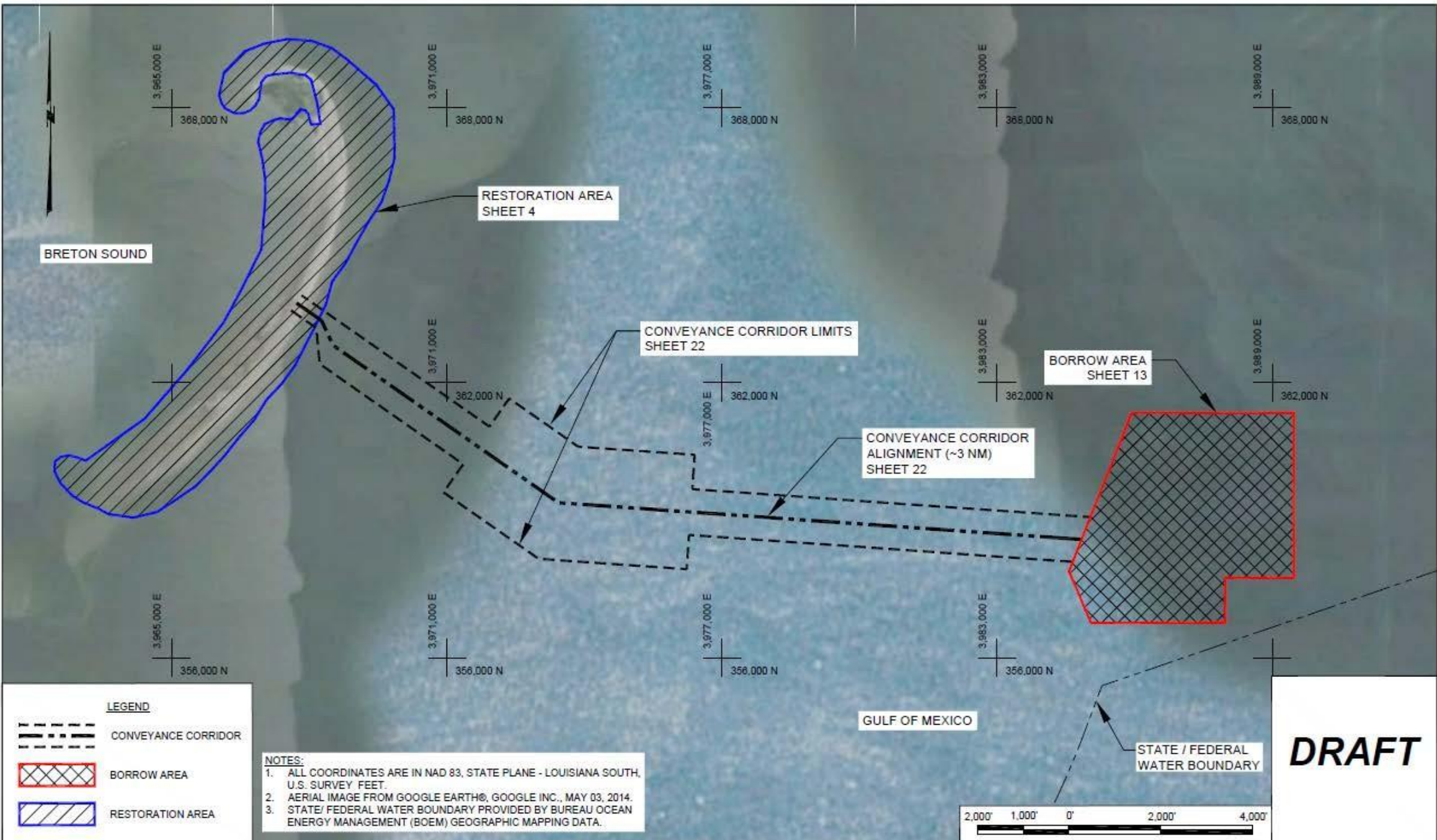
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LEGEND

-  CONVEYANCE CORRIDOR
-  BORROW AREA
-  RESTORATION AREA

NOTES:

1. ALL COORDINATES ARE IN NAD 83, STATE PLANE - LOUISIANA SOUTH, U.S. SURVEY FEET.
2. AERIAL IMAGE FROM GOOGLE EARTH®, GOOGLE INC., MAY 03, 2014.
3. STATE/ FEDERAL WATER BOUNDARY PROVIDED BY BUREAU OCEAN ENERGY MANAGEMENT (BOEM) GEOGRAPHIC MAPPING DATA.



DRAFT



Timelines and Path Forward

Phase	Projected Schedule
Permit-Ready Plans and Technical Specifications	Early June 2017
Joint Coastal Permit Application USACE LDNR Permits	Mid-June 2017 February 2018 September 2017
Construction Documents Preparation	March 2018 – October 2018
Updated Topographic and Bathymetric Survey	Late Summer 2018
Final Contract Documents	Early Fall 2018
Construction Procurement	November 2018
Construction	Likely 2019



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