BOEM
Bureau of Ocean Energy Management

Gulf of Mexico Offshore Sand Management Working Group

New Orleans, Louisiana

October 13, 2015

9:00 a.m. to 4:30 p.m.

Meeting Objectives

- Receive update on BOEM Marine Minerals Program (MMP) and Sand Management Working Group (SMWG) efforts
- Share information on gulf-wide sand inventory initiatives
- Discuss lessons learned from recent sand management efforts
- Identify opportunities for continued Gulf of Mexico SMWG activities

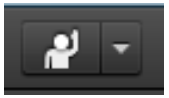
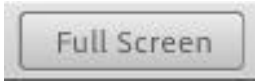
Agenda

Time	*Discussion Topic*
9:00-9:15	Welcome & Introductions
9:15-9:30	MMP and SMWG Overview
9:30-10:30	Gulf-wide Sand Inventory Initiative
10:30-10:45	Break
10:45-12:00	Gulf-wide Sand Inventory Initiative (cont.)
12:00-1:30	Lunch (on your own). See “Dining Options” handout.
1:30-2:45	Barrier Island Restoration Using GOM Shoal Sands: Success Stories, Lessons Learned
2:45-3:00	Break
3:00-4:20	Barrier Island Restoration Using GOM Shoal Sands: Success Stories, Lessons Learned (cont.)
4:20-4:30	Wrap Up & Next Steps
4:30	Adjourn

Ground Rules

- "Honor" the agenda
- Participate actively and respectfully
- Focus comments and speak concisely
- Speak in order; facilitator will mind the queue
- Speak clearly into the microphone for those joining by phone/webinar
- Limit side conversations or take them outside
- Cell phones off/silent

Ground Rules for Webinar Participants

- Please select *6 or the mute button to mute your audio to the phone
- **Please do not put the line on hold!**
- Click the “raise hand” icon in the top of the webinar window to enter the discussion queue; click again to lower your hand after speaking 
- You can also share questions using the chat pod in the bottom left of the webinar window
- Click the “full screen” button – top right of the presentation pod – to make the presentation bigger 

This call will be recorded for those unable to attend.

Introductions

Wrap Up and Next Steps

- Recap
- Identify potential working groups and volunteers
- THANK YOU!

AGENDA

Bureau of Ocean Energy Management (BOEM), Marine Minerals Program
In Partnership with the Gulf of Mexico Alliance
Gulf of Mexico Offshore Sand Management Working Group

Tuesday, October 13, 2015
9:00 AM - 4:30 PM

Location: Intercontinental Hotel
Melpomene Room
444 St. Charles Ave.
New Orleans, LA 70130

Information for Remote Participants:
Call-in Number: 1-866-244-8528
Participant Passcode: 640961
Webinar Link: http://kearnswest.adobeconnect.com/boemsm/
Note: Please follow the Adobeconnect instructions to join the webinar audio. The above dial-in number is an alternate way to connect to the meeting if not joining the webinar.

Meeting Purpose/Objectives:

- Receive update on BOEM Marine Minerals Program (MMP) and Sand Management Working Group (SMWG) efforts
- Share information on gulf-wide sand inventory initiatives
- Discuss lessons learned from recent sand management efforts
- Identify opportunities for continued Gulf of Mexico (GOM) SMWG activities

TIME	ITEM
8:30-9:00	*Arrivals*
9:00-9:15	**Welcome & Introductions** • Introductions of new MMP staff and Headquarters staff (Mike Miner, BOEM) • Review agenda, meeting objectives, and process approach (Facilitator) *For Webinar Participants:* • *Please select *6 or the mute button to mute your audio to the phone* • ***Please do not put the line on hold!*** • *Click the "raise hand" icon in the top of the webinar window to enter the discussion queue* • *You can also share questions using the chat pod in the bottom left of the webinar window* • *Click the "full screen" button – top right of the presentation pod – to make the presentation bigger*

TIME	ITEM
9:15-9:30	**MMP and SMWG Overview (Mike Miner, BOEM)** • History of SMWG • GOMA Partnership • New MMP Developments • Sediment Budgets & OCS Sand Value • Significant Sand Resources • Goals
9:30-10:30	**Gulf-wide Sand Inventory Initiative** • Texas database (Ray Newby, Texas General Land Office) • Louisiana database (Syed Khalil/Rick Raynie, CPRA) • Alabama database (Steve Jones, Geological Survey of Alabama)
10:30-10:45	***Break***
10:45-12:00	**Gulf-wide Sand Inventory Initiative (cont.)** • Florida database (Jennifer Coor) • BOEM Gulf-wide efforts/MMP GIS Database (Mike Miner/Lora Turner, BOEM) • Discussion
12:00-1:30	***Lunch (on your own). See "Dining Options" handout.***

1:30-2:45	**Barrier Island Restoration Using GOM Shoal Sands: Success Stories, Lessons Learned**
	• Regroup, introduction to Afternoon Session, and introduction of new participants (Facilitator)
	• Caminada 1 and 2 (Brad Miller/Clayton Breland, CPRA and Steve Dartez Coastal Engineering Consultants)
	  ○ Planning & Permitting
	  ○ Operational Overview
	  ○ Issues & Lessons Learned (e.g., borrow design, dive team, turtle trawling, etc.).
	  ○ Discussion

2:45-3:00	***Break***
3:00-4:20	**Barrier Island Restoration Using GOM Shoal Sands: Success Stories, Lessons Learned (cont.)** • MsCIP (Justin McDonald, USACE) • Whiskey Island (Devyani Kar, CPRA and Greg Grandy, Coastal Engineering Consultants) • Discussion (Facilitator)
4:20-4:30	**Wrap Up & Next Steps (Mike Miner, Facilitator)**
4:30	***Adjourn***

2015 Gulf of Mexico

Offshore Sand Management Working Group

Introduction

New Orleans, Louisiana

October 13, 2015

Michael Miner, BOEM michael.miner@boem.gov

Introduction

- BOEM Marine Minerals Program (MMP)
- MMS La SMWG → BOEM/GOMA Gulf of Mexico Offshore Sand Management Working Group
- Overview
  - History of SMWG
  - Impact of SMWG
  - BOEM MMP Status

SMWG History 2003-2007

- **Bureau Priorities**: no dedicated GOM staff; no dedicated funding
- **Partnering:** Stakeholder engagement poor in most areas (SMWG good start); coordination with other agencies lacking
- **Stewardship of Mineral Resources:** Inventory of sand resources identified as primary need (did have strong but minimally funded co-op program)
- **Managing Multiple Uses:** Surface mineral access not considered when siting petroleum infrastructure, especially approving pipeline abandonment
- **Project Management, Planning, and Outreach:** Time required to get an agreement uncertain; requirements uncertain and inconsistent
- **Science-Informed Decisions:** Applied research to inform decision making advanced significantly during this time period

SMWG History 2009

- **Bureau Priorities**: Improving? 1 dedicated staff in Gulf Region; no dedicated funding; increased awareness of issues
- **Partnering:** Stakeholder engagement poor; coordination with other agencies lacking; restoration project construction timelines impacted
- **Stewardship of Mineral Resources:** Some accomplishments, (geological and geophysical data collected/analyzed) through co-ops; focused on near term use needs not regional resource management
- **Managing Multiple Uses:** Significant OCS Sediment Resources policy developed and Notice to Lessees (oil and gas) issued to inform stakeholders
- **Project Management, Planning, and Outreach:** Time required to get an agreement too long; NEPA and other compliance requirements not coordinated with other agencies

Impact of SMWG

Where we stand today:

Bureau Priorities: Support for the program at the highest levels in BOEM and DOI

- Dedicated funding
- 4 passionate and full-time dedicated staff in GOM (13 program-wide)
- Encouraging and fostering partnerships outside of Bureau
- Supporting (funding) MMP-specific science to inform decisions

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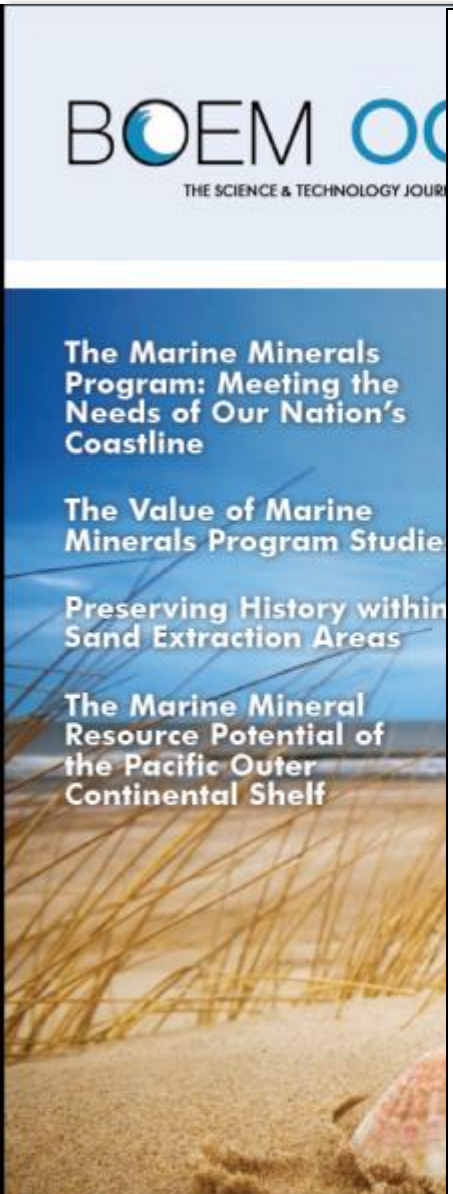
Bureau Support for MMP



Building Coastal With OCS Sand

Managing Shores for the Long

By Renee Orr • William Yancey Brown

Coastal resilience is a term we hear often, especially after Hurricane Sandy. This prompts some to ask, "How can we make our coasts more resilient?"

As the nation's steward of offshore energy and nonenergy mineral resources, the Bureau of Ocean Energy Management (BOEM) at the U.S. Department of the Interior (DOI) is making tangible contributions to building coastal resilience. For more than two decades, BOEM's Marine Minerals Program (MMP) has been a central player in coastal restoration by granting access to sand resources from the Outer Continental Shelf (OCS). BOEM agreements and partnerships with federal agencies, states and coastal communities enable us to provide sand to restore beaches, wetlands a These efforts help to reduce the impacts of h nor'easters and long-term erosion on vulnerable infrastructure and habitat. Our goal is to contrib nation's environmental, economic and recreati being through safely completed, sustainable proje

BOEM is the only agency authorized to grant OCS sand and has seen an increased number o for this resource in recent years, due to stronger frequent storms and the depletion of suitable reso state waters for restoration projects. Hurricane Sar tober 2012, intensified the demand and stimulate federal-state-private sector collaboration, whic aged a change in perspective from a project-by-p proach to broader regional approaches and more efforts to build resilience for the long term.

The MMP is also actively leasing OCS materi of Mexico coastal restoration projects for Louisia island shorelines battered by Hurricanes Katrina a 2005, Gustav in 2008, and Isaac in 2012, and impacted by the 2010 *Deepwater Horizon* event.

BOEM does not conduct the dredging or und

BOEM Partnerships Strengthen Coastal Resilience, Environmental Stewardship

Restoration Progress Along the Gulf and Atlantic Coasts

By Abigail Ross Hopper

This fall, we will mark the third anniversary of Hurricane Sandy, which wreaked havoc along the U.S. East Coast. From flooding and waist-deep sand deposited on small town streets to damaged property, mangled infrastructure and battered wildlife habitat along the coast, Sandy's legacy will not be forgotten. The coastal communities that fared the best—where impacts were less severe—were those that had invested in their own resilience, those that had rebuilt beaches and dunes and other protective measures in the wake of previous storms or to combat long-term erosion.

The year 2015 also marks the 10th anniversary of Hurricanes Katrina and Rita, which devastated the Gulf of Mexico (GOM) Coast, as well as the fifth year since the *Deepwater Horizon* (DWH) tragedy, bringing other coastal ecosystem impacts and demonstrating the need for coastal resilience.

For more than 20 years, the U.S. Bureau of Ocean Energy Management (BOEM) has partnered with coastal communities, states and other federal agencies to help build that

The Long Beach Island Coastal Storm Damage Reduction Project in New Jersey, started in May 2015, is designed to complete the dune and berm system and reduce future storm damage. It is a partnership between BOEM, USACE and the New Jersey Department of Environmental Protection.

Impact of SMWG

Where we stand today:

Partnering: Key to recent program success

- Project Partnering: remove “stovepipe”
  - USACE Regulatory for most projects: identify agency roles and responsibilities from start; no duplication of effort
  - BOEM engaged at planning stage instead of “permitting” stage
  - BOEM involved in borrow area alternative screening: improve planning confidence (identify building material)
- Program Partnering :
  - Regional groups (GOMA)
  - Science efforts (USACE; Navy; USGS; States)
  - Monitoring efforts
  - Programmatic consultations (protected species, etc.)

Impact of SMWG

Where we stand today:

Managing OCS Mineral Resources: Can't manage the resource and be effective partners in Gulf restoration if we don't know what we have

- Marine Minerals Program geospatial database
- Gulf-wide offshore sediment inventory initiative
  - Understanding recent geology/evolution of shelf key
  - Existing data provides framework in GIS
  - Programmatic approach to collect, process, analyze and interpret new data
  - Uniform methods, various interpretation considered, standard formats

Impact of SMWG

Where we stand today:

Managing Multiple Uses: Shelf sediment resources need to be available for use

- IMPLEMENTING Significant OCS Sediment Resources policy
- Large component of Gulf MMP workload
- Coordination with petroleum industry stakeholders and Bureau of Safety and Environmental Enforcement
- Coordination with States for identification of “Significant” resources and during CZMA reviews
- For efficient conflict management reliable geologic/geophysical data are key (science-informed decisions)

Impact of SMWG

Where we stand today:

Project Management, Planning, and Outreach: Goes back to partnering

- Beyond SMWG, continued dialog with potential stakeholders (project managers, planners, scientific experts, etc.)
- All projects different: case-by-case approach instead of one-size fits all guidelines
- Provide scientific and technical support beyond the borrow area
- BOEM comes on early as part of the design or planning team
  - All agencies coordinating early on environmental/safety requirements met for agencies
  - Issues identified early on
  - Design to construction was 8-10 yrs, now less than 3

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Role in Gulf Restoration Programs

FY 13- FY 16 Gulf of Mexico OCS Sand Projects

Project (funding)	Lead Agency	Sand Vol. (yd^3)	Status
Raccoon Island, LA (CWPPRA)	NRCS	1.2 million	Complete 3/13
Pelican Island, LA (CWPPRA)	NOAA-NMFS	5.5 million	Complete 2/13
Cameron Parish Shoreline, LA (State)	LA CPRA	5 million	Complete 3/14
Caminada Headland Increment 1, LA (CIAP)	LA CPRA	5.2 million	Complete 12/14
Caminada Headland Increment 2, LA (NFWF)	LA CPRA	8.8 million	Construction began 5/15
MsCIP Gulf Islands National Seashore, MS (Direct appropriations)	USACE	14 million	Environmental Review
Whiskey Island, LA (NRDA)	LA CPRA	13.4 million	Lease Signed 6/15
N. Breton Is., LA (NRDA)	FWS	1-6 million	Planning
E. Timbalier Is., LA (NFWF)	LA CPRA	6-10 million	Planning

Impact of SMWG

Where we stand today:

Science-Informed Decision Making: Problems never encountered before arise working in a new environment with different agency/resource concerns.

- Often existing science not adequate to inform decisions → overly conservative or impractical mitigations, project designs, etc.
- Focused applied science develops tools needed to move forward with confidence
- Marine Minerals Program Science Exchange Meeting: December 2, 2015 New Orleans

Significance and Impact of SMWG

Example problems/science applied:

- Buried channel sands require deeper pits – understanding evolution of pits important to determine setback from pipelines and sensitive seafloor habitat. Recovery important for water quality/fish habitat (EFH)
- Shoal response to dredging – questions about habitat function of shoals. Linking process geomorphology to habitat
- Turtle tagging w USGS – more turtles than expected during relocation trawling, using opportunity of relocation trawling to access turtles for telemetry/tagging; inform future NMFS decisions

Conclusions and Long Term Strategy

- Build on program success – partnering focus

- Engaged in regional Gulf restoration planning efforts

- Improving stewardship capabilities → Gulf-wide offshore sediment inventory

Gulf-Wide Offshore Sediment Inventory

- Update from Gulf States offshore sediment management efforts
- Discussion on how we (states, BOEM, USGS, USACE, etc.) move forward toward a Gulf-wide inventory
- Understanding shelf geologic evolution important to locating discrete sand bodies (not just “low hanging fruit” bathymetric highs)
- Beyond the project scale, long term management as stewards of OCS mineral resources (managing use conflicts, decrease restoration planning uncertainty, etc.)

Sediment Data for the Texas Coast

TxSed Mapping Viewer
Texas Coastal Sediments Geodatabase

Ray Newby, P.G.
Coastal Geologist
Coastal Resources Program

Texas General Land Office
George P. Bush, Land Commissioner

Texas General Land Office (GLO) and the Texas Coast:

- State Land Managers – Submerged Lands out to 10 Miles;
- Lead Agency for Texas Coastal Management Program;
- Administrating Agency for Texas Open Beaches Act;
- Adopt-a-Beach Program for Beach Cleaning;
- Coastal Oil Spill Program;
- Coastal Erosion Planning and Response Act (CEPRA) Program;

Types of CEPRA Projects:

- Beach and Dune Restoration

Jamaica Beach Dune Restoration, Galveston Island

Types of CEPRA Projects:

- Marsh Restoration

Jumbile Cove Marsh Restoration, Galveston Island

Types of CEPRA Projects:

- Shoreline Protection

Beach Drive Revetment, Surfside Beach

Types of CEPRA Projects:

- Beneficial Use of Dredged Material

South Padre Island
Beach Nourishment

Why Sediment Data is Needed:

- Locate sediment sources to support projects;
- Quantify the percentage of sand / silt / clay content of sediment bodies;
- Assess compatibility of imported sediment;
- Determine engineering qualities of foundation conditions;
- Map the distribution of geologic features;
- Evaluate existing and past geomorphic conditions.

Problem: Where are the sediment data?

- Legacy analog data are buried in
  - Publications
  - Unpublished reports
  - Theses/dissertations
  - Field notes
  - Maps
  - Engineering documents

Analog Data Storage Devices (ADSDs)

- Scattered among institutions
  - Universities
  - Research institutions
  - Governmental agencies
  - Engineering firms

- More recent data reported in digital format
  - ESRI Shapefiles, Excel Spreadsheet, PDF, etc.

Solution: A clearinghouse for data consolidation & accessibility - TxSed

TxSed Mapping Viewer
Texas Coastal Sediments Geodatabase

- A repository of sedimentary sampling data in digital format;
- A geospatial and relational database;
- An online mapping interface for viewing, searching and downloading.

Similar Projects (federal and state)

- Offshore Surficial Sediment Data – usSEABED
  (U.S. Geological Survey)
- Marine Geology Data
  (NOAA-National Geophysical Data Center)
- Louisiana Sedimentary & Environmental Database - LASED
  (USGS)
- Reconnaissance Offshore Sand Search - ROSS
  (Florida Dept of Environmental Protection)
- Offshore Alabama Sand Information System - OASIS
  (Geological Survey of Alabama)
- Louisiana Sand Resources Database - LASARD
  (Louisiana Office of Coastal Protection and Restoration)

Past Projects (for Texas coast)

- Univ. of Texas-Bureau of Economic Geology Coastal Studies Group

  Submerged Land Geologic & Environmental Atlases (1983-1989)
  Sand Resources in Southeast Continental Shelf (2001-2003)

- Rice University Coastal Research Group

  Sand Resources in East and Central Texas (2002-2003)

- USACE/Coastal Planning &Engineering, Inc.

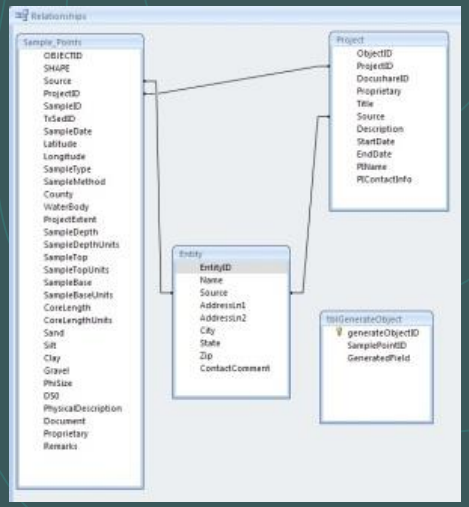
  Sabine Pass to San Luis Pass Shoreline Erosion Feasibility Study (2001-2008)

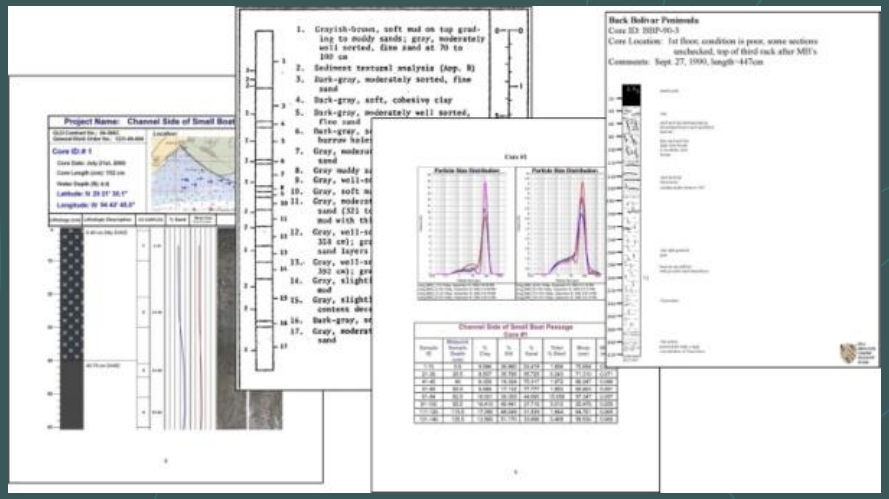
Challenges for TxSed:

- Legacy data location;
- Variety in data sources, availability, and quality;
- Diversity in data reporting format/medium;
- Limited resources (personnel, time, funding);
- Vision, leadership, collaboration, coordination and communication was also crucial.

Database Design Considerations:

- Start with sampling data (core, grab, etc.);
- Focus on geotechnical data (grain size info);
- Find the “Common denominator” for attribute/field;
- Preserve and present original data “as is” (no interpretation added).



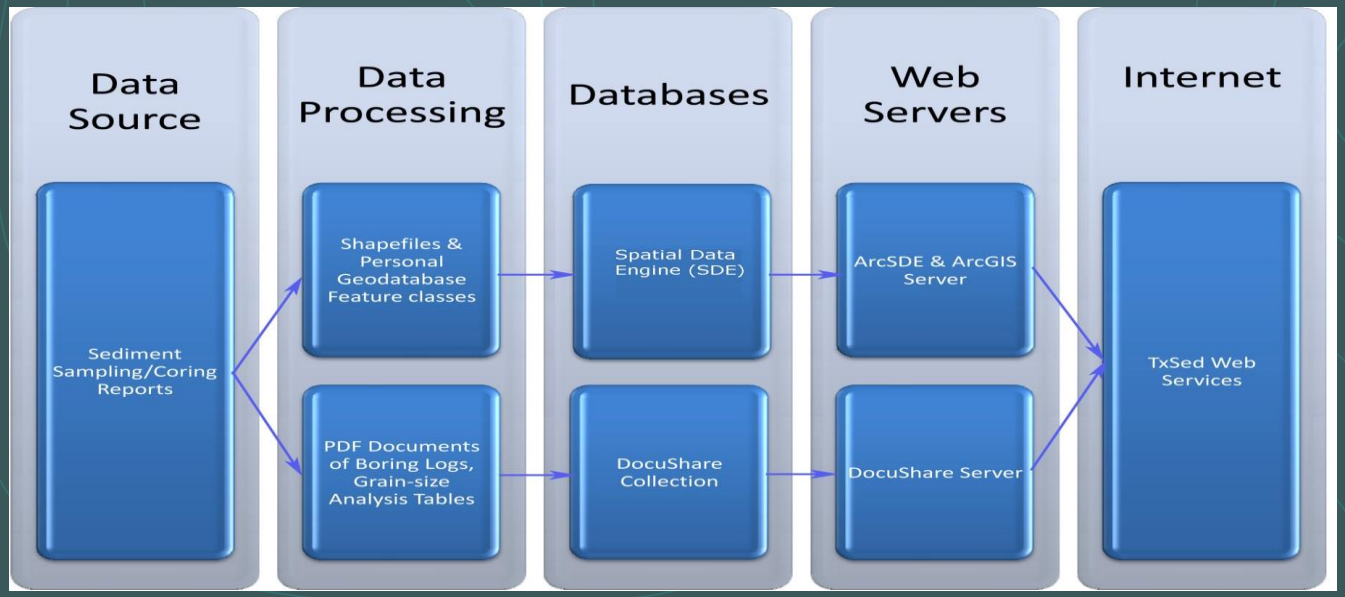


Technologies Used for TxSed:

- ESRI ArcGIS;
- Adobe Acrobat Professional;
- Xerox DocuShare;
- Internet.

Component and Work Flow

- Data Processing (local):
  - A: Geo-coding - Shapefiles/Personal geodatabase;
  - B: Data scanning.
- Enterprise Database (internal network):
  - A: Geospatial: Spatial Data Engine feature dataset;
  - B: Document: DocuShare file collections.
- Web Interface (public):
  - ArcGIS Server Mapping Viewer.

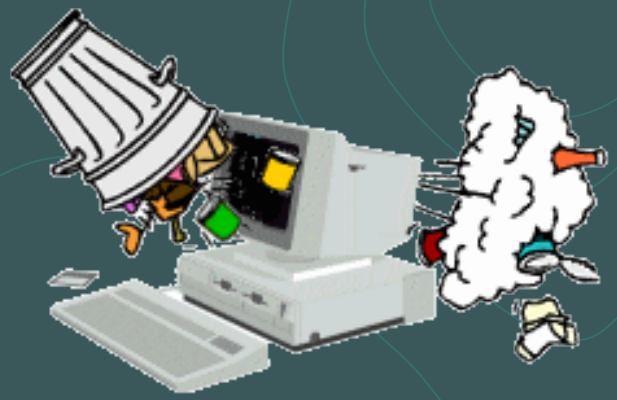


Geocoding Quality Control:

- Not liable for the quality/reliability of original data;
- Clearly defined work flow and responsibility;

Raw Data – *Processed Data* – ***QA*** – *GDB* - ***QA*** – *SDE*

- Using the best available reference data;
- Cross-checking or referencing when possible;
- Proper documentation.

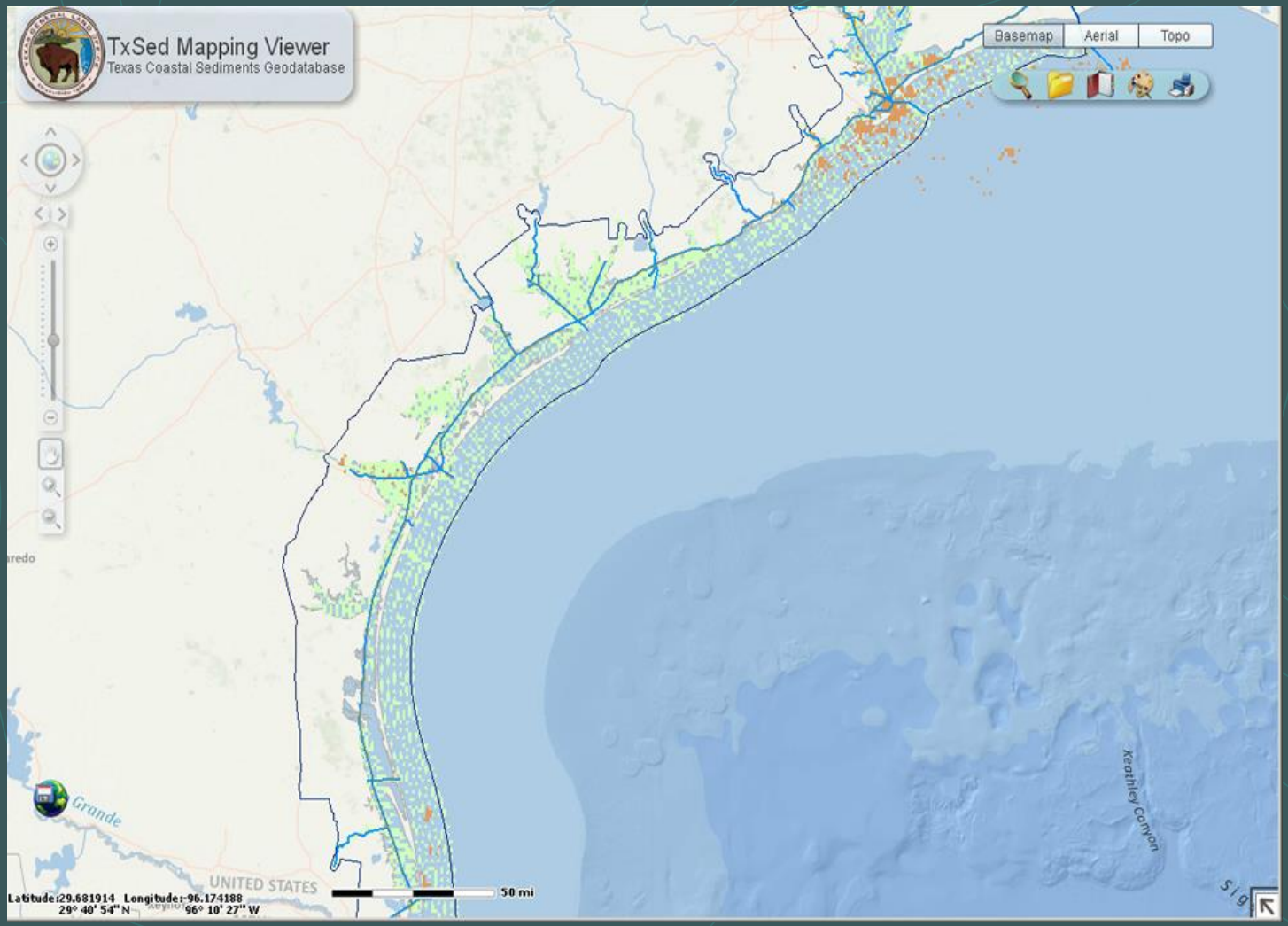


TxSed Viewer

- Utilizing ArcGIS Server 10.2;
- ArcGIS Viewer for Flex (uncompiled);
- Integrated Development Environment: Adobe Flash Builder;
- WebServer : Microsoft IIS;
- Microsoft SQL - Structure Query Language with ArcSDE – Spatial Data Engine;
- Workflow – ArcGIS-ArcMap to develop the data;
- Python programming language : to automate geo-processing, data load, stop/start ArcGIS Server services;
- Xerox – DocuShare: for document management.

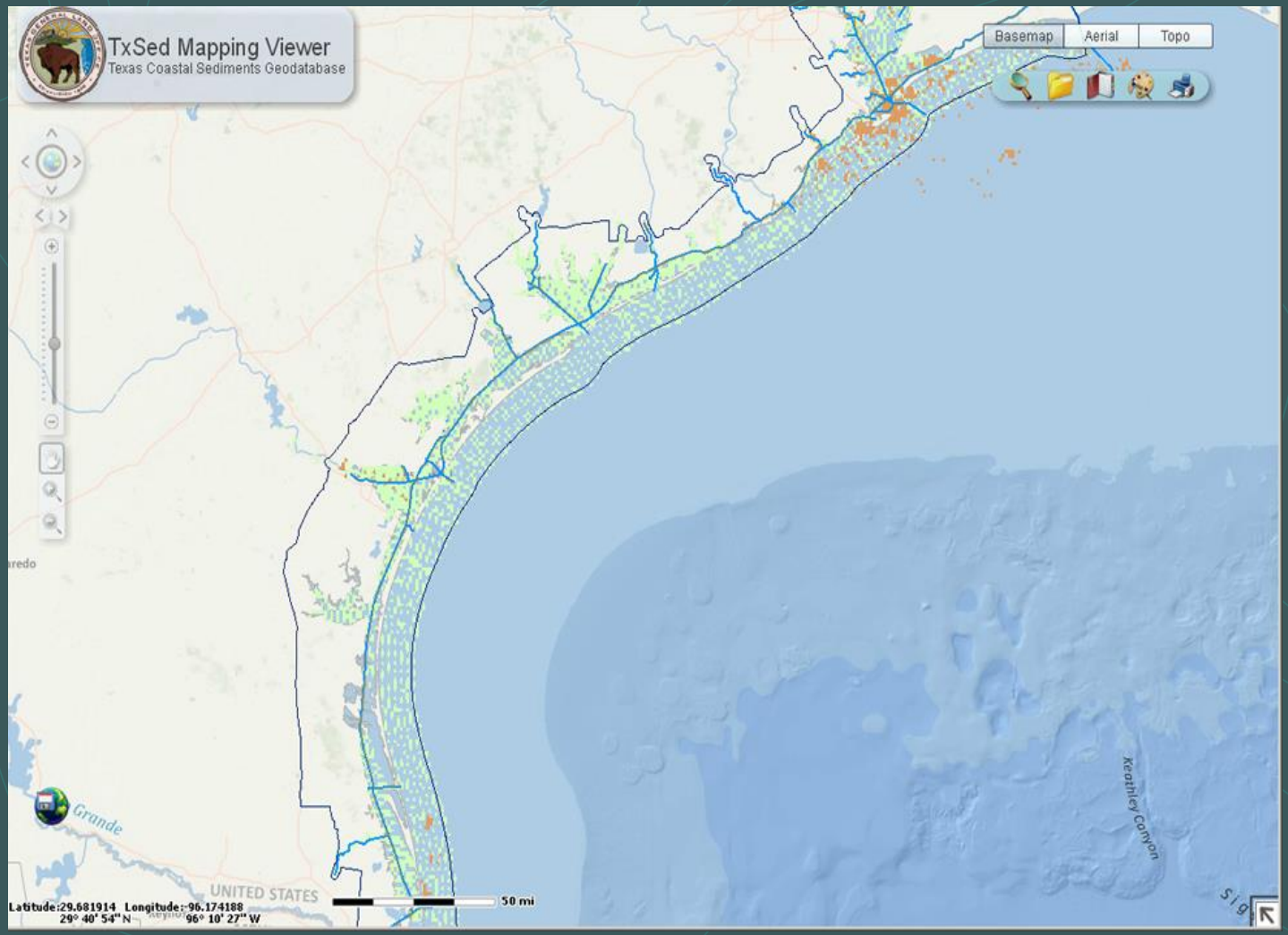
Building the Viewer

- Keep it SIMPLE! Less is better;



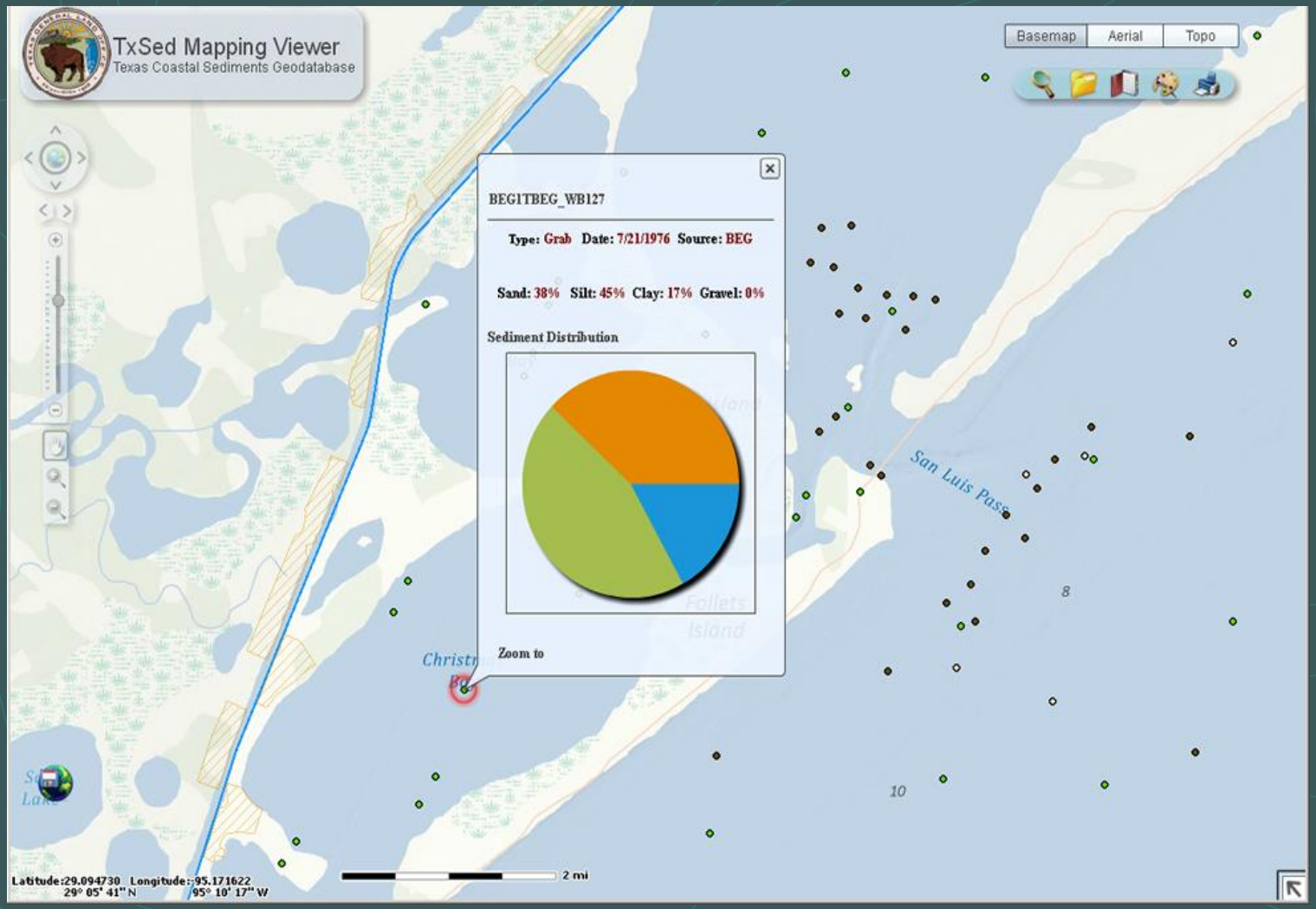
Building the Viewer (cont.)

- Utilize as much of the screen as possible;



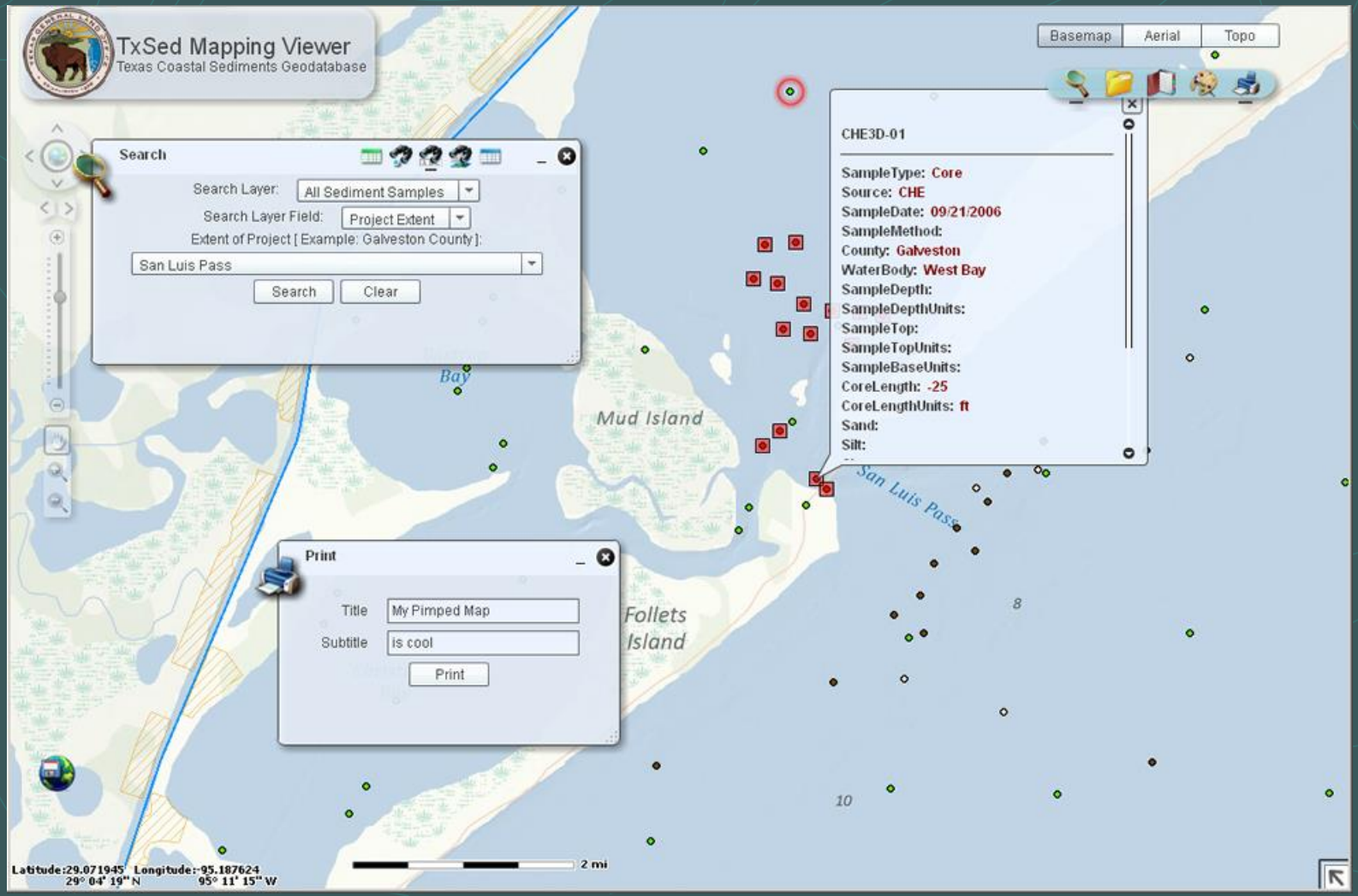
Building the Viewer (cont.)

- As few clicks as possible;



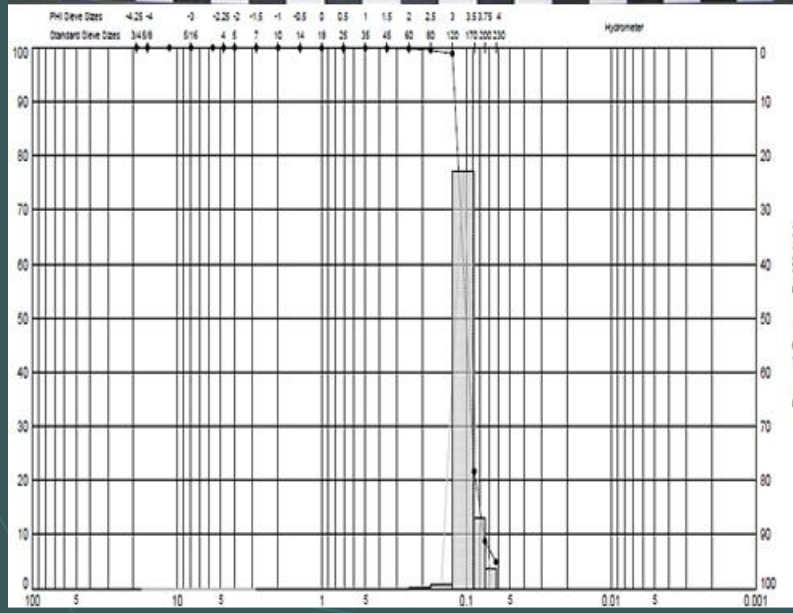
Building the Viewer (cont.)

- Have basic mapping functions. Search, ID, Print, Draw, TOC, Pan and Zoom;



Building the Viewer (cont.)

- Utilize hyper-linking to display documents;



Granularmetric Report
Depths and elevations based on measured values

Project Name: Texas Geotechnical Sand Search
Sample Name: GCVC-06-17 #1
Analysis Date: 10-18-06
Analyzed By: MC

CPE
Coastal Planning & Engineering
2481 NW Boca Raton Blvd, Boca Raton
FL 33431
ph (561) 391-8102
fax (561) 391-9116

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
3,210,620	13,591,627	Texas South Central	-20.2 MLLW

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-5/1 Dry - 5Y-5/1 Washed - 2.5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
91.31	88.58	1.64	0.16	#200 - 8.78 #230 - 4.97			

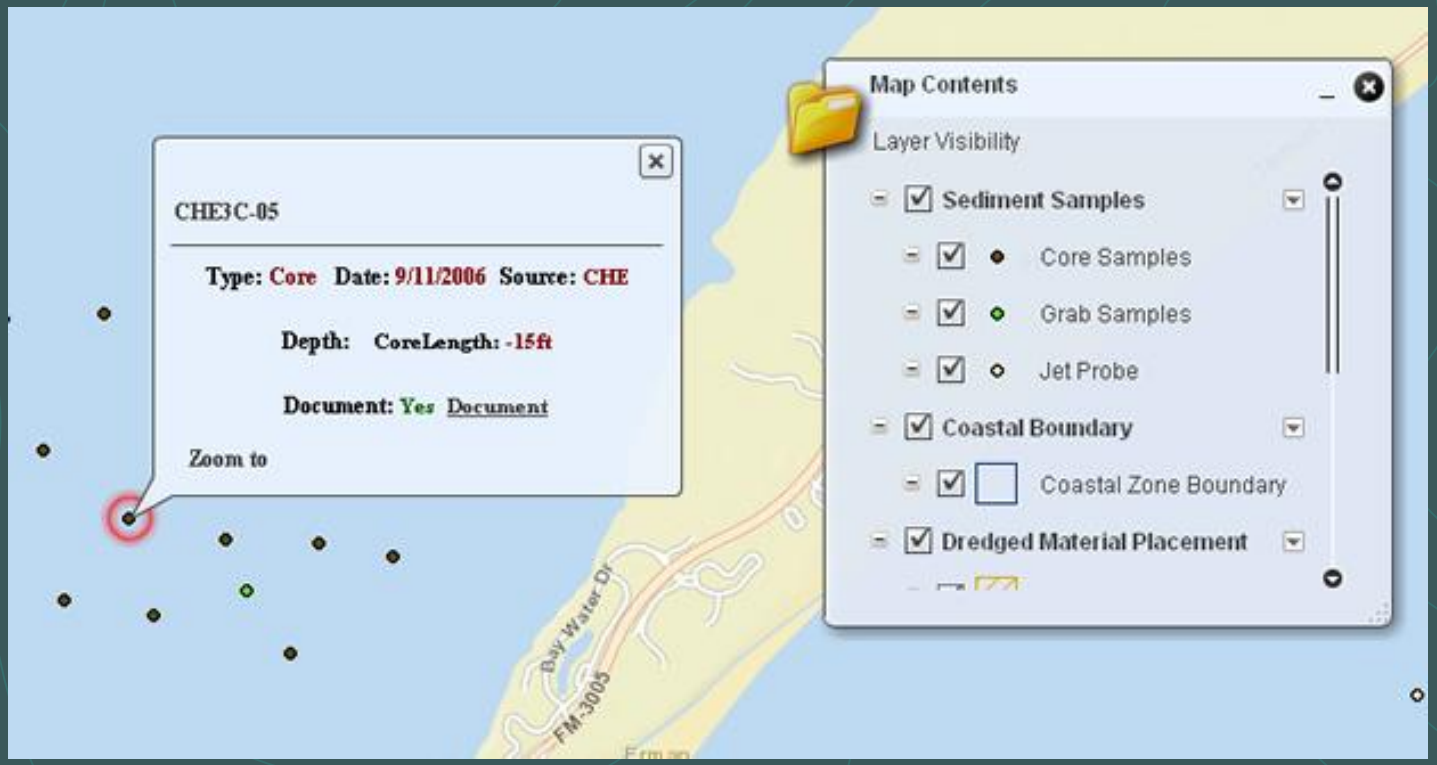
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.03	0.03	0.03	0.03
14	-0.50	1.41	0.03	0.03	0.06	0.06
18	0.00	1.00	0.01	0.01	0.07	0.07
25	0.50	0.71	0.02	0.02	0.09	0.09
35	1.00	0.50	0.01	0.01	0.10	0.10
45	1.50	0.35	0.02	0.02	0.12	0.12
60	2.00	0.25	0.03	0.03	0.15	0.15
80	2.50	0.18	0.26	0.28	0.41	0.43
120	3.00	0.13	0.58	0.64	0.99	1.07
170	3.50	0.09	70.50	77.21	71.49	78.28
200	3.75	0.07	11.82	12.94	83.31	91.22
230	4.00	0.06	3.48	3.81	86.79	95.03

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
4.00	3.61	3.48	3.32	3.15	3.10	3.03

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	3.31	0.10	0.23	-5.39	105.3

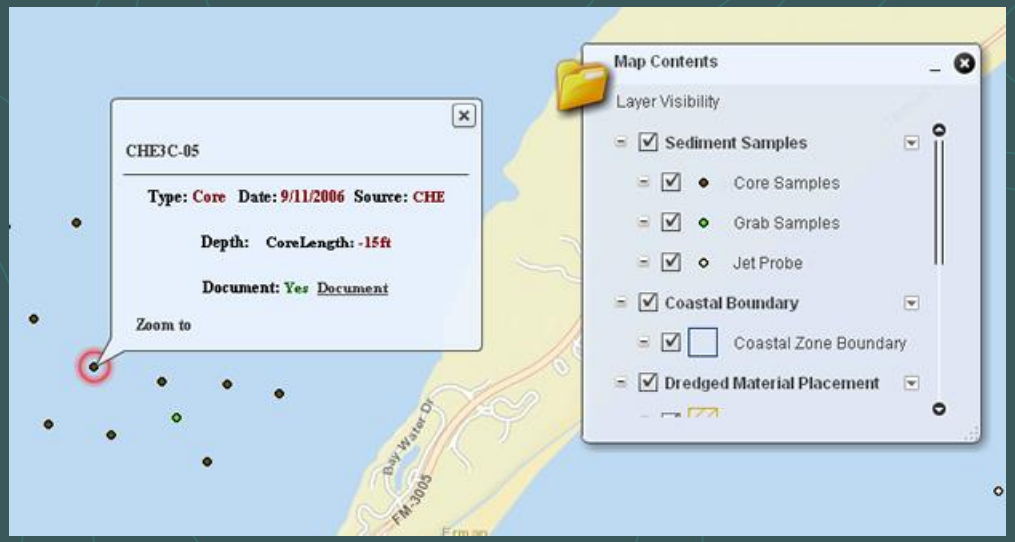
Data

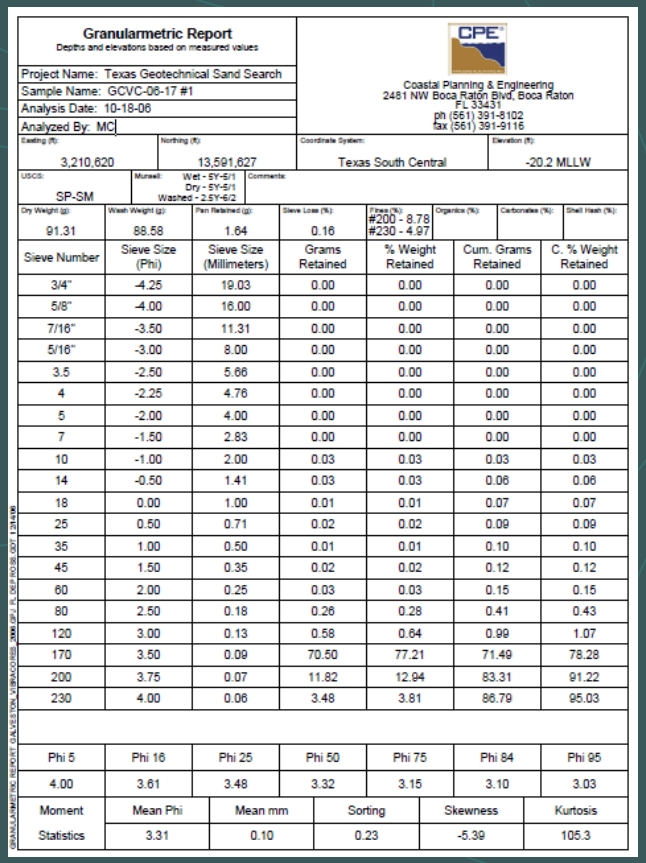
- 3 type of samples: Core, Jet Probe, & Grab;
- Core and Jet Probe have documentation;



Data (cont.)

- 3 type of samples: Core, Jet Probe, & Grab;
- Core and Jet Probe have documentation;





Granularmetric Report
Depths and elevations based on measured values

Project Name: Texas Geotechnical Sand Search
Sample Name: GCVC-06-17 #1
Analysis Date: 10-18-06
Analyzed By: MC

Coastal Planning & Engineering
2481 NW Boca Raton Blvd, Boca Raton
FL 33431
ph (561) 391-8102
fax (561) 391-9116

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
3,210,620	13,591,627	Texas South Central	-20.2 MLLW

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-6/1 Dry - 5Y-6/1 Washed - 2.5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
91.31	88.58	1.64	0.16	#200 - 8.78 #230 - 4.97			

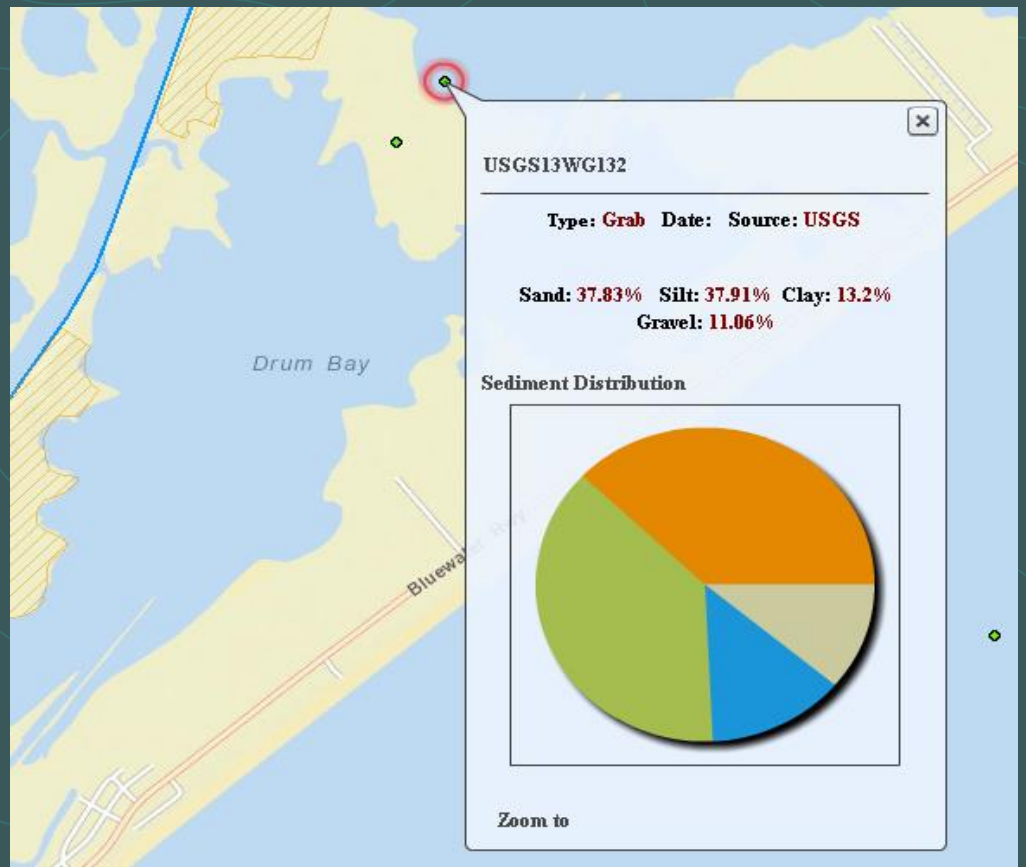
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.03	0.03	0.03	0.03
14	-0.50	1.41	0.03	0.03	0.06	0.06
18	0.00	1.00	0.01	0.01	0.07	0.07
25	0.50	0.71	0.02	0.02	0.09	0.09
35	1.00	0.50	0.01	0.01	0.10	0.10
45	1.50	0.35	0.02	0.02	0.12	0.12
60	2.00	0.25	0.03	0.03	0.15	0.15
80	2.50	0.18	0.26	0.28	0.41	0.43
120	3.00	0.13	0.58	0.64	0.99	1.07
170	3.50	0.09	70.50	77.21	71.49	78.28
200	3.75	0.07	11.82	12.94	83.31	91.22
230	4.00	0.06	3.48	3.81	86.79	95.03

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
4.00	3.61	3.48	3.32	3.15	3.10	3.03

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	3.31	0.10	0.23	-5.39	105.3

Data (cont.)

- 3 type of samples: Core, Jet Probe, & Grab;
- Grab Sample – no document, but has sand, silt, clay, & gravel composition breakdown in graph.



Data and Scanning for TxSed

- How to get the data from analog boxes to digital on a budget?
- Hours of intelligent scanning and digitizing!

ADSDs

Lessons Learned from Scanning

- Equipment and work space is important;
- Unless your files are perfect, don’t scan everything;
- 95 hours to scan and process each box;
- INTERNS ARE INVALUABLE.

In a nutshell

- This is a complex project and we had one shot to get it right.

- The key ingredients:
  - Data;
  - Money;
  - Documentation;
  - People.

Acknowledgements

Many folks contributed and shared in the solution. The following illustrates the immense collaboration and energy making this idea that is now over 15 years old, a reality:

- Dr. Juan Moya for making the database a reality, he got this going;
- Dr. Tim Dellapenna at Texas A&M Galveston and his wonderful interns;
- Dr. John Anderson at Rice University;
- Dr. Jim Gibeaut of the University of Texas Bureau of Economic Geology
- Lori Thomas and her Geotech team at the Corps-Galveston providing data;
- Dr. Michael Sterling at the Corps who helped us with longevity;
- Luis Saenz from the Corps knew where the data were buried;
- Many others at the Galveston Corps District office.

Acknowledgements (cont.) GLO:

- GIS Interns at the General Land Office;
- Laura Wisdom, M.I.S – Coastal Information Architect / Task Master;
- Daniel Gao, Ph.D. – Coastal GIS Specialist and Project Manager;
- GIS and Information Systems;
- Jeff Perkins – GIS Specialist;
- Keith Corkran – Database Administrator;
- Deputy Steve Paxman – Information Services – support and vision;
- Director Sheri Land - Coastal for support and getting us more money;
- Coastal Resources staff;
- Tony Williams – Prof. Services, data transport to and from the Corps;
- GLO Communications for making an outreach video about this project;
- GLO's contracted engineering firms for support and feedback.

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(512) 475-1967

Jeff Perkins
Jeff.perkins@glo.texas.gov
(512)463-5257

Laura Wisdom, M.I.S.
laura.wisdom@glo.texas.gov
(512) 463-7397

Or visit us on the Web:

http://glo.texas.gov

http://gisweb.glo.texas.gov/txsed/

LouisianA SAnd Resources Database (LASARD)

Rick Raynie[1], Syed Khalil[1], Beth Forrest[2]
[1] CPRA; [2] CB&I

Gulf of Mexico Offshore Sediment Management Working Group
October 13, 2015

committed to **our coast**

Need for LASARD

- Availability of enormous amount of historical geoscientific data (mostly collected for sand searches) collected during the last few decades
- These data in diverse format were not in one place and needed for
  - Exploration of sand/sediment
  - Compilation of sediment distribution map
  - Sediment volume estimates
- These data needed to be
  - Organized for systematic and planned approach
  - Centralized for better coordination and to avoid duplication

LASARD Objectives

- Manage, archive, and maintain geological, geophysical, geotechnical and other related data pertaining to the exploration of sand/sediment for coastal restoration

- Centralize relevant data from various sources for:
  - identification & management of sediment sources
  - better coordination of restoration projects, and
  - to facilitate future planning for delineation and utilization of sediment resources

LASARD Data Types

Louisian**A** **SA**nd **R**esources **D**atabase:

A GIS database managing the following:

Geoscientific Data (geological/geophysical/geotechnical)

- Sediment Data (incl. geotechnical properties)
- Bathymetric Data
- Seismic Data/Sub-bottom Profiles
- Side Scan Sonar Data
- Magnetic Data
- Subsidence Data/ Faults
- Geomorphic Data – paleo-channels, shoals
- ADCP, LISST, CTD data

Miscellaneous Data

- Oil & gas pipelines/infrastructure
- Archaeological Data/Hazard Map
- Lidar Data
- Aerial Photographs
- Habitat Types, Vegetation, Oyster leases

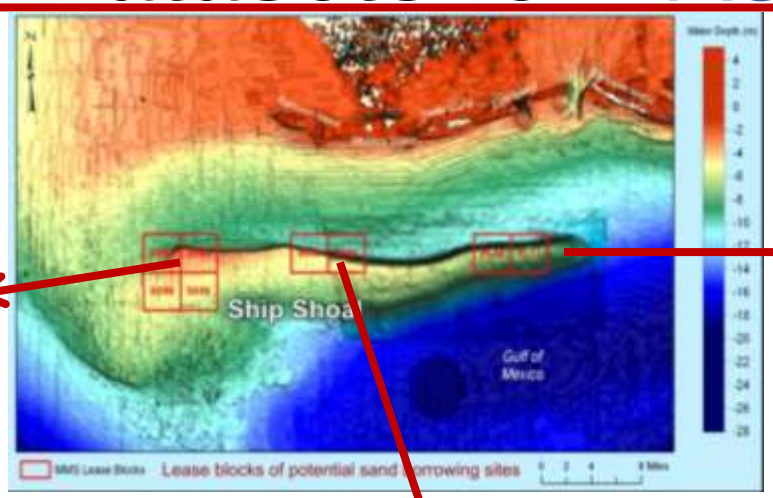
History of LASARD

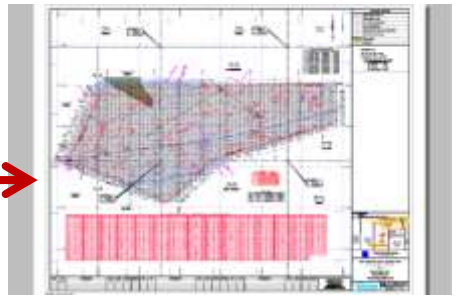
- **Initiated in 2003** as a multi-year cooperative project between the then MMS and LDNR in collaboration with CSI/LSU (Dr. Harry Roberts & DeWitt Braud).
- **A humble beginning** with some geoscientific data from **Ship Shoal** (Ship Shoal Blocks 88 & 89 & South Pelto Blocks 12 &13)
- **LASARD phase I/Pilot Study** (2009, 33 datasets formatted)
- **LASARD phase II to V** (2010 - 2015, approx. 661 datasets formatted)
  - *LASARD phase IV (2013, focused on development of standards)*
- **MRHDMS (Hydro-component)** Years 1-3 (2012-2014; approx. 920 datasets formatted)
- **MRHDMS (Delta Mgmt)** Years 1 (2015; initiation of formatting)

First Few Datasets for LASARD

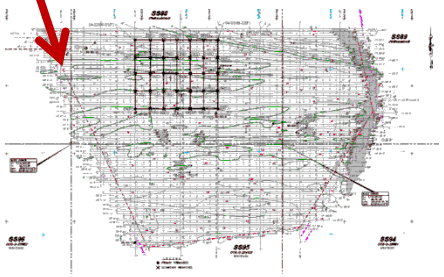
Ship Shoal Complex

Western SS Blocks 84, 85, 98 & 99

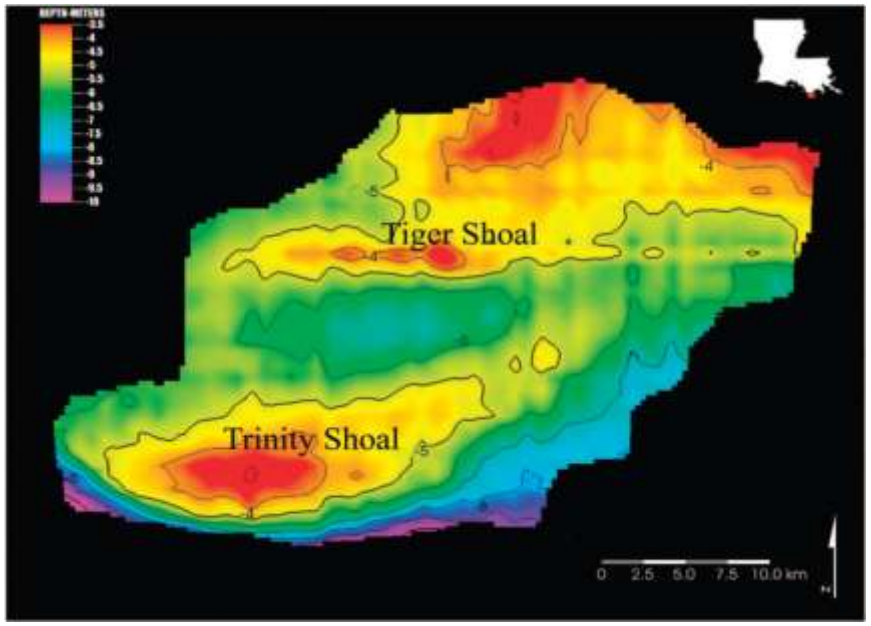




Eastern Ship Shoal
SP Blocks 12 & 13
Caminada Headland Restoration



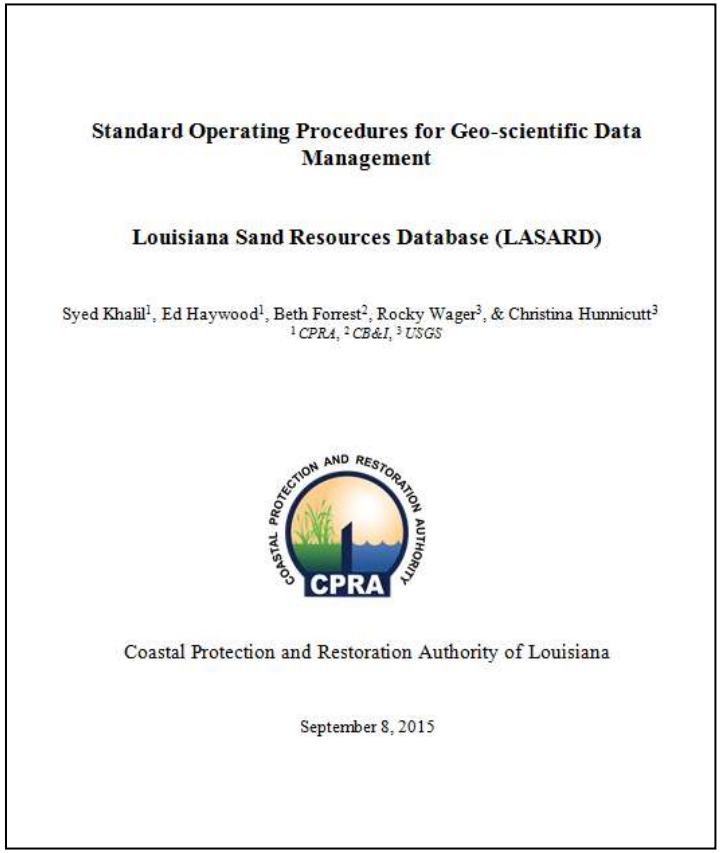
Central Ship Shoal
Blocks 88 & 89
Whiskey Island Restoration



Tiger & Trinity Shoal Complex

LASARD Standard Operating Procedures

- Guidelines and procedures have been developed for the standardization of geoscientific data



Standard Operating Procedures for Geo-scientific Data Management

Louisiana Sand Resources Database (LASARD)

Syed Khalil[1], Ed Haywood[1], Beth Forrest[2], Rocky Wager[3], & Christina Hunnicutt[3]
[1] *CPRA*, [2] *CB&I*, [3] *USGS*

Coastal Protection and Restoration Authority of Louisiana

September 8, 2015

- Data formatting standards
- QA/QC standards
- Data submittal standards

LASARD Data Formatting Standards

- Attribute table specifications developed for each data type
- FGDC compliant metadata
- Coordinate system
- Horizontal & vertical datums

Table 3: Magnetic Anomaly Points

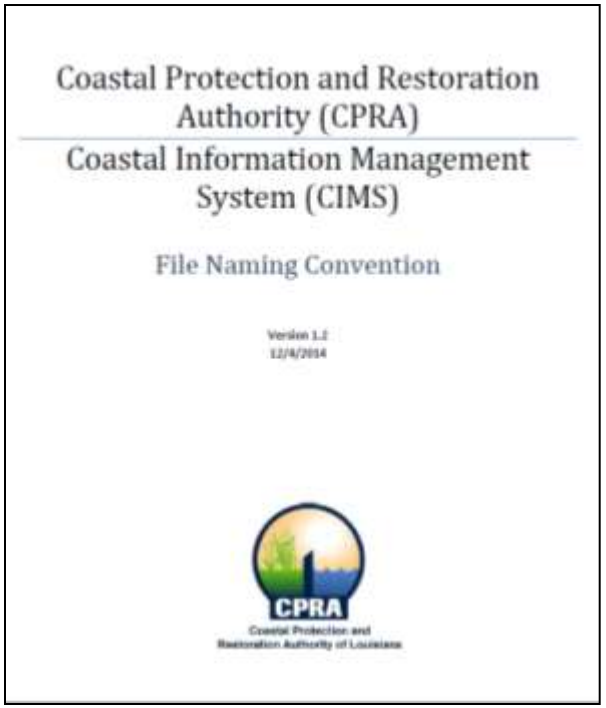
Field Name	*Field Alias*	*Generic Data Type*	*Description*	*Specific GIS Data Type*	*If numeric, Precision (.shp)*	*If numeric, Scale (.shp)*	*If text, length*	***If data value unknown, enter***
Required CPRA data format. These data attributes should be included with data submitted to CPRA.								
PROGRAM	Program	Text	Program (CWPPRA, LCA, STATE, ...). Do not use the following characters:"_" (underscore), "<" (less than), ">" (greater than), ":" (colon), """ (double quote), "/" (forward slash), "\" (backslash), "|" (vertical bar or pipe), "?" (question mark), "*" (asterisk)	Text			20	UNKNOWN
PROJECT	Project	Text	Project title	Text			200	UNKNOWN
PROJ_ID	Project ID	Text	Project number (state id, federal id, ...). Do not use the following characters: "_" (underscore), "<" (less than), ">" (greater than), ":" (colon), """ (double quote), "/" (forward slash), "\" (backslash), "|" (vertical bar or pipe), "?" (question mark), "*" (asterisk)	Text			20	UNKNOWN
DATE_COLL	Date Collected	Date	Date collected (YYYYMMDD)	Text			10	99999999
TARGET_ID	Target ID	Text	Target identifier	Text			50	UNKNOWN
CLUSTER_ID	Cluster ID	Text	Cluster identifier	Text			50	UNKNOWN
SIGNAL_STR	Signal Strength	Numeric	Peak gamma height	Double	10	3		-9999
SIG_TYPE	Signal Type	Text	Signal characteristics (multi component, dipolar, monopolar, negative monopolar, or positive monopolar)	Text			20	UNKNOWN

LASARD QA/QC Standards

- Review by a Geologist and a GIS analyst or equivalent (not involved in project) for:
  - Integrity
  - Completeness
  - Accuracy
  - Functionality of hyperlinks
  - Verification of geographic location
  - Verification of projection

LASARD Data Submittal Standards

- File naming convention
- Data Delivery Grid

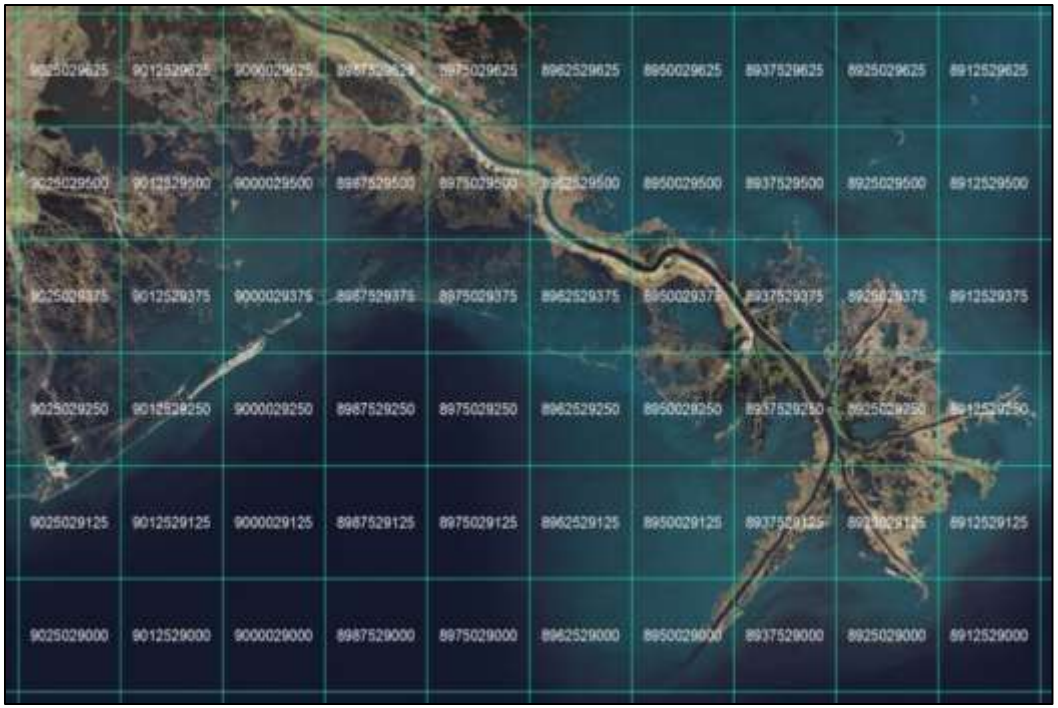

Coastal Protection and Restoration Authority (CPRA)

Coastal Information Management System (CIMS)

File Naming Convention

Version 1.2
12/4/2014

CPRA
Coastal Protection and Restoration Authority of Louisiana



Example: LA-0026_ELMBB_9500028125_20110514_PBF0003_CHANDELEUR

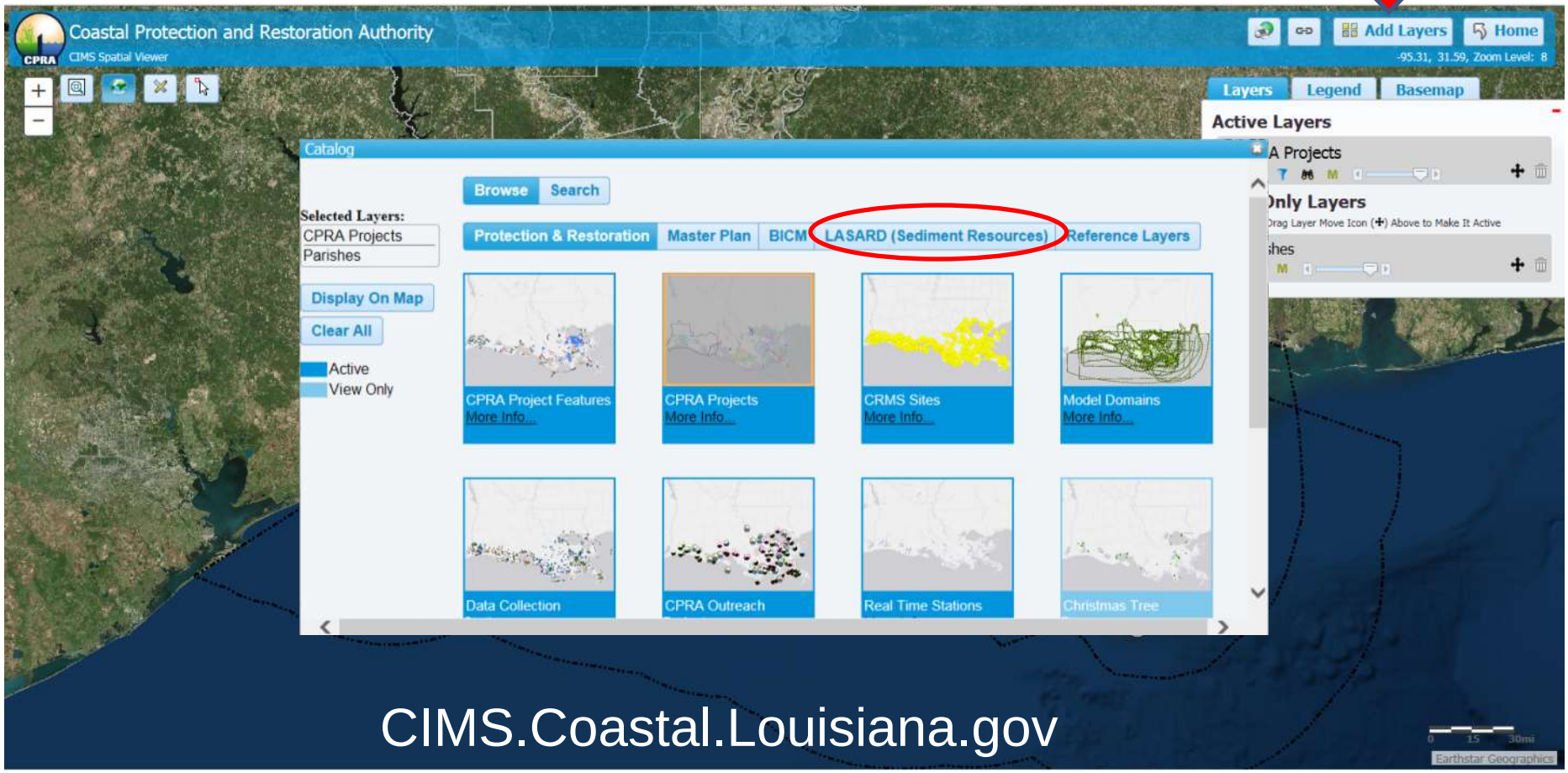
LASARD Data Accessibility

Once formatted & standardized, data is made available to users through the CPRA publically accessible spatial viewer

CIMS.Coastal.Louisiana.gov

LASARD Data Accessibility

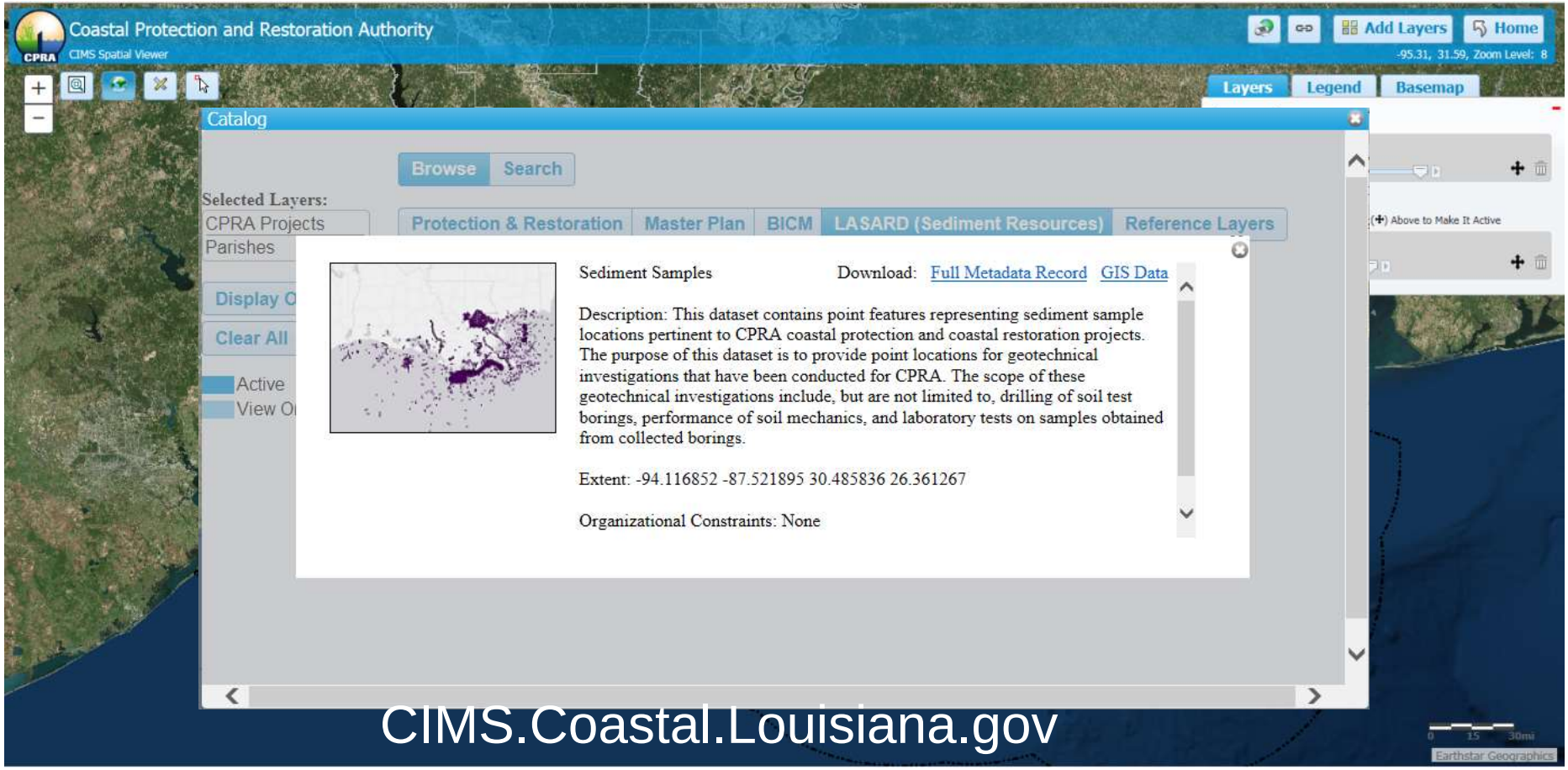
Once formatted & standardized, data is made available to users through the CPRA publically accessible spatial viewer



CIMS.Coastal.Louisiana.gov

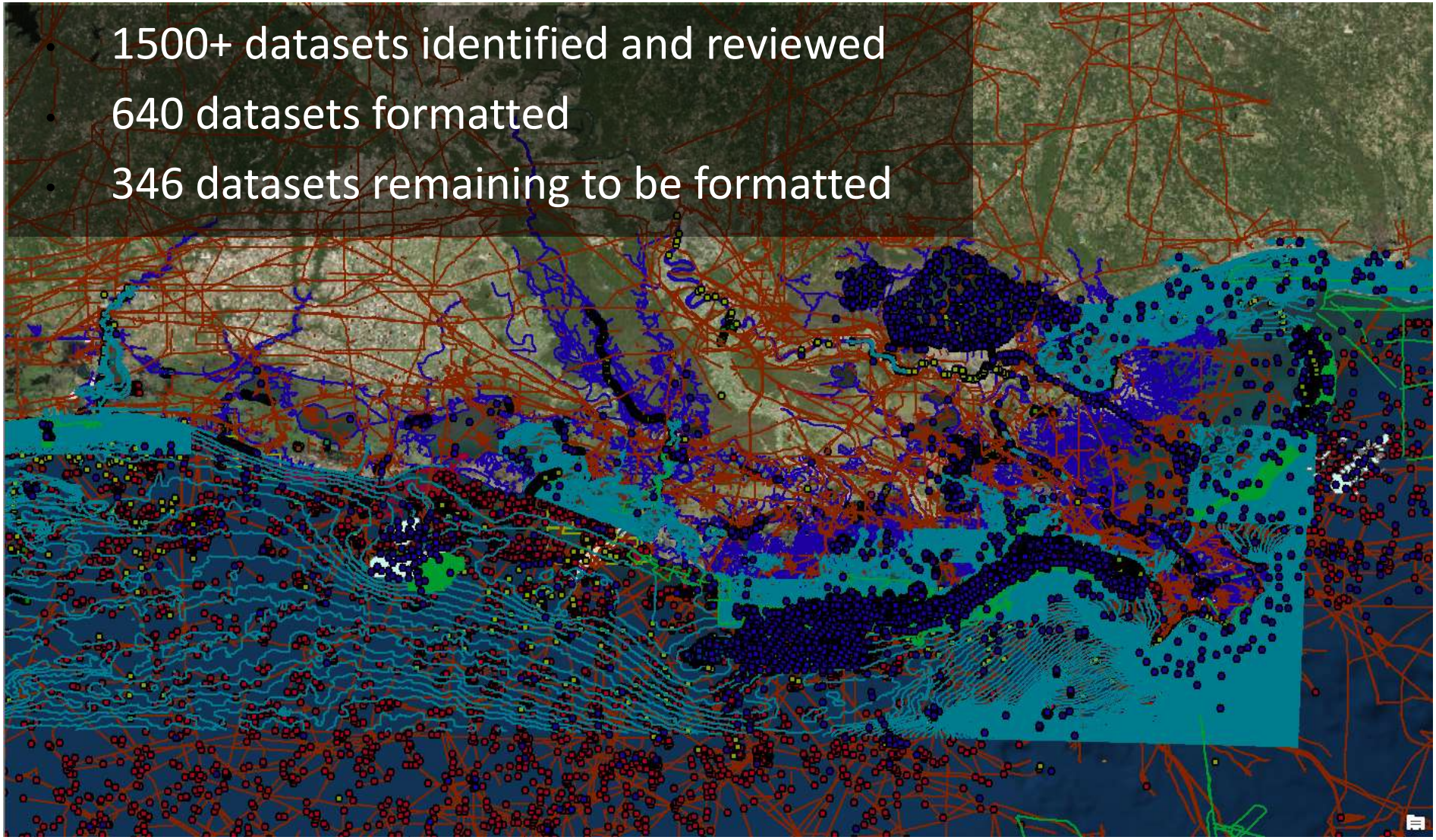
LASARD Data Accessibility

Once formatted & standardized, data is made available to users through the CPRA publically accessible spatial viewer



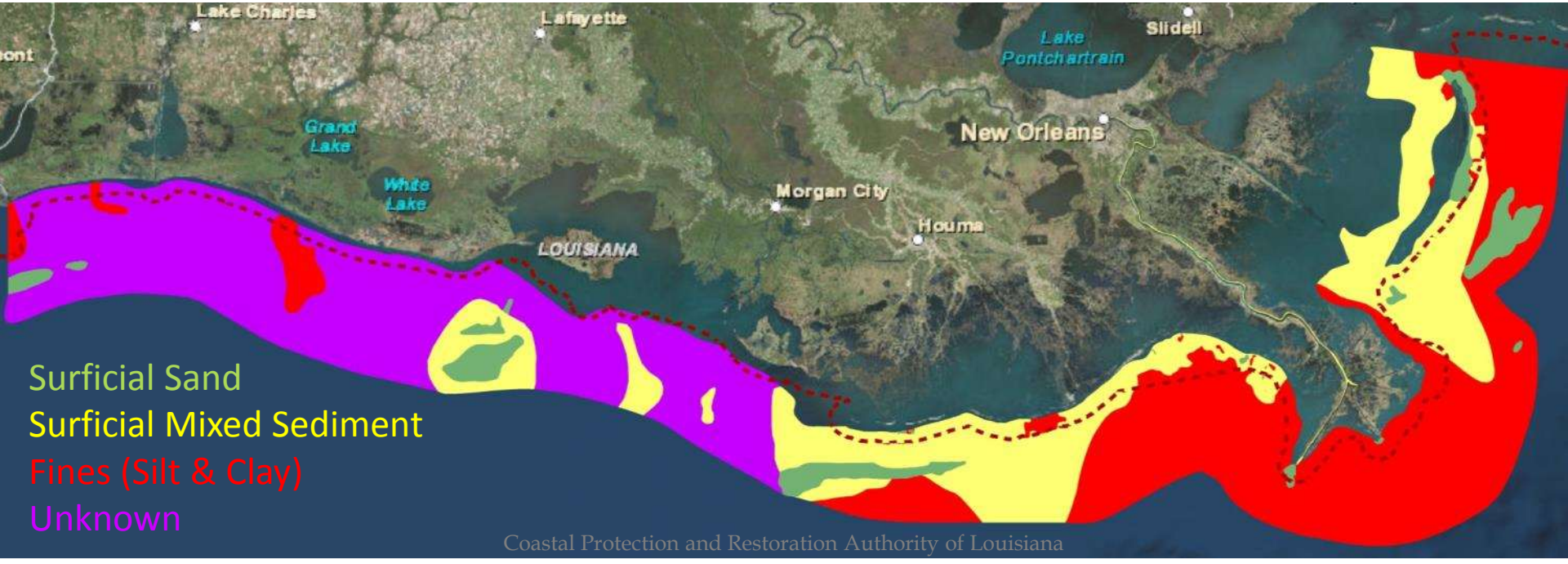
LASARD Data Coverage

- 1500+ datasets identified and reviewed
- 640 datasets formatted
- 346 datasets remaining to be formatted

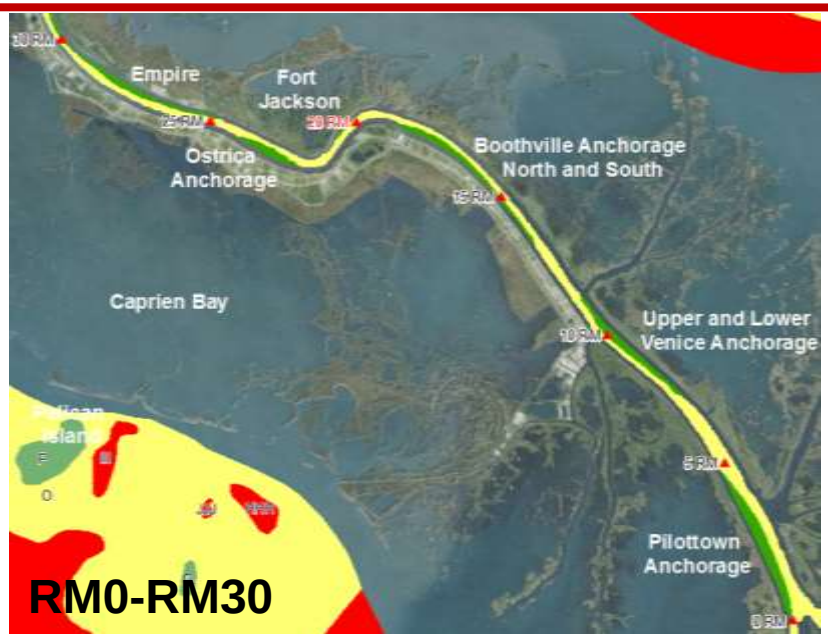


LASARD Offshore Surficial Sediment Distribution Map

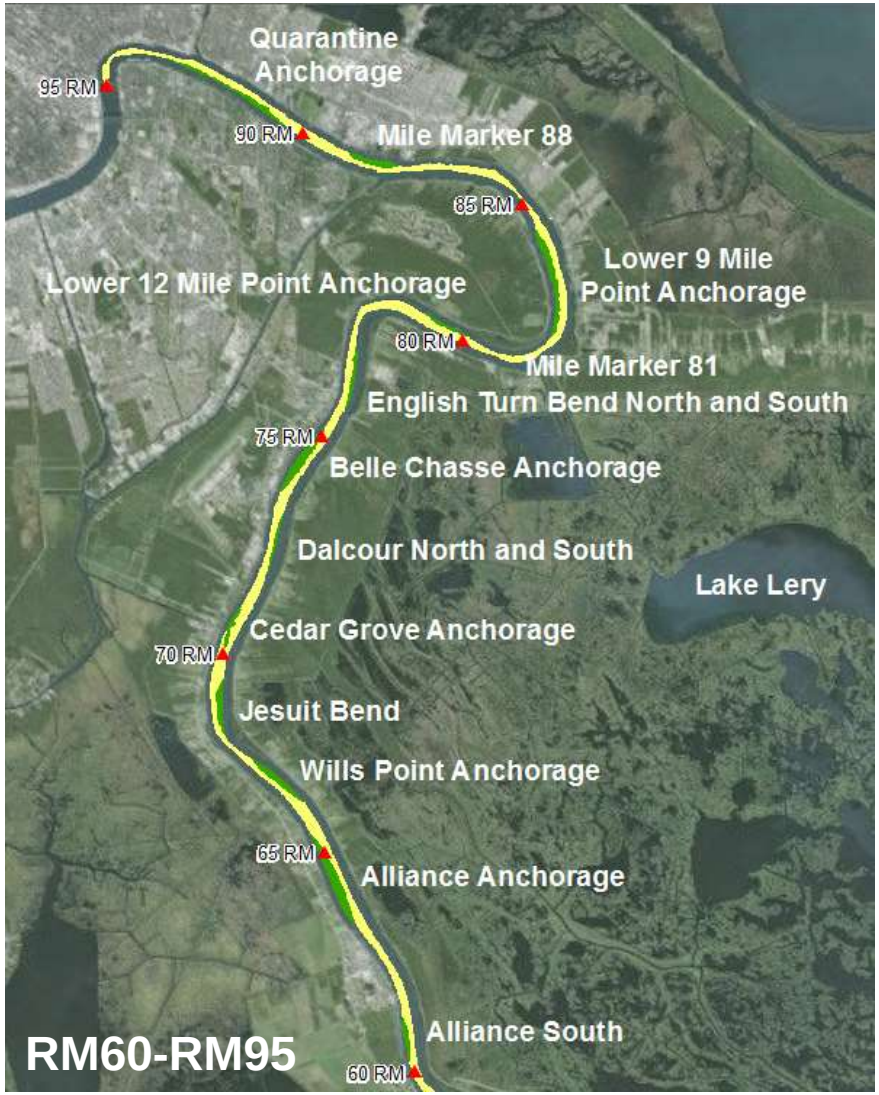
- Sediment distribution maps compiled from existing geophysical & geotechnical data in LASARD
- developed initially to assist in planning coastal restoration projects for the 2012 Master Plan
- Updated in 2015



LASARD LMR Surficial Sediment Distribution Map



Lower Mississippi River (RM 0-95)



Estimated 1st Order Offshore Sediment Volumes

Volume estimates incorporated:

- oil & gas infrastructure safety buffer
- levee offset (river)
- Existing borrow areas

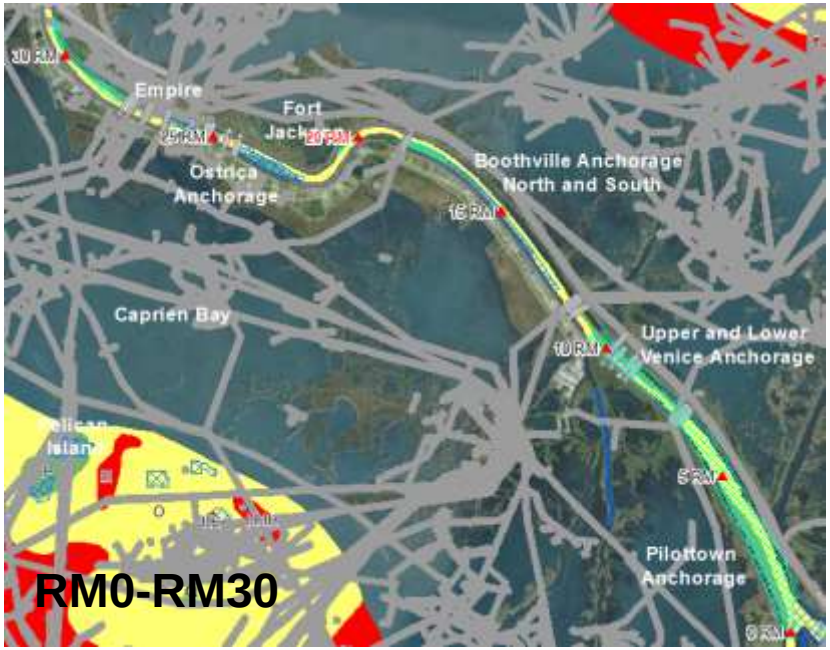
Pipeline Buffer

Pipelines

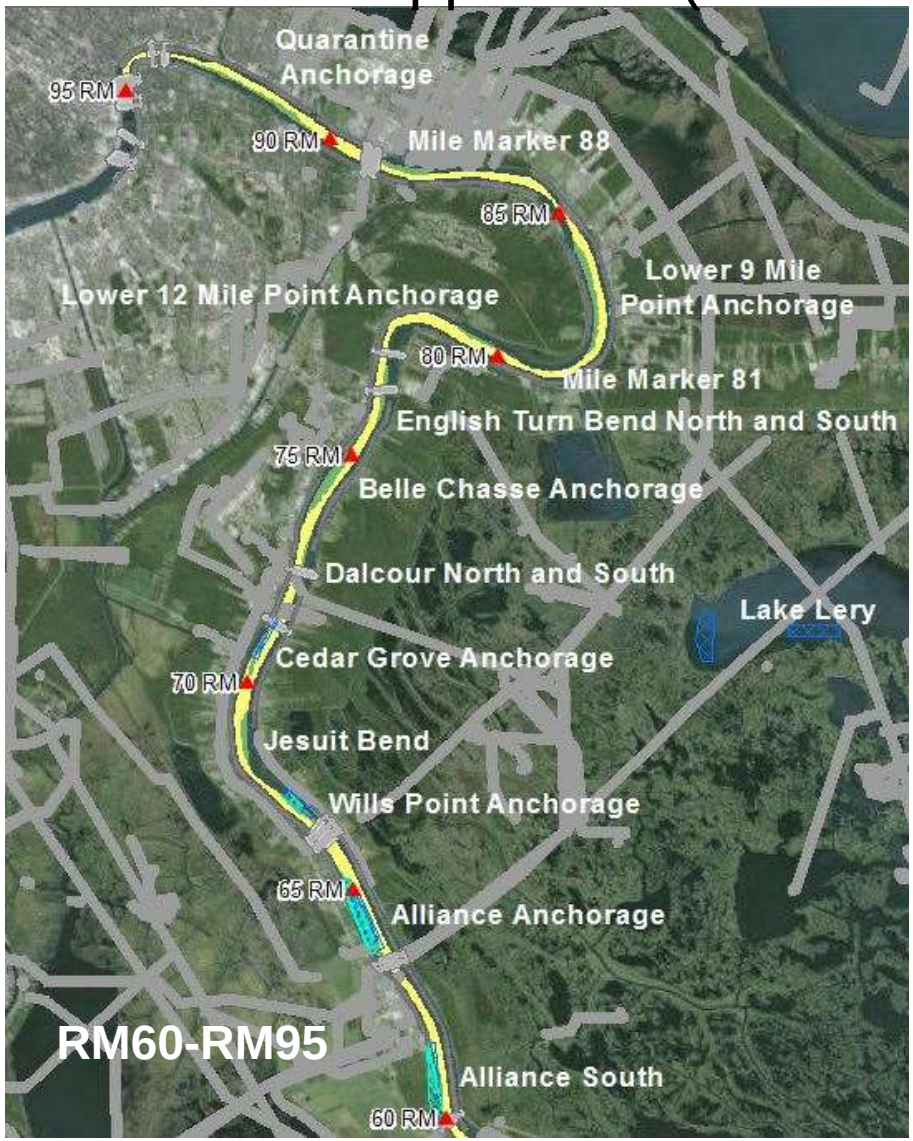
Potential Borrow Area

Borrow Area

Estimated 1st Order LMR Sediment Volumes



Lower Mississippi River (RM 0-95)



Estimated 1st Order Sediment Volumes

Lower Mississippi River (RM0-RM95)

Sediment Type	Total Volume (cy)	Useable Volume (cy)
Sand	43,421,000 (-70 ft NAVD) 103,883,000 (-90 ft NAVD)	39,124,000 (-70 ft NAVD) 94,918,000 (-90 ft NAVD)

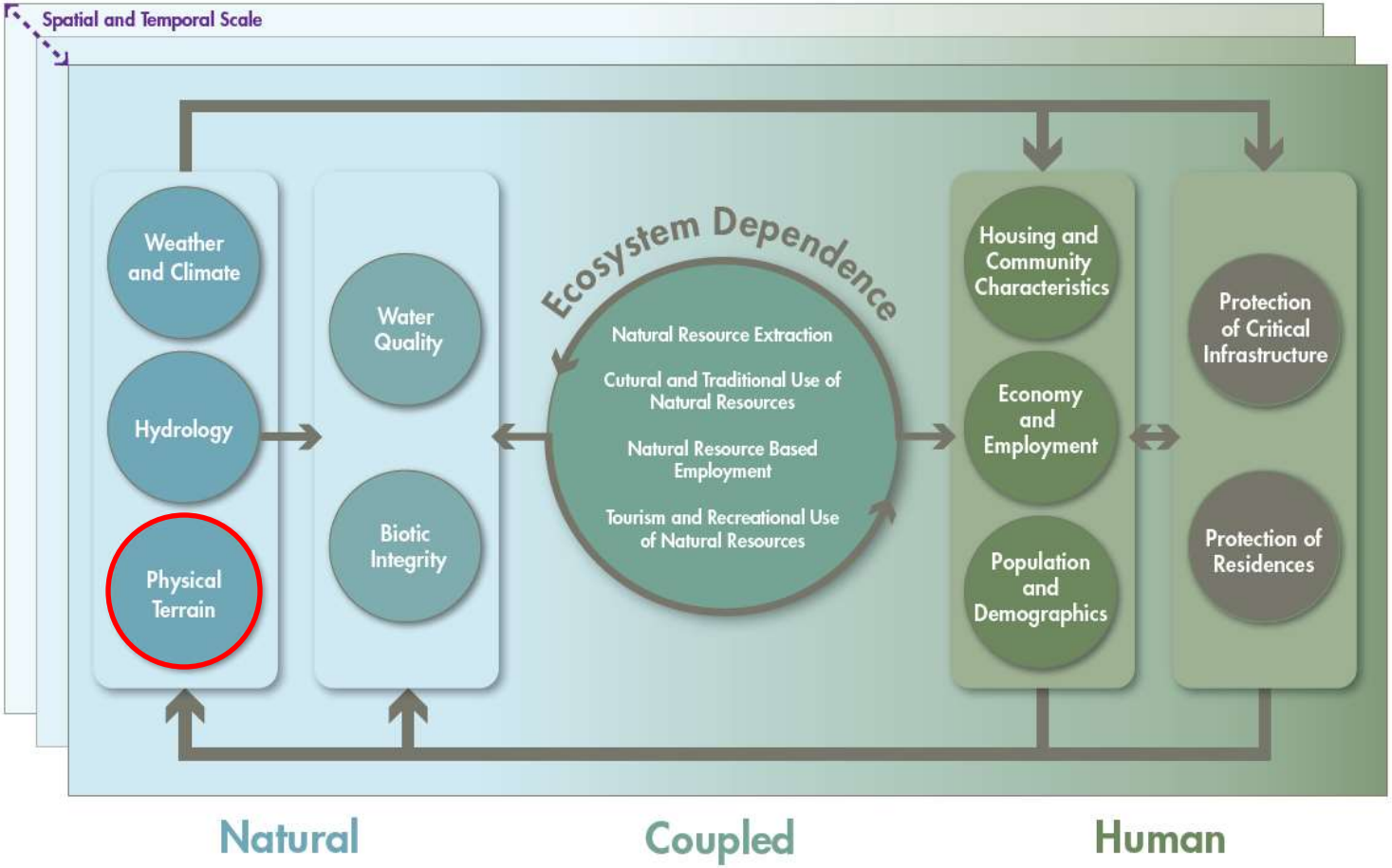
Offshore Louisiana

Sediment Type	Total Volume (cy)	Useable Volume (cy)
Sand	3,147,933,000	2,603,289,000
Mixed Sediment	25,298,268,000	17,211,309,000
Fines	37,272,892,000	26,511,531,000

LA Sediment Management Plan (LASMP)

- Developed by CPRA to facilitate optimum use of sediment resources in an environmentally effective & economically feasible manner
- LASARD and sediment distribution maps integral to LASMP

System Wide Assessment and Monitoring Program (SWAMP)



Conceptual diagram illustrating the concepts of a coupled human-natural system. Color gradient represents the direct linkages between these two systems. The arrows illustrate that interactions occur within the systems themselves and also the feedbacks that occur across the systems. The relative strength of these interactions is influenced by the scale at which they occur. (TWIG 2015)

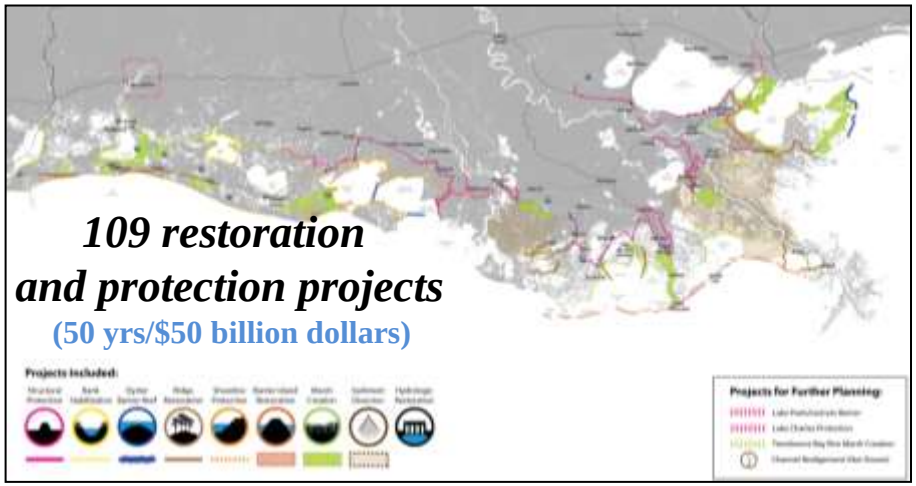
Importance of LASARD

- Restoration
  - Sediment Management
  - Sediment Inventories/Allocation/Allotment
  - Sediment Distribution Maps
  - Protection of Significant Sediment Resources from pipelines and other infrastructure
  - Availability of sediment resources by identifying inactive and abandoned pipelines
- Data Management
  - Archival
  - Avoid Duplication
- Coordination with other entities
  - BOEM
  - GOMA Priority Issue Teams
  - LDNR/Coastal Management Division (Coastal Use Permits)

LouisianA SAnd Resources Database

- For More Information:
  - Rick Raynie Richard.Raynie@LA.gov
  - Syed Khalil Syed.Khalil@LA.gov
  - CIMS.Coastal.Louisiana.gov

Louisiana's Coastal Master Plan



+

Sediment Management

Offshore Alabama Sand Information System

//Stat: 2009

Gulf of Mexico Offshore Sand Management Working Group Meeting

October 13, 2015

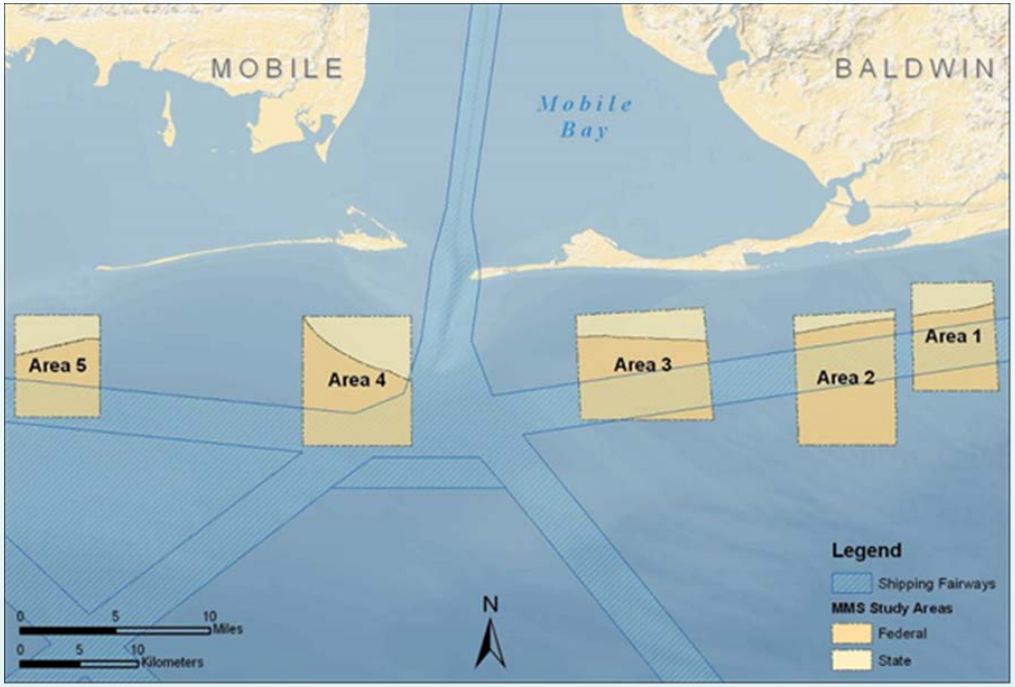
Stephen C. Jones, P.G.

Geological Survey of Alabama

Geological Investigations Program

Coastal Resources Section

Offshore Study Areas



Parker and others (1993)

- Receding shorelines
- Sediment distribution
- Location and subsequent analysis of surface and core sediment samples
- bathymetry

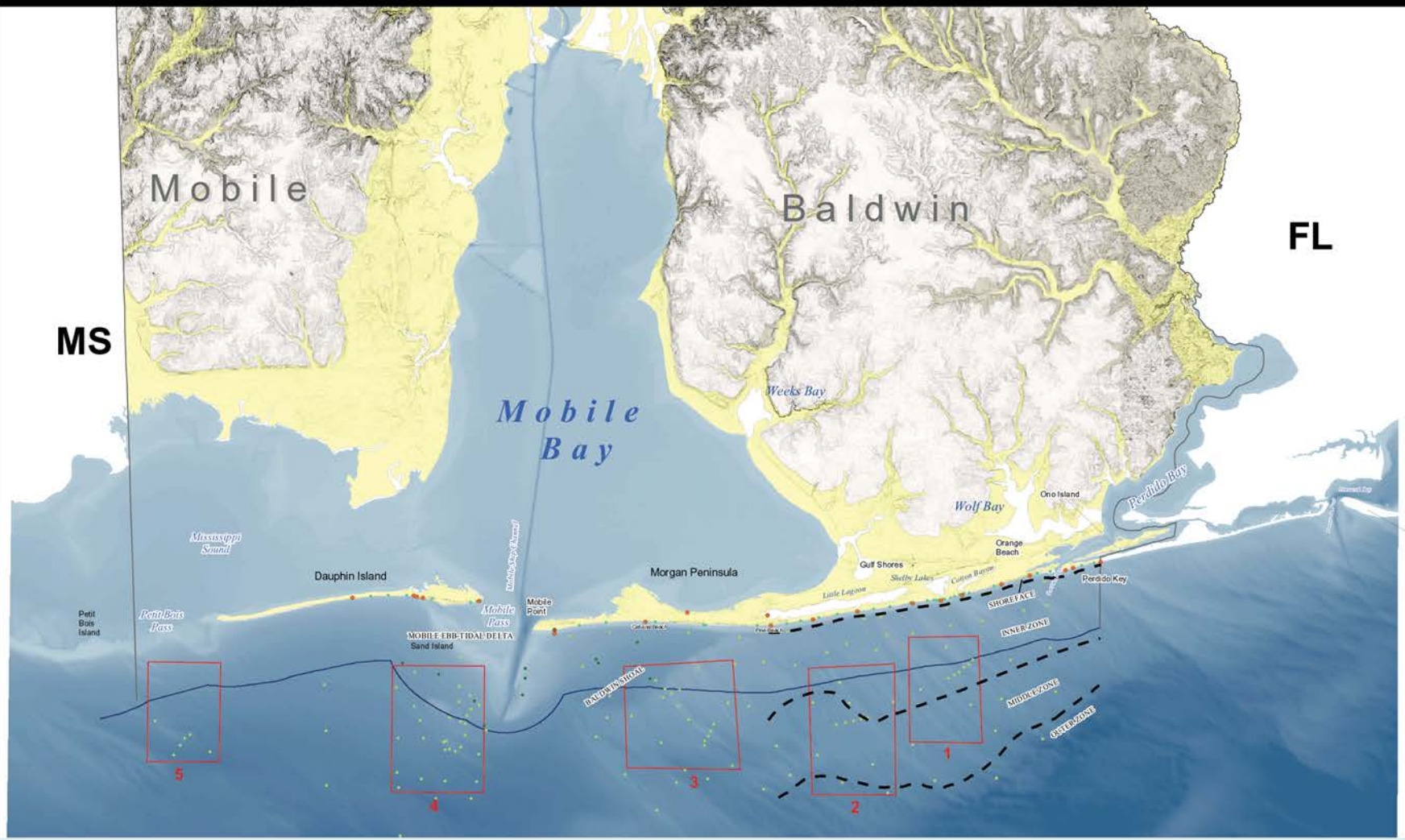
Area 1: 21.7 mi^2 Federal: ≈75%

Area 2: 31.7 mi^2 Federal: ≈91%

Area 3: 34.0 mi^2 Federal: ≈76%

Area 4: 33.8 mi^2 Federal: ≈69%

Area 5: 20.9 mi^2 Federal: ≈70%



- 2004 Data collection sites
- Shoreline
- Roads
- Alabama state boundary
- Federal-State boundary
- MMS Study Areas
- Foundation boring
- Shoreline profile
- Vibracore
- Bathymetry in 1 meter intervals, below mean lower low water

N
W E
S

Scale

9 4.5 0 9 Miles

9 4.5 0 9 Kilometers

BATHYMETRIC CHART OF COASTAL ALABAMA

Bathymetric data from the National Oceanic and Atmospheric Administration (NOAA) Satellite and Information Service's National Geophysical Data Center (downloaded from http://www.ngdc.noaa.gov/mgg/coastal/coastal.html, 2005) as adjusted by Geological Survey of Alabama.
Not for navigation purposes.

Areas of Historic Sand Placement

(excluding upland recovery, Perdido Pass maintenance)

Source: Alabama Placement Inventory

Orange Beach/Gulf State Park/Gulf Shores
2005 – 2006 Beach Restoration Project
≈ 8 million yd³ and 15.3 miles

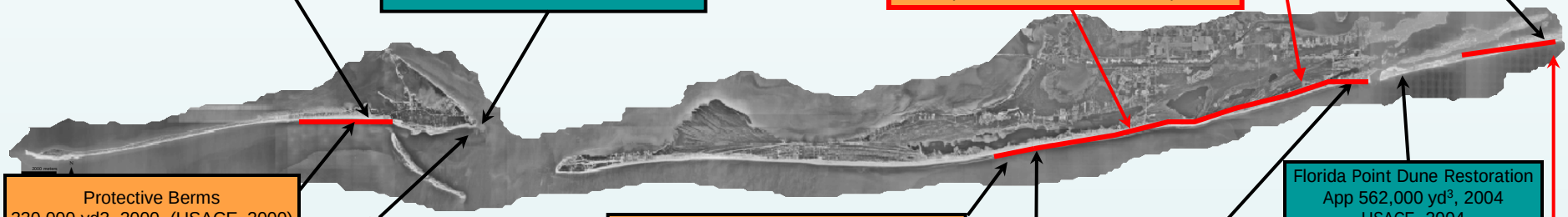
2013 - ≈ 2.7 Myd³

"Orange Beach Dune Project"
Unknown quantity, 2004

12,000 m³ ,1991
(Douglass, Scott L., 1994)

140,000 m³ ,1980
(Douglass, Scott L., 1994)

Gulf Shores Beach Restoration
1,800,000 yd³, 2001
(Duke PSDS database, 2005)



Protective Berms
330,000 yd3, 2000, (USACE, 2000)
562,000 yd3, 2007, (USACE, 2007)

?

West Gulf Shores Emergency Beach Fill
700,000 yd³, 2003
(Duke PSDS database, 2005)

Florida Point Dune Restoration
App 562,000 yd³, 2004
USACE, 2004

660,000 yd³ ,1986
(Trembanis, A.C. and Pilkey, O.H. 1998)

20,000 yd³ ,1996
(Trembanis, A.C. and Pilkey, O.H., 1998)

The Alabama Sand Island berms
-feeder berm research area
(USACE WES DRP-1-08, 1992)

300,000 yd³, 2002
(Duke PSDS database, 2005)

Mobile Outer Mound
17,000,000 yd³, 1988-1990

Sand Island Bar
464,000 yd³, 1987

Sand Island Mound

Little Lagoon Pass bypassing
Unknown quantities
1993 (14x),
1995 (7x),
1996 (5x),
1997 (5x)
1998 (6x),
2000 (4x),
2001 (1x)
2002 (1x)
2003 (1x)
2004 (1x)
2005 (1x)
2006 (6x)
2007 (6x)
2008 (6x)
ALDOT

Perdido Key Beach Nourishment
App 714,000 yd³, 2004
Olsen and Associates, Inc., 2004

Previous Work
Geological Survey of Alabama

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Hummell, R. L. and Smith, W. E., 1995, Geologic and environmental characterization and near-term lease potential of an offshore sand resource site for use in beach nourishment projects on Dauphin Island, Alabama, Minerals Management Service Cooperative Agreement No. 14-35-0001-30725, 164 p. + 29 p. appendix.

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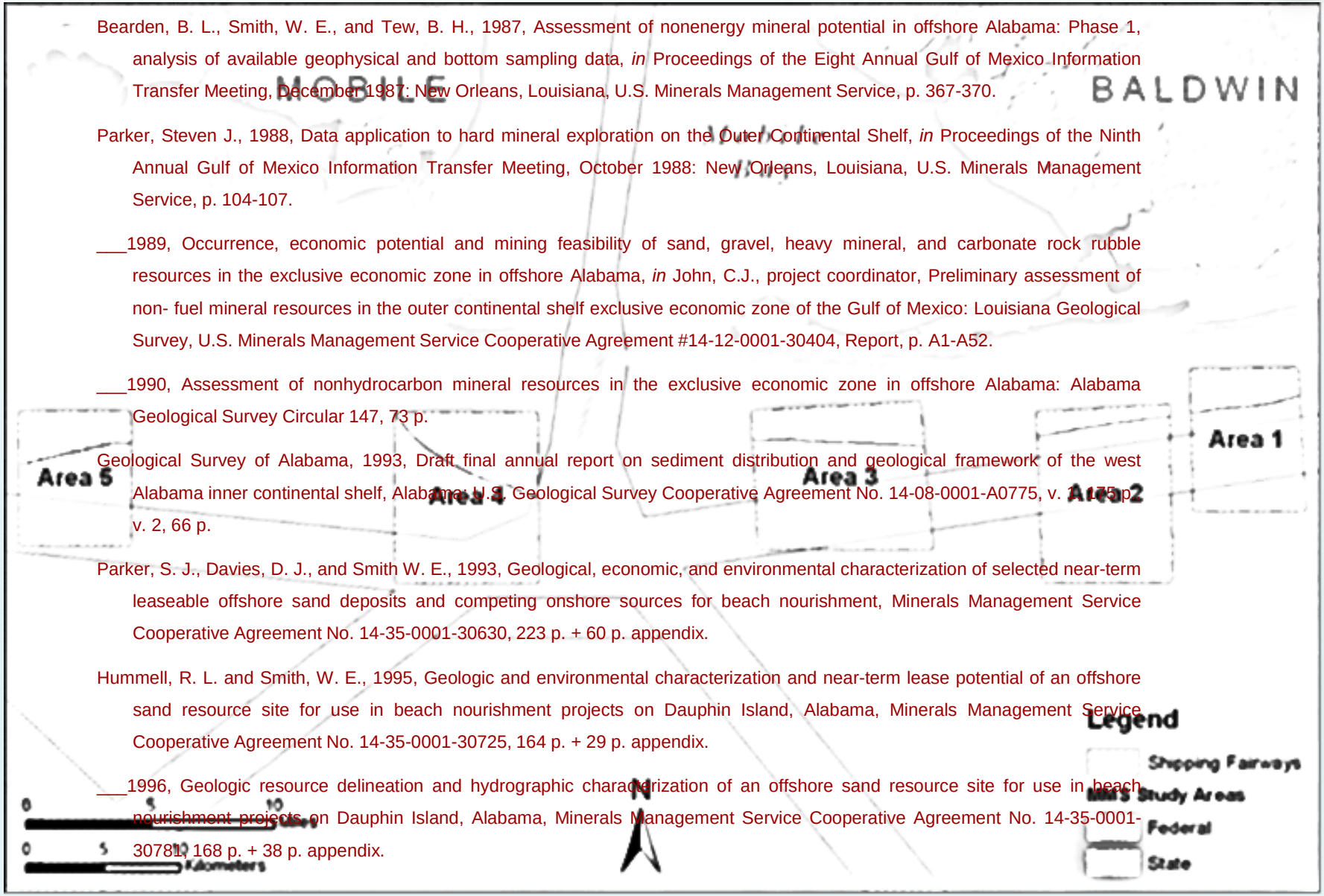

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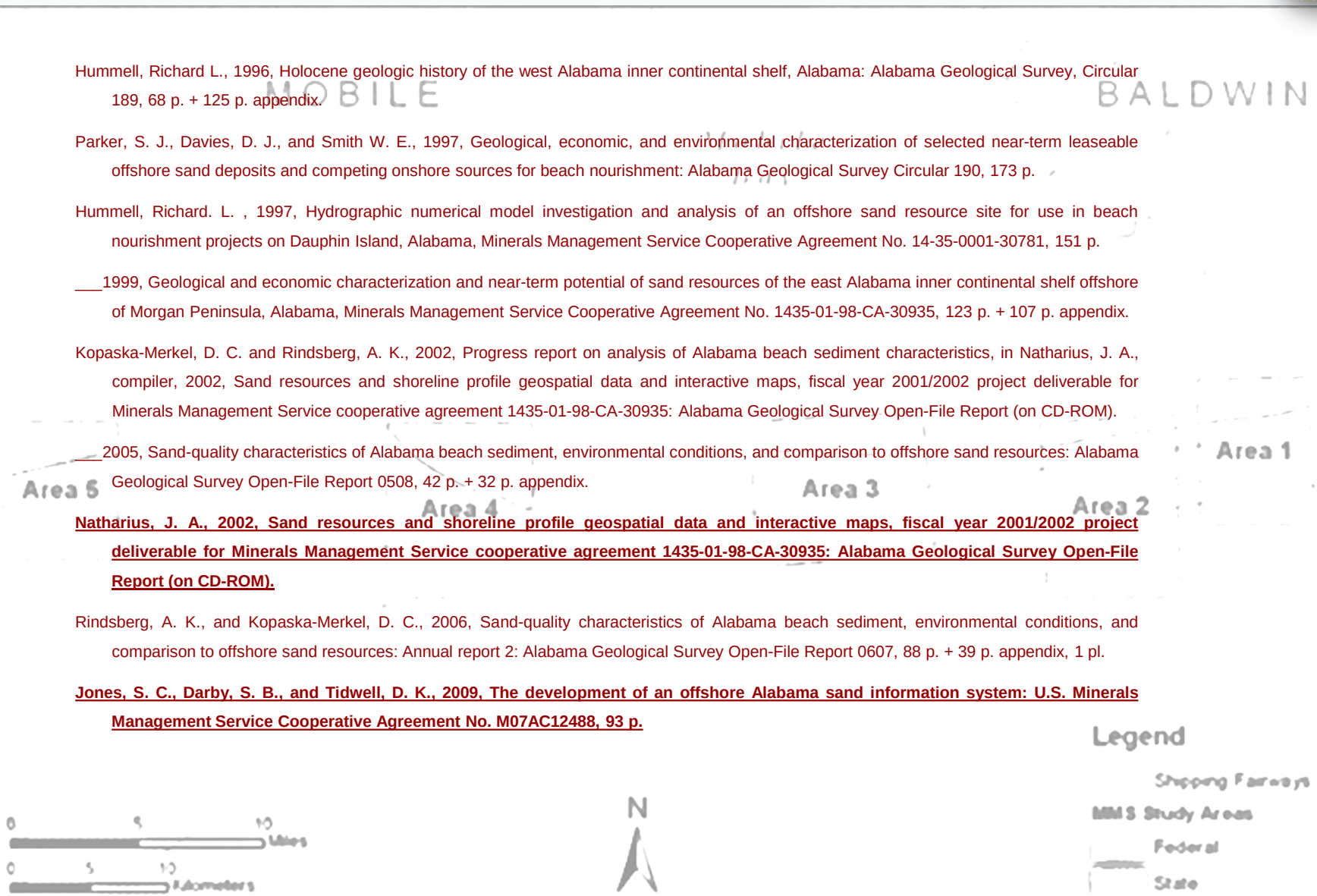
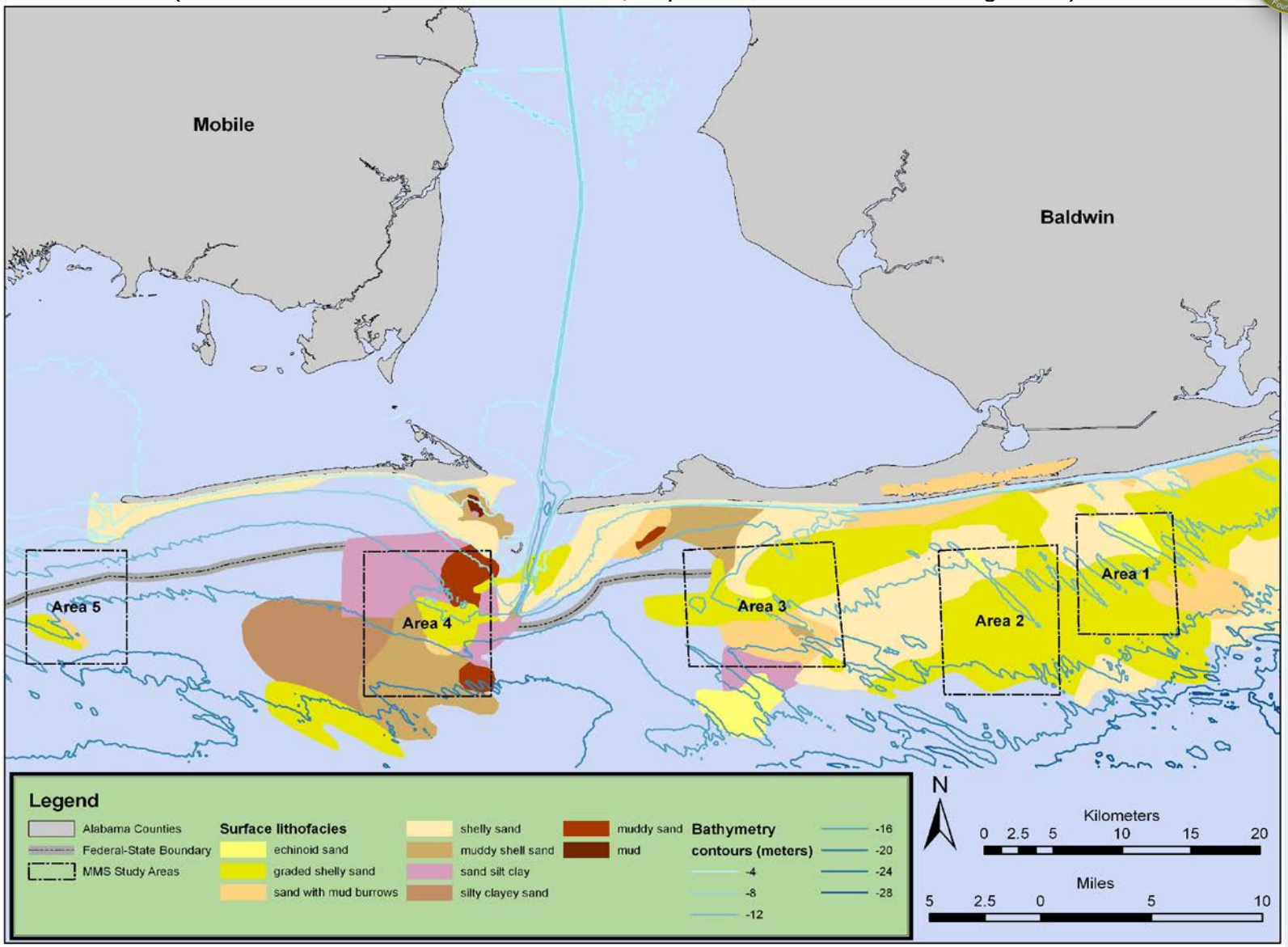


Surface Sediment Texture – Inner Alabama Shelf

(modified from Parker and others, 1993; Kopaska-Merkel and Rindsberg, 2005)



Previous Work
Contracted

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Byrnes, M. R., Hammer, R. M., Vittor, B. A., Ramsey, J. S., Snyder, D. B., Bosma, K. F., Wood, J. D., Thibaut, T. D., and Phillips, N. W., 1999, Environmental survey of identified sand resource areas offshore Alabama: Volume I: Main test, Volume II: Appendices. U.S. Department of Interior, Minerals Management Service, International Activities and Marine Minerals Division (INTERMAR), Herdon, Virginia, OCS Report MMS 99-0052, 326 pp. + 132 pp. appendices.

Byrnes and others, 1999

--geologic, hydrodynamic, and biologic setting

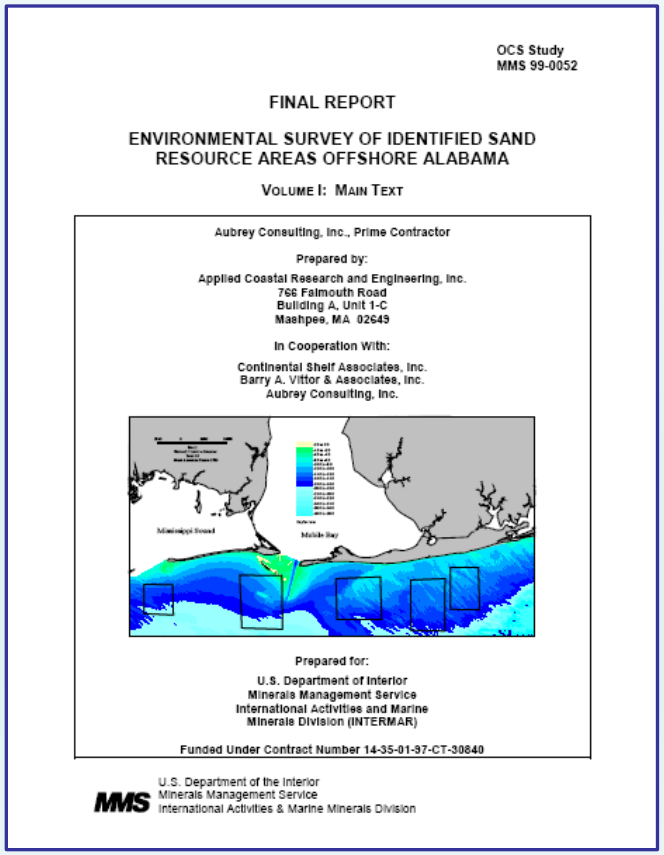
--shoreline and bathymetric change analyses

--wave transformation modeling, circulation, and sediment transport

--biological field assessment/survey

--summarized likely borrow sites

--assessment of dredging impacts to hydrodynamics, sediment transport, and benthic and pelagic environments



OCS Study
MMS 99-0052

FINAL REPORT

ENVIRONMENTAL SURVEY OF IDENTIFIED SAND RESOURCE AREAS OFFSHORE ALABAMA

VOLUME I: MAIN TEXT

Aubrey Consulting, Inc., Prime Contractor

Prepared by:

Applied Coastal Research and Engineering, Inc.
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Mashpee, MA 02649

In Cooperation With:

Continental Shelf Associates, Inc.
Barry A. Vittor & Associates, Inc.
Aubrey Consulting, Inc.

Prepared for:

U.S. Department of Interior
Minerals Management Service
International Activities and Marine
Minerals Division (INTERMAR)

Funded Under Contract Number 14-35-01-97-CT-30840

MMS U.S. Department of the Interior
Minerals Management Service
International Activities & Marine Minerals Division

Previous Work
Contracted

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___2006, Orange Beach, Gulf State Park, and Gulf Shores 2006 phase I deep-water sand search: Jacksonville, Florida, Olsen Associates, Inc., submitted to the City of Orange Beach, the Alabama Department of Conservation and Natural Resources, and the City of Gulf Shores, Alabama, 59 p. + appendices

___2011, Orange Beach, Gulf State Park, and Gulf Shores 2006 phase II sand search: Jacksonville, Florida, Olsen Associates, Inc., submitted to the City of Orange Beach, the Alabama Department of Conservation and Natural Resources, and the City of Gulf Shores, Alabama, 69 p. + appendices

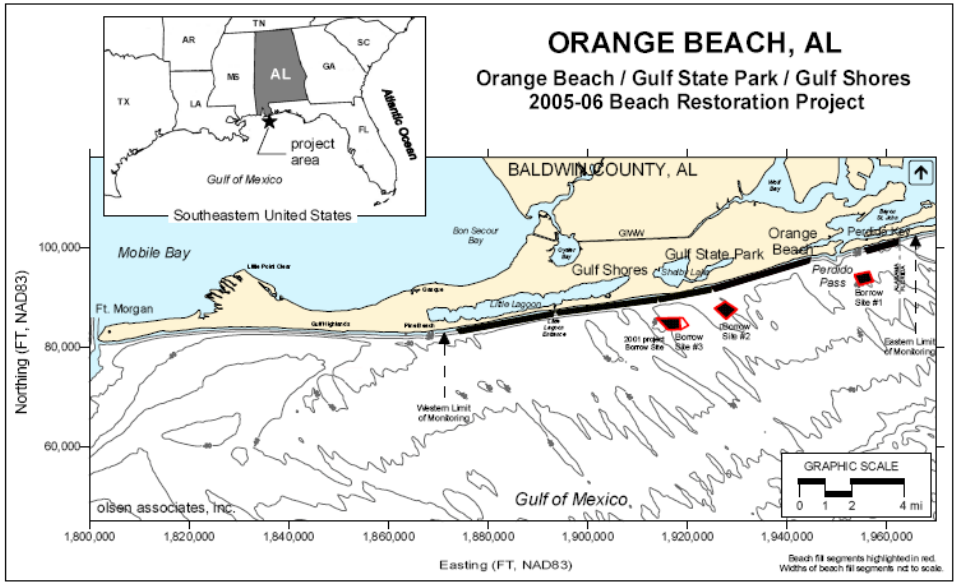


Figure 1.1: Location map – Orange Beach/Gulf State Park/Gulf Shores Beach Restoration Project. The map depicts the two engineered beach restoration segments within Orange Beach, AL, Romar Beach and Perdido Key (highlighted in red).

Native Beach Characteristics

Range: 0.21 mm – 0.46 mm (2.252ø to 1.120ø)

Sorting Coefficient: Well-sorted (0.47ø to 0.50ø)

Shell Content: << 1%

Color: 10YR 9.0/1.0 to 9.0/1.5 (Munsell's nearly Whites)

Project Objectives

- **Identify and compile all available supporting sand resource and supplementary/ancillary data**

  Federal, State, academic, and private sources

- **Construct a comprehensive interactive mapping interface**

  facilitates rapid updating

  promotes data dissemination

  web-deployed guidance tool

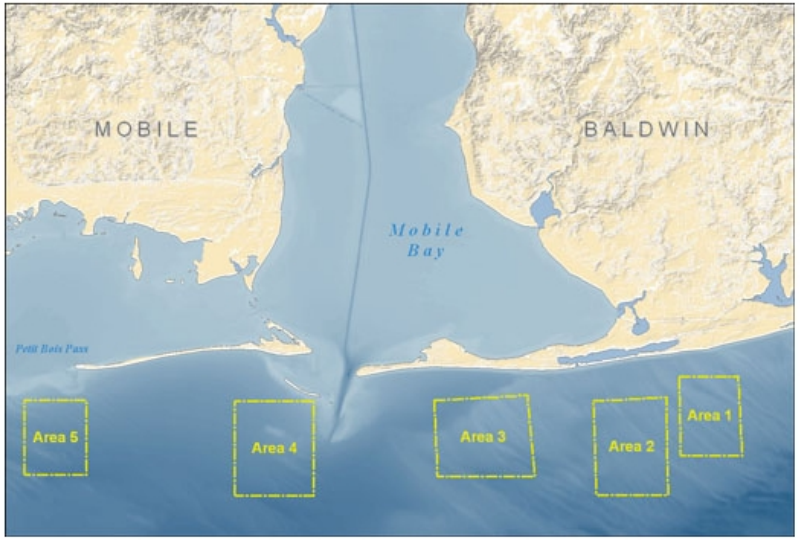
- **Develop conclusions and recommendations about sand source potential**

Offshore Sand Resources

OASIS

Offshore Alabama Sand Information System

Home | Reports | Related Studies | Related Links | Contact



The Offshore Alabama Sand Information System (OASIS) was developed by the Geological Survey of Alabama in cooperation with the Minerals Management Service to identify potential high-quality sand deposits in the Gulf of Mexico and to provide a guideline for future sand investigations. This cooperative agreement was established as a result of Public Law 109-234- Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery.

The primary feature of this site is an interactive web map of the Gulf of Mexico, centered on offshore Alabama, which contains a variety of datasets used in sand resource location. Historical sand resource reports published by the Geological Survey of Alabama have also been made available on this site, along with links to related studies and contact information.

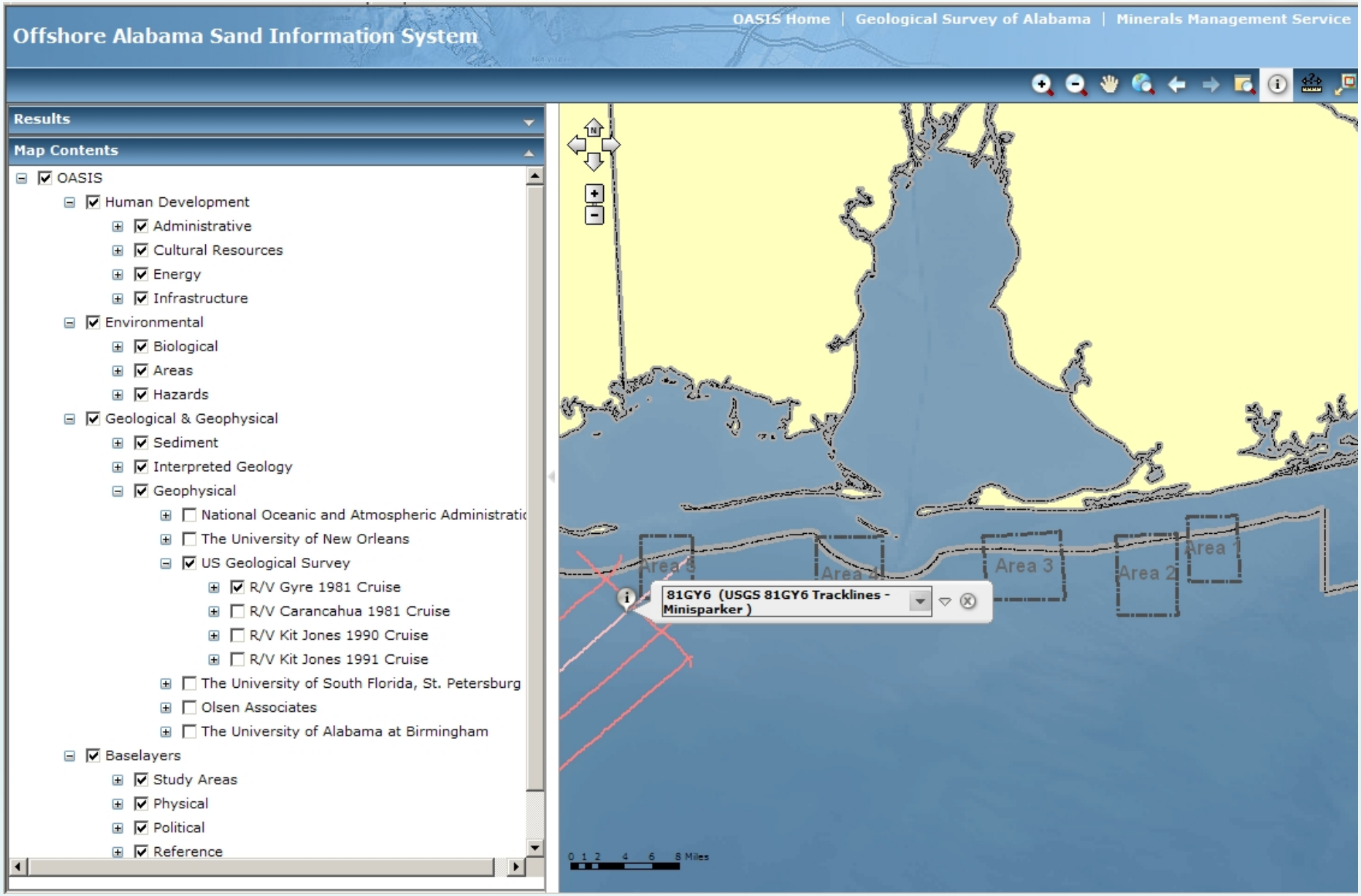
Launch OASIS

Prepared by the Geological Survey of Alabama in fulfillment of U.S. Department of the Interior,
Minerals Management Service Cooperative Agreement No. M07AC12488
Tuscaloosa, Alabama 2009

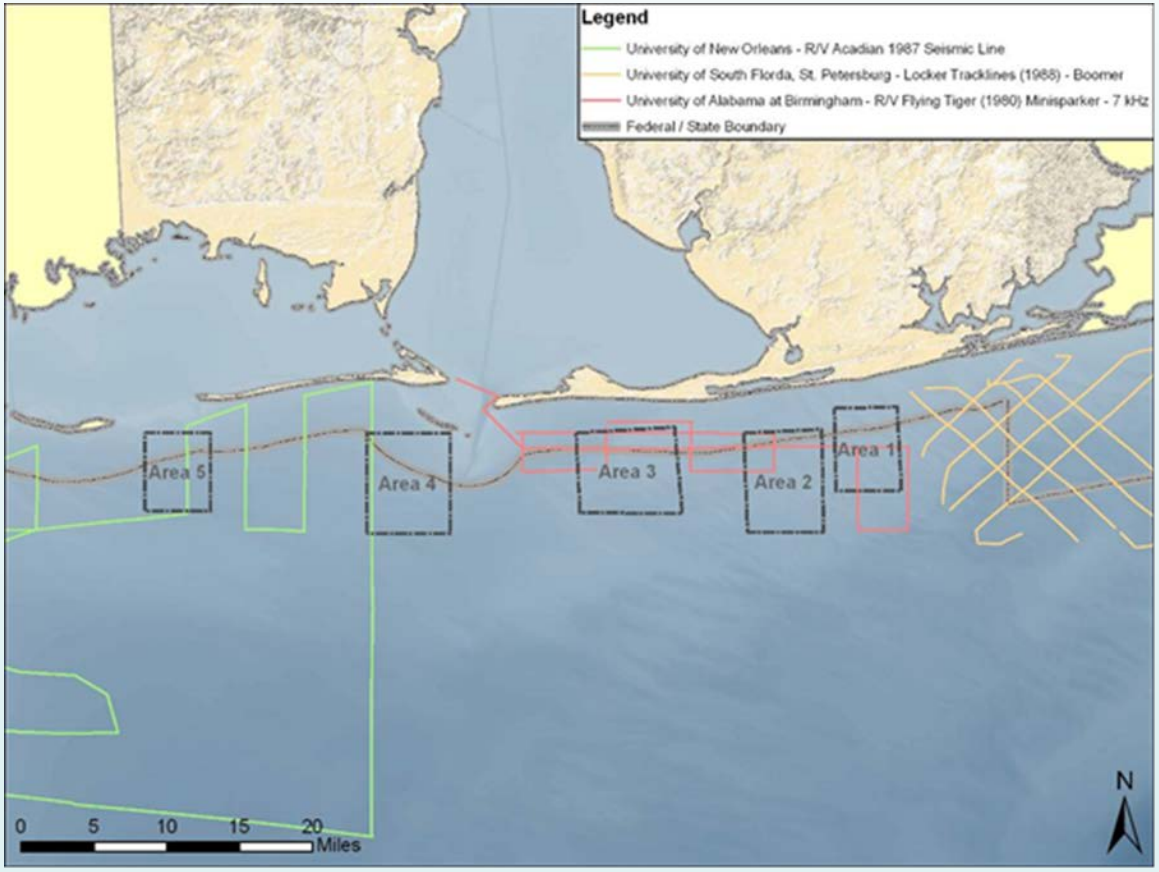
The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

Privacy Statement | Disclaimer

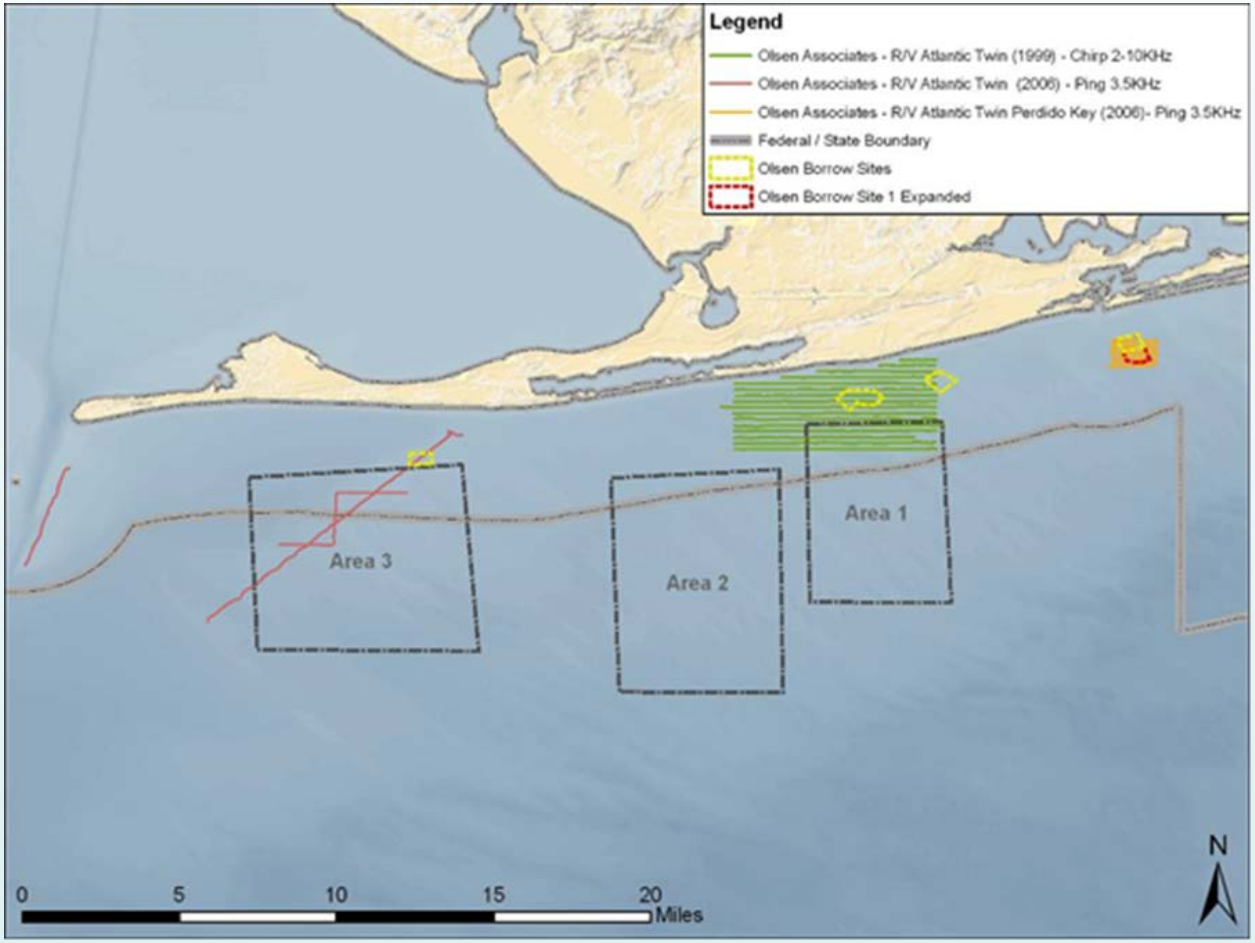
Offshore Sand Resources



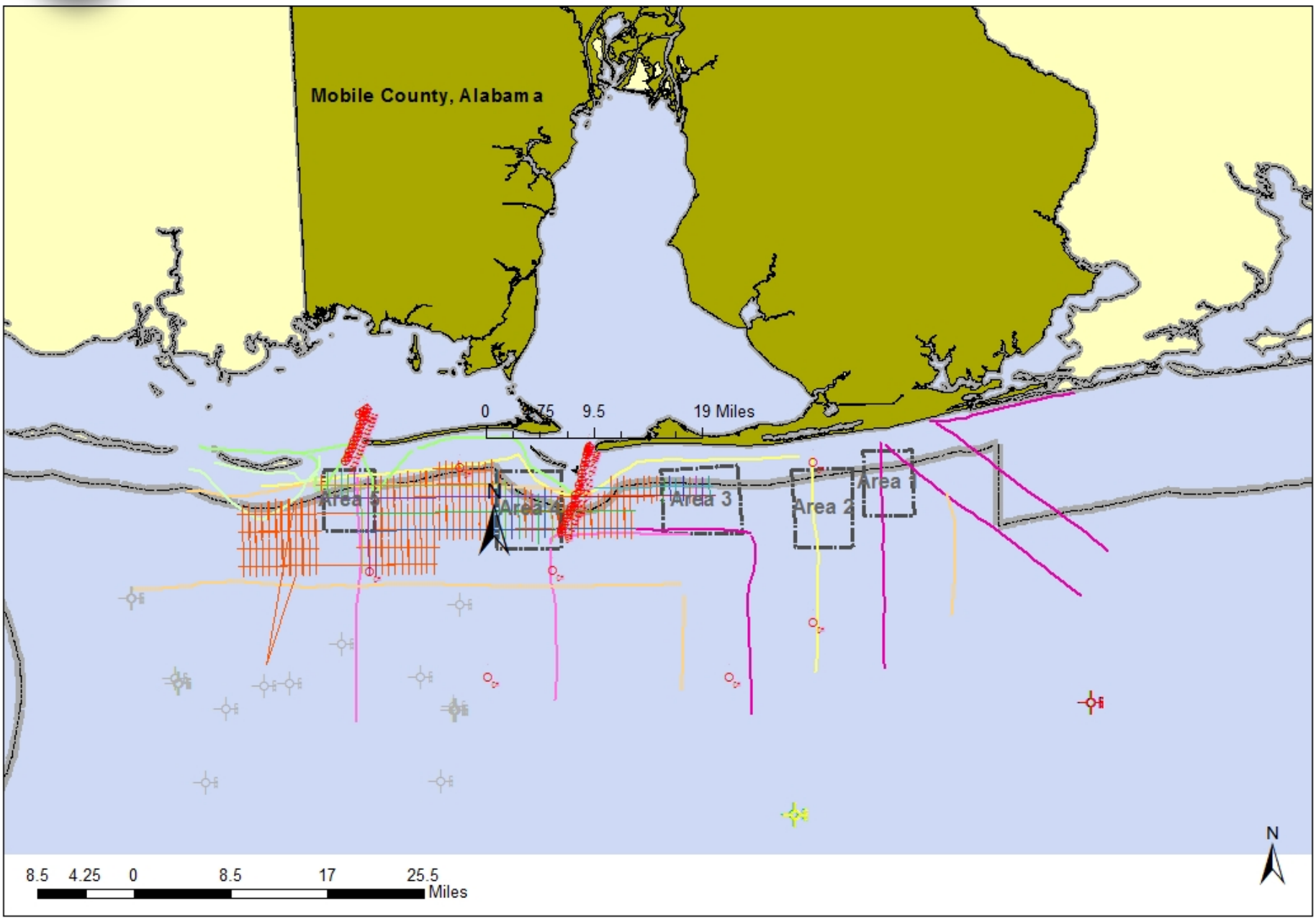
Academic

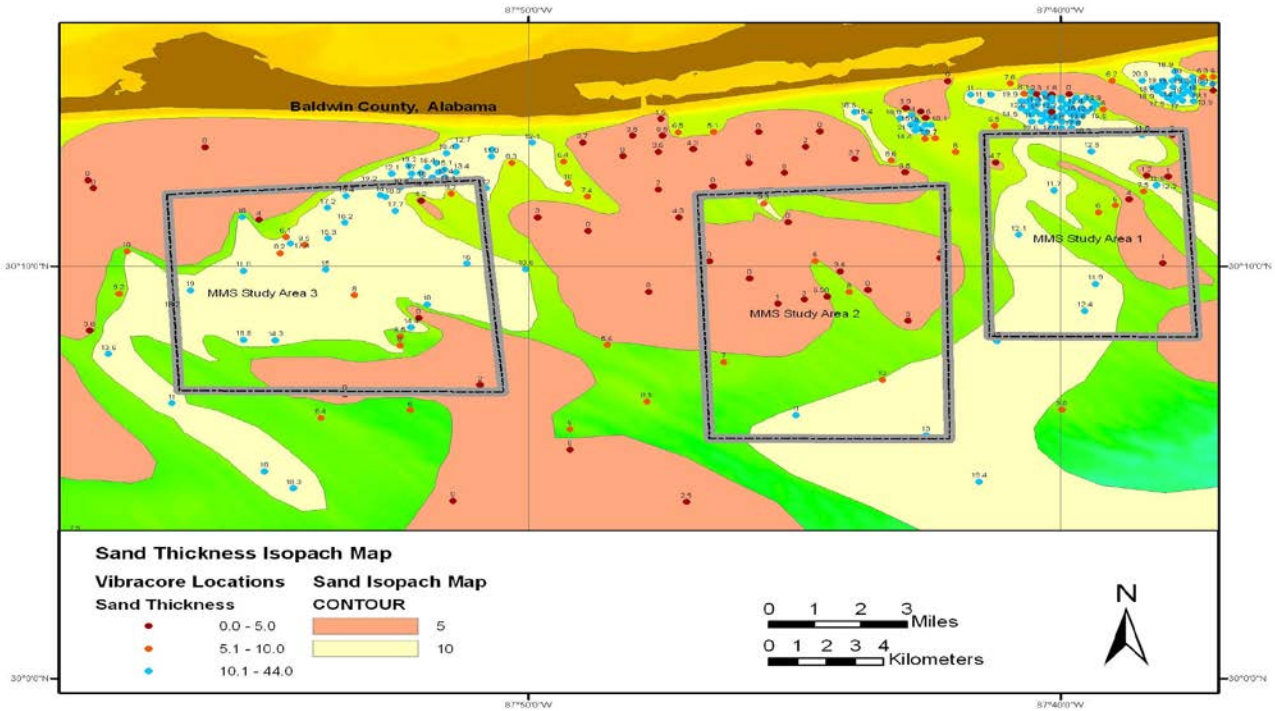

Legend
University of New Orleans - R/V Acadian 1987 Seismic Line
University of South Florda, St. Petersburg - Locker Tracklines (1988) - Boomer
University of Alabama at Birmingham - R/V Flying Tiger (1980) Minisparker - 7 kHz
Federal / State Boundary
Area 5
Area 4
Area 3
Area 2
Area 1
0 5 10 15 20
Miles
N

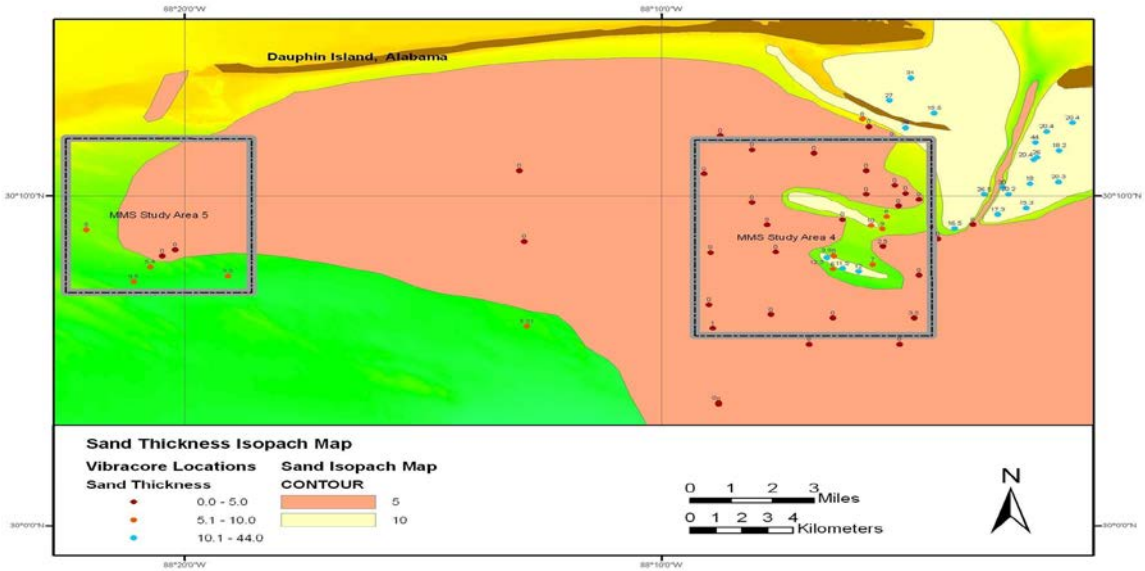
Consultant

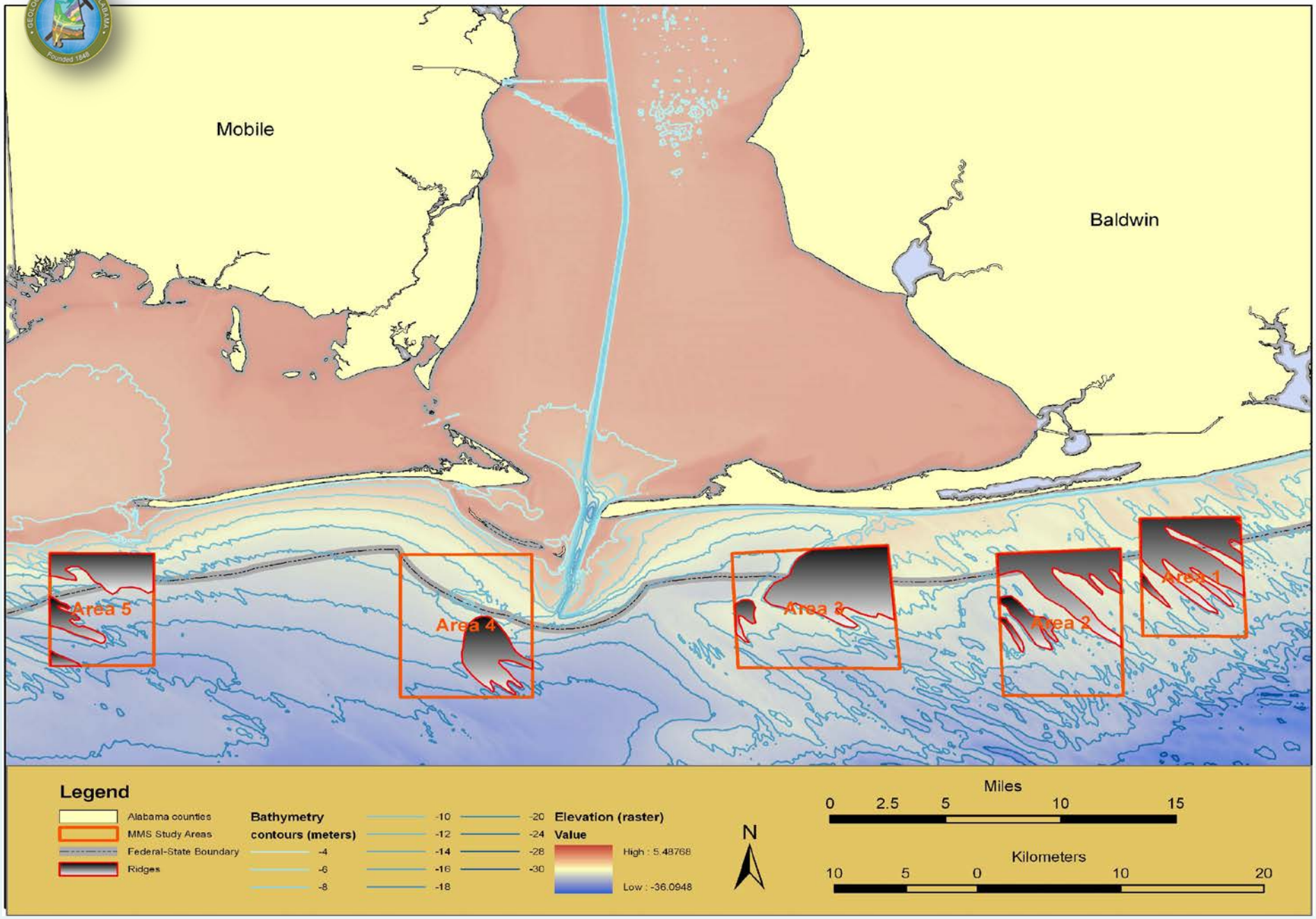

Legend
Olsen Associates - R/V Atlantic Twin (1999) - Chirp 2-10KHz
Olsen Associates - R/V Atlantic Twin (2006) - Ping 3.5KHz
Olsen Associates - R/V Atlantic Twin Perdido Key (2006)- Ping 3.5KHz
Federal / State Boundary
Olsen Borrow Sites
Olsen Borrow Site 1 Expanded
Area 1
Area 2
Area 3
0
5
10
15
20
Miles
N

Federal Seismic / Vibracore

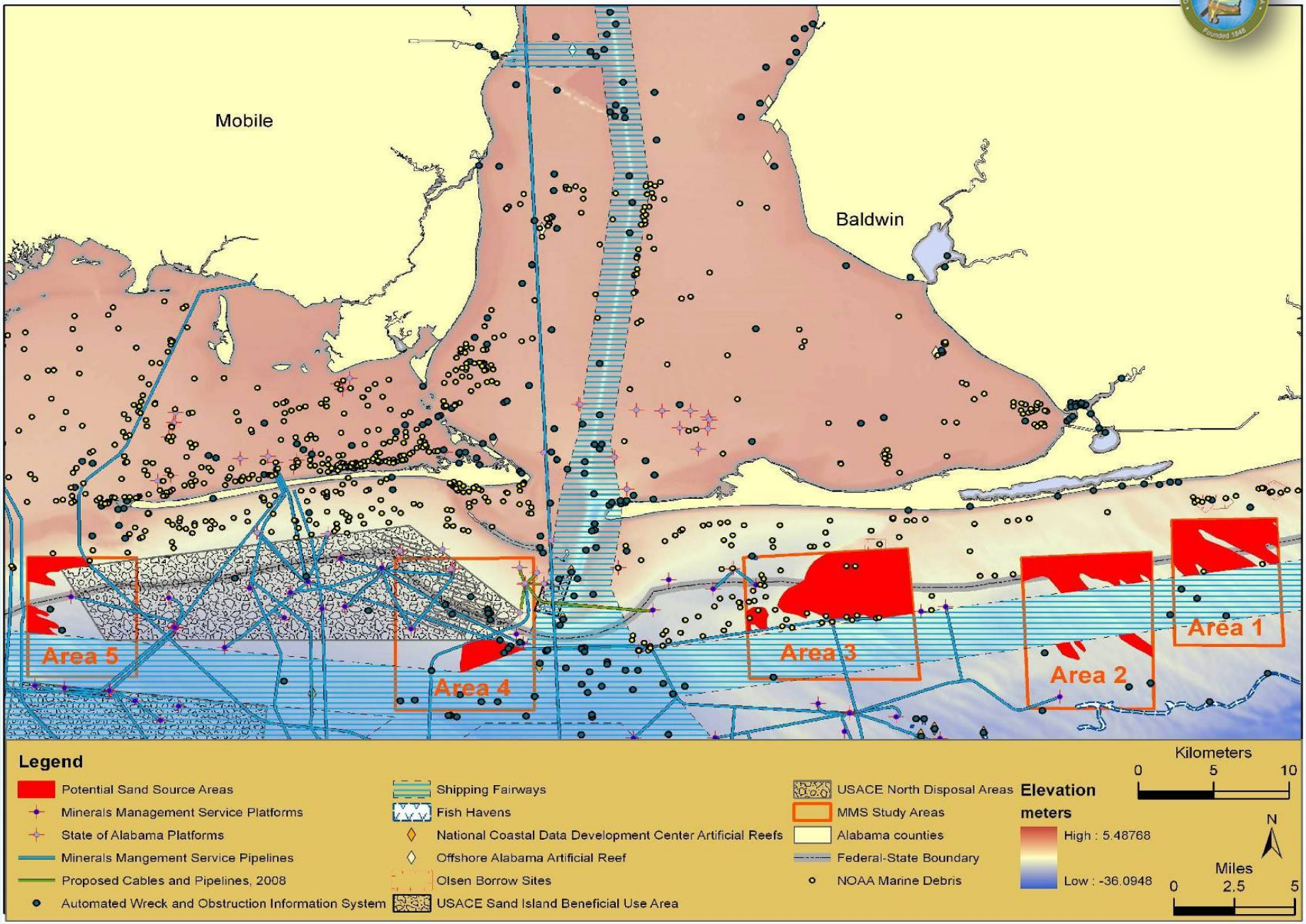



Baldwin County, Alabama
MMS Study Area 1
MMS Study Area 2
MMS Study Area 3
Sand Thickness Isopach Map
Vibracore Locations
Sand Thickness
0.0 - 5.0
5.1 - 10.0
10.1 - 44.0
Sand Isopach Map
CONTOUR
5
10
0 1 2 3 Miles
0 1 2 3 4 Kilometers
N


Dauphin Island, Alabama
MMS Study Area 5
MMS Study Area 4
Sand Thickness Isopach Map
Vibracore Locations
Sand Thickness
0.0 - 5.0
5.1 - 10.0
10.1 - 44.0
Sand Isopach Map
CONTOUR
5
10
0 1 2 3 Miles
0 1 2 3 4 Kilometers
N


Mobile
Baldwin
Area 5
Area 4
Area 3
Area 2
Area 1
Legend
Alabama counties
MMS Study Areas
Federal-State Boundary
Ridges
Bathymetry contours (meters)
-4
-6
-8
-10
-12
-14
-16
-18
-20
-24
-28
-30
Elevation (raster)
Value
High : 5.48768
Low : -36.0948
N
Miles
0 2.5 5 10 15
Kilometers
10 5 0 10 20

Offshore Sand Resources

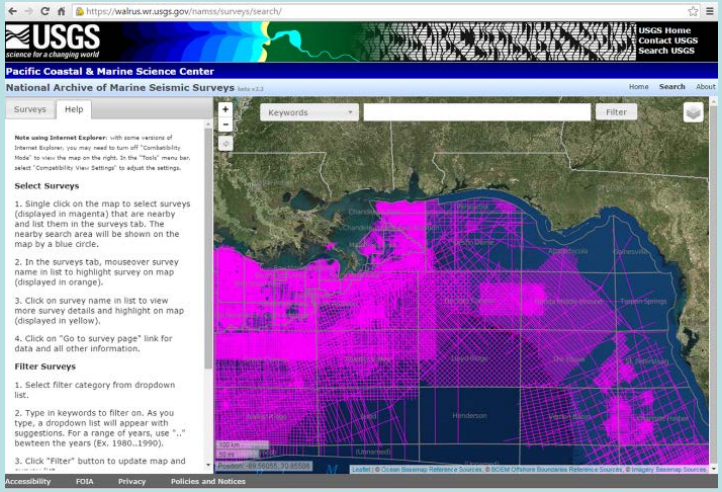


Conclusion

For Alabama beaches, are OCS sand deposits needed in the future?
Few to no reasons to believe that OCS sand deposits would not be!

Needs

- Funding
- Cooperative/Working Group between Government, Academic, and Private interest
- Compile data missed (proprietary, public but not identified, etc.) and new
- Update the Offshore Alabama Sand Information System (Data & Platform)
- Data review
- Revisit sand source potential--------DATA GAPS
- Further offshore characterization
- Revisit sand source potential



Stephen C. Jones, P.G.
Geological Survey of Alabama
Geological Investigations Program
Director, Coastal Resources Section

Florida Department of Environmental Protection

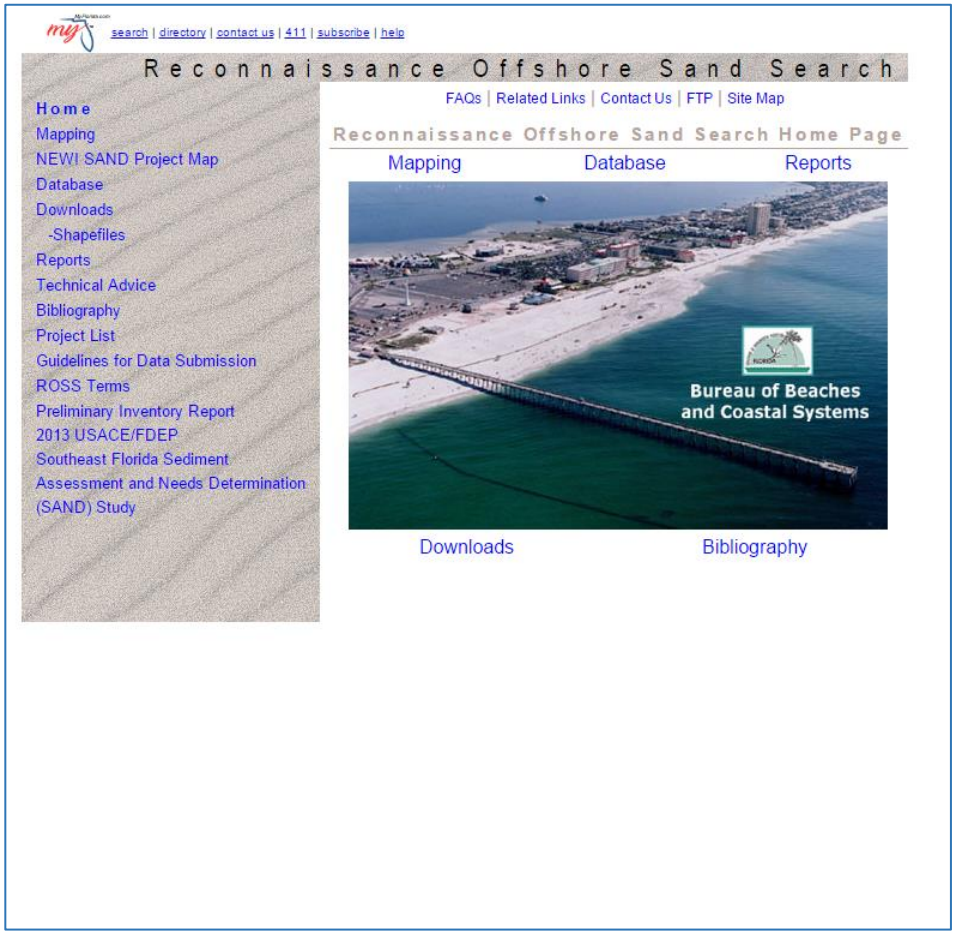
ROSSI

The New and Improved Coastal Sediment Management Tool

October 13, 2015

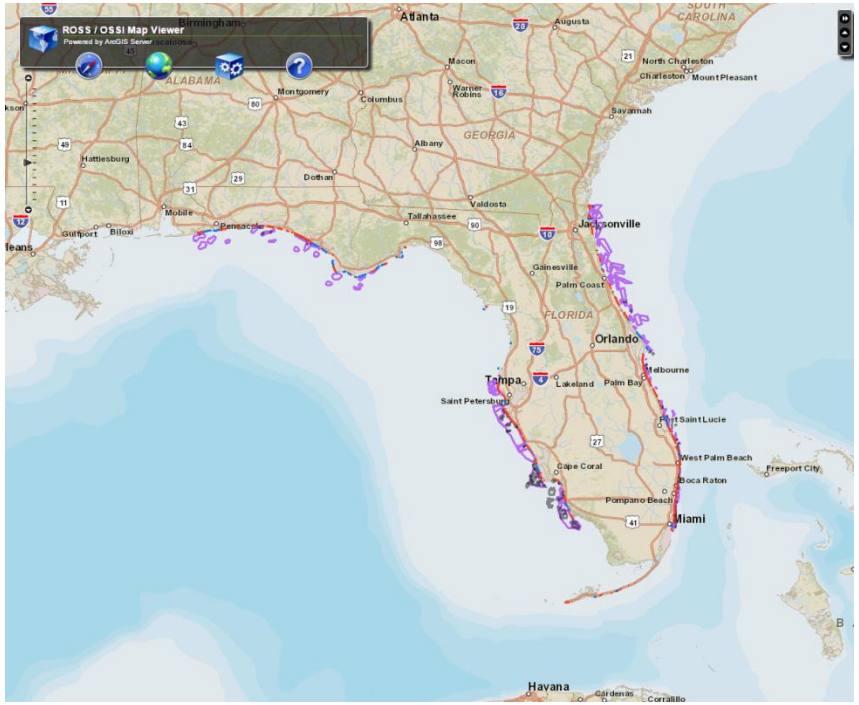
Background

- ROSS – Reconnaissance Offshore Sand Search
- OSSI – Offshore Sand Source Inventory
- ArcIMS in early 2000s
- Upgraded to ArcGIS Server 9 in 2008
- Upgraded to ArcGIS Server 10 in 2013



Background

- 2014 BOEM cooperative agreement award
  - Populate remaining Atlantic counties
  - Webpage update
  - Add feature datasets
  - Provided for two years of hosting
- ROSS/OSSI renamed ROSSI
  - Regional Offshore Sand Source Inventory



Technology Stack

- Oracle relational database management system
- ESRI ArcSDE for managing geospatial data
- ESRI ArcGIS Server for serving geospatial data via the web
- Custom map viewer based on ESRI JavaScript API for ArcGIS Server

Advantages

- Single master repository of all data, in one uniform, consistent format
- Enforces consistency of data structures across projects, both historic and future
- Publicly accessible via Web browser rossi.urs-tally.com

Florida Department of Environmental Protection

ROSSI

Modernization

History

- Website created in 2001
- No significant updates had been made since
- Webpage and mapping utility outdated
  - Mapping utility extensively customized by AECOM (formerly URS)
  - Based on a sample map viewer written by ESRI, which is no longer supported

Ongoing Tasks

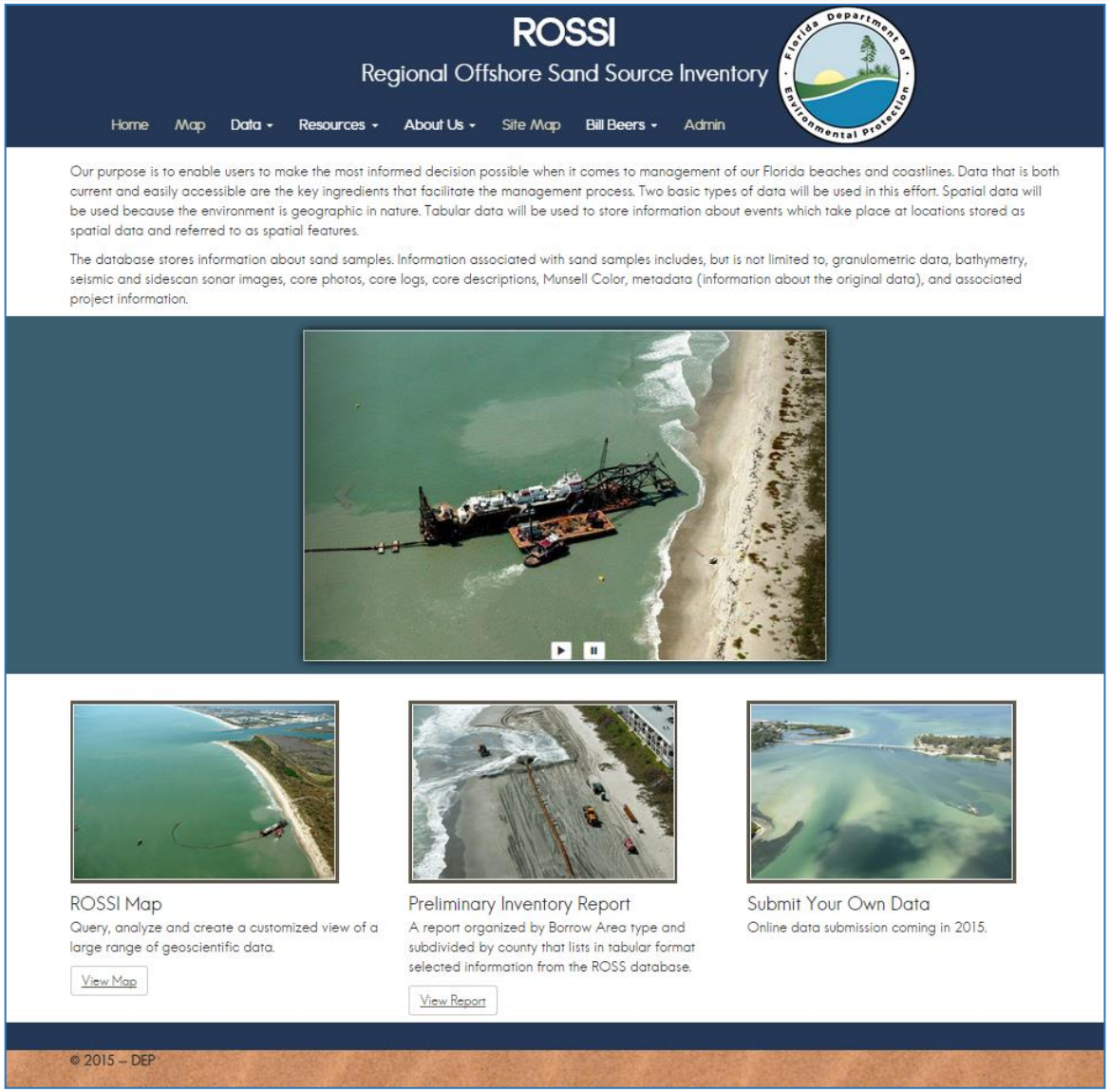
- Population of Gulf and Panhandle counties
- Link Directly to JCPs
- Project File Delivery System
  - Direct Data Upload Interface
  - FDEP gINT® correspondence (export) format no longer supported by Bentley
  - Create program to directly upload gINT® data using the FDEP library file

Florida Department of Environmental Protection

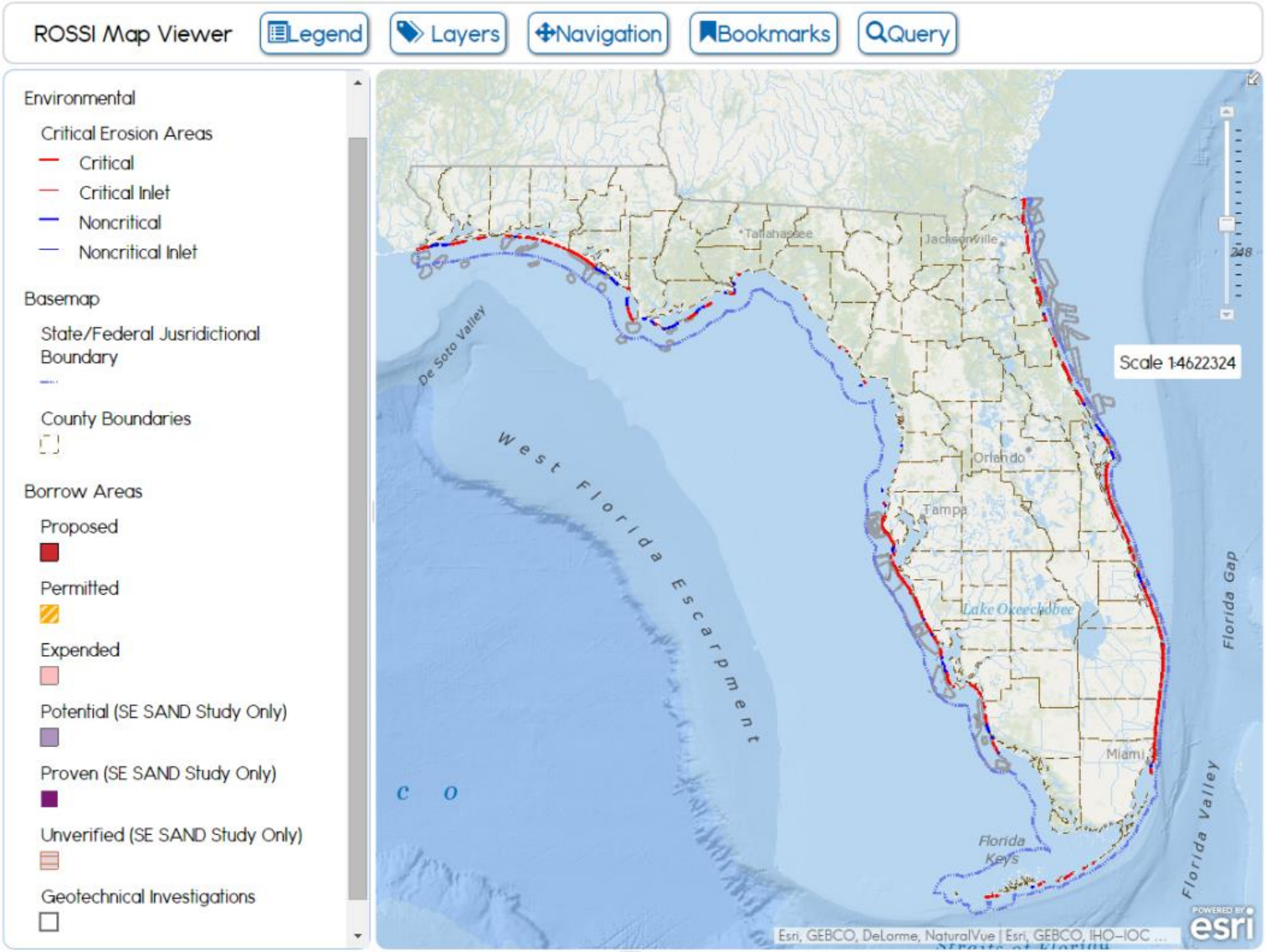
ROSSI

Functionality

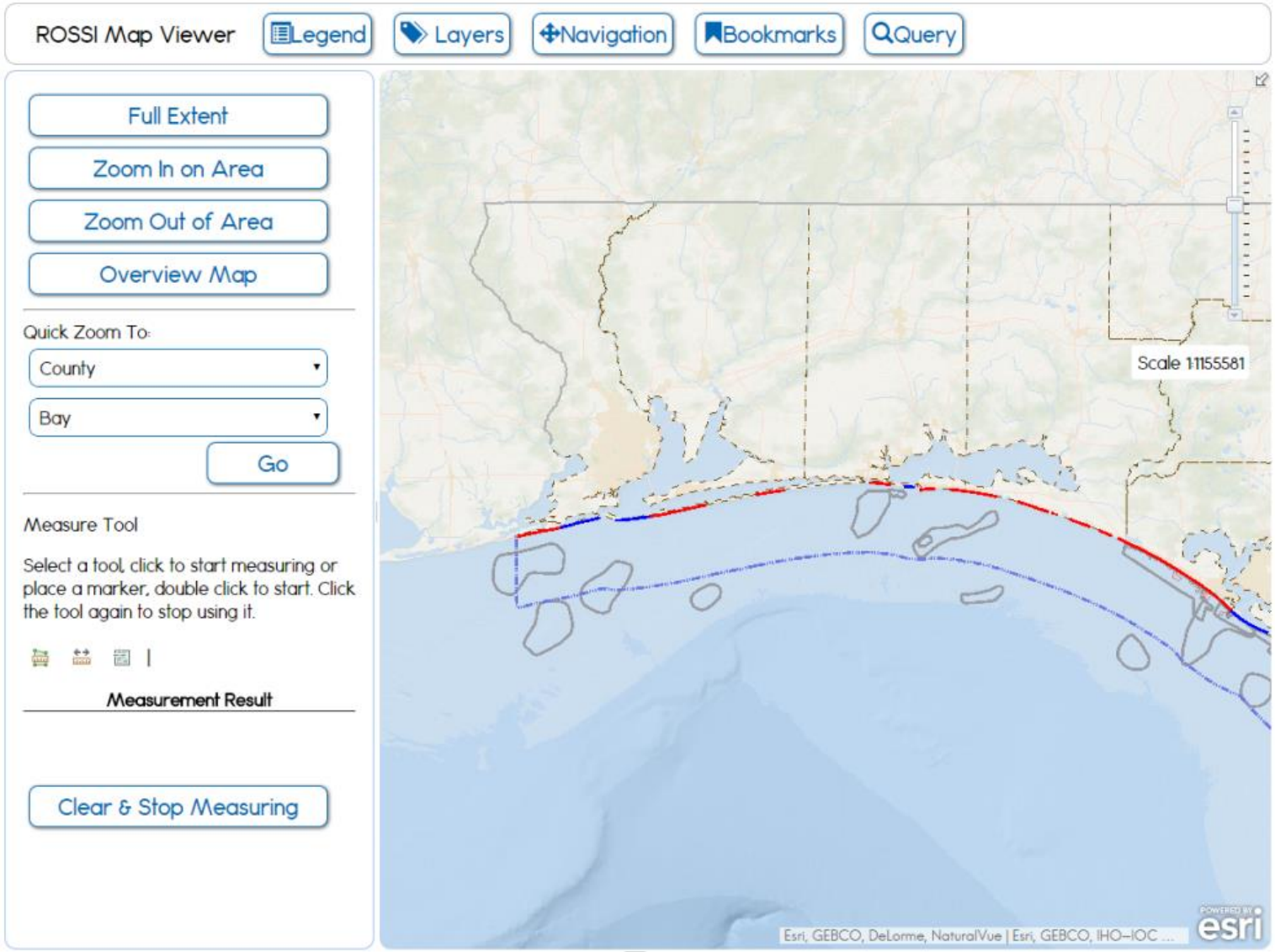
Website


ROSSI
Regional Offshore Sand Source Inventory
Home
Map
Data
Resources
About Us
Site Map
Bill Beers
Admin
Our purpose is to enable users to make the most informed decision possible when it comes to management of our Florida beaches and coastlines. Data that is both current and easily accessible are the key ingredients that facilitate the management process. Two basic types of data will be used in this effort. Spatial data will be used because the environment is geographic in nature. Tabular data will be used to store information about events which take place at locations stored as spatial data and referred to as spatial features.
The database stores information about sand samples. Information associated with sand samples includes, but is not limited to, granulometric data, bathymetry, seismic and sidescan sonar images, core photos, core logs, core descriptions, Munsell Color, metadata (information about the original data), and associated project information.
ROSSI Map
Query, analyze and create a customized view of a large range of geoscientific data.
View Map
Preliminary Inventory Report
A report organized by Borrow Area type and subdivided by county that lists in tabular format selected information from the ROSS database.
View Report
Submit Your Own Data
Online data submission coming in 2015.
© 2015 – DEP

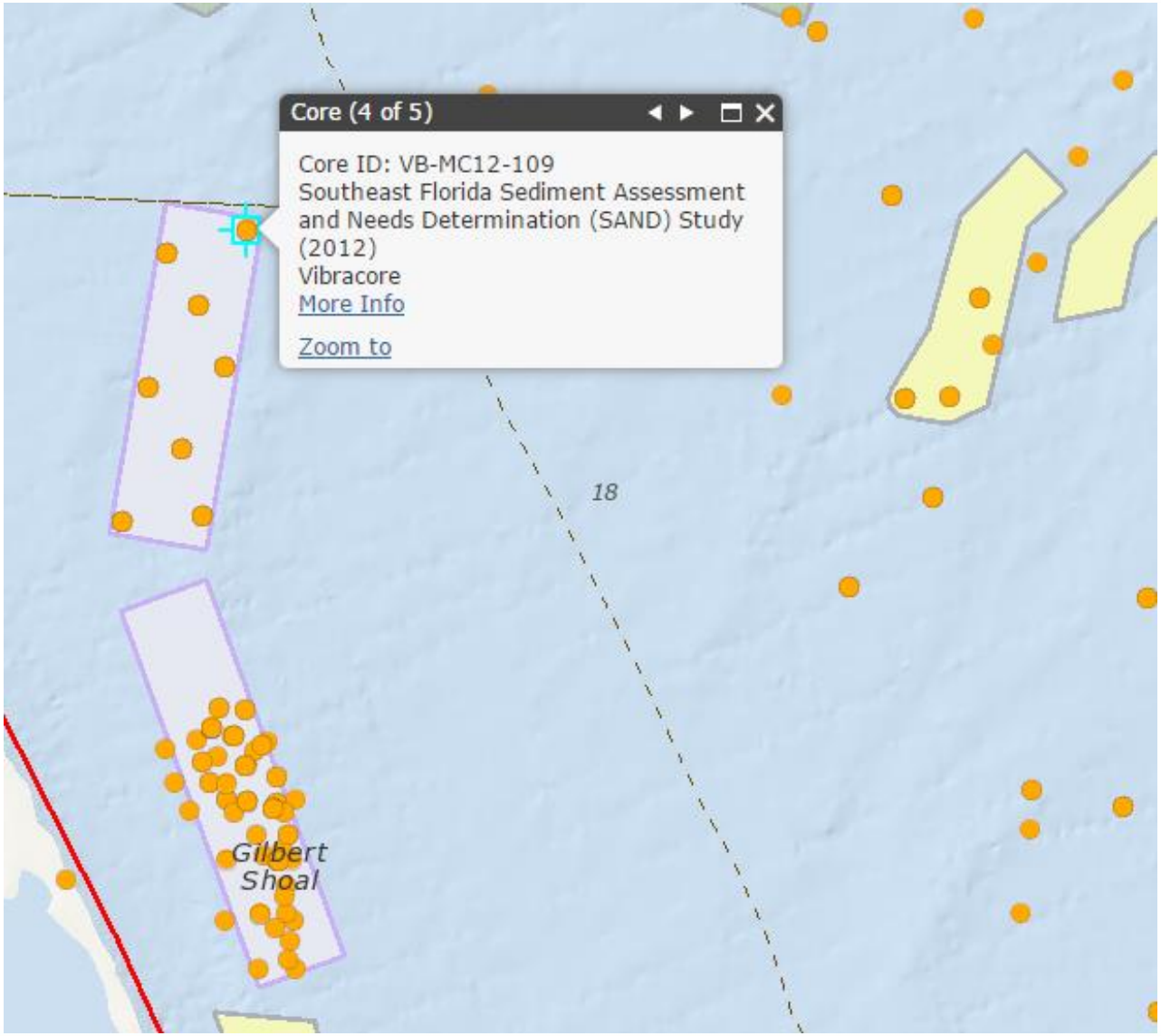
Map Viewer


ROSSI Map Viewer
Legend
Layers
Navigation
Bookmarks
Query
Environmental
Critical Erosion Areas
Critical
Critical Inlet
Noncritical
Noncritical Inlet
Basemap
State/Federal Jusridictional Boundary
County Boundaries
Borrow Areas
Proposed
Permitted
Expended
Potential (SE SAND Study Only)
Proven (SE SAND Study Only)
Unverified (SE SAND Study Only)
Geotechnical Investigations
Tallahassee
Jacksonville
Orlando
Tampa
Miami
Lake Okeechobee
Florida Keys
De Soto Valley
West Florida Escarpment
Florida Gap
Florida Valley
Scale 1:4622324
Esri, GEBCO, DeLorme, NaturalVue | Esri, GEBCO, IHO-IOC ...
esri

Navigation Tools



Features


Core (4 of 5)
Core ID: VB-MC12-109
Southeast Florida Sediment Assessment and Needs Determination (SAND) Study (2012)
Vibracore
More Info
Zoom to
18
Gilbert Shoal

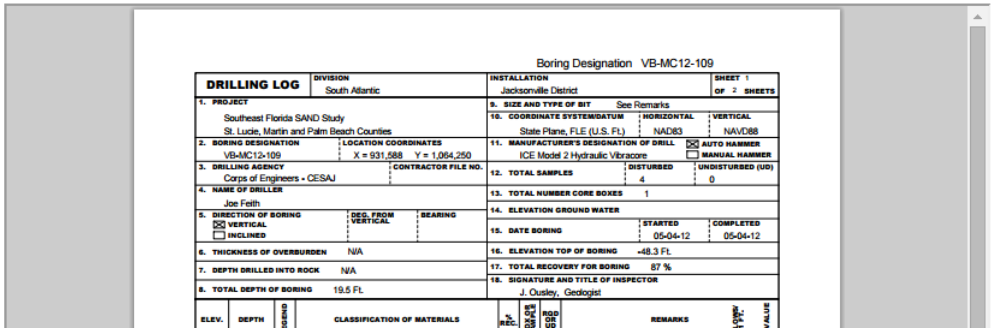
Data Available – Geotechnical

Core VB-MC12-109

Project	Southeast Florida Sediment Assessment and Needs Determination (SAND) Study (2012)
Driller	
Collection Method	Vibracore
Collection Date	
Top Elevation	0.00
Length	
Diameter	
Penetration Depth	
Recovered Length	
Direction	
Overburden	
Depth Into Rock	
Groundwater Elevation	
Percent Recovered	
Start Date	
End Date	
Geologist	
Number Of Core Boxes	

Documents

Core Log



Boring Designation VB-MC12-109

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT Southeast Florida SAND Study St. Lucie, Martin and Palm Beach Counties		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION VB-MC12-109	LOCATION COORDINATES X = 931,588 Y = 1,064,250	11. MANUFACTURER'S DESIGNATION OF DRILL ICE Model 2 Hydraulic Vibracore	☒ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 4 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Joe Feith		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER	
		15. DATE BORING	STARTED 05-04-12 / COMPLETED 05-04-12
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING -48.3 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 87 %	
8. TOTAL DEPTH OF BORING 19.5 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR J. Ousley, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	BLOWS	RQD OR REC	REMARKS	SPT VALUE

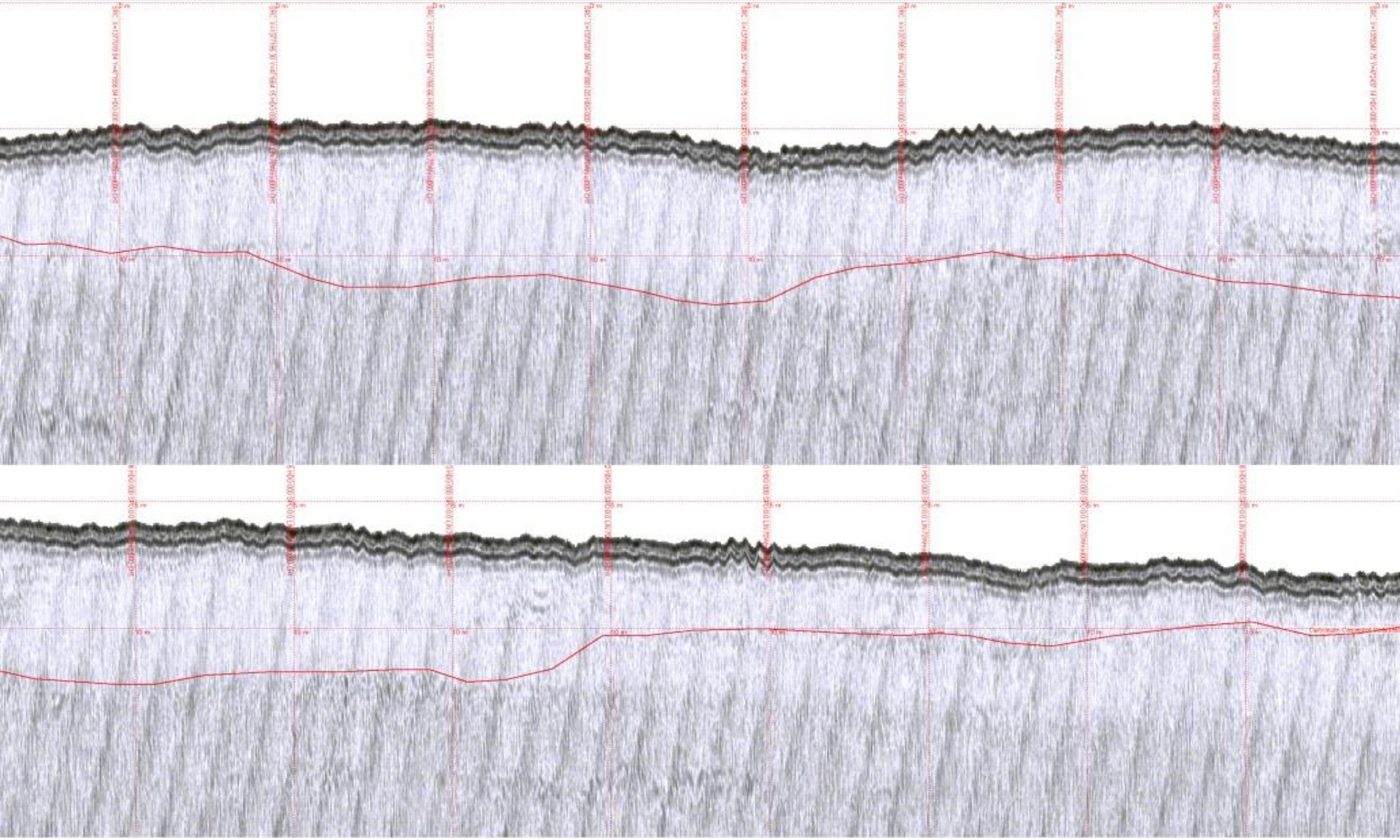
Sample VB-MC12-41 #1

Project	Southeast Florida SAND Study
Sample Date	4/6/2012
Munsell (Dry)	N 5/0
Munsell (Wet)	N 3/0
Munsell (Washed)	N 6/0
Analysis Date	8/17/2012
Top Of Sample Interval	2.80
Bottom Of Sample Interval	3.00
Original Mean	1.78
Original Median	1.97
Originial Median Standard Deviation	1.00
Original Skewness	–1.55
Original Kurtotis	6.47
Percent Fines	1.04
Percent Pan Fraction	0.06
Percent Carbonate	72.00
Percent Shell Fragments	40.00
Carbonate Dissolved	Y
Heavy Minerals Dissolved	N
Organics Removed	N
Shell Fragments Removed	N
Analytical Method	sieved 230 wash
Kurtosis Calculation Method	Moment Method
Mean Calculation Method	Moment Method
Median Calculation Method	Moment Method
Skewness Calculation Method	Name
Standard Deviation Calculation Method	Moment Method
Sample Collection Method	Vibracore

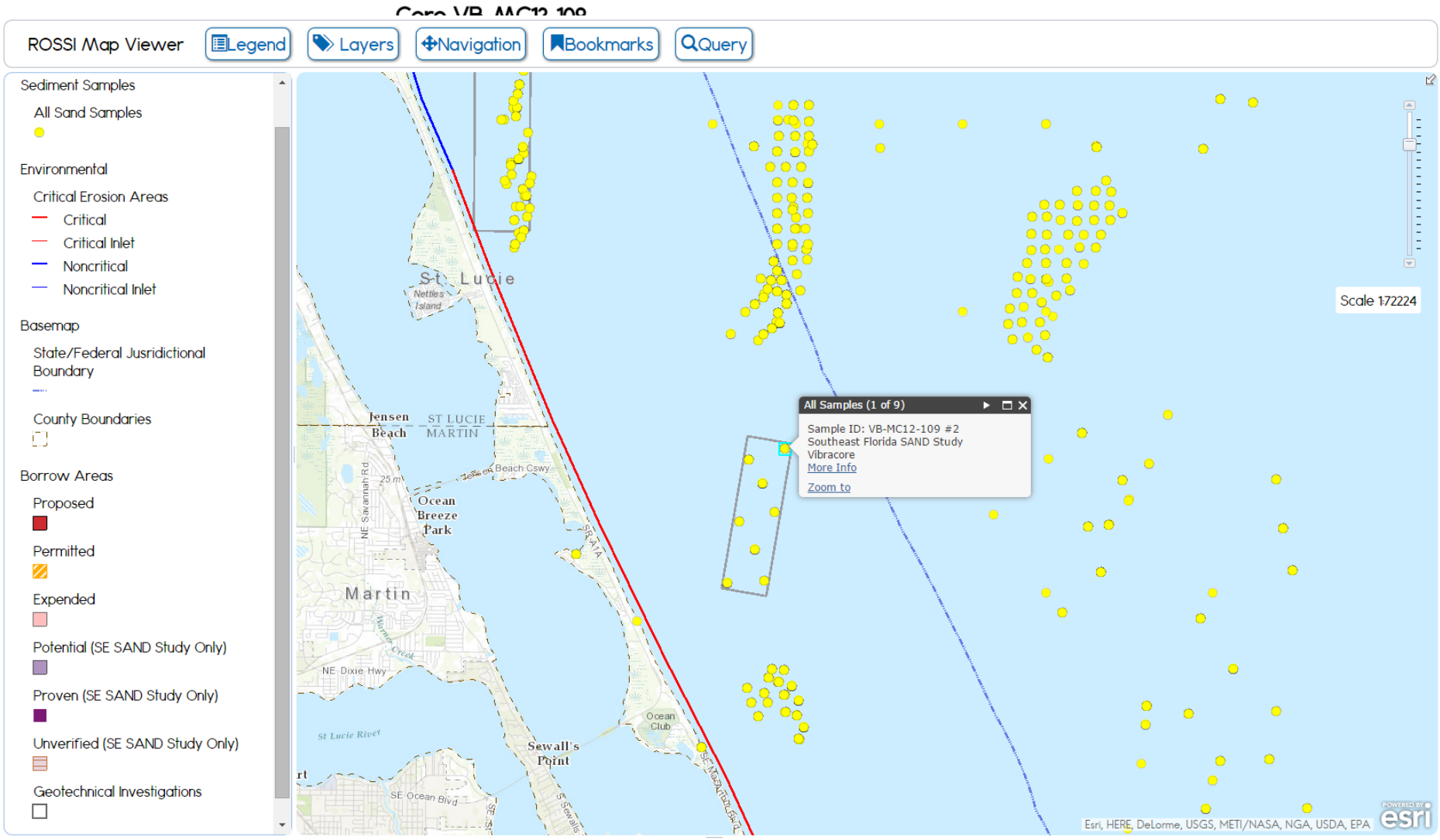
Grain Size Breakdown-Krumbein Phi (φ) Scale

–4.25 φ	0.00
–4 φ	0.00
–3.5 φ	0.00
–3 φ	0.00
–2.5 φ	0.44
–2.25 φ	0.30
–2 φ	0.15
–1.5 φ	0.41
–1 φ	0.92
–0.5 φ	1.90
0 φ	2.12
0.5 φ	3.35
1 φ	5.74
1.5 φ	10.41
2 φ	25.62
2.5 φ	27.38
3 φ	16.91

Data Available - Seismic

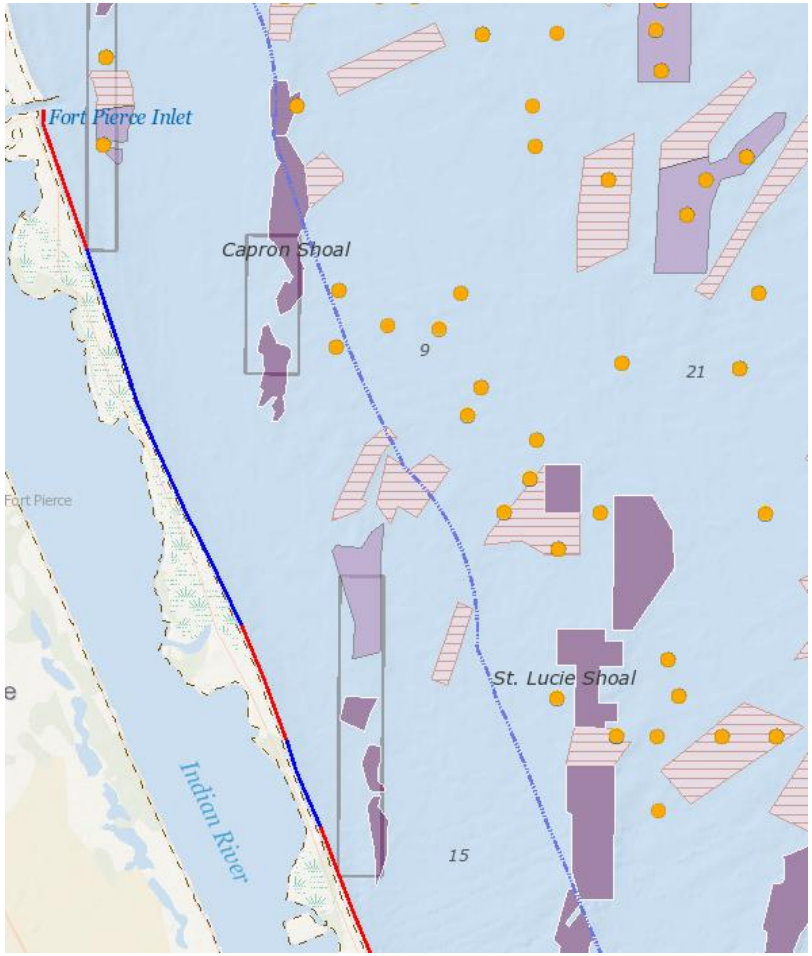


Results


ROSSI Map Viewer
Legend
Layers
Navigation
Bookmarks
Query
Sediment Samples
All Sand Samples
Environmental
Critical Erosion Areas
Critical
Critical Inlet
Noncritical
Noncritical Inlet
Basemap
State/Federal Jusridictional Boundary
County Boundaries
Borrow Areas
Proposed
Permitted
Expended
Potential (SE SAND Study Only)
Proven (SE SAND Study Only)
Unverified (SE SAND Study Only)
Geotechnical Investigations
St. Lucie
Jensen Beach
ST LUCIE
MARTIN
Ocean Breeze Park
Martin
Sewall's Point
Ocean Club
All Samples (1 of 9)
Sample ID: VB-MC12-109 #2
Southeast Florida SAND Study
Vibracore
More Info
Zoom to
Scale 1:72224
Esri, HERE, DeLorme, USGS, METI/NASA, NGA, USDA, EPA
esri

Data Currently Available

- 300+ Projects
- 5,600+ Cores
- 18,000+ Samples
- 500+ Borrow Areas
- 2,600+ Track Lines
- 137,000+ Track Points



ROSSI

Coming Soon

Project File Delivery System

- Previous process for file delivery
  - Application submitted to FDEP
  - EHG retains, reviews, submits to AECOM
  - AECOM reviews
  - Pre-processing
  - FTP to Morrisville
  - Update links on website

Project File Delivery System

- Updated system
  - EHG creates a project when application received
  - Submit files link sent to applicant
  - Includes a tracking system
  - Data providers get a consistent interface for upload
  - Upload to staging area, email received by administrators
  - Status tracker (unverified, rejected by EHG, rejected by AECOM, approved for integration, integration completed without errors)
  - Applicants may login and see status and will receive email notifications

Data Upload

- Data from 21 beach nourishment projects
  - New borrow areas
  - Borrow areas found during QA/QC during modernization
- Addition of FGS Coastal Atlas
- Registering on data.gov

Acknowledgements

- FDEP
- BOEM
- USACE
- FGS
- AECOM (formerly URS)
- Local Sponsors
- Local Governments
- Consulting Firms

Thank you!

Questions?

rossi.urs-tally.com

Florida Department of Environmental Protection

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robert.brantly@dep.state.fl.us

Candace Beauvais, P.G.

AECOM

(850) 402-6412

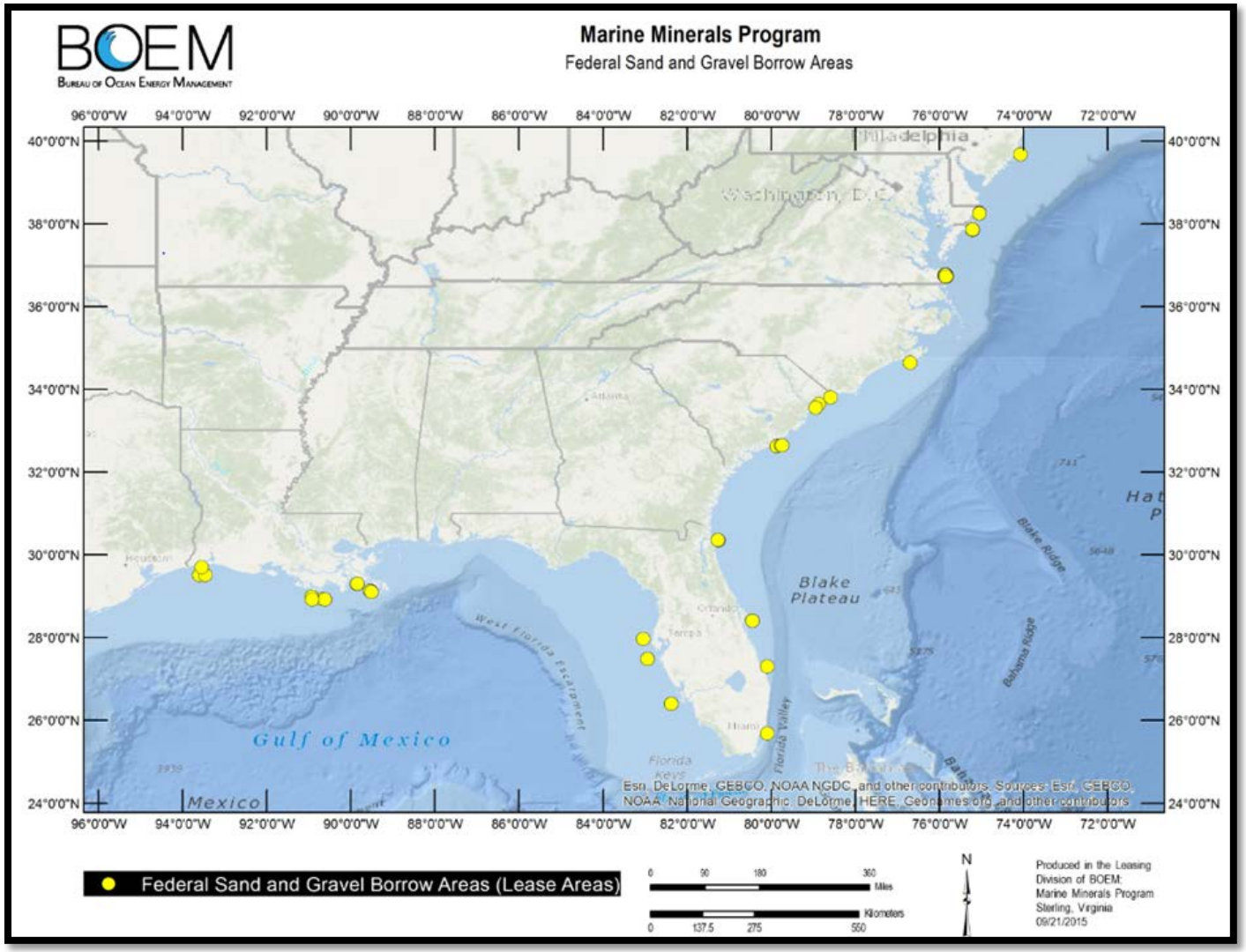
candace.beauvais@aecom.com

Marine Minerals Geospatial and Information Management System (MMPGIS)

13 October 2015

Lora Turner

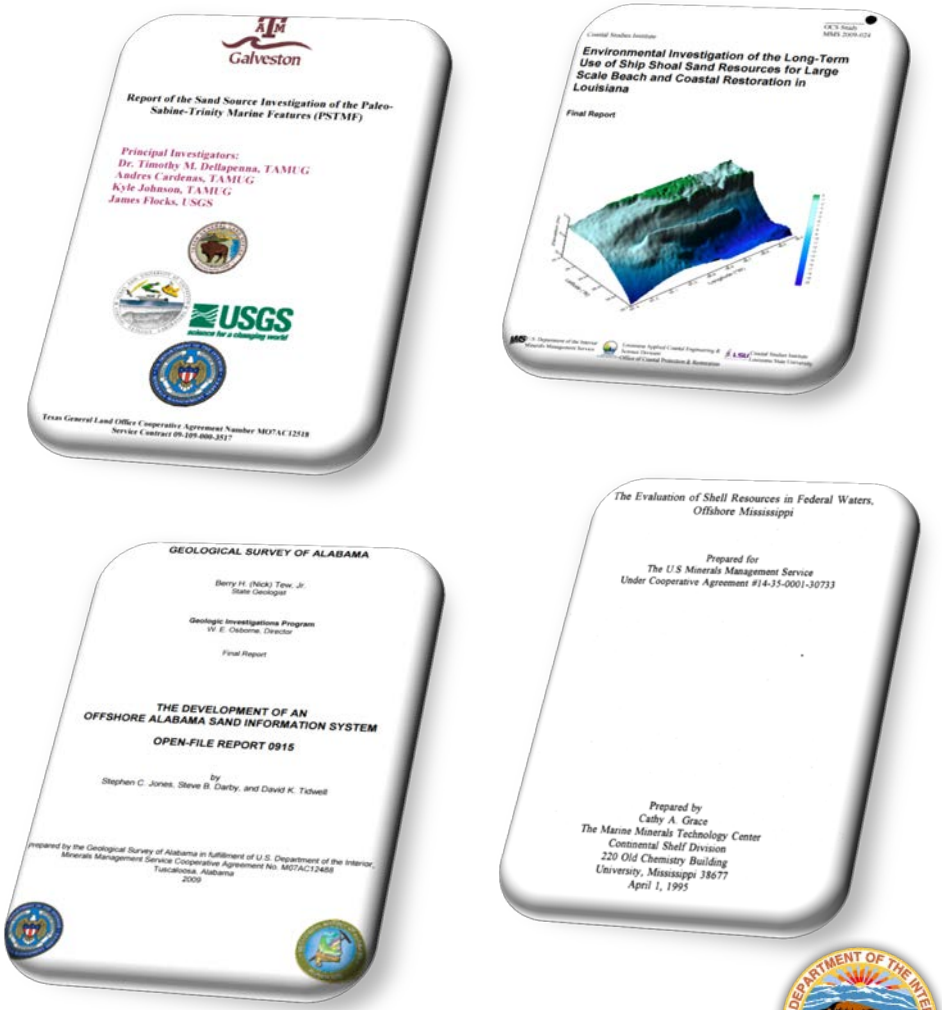
Marine Minerals Program



How to get to a comprehensive sand / sediment inventory (Atlantic and Gulf)?

What do we need to do?

- Leverage investments of historic and current project data (e.g., leasing, cooperative agreements, studies, resource evaluation) and maintain a repository of applicable offshore marine mineral data;
- Implement and maintain a system to support offshore mineral resource planning and decisions;
- Manage use conflicts with other offshore activities;
- Provide reliable shared access to applicable marine minerals data; and
- Leverage and align with applicable federal IT technologies.



What are we doing about it?

- **Developing a Marine Minerals Geodatabase**
  - To help manage the development of the Nation's offshore mineral resources in an environmentally and economically way and establish data stewardship and data structure for Marine Minerals Program (MMP).

- **Project Goals**
  - To integrate MMP and partner agency geospatial data and related non-geospatial information systematically into a uniform data model with applicable geodatabase schemas and develop a Marine Minerals Geospatial Information and Management System that enables MMP to characterize and delineate sand resources on the Outer Continental Shelf (OCS) and support resource decisions.
    - Create a data strategy that supports an OCS sand resource inventory for MMP.
    - Develop geospatial services and a database management system to support sand resource management for the MMP.
    - Optimize and standardize common geospatial functions, services, and processes to leverage and align with other Federal initiatives.
    - Support productive local, state, and Federal collaboration for OCS sand resource geospatial information exchange and investments across all levels of government.

- **Planning Process and Role of External Agencies**
  - BOEM / Federal / State / Local Agency coordination for sand resource needs
  - Data Search / Existing Data Synthesis through Cooperative Agreements / Studies
  - Coordination with other Federal and State agencies such as the USGS, NOAA, USACE, State Geological Survey offices for existing data or planned survey areas
  - Data gap areas identified
  - Environmental Impact Statement / G&G permit for Geological and Geophysical Activities
  - Data Acquisition / Survey Plan developed

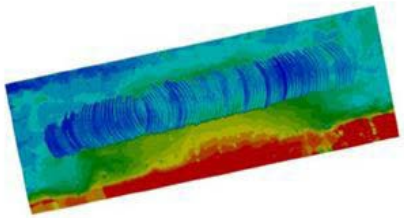
What we are doing

Need to know what we have to manage the resource successfully

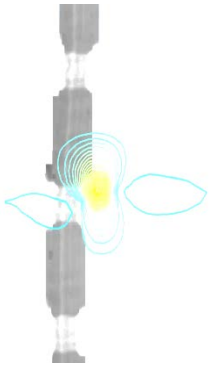
Resource Evaluation – Sand / Sediment Resource Delineation

Geophysical and Geological mapping data collected

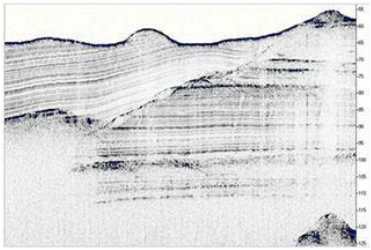
Bathymetry



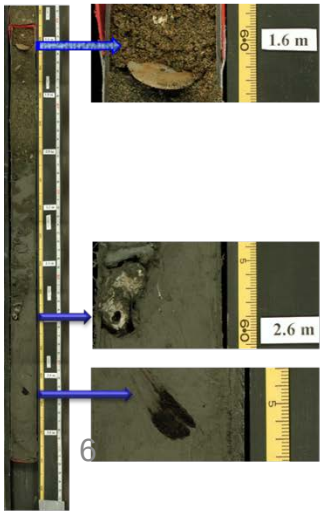
Magnetometer

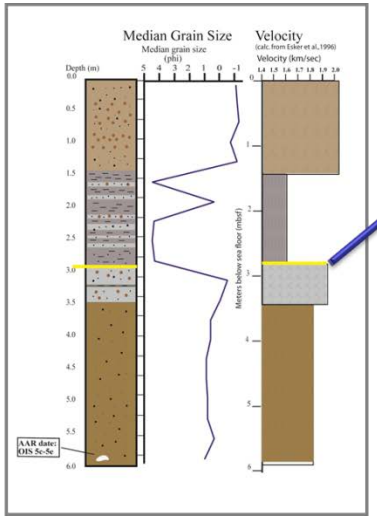


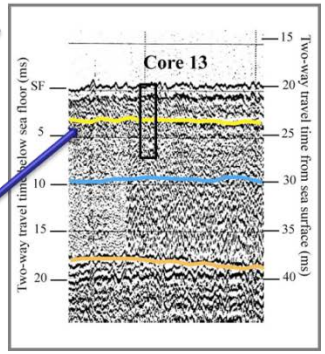
Chirp sub-bottom seismic



Vibracores / Grab Samples

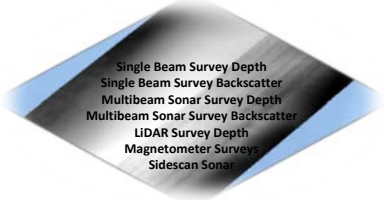




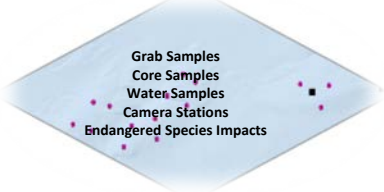


Marine Minerals Program Geospatial and Information System (MMPGIS)

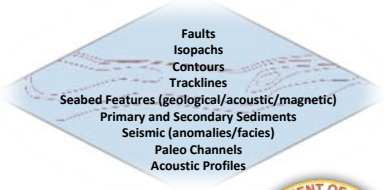
Bathymetry & Backscatter



Environmental Data



Bottom Characteristics

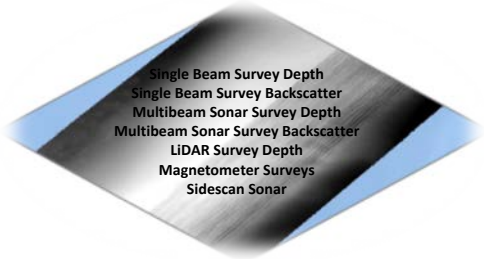


What we are doing

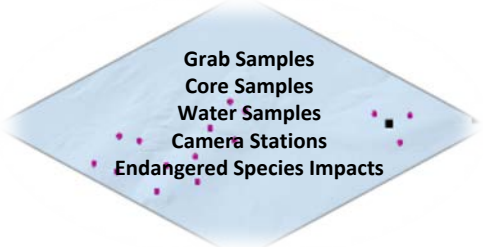
Marine Minerals Program Geospatial and Information System (MMPGIS)

Identification and Analysis of Sediment / Sand Resources

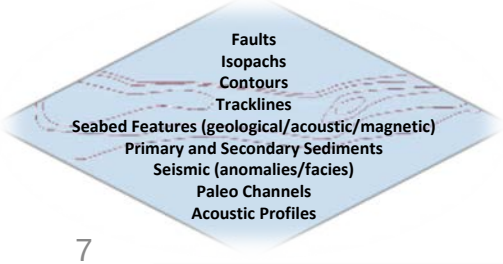
Bathymetry & Backscatter



Environmental Data



Bottom Characteristics



Resource Planning and Administration

Planning Areas / Boundaries

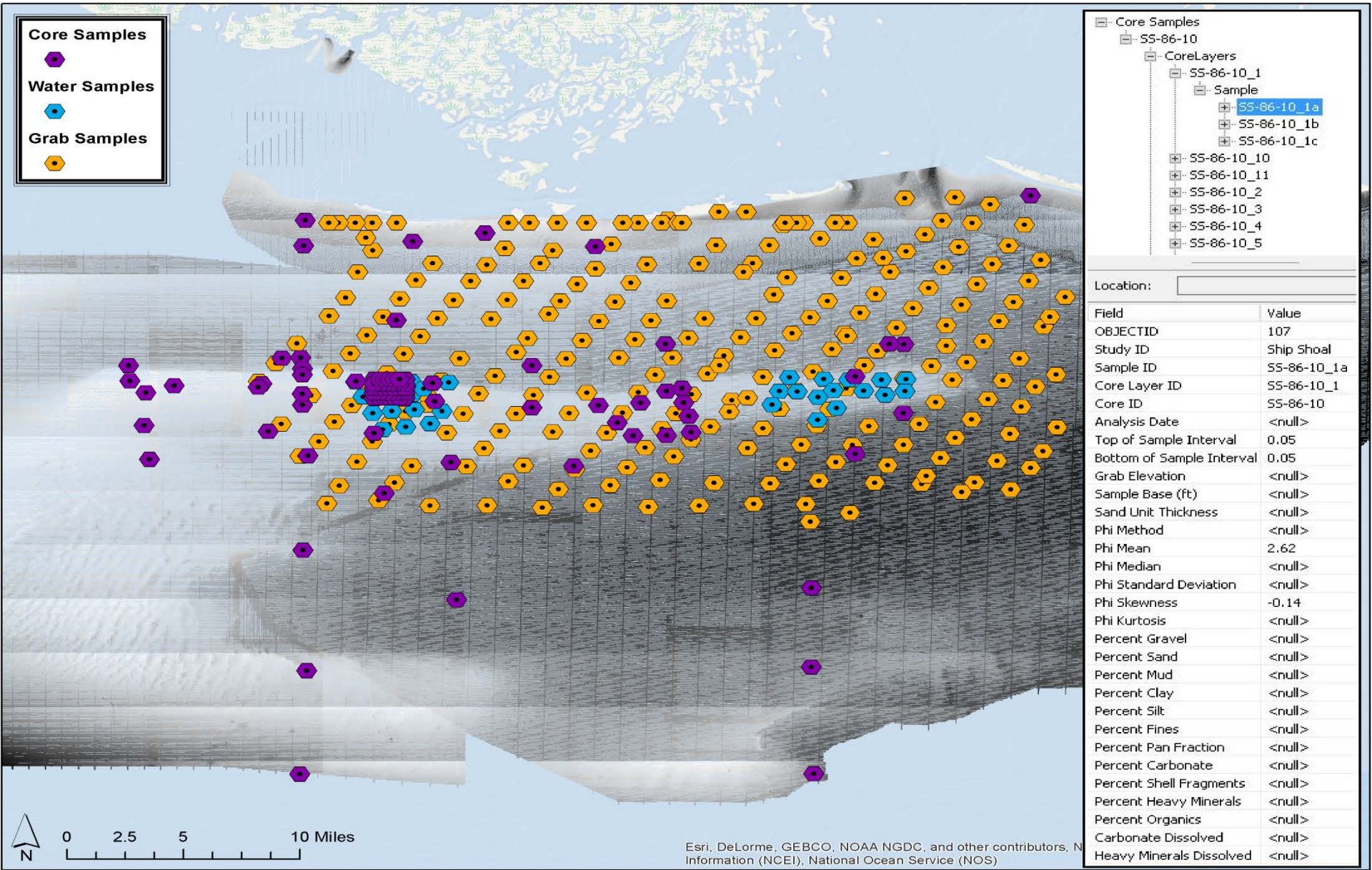
Partner Data

Leasing / Environmental

Coastal Restoration / Offshore Dredging Projects

Capturing where it is, what it is, how much is there

Core Samples



Field	Value
OBJECTID	107
Study ID	Ship Shoal
Sample ID	SS-86-10_1a
Core Layer ID	SS-86-10_1
Core ID	SS-86-10
Analysis Date	<null>
Top of Sample Interval	0.05
Bottom of Sample Interval	0.05
Grab Elevation	<null>
Sample Base (ft)	<null>
Sand Unit Thickness	<null>
Phi Method	<null>
Phi Mean	2.62
Phi Median	<null>
Phi Standard Deviation	<null>
Phi Skewness	-0.14
Phi Kurtosis	<null>
Percent Gravel	<null>
Percent Sand	<null>
Percent Mud	<null>
Percent Clay	<null>
Percent Silt	<null>
Percent Fines	<null>
Percent Pan Fraction	<null>
Percent Carbonate	<null>
Percent Shell Fragments	<null>
Percent Heavy Minerals	<null>
Percent Organics	<null>
Carbonate Dissolved	<null>
Heavy Minerals Dissolved	<null>

Business Value

MMP Data

- Data that is specific to MMP applications, business functions

Resource Evaluation

— Administrative
— Planning and Administration
— Construction Survey Measurements
— Environmental Samples
— Study Area Survey
— Seabed Features
— Sub Surface Geology

MMP Data Assets

- Data that has a long term value to BOEM and if the data is used across multiple systems, business processes and / or multi-agency / organizations

Cooperative Agreements

— Lease Areas
— Marine Mineral Resource Areas (significant sediment areas)
— Potential Marine Mineral Resource Areas
— Volume and Type of Resource

Benefit	Federal	State	Public
Consistent and authoritative marine mineral resource data to support decision making	√	√	√
Shared geospatial data, build it once and it can be used many times by multiple Federal & State Agencies	√	√	√
Data is not lost, Metadata (In a library you need a catalog, in data management you need metadata to facilitate discovery, access and information data exchange)	√	√	√
Infrastructure, data organization tools for MMP to update and maintain marine mineral resource information	√	√	

Engagement / Collaboration

Federal Agencies

- BOEM
- DOI OCIO
- USGS
- BSEE
- USACE
- NOAA

State Entities

- New Jersey Department of Environmental Protection
- New York State Department of State
- Virginia Department of Mines, Minerals and Energy
- Maryland Department of Natural Resources
- Florida Department of Environmental Protection
- South Carolina Department of Natural Resources
- Maine Geological Survey
- Louisiana Geological Survey
- Geological Survey of Alabama

Educational Institutions

- University of Delaware - Delaware Geological Survey
- University of Rhode Island
- University of New Hampshire
- University of Massachusetts Amherst - Massachusetts Geological Survey
- Dept of Geological Sciences, East Carolina University & UNC Coastal Studies Institute
- Skidway Institute of Oceanography, University of Georgia
- Louisiana State University
- The University of Texas
- Texas A&M University

Industry

- Coastal Engineering Consulting Firms
- Geospatial Services
- Cloud Services

Current / Previous Cooperative Agreement Partners		
New Jersey	New Jersey Department of Environmental Protection	Jane Uptegrove
New York	New York State Department of State	Michael D. Snyder
Delaware	University of Delaware - Delaware Geological Survey	Kelvin W. Ramsey
Virginia	Virginia Department of Mines, Minerals and Energy	Wiliam L. Lassetter
Rhode Island	University of Rhode Island	John King
Maryland	Maryland Department of Natural Resources	Robert D. Conkwright
New Hampshire	University of New Hampshire	Larry Ward
Massachusetts	University of Massachusetts Amherst - Massachusetts Geological Survey	Jon Woodruff
Florida	Florida Department of Environmental Protection	Jennifer Coor / Daniel C. Phelps
North Carolina	Dept of Geological Sciences, East Carolina University & UNC Coastal Studies Institute	John P. Walsh
South Carolina	South Carolina Department of Natural Resources	Scott Howard
Maine	Maine Geological Survey	Matthew Nixon
Georgia	Skidway Institute of Oceanography, University of Georgia	Clark R. Alexander
Louisiana	Office of Coastal Protection, Louisiana State University	Syed Khalil
Texas	Texas General Land Office	Ray Newby
Alabama	Geological Survey Alabama	Steve Jones
Mississippi	Mississippi Department of Marine Resources	George Ramseur

Partnerships are valued

Use Cases

As a Physical Scientist, I need to

- characterize and describe the marine subsurface (volume of sand, grain size distribution, color….)
- incorporate and process geophysical and geological datasets

As a Data Steward, I need to

- exchange data with state and federal partners
- maintain federal / state funded data
- create metadata so sets can become registered on data.gov (geoplatform.gov)

As a Planner, I need to

- create sand resource maps / information layers

So that (State, Federal, _____) can

manage development of OCS marine mineral resources in environmentally sustainable way

provide derived product information to characterize the environment for decisions

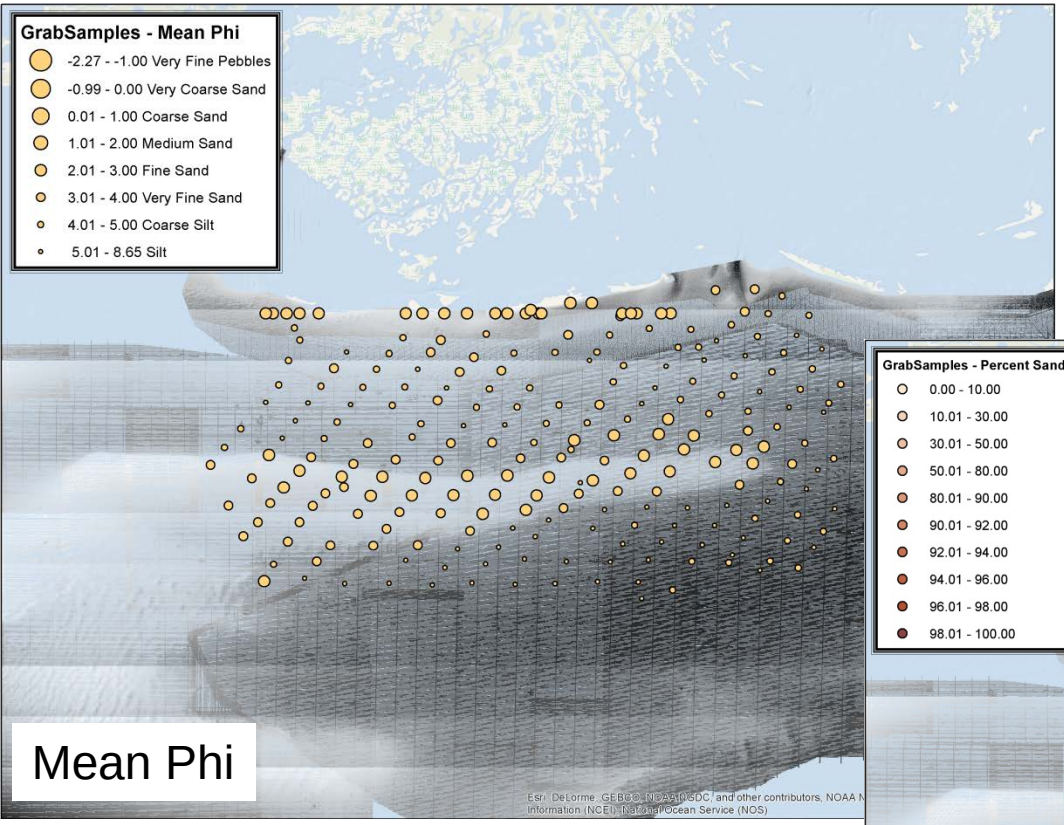
facilitate resource planning

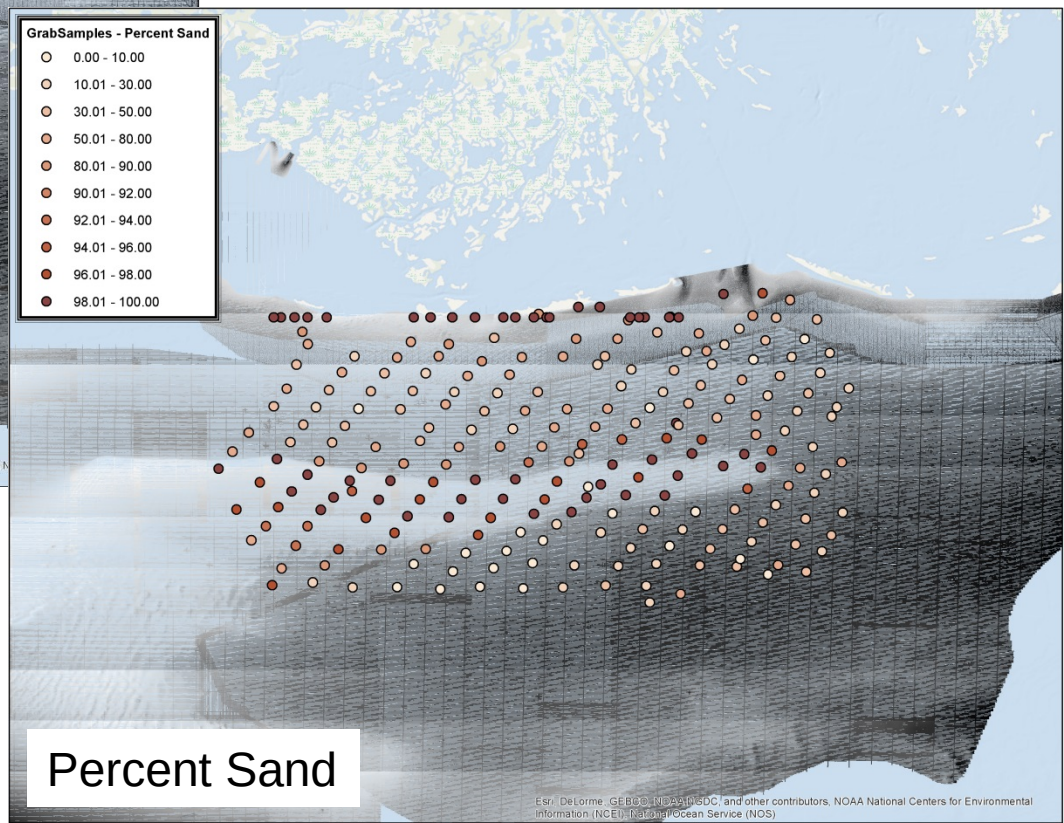
share authoritative data

provide marine minerals information layers for multi-use conflict analysis, USACE projects, ….

Physical Scientist

Marine Minerals Program Geospatial and Information System (MMPGIS)





Stewardship / Resource Management

Coastal Protection and Restoration Authority

LSU | Coastal Studies Institute

BOEM
Bureau of Ocean Energy Management

BOEM Cooperative Agreement with Louisiana Office of Coastal Protection and Restoration and the Coastal Studies Institute at Louisiana State University

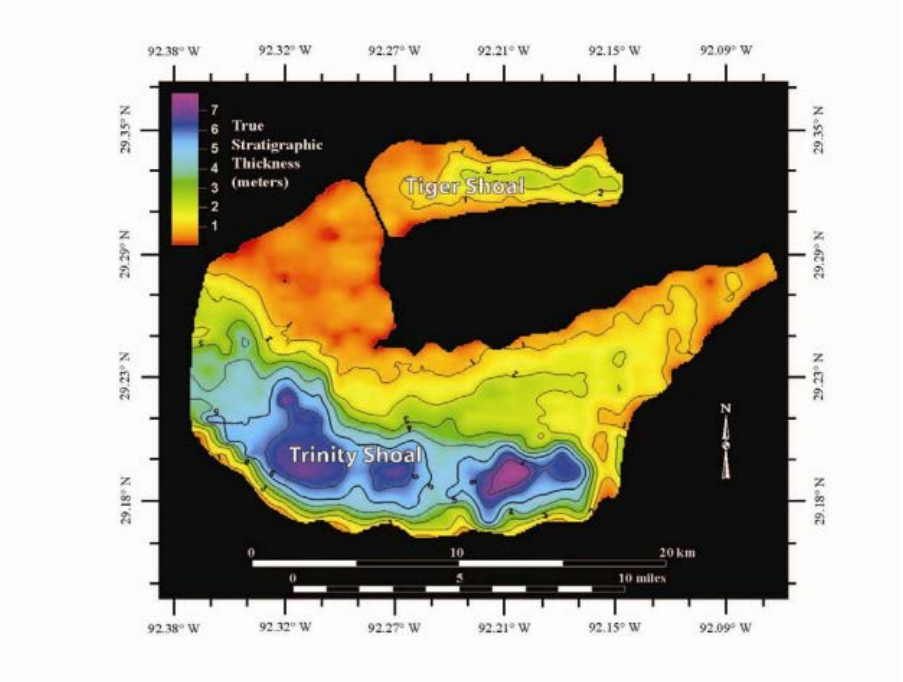
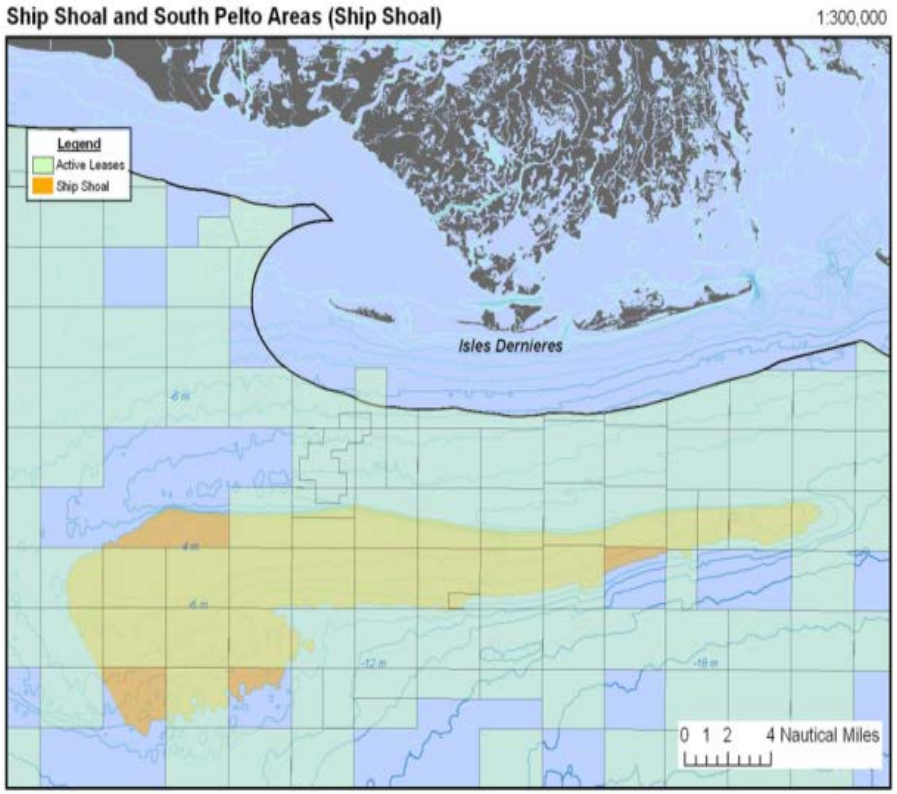
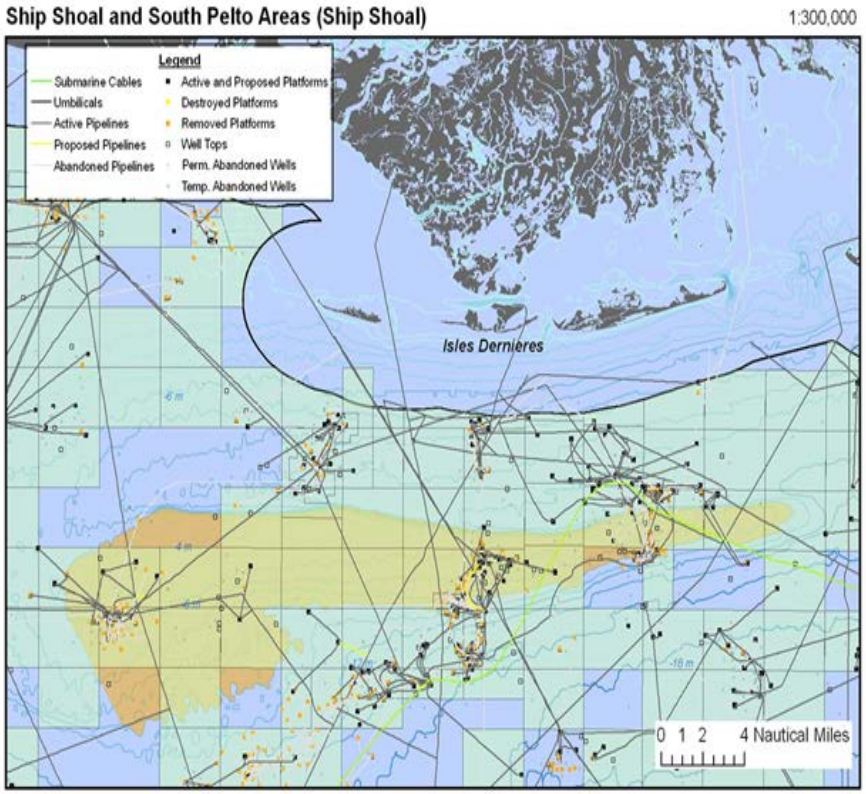


Figure 15. Isopach map of the Trinity and Tiger Shoals Complex. The thickest areas of Trinity Shoal are primarily in its most southern region, whereas Trinity Shoal gradually thins over its broader northern region. Tiger Shoal, in contrast, is more symmetrical in both sand distribution and thickness.

We have to know what we have to manage the resource successfully thru partnerships

Planner

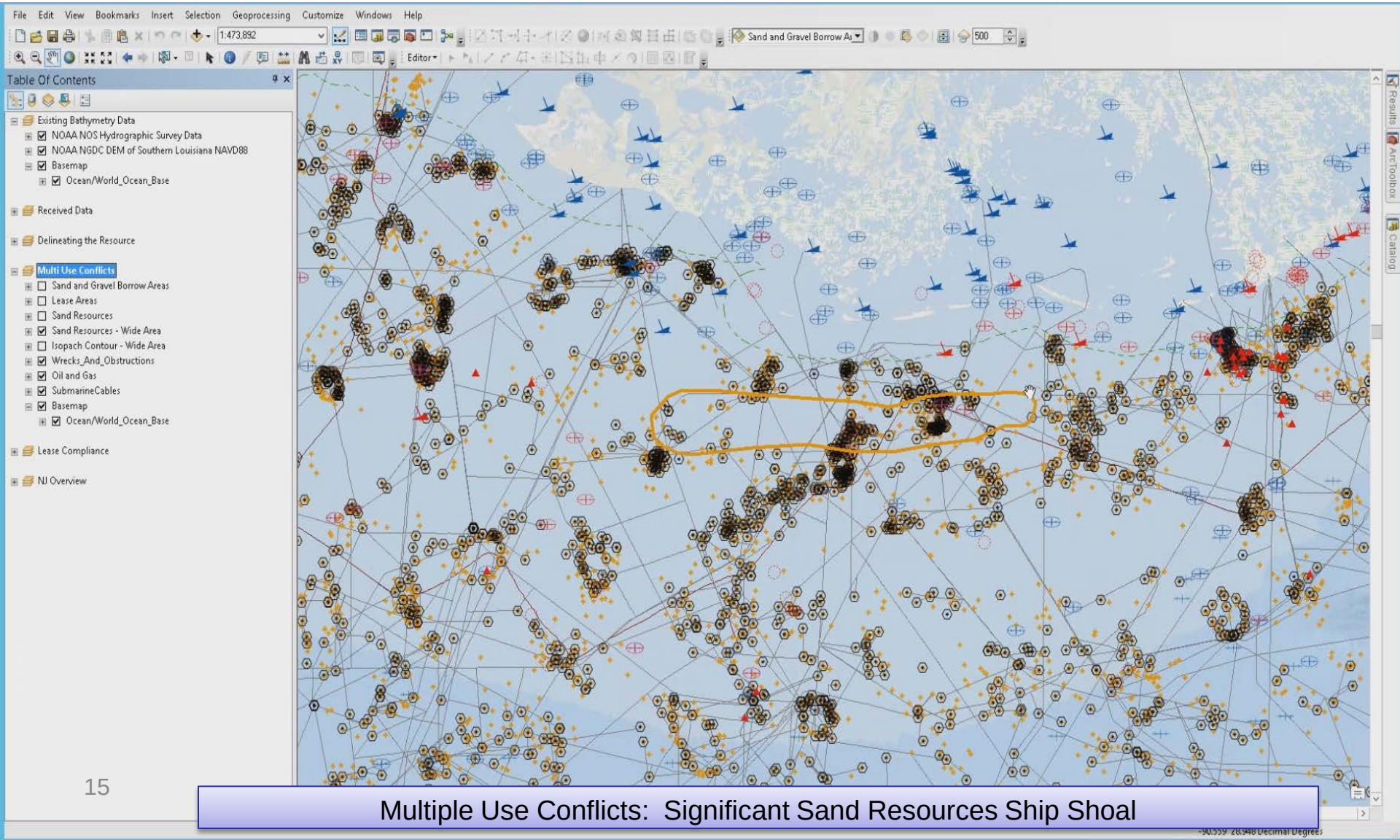




Multiple Use Conflicts: Significant Sand Resources Ship Shoal

Planner

Marine Minerals Program Geospatial and Information System (MMPGIS)



Multiple Use Conflicts: Significant Sand Resources Ship Shoal

Gulf of Mexico Projects

Project	Sand Volume (cubic yard)	Status
Holly Beach, LA	4,200,000	Complete Apr 2003
Ship Shoal Dredge Test, LA	3,000	Complete Dec 2002
Pelican Island (Amendment), LA	5,523,000	Complete Nov 2012
Terrebonne Parish – Raccoon Island (Amendment), LA	750,000	Complete Mar 2013
Louisiana Emergency Berm, LA	10,000,000	Not constructed
Caminada Headland Shoreline Restoration (Phase I), LA	5,200,000	Complete Jan 2015
Cameron Parish Restoration , LA	5,000,000	Complete Feb 2014
Caminada Headland Shoreline Restoration (Increment 2), LA	8,800,000	Construction began May 2015
NRDA Caillou Lake Headlands (Whiskey Island) , LA	13,400,000	Lease Issued
East Timbalier Island Restoration (TE-118), LA		Planning
NRDA North Breton Island, LA		Planning
Mississippi Coastal Improvements Program (MsCIP) Gulf Islands National Seashore Restoration, MS		Environmental Review

Caminada Phase II

Photo Source: Patrick Quigley
www.gulfcoastairphoto.com

Project: Caminada Headlands Beach & Dune Restoration-Increment II for Louisiana CPRA

Team: Coastal Tech-G.E.C., Inc. is assisting the prime consultant, Coastal Engineering Consultants, with Construction Phase Services. The contractor is Weeks Marine, Inc.

Atlantic Cooperative Agreements

FY14 – FY16 Mapping Activities

Assessment of Offshore Sand Sources on the Atlantic Outer Continental Shelf (OCS)

- Develop a database of existing geological and geophysical data
- Determine states need for sand
- Compile and analyze existing sand resources data
- Identify gap area where future information needs to be collected

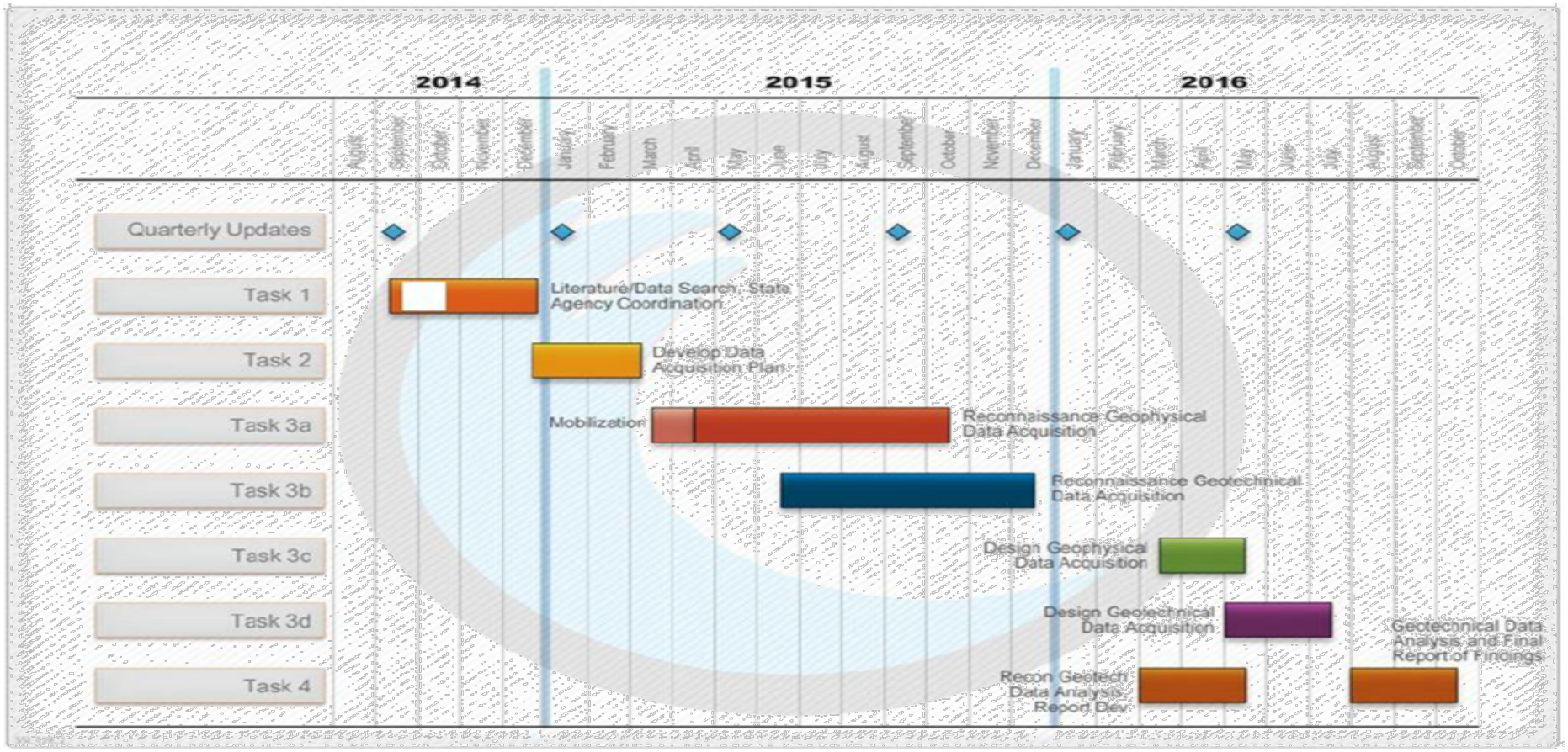
FY15 – FY16 Mapping Activities

Geological and Geophysical Data Acquisition

- 3 – 8 nm offshore on the OCS from Maine to Miami (water depths up 90 ft)
- Geophysical data: ~5600km (3023nm) of chirp sub-bottom profiling, swath bathymetry, sidescan sonar and magnetometer
- Geotechnical data: ~350 sediment samples (250 vibracores and 100 surface grab samples) analyzed for texture (grain size) and composition (organic, mineral and shell content, color and sand percentage)
- Data Acquisition Plan (Geophysical Survey Areas): May – Oct 2015 – State and Federal Agency Coordination
- Data Acquisition Plan (Geotechnical): Jul – Sept 2015 - State and Federal Agency Coordination
- Approx. $5 million (Hurricane Sandy Funding)

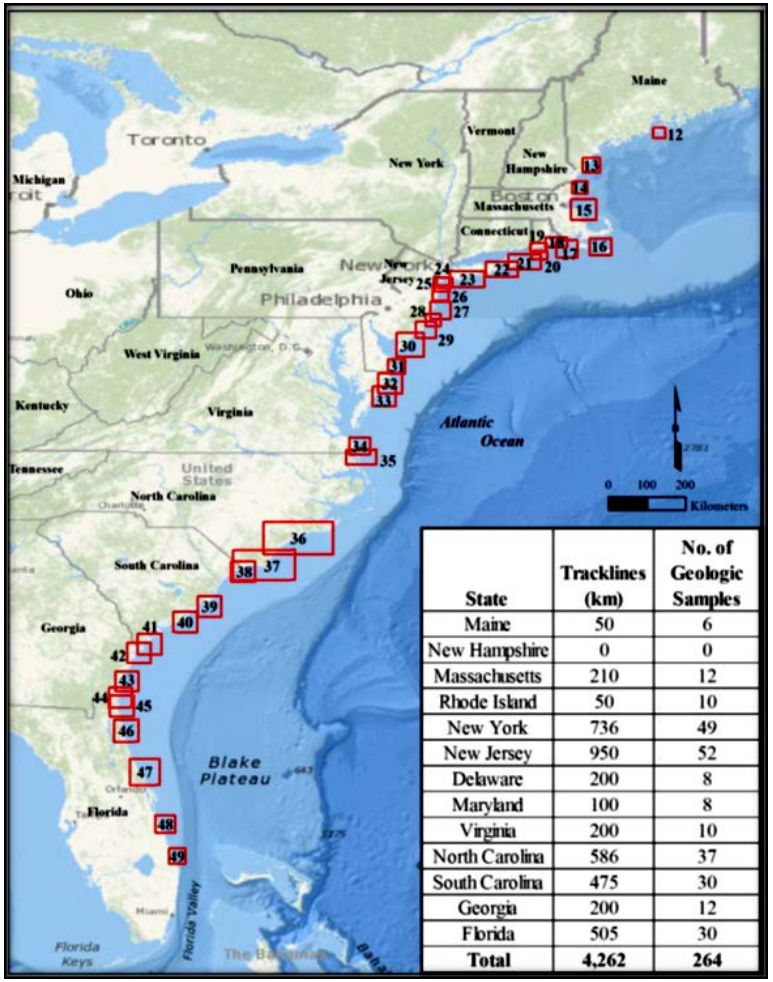
Atlantic Sand Assessment Project

Timeline



Atlantic Investigation Areas for Sand

BOEM geological and geophysical collection areas posted in Seasketch

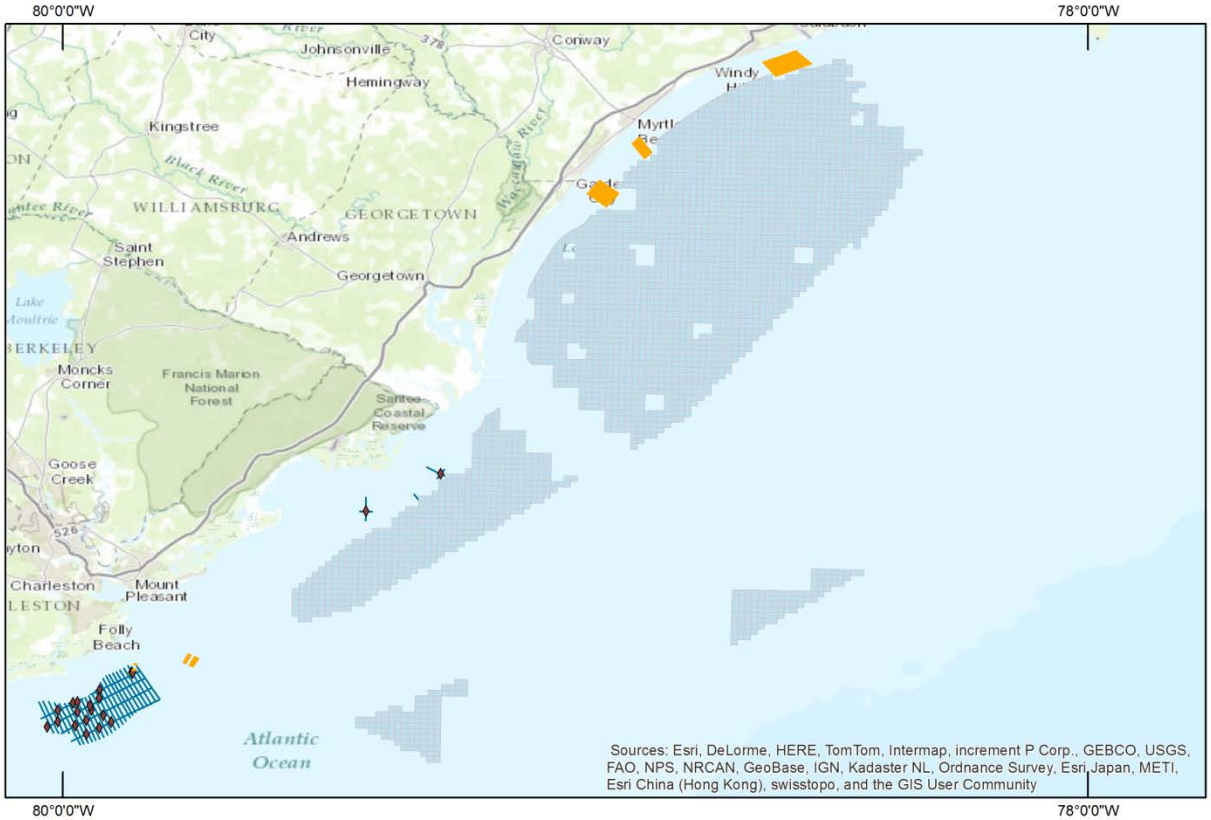


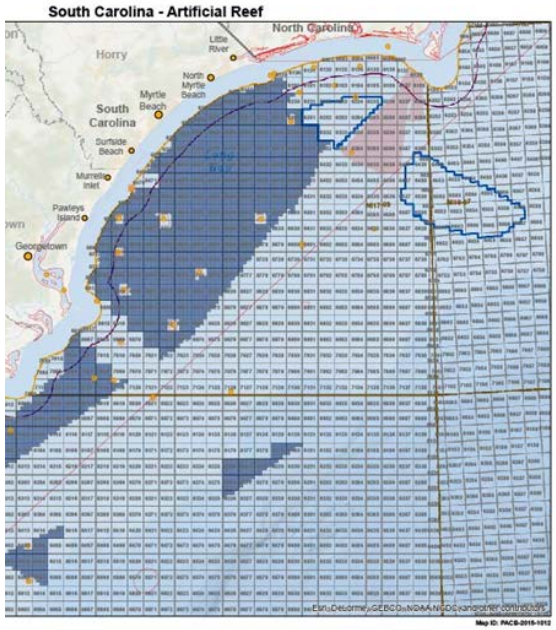
State	Tracklines (km)	No. of Geologic Samples
Maine	50	6
New Hampshire	0	0
Massachusetts	210	12
Rhode Island	50	10
New York	736	49
New Jersey	950	52
Delaware	200	8
Maryland	100	8
Virginia	200	10
North Carolina	586	37
South Carolina	475	30
Georgia	200	12
Florida	505	30
Total	**4,262**	**264**

Atlantic Sand Assessment Project – Survey Areas

Planner

South Carolina





South Carolina Call Area

BOEM Marine Minerals Lease Areas

Atlantic Sand Assessment Project Geologic Samples

Atlantic Sand Assessment Project Geophysical Tracklines

0 5 10 20 Miles

0 12.5 25 50 Kilometers

N

Produced in the Leasing Division of BOEM:
Marine Minerals Branch
Sterling, Virginia
06/05/2015
Datum:

Conflict Use

Use Cases

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So that (State, Federal, _____) can

manage development of OCS marine mineral resources in environmentally sustainable way

provide derived product information to characterize the environment for decisions

facilitate resource planning

share authoritative data

provide marine minerals information layers for multi-use conflict analysis, USACE projects, ….

Discussion Questions

1. How can BOEM and stakeholders achieve a Gulf-wide Sand Inventory initiative (e.g., how to manage, fund, etc.)?
2. How can the database best serve everyone's needs?

GULF OF MEXICO OFFSHORE SAND MANAGEMENT WORKING GROUP

New Orleans, LA – October 13, 2015

Barrier Island Restoration Using GOM Shoal Sands: Success Story and Lessons Learned

Caminada Headland Beach and Dune Restoration (BA-45/BA-143) Projects

Clayton Breland – CPRA
Brad Miller – CPRA
Steve Dartez – CEC

committed to **our coast**

Outline

- ***Project Overview***
- Project Phases and Involvement
- Sediment Search
- Permitting / NNA
- Borrow Area Designs
- Headland Designs
- Construction Overview and Challenges
- Lessons Learned

Project Location

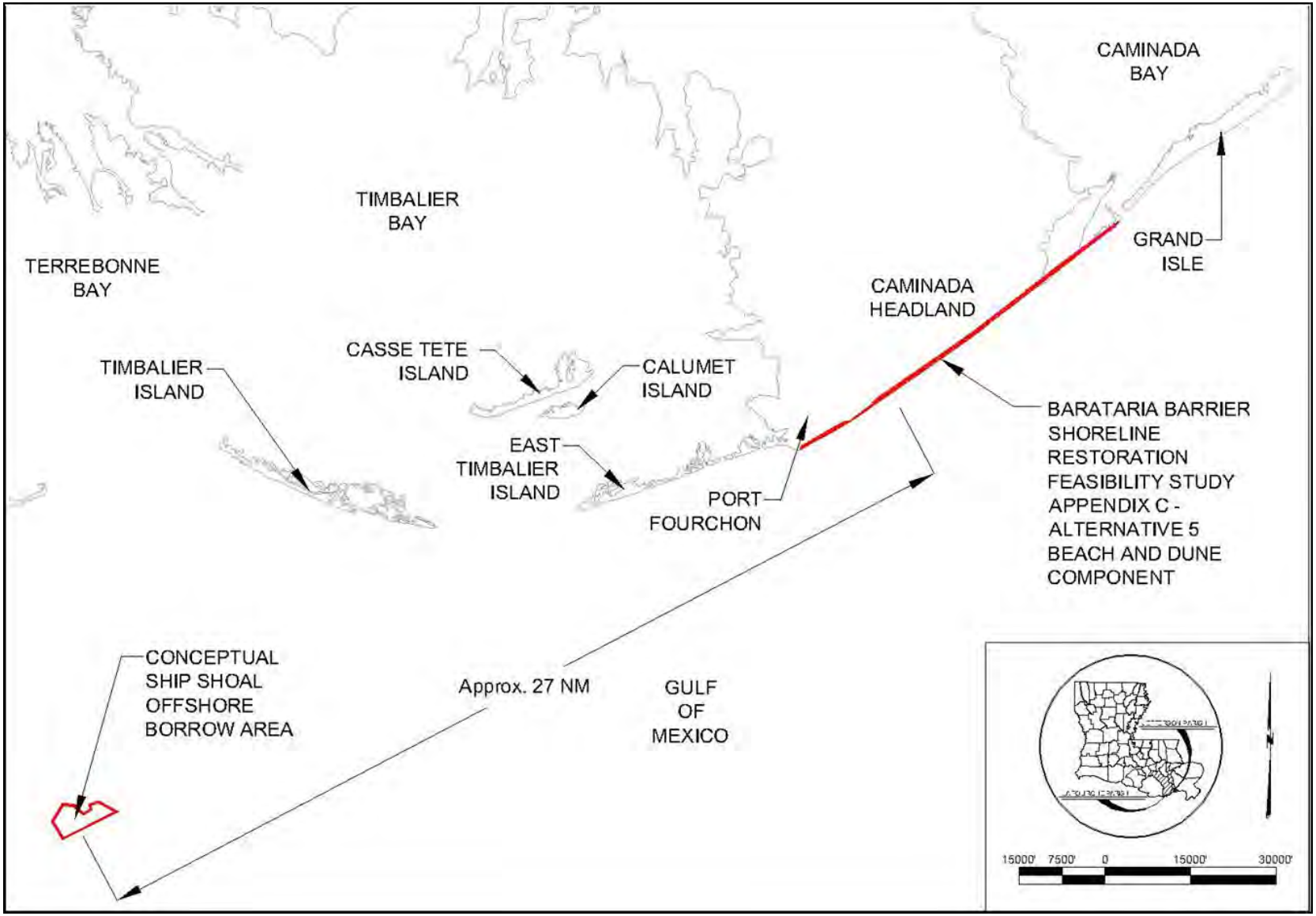
New Orleans

Caminada
Headland

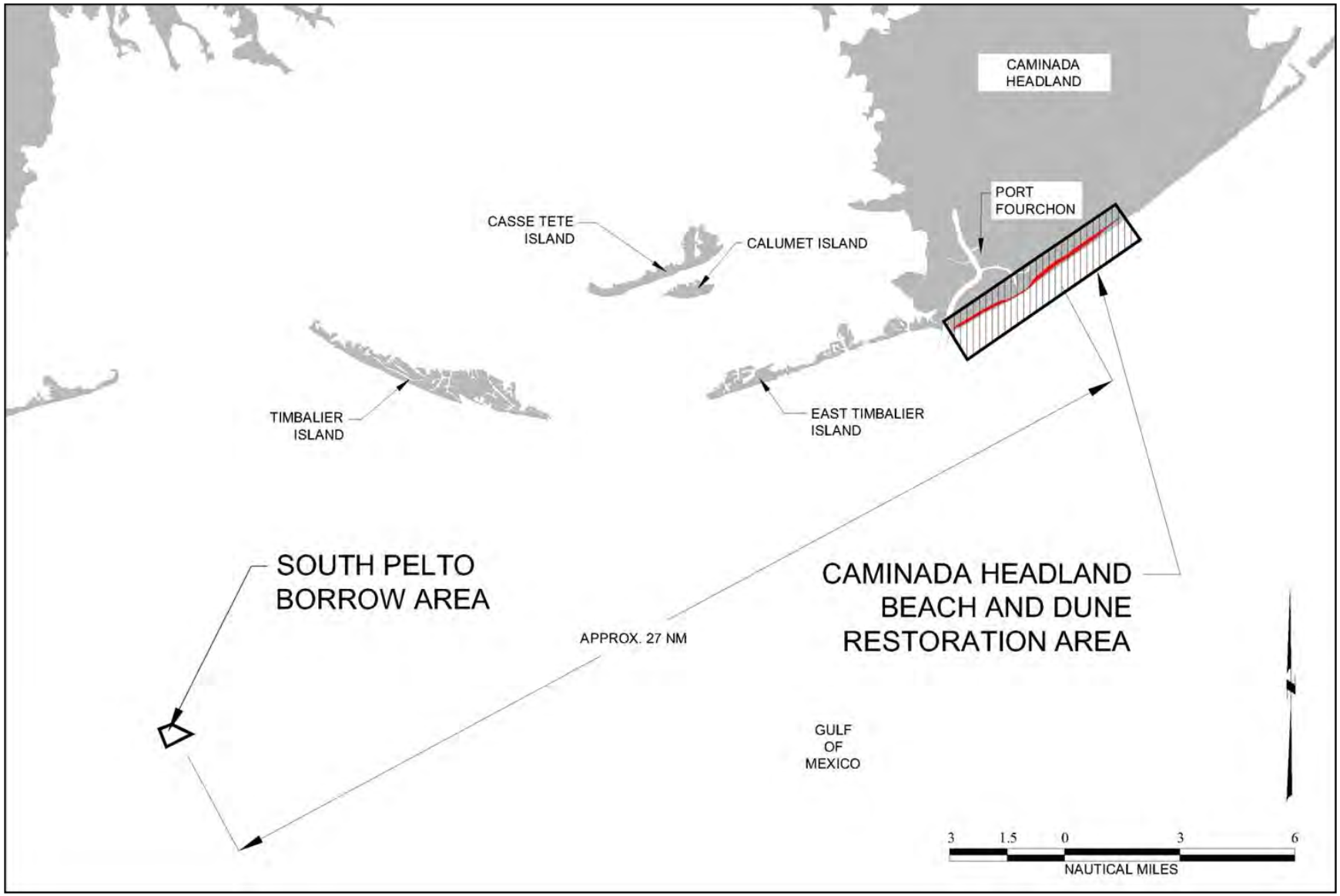
Miss. River
Southwest Pass

Google earth
Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2015 TerraMetrics
Image NOAA

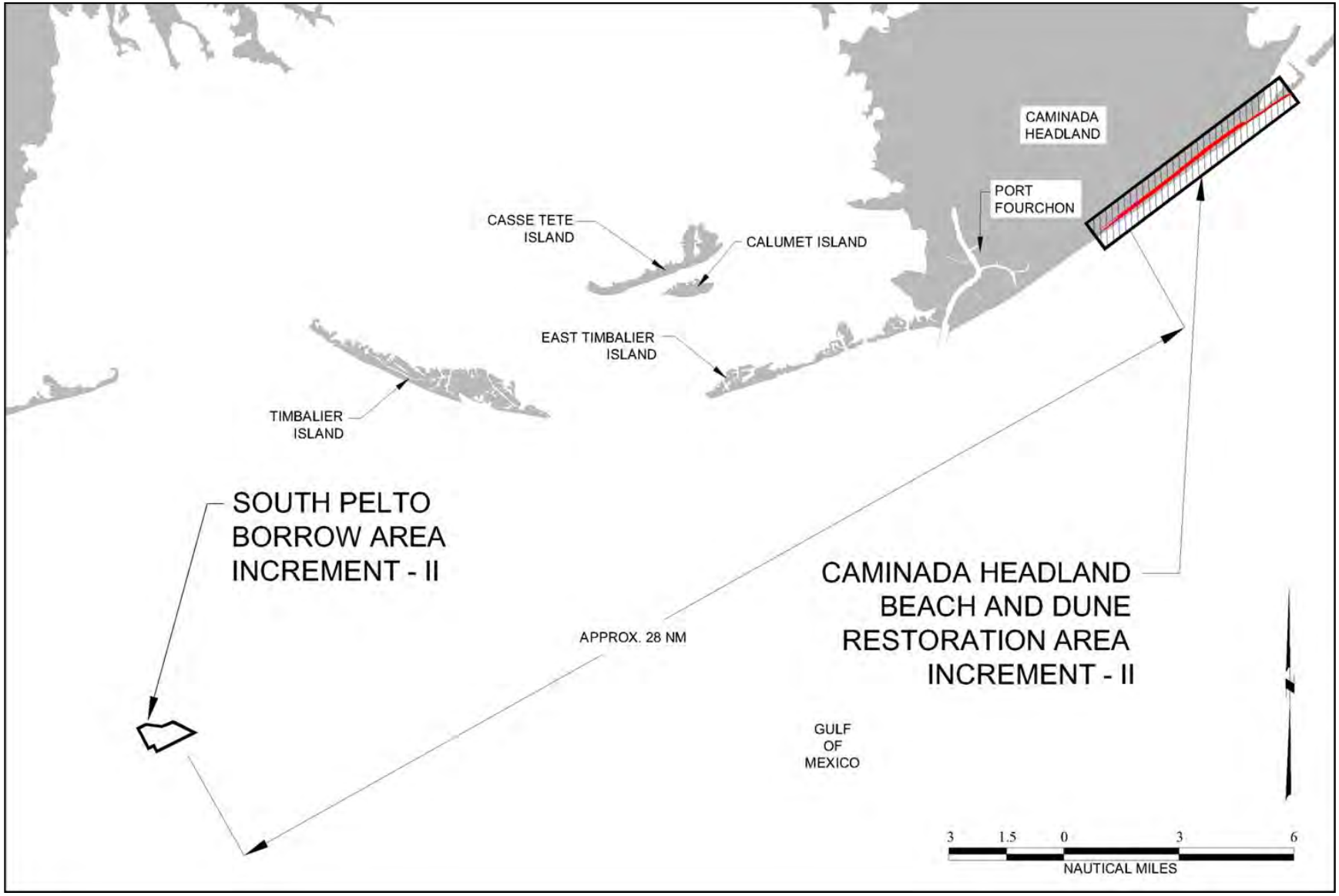
Project Overview – Feasibility Level



BA-45 Project Overview



BA-143 Project Overview



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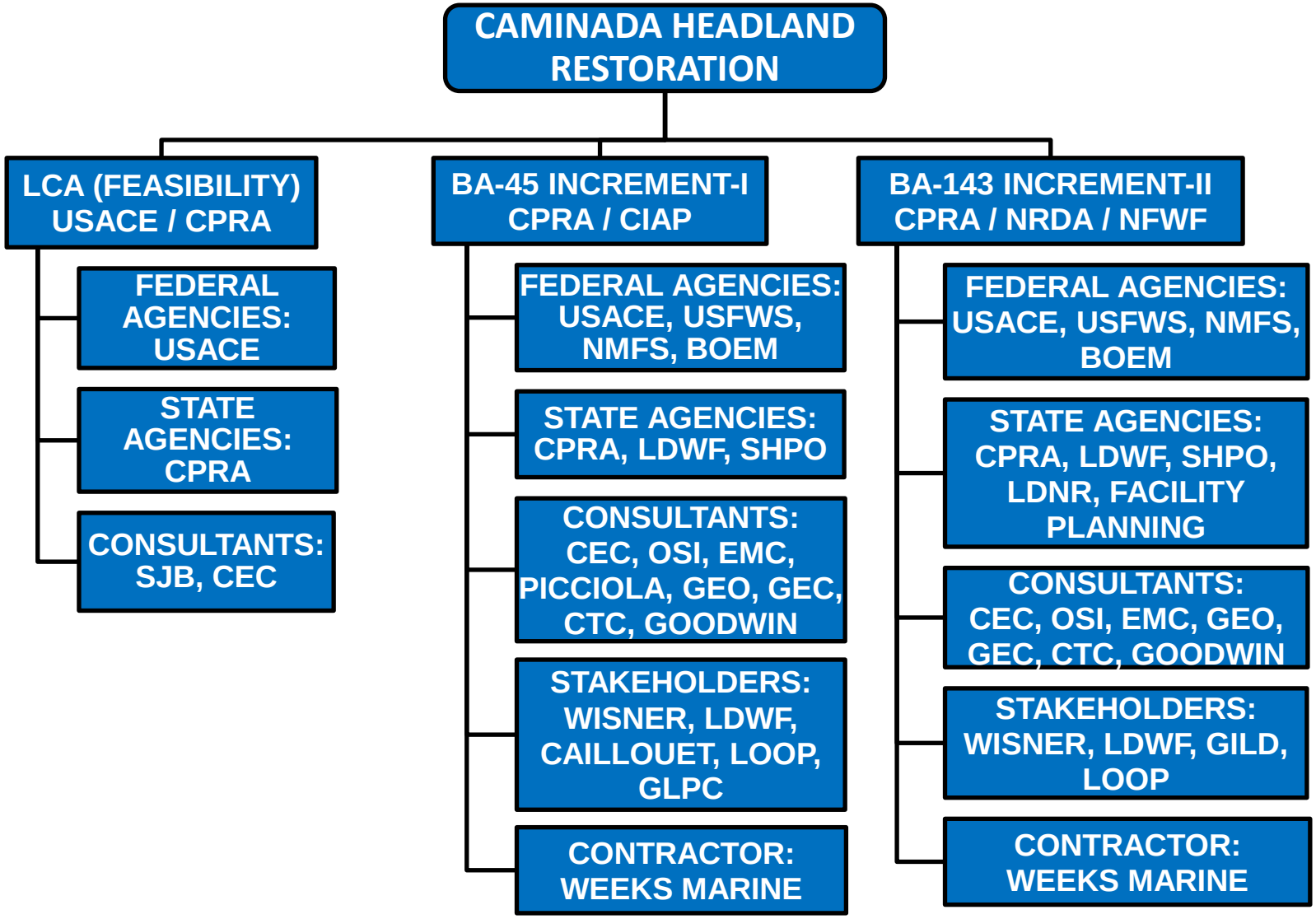
Project Phases

- Feasibility Phase
  - Conducted as part of the Louisiana Coastal Area (LCA) Barataria Basin Barrier Shoreline Restoration (BBBS).
- Design Phase
  - BA-45 – Caminada Increment I designed, permitted, and constructed as part of the Coastal Impact Assistance Program (CIAP) and LA State Surplus.
  - BA-143 – Caminada Increment II designed and is under construction as part of the settlement funds administered by the National Fish and Wildlife Foundation (NFWF)

Project Timelines

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
LCA COMPONENT												
Feasibility Report												
USACE Final Report												
USACE Chief's Report												
BA-45 CAMINADA INCREMENT-I												
Preliminary Design												
Permitting												
Final Design												
Bid Document Preparations												
Bid Opening												
Construction												
BA-143 CAMINADA INCREMENT-II												
Preliminary Design												
Permitting (including amendment)												
Final Design												
Bid Document Preparations												
Bid Opening												
Construction (anticipated)												

Project Involvement



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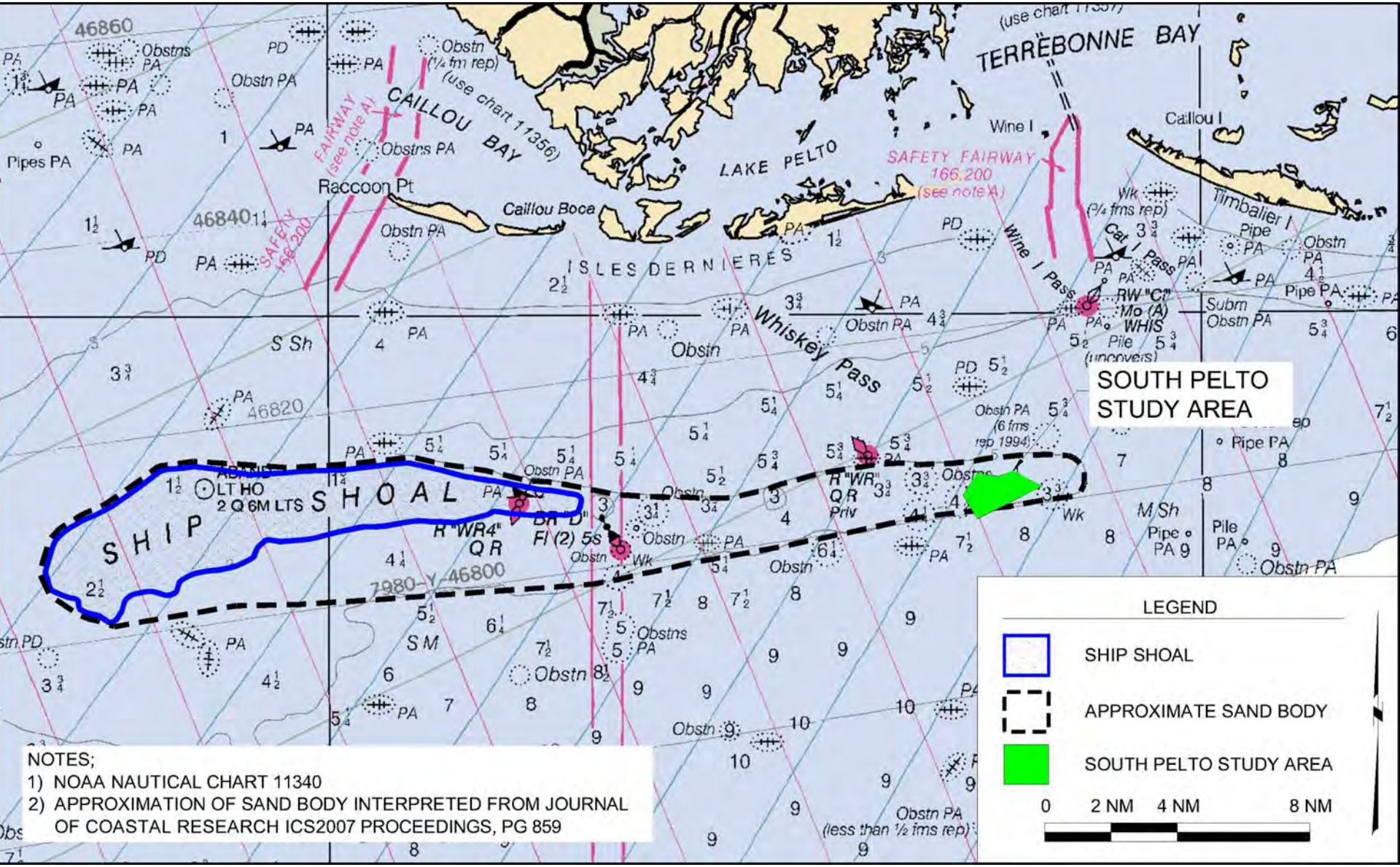
Ship Shoal Overview



NOTES;
1) NOAA NAUTICAL CHART 11340
2) APPROXIMATION OF SAND BODY INTERPRETED FROM JOURNAL OF COASTAL RESEARCH ICS2007 PROCEEDINGS, PG 859

Ship Shoal

- Ship Shoal is the product of reworked barrier island remnants of the foundered Maringouin delta complex formed by sediment deposited by the Mississippi River approximately 8,000 years ago (Krawiec, 1966: Frazier, 1967).
- Ship Shoal is estimated to contain 1.57 billion cubic yards of fine to very fine sand (Penland et al., 1990, Byrnes and Patniak, 1991).
- The shoal is approximately 50 km (31 mi) long and 5-12 km (3-9 mi) wide with relief of up to 3.6 m (12 ft). Water depth ranges from 7-9 m (23-30 ft) on the eastern side of the shoal to approx. 3 m (10 ft) on the western side (Penland et al., 1986).
- BA-45 is the 1st project in Louisiana to use Outer Continental Shelf (OCS) shoal sands in the Gulf for barrier island restoration.

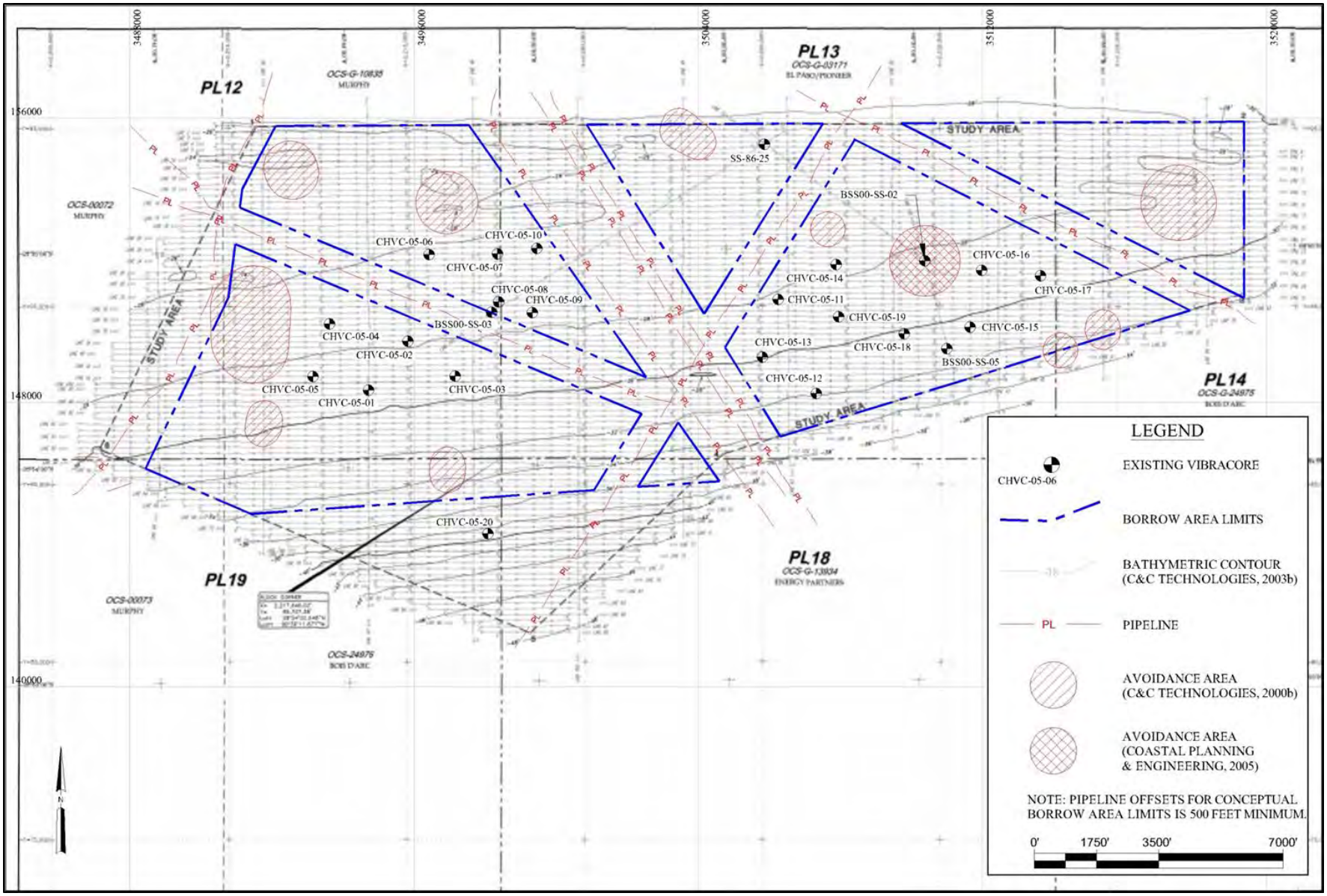
Ship Shoal – Prior Work

- Over 2,000 km of high-resolution seismic reflection data and 50 offshore sediment vibracore borings have been collected by the Louisiana Geological Survey, U.S. Geological Survey and MMS.
- Penland et al. (1986), Cuomo (1984), and Krawiec (1966) provide relatively comprehensive descriptions of Ship Shoal area geology and the in-situ sand resource.
- Based on an “overfill factor” calculation of 1:1.03 for Isle Dernieres shoreline using sand from Ship Shoal, McBride et al. (1989) showed Ship Shoal sand to be an excellent long-term source of sand for Louisiana beach restoration projects.

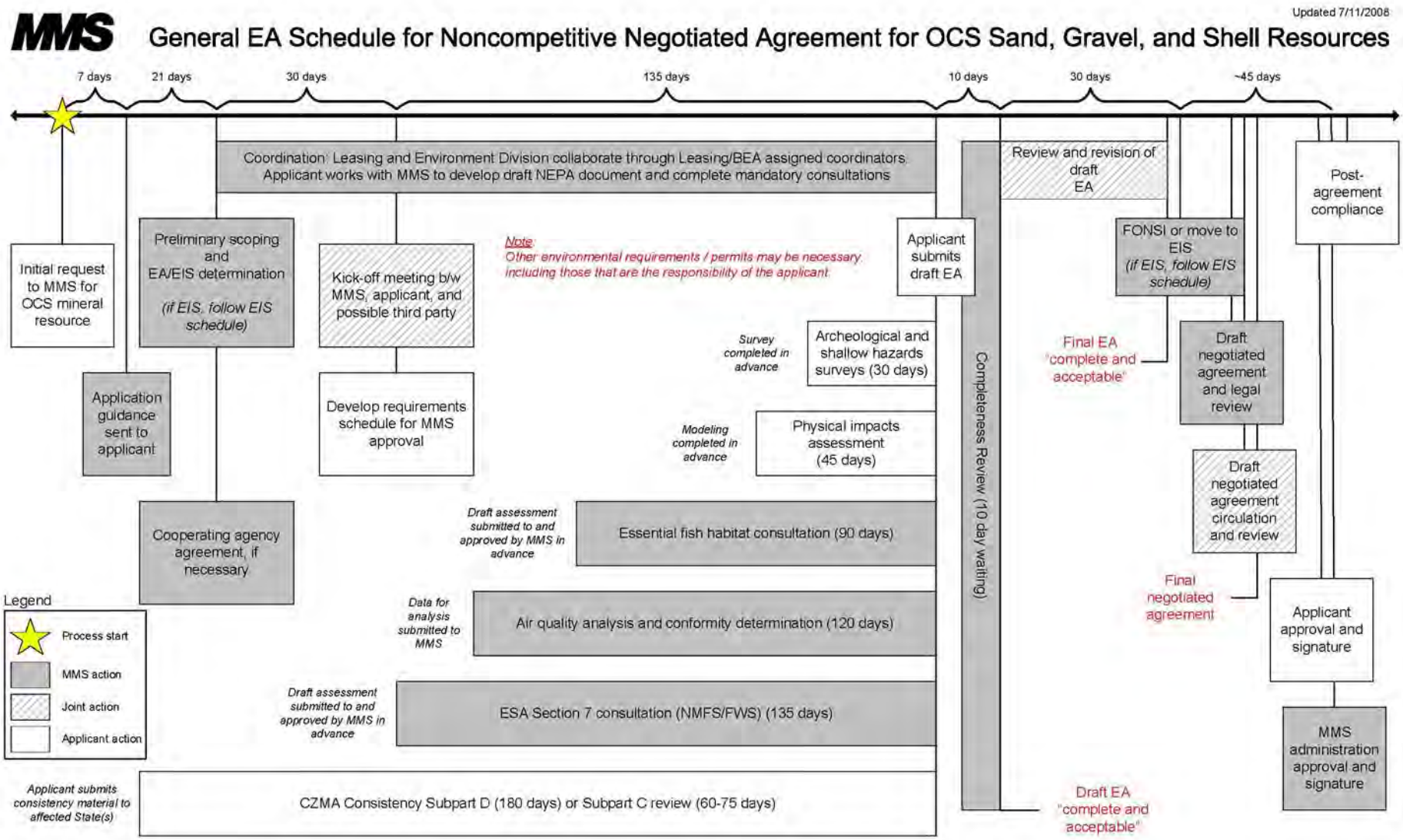
Ship Shoal – Prior Work Cont.

- Kulp et al. (2001), based on resource estimates, showed that South Pelto Blocks 12, 13 and 19 were likely candidates for restoration and other projects located on the far eastern portion of Isle Dernieres and Terrebonne Basin and within Barataria Basin.
- Extensive geophysical and archaeological studies undertaken in the project area in 2003 (C&C, 2003).

Sediment Search – Prior Work



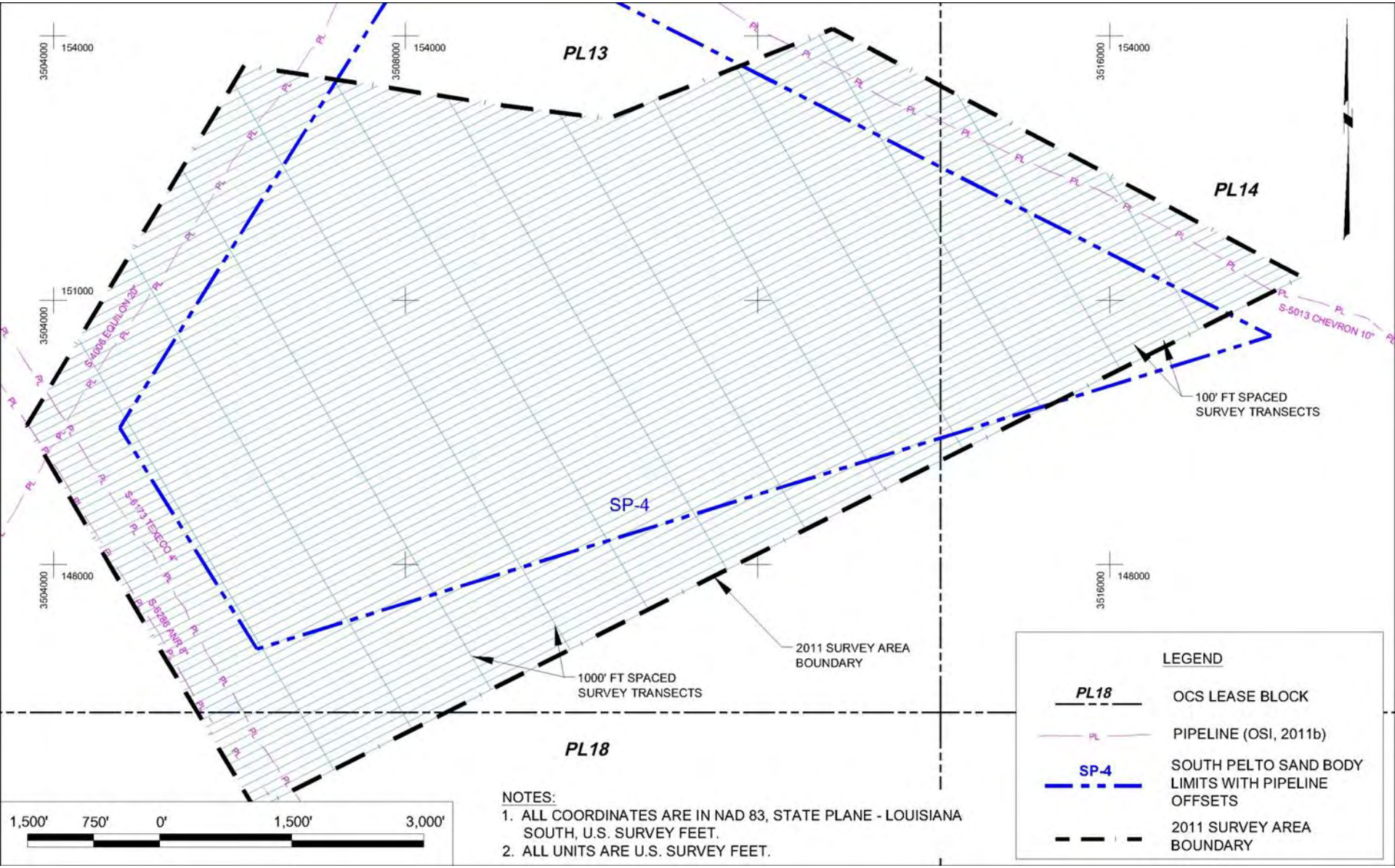
Negotiated Non-Competitive Agreement



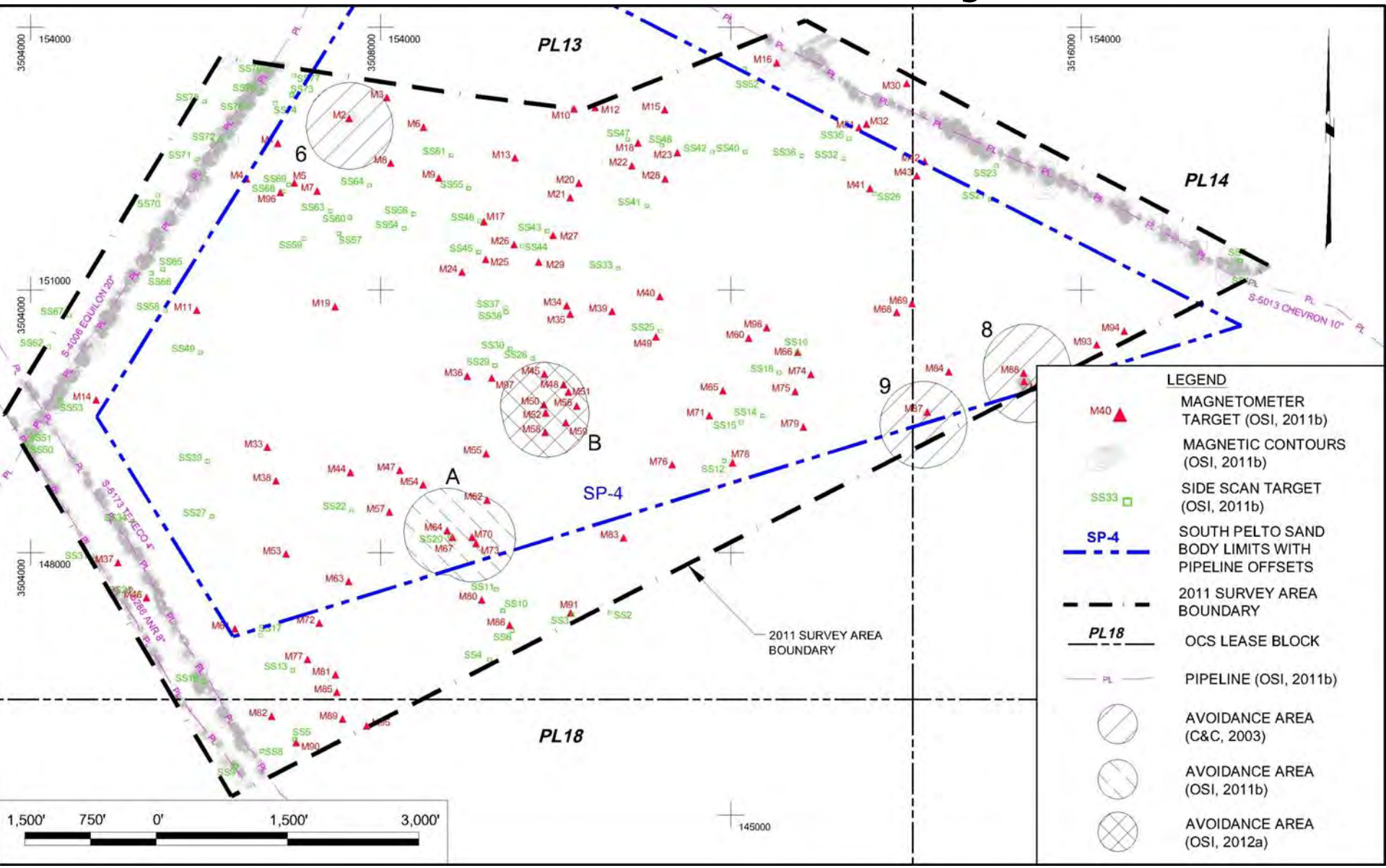
BOEM OCS G&G Permits

- Coordinate with BOEM's Marine Minerals Program to contact the BOEM Office of Resource Evaluation to apply for and obtain Geology and Geophysical Authorizations to conduct sand evaluation over proposed OCS borrow resource.
- 30 CFR 580 (online) may provide you with some insight into the G&G process and protocol but only covers competitive not public works projects.
- Application requires signed application Form BOEM-134 which must accompany corresponding geophysical authorization Form BOEM-135 or geological authorization Form BOEM-136.
- BOEM presently requires 30 m offset spacing for geophysical/cultural resource data acquisition.

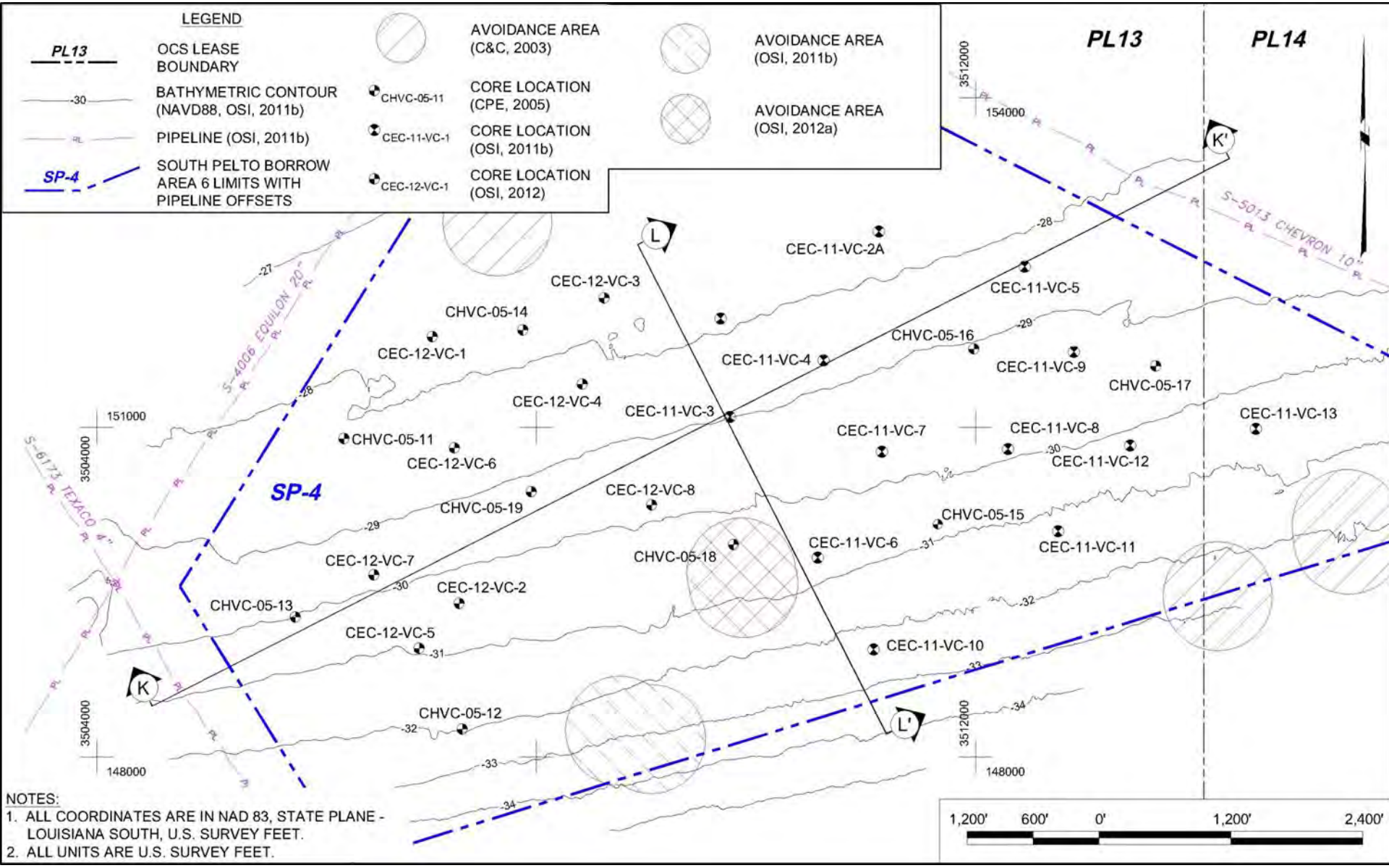
Cultural Resources Survey – New Work



Cultural Resources Survey Results

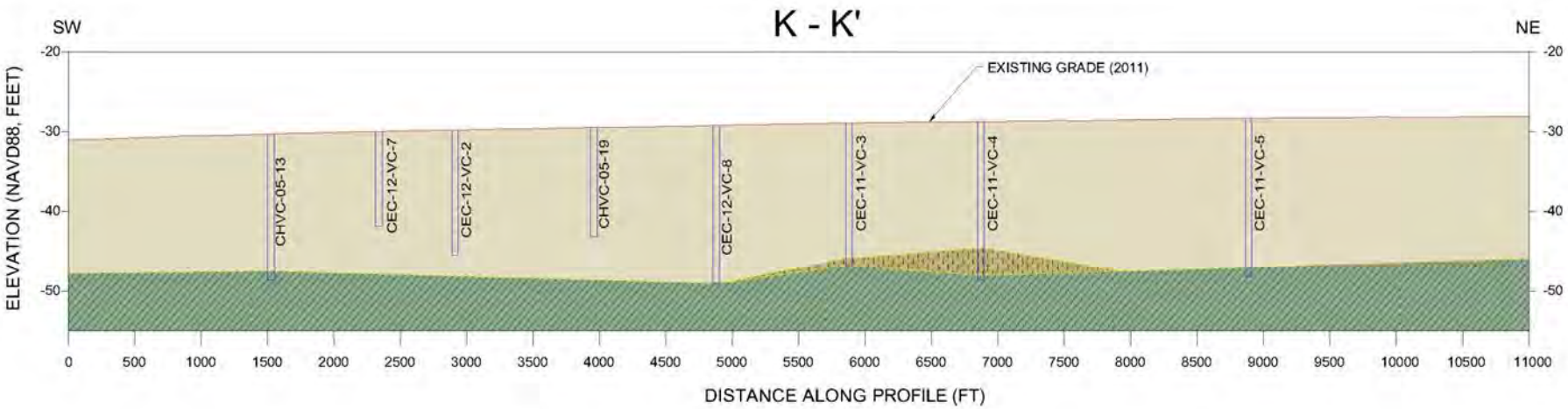


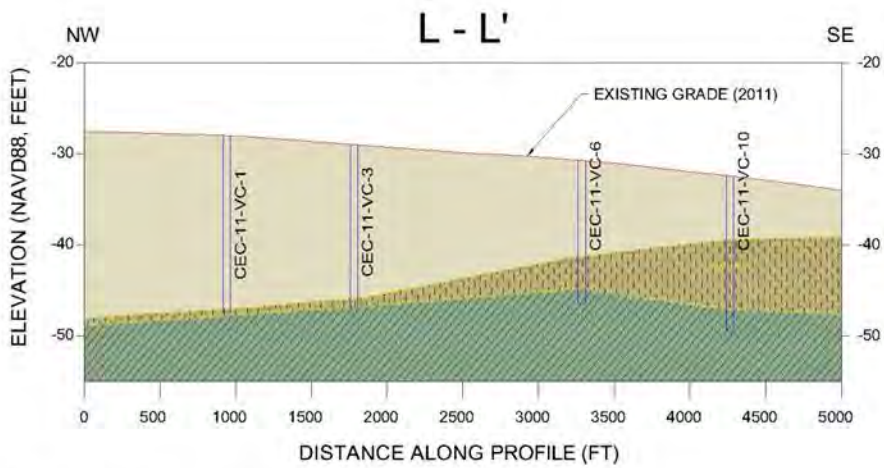
Geotechnical Investigations



NOTES:
1. ALL COORDINATES ARE IN NAD 83, STATE PLANE - LOUISIANA SOUTH, U.S. SURVEY FEET.
2. ALL UNITS ARE U.S. SURVEY FEET.

Geologic Sections





SCALE
H: 1" = 1200'
V: 1" = 20'

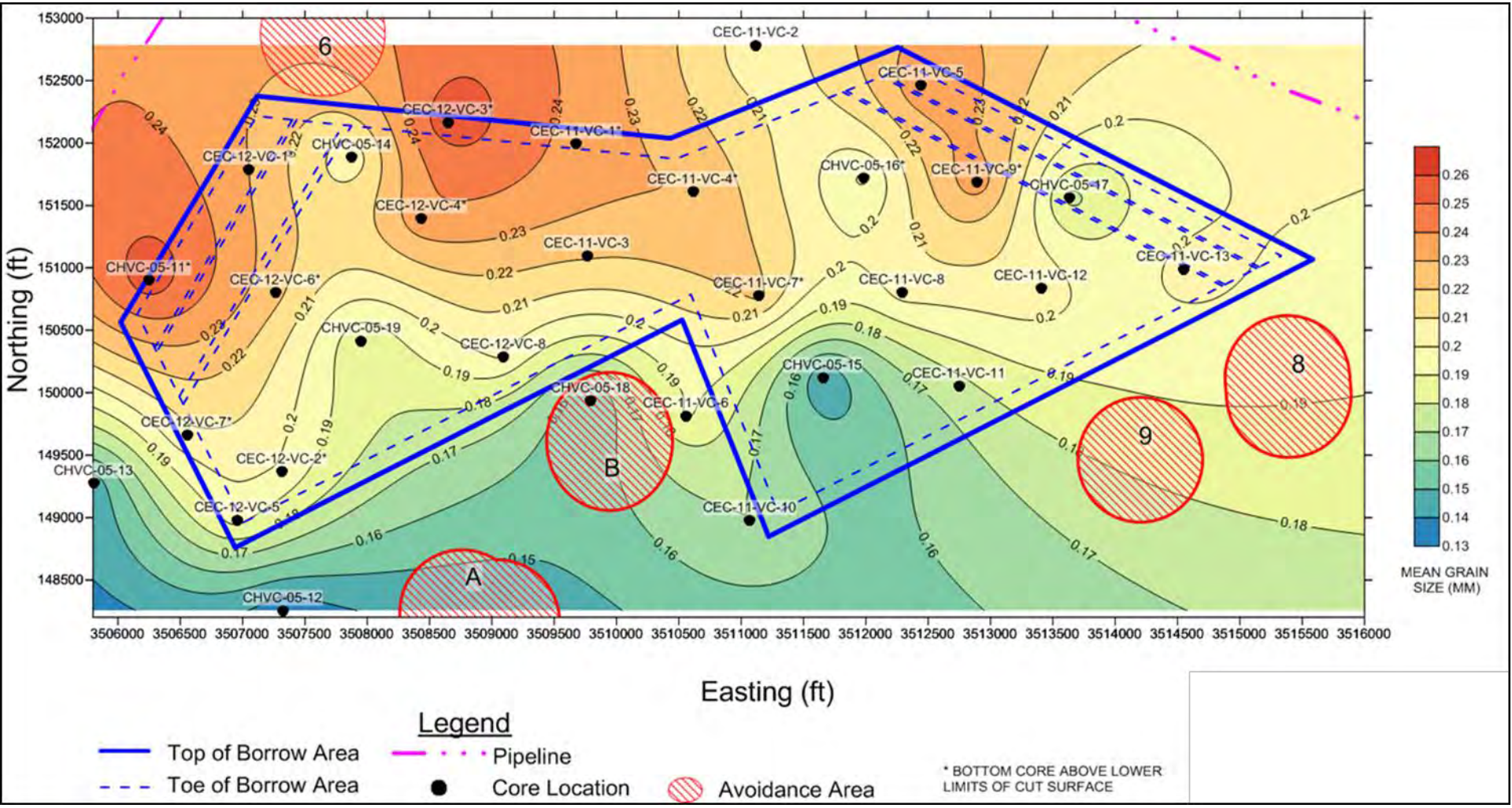
LEGEND:

- SAND
- SILTY SAND
- CLAY

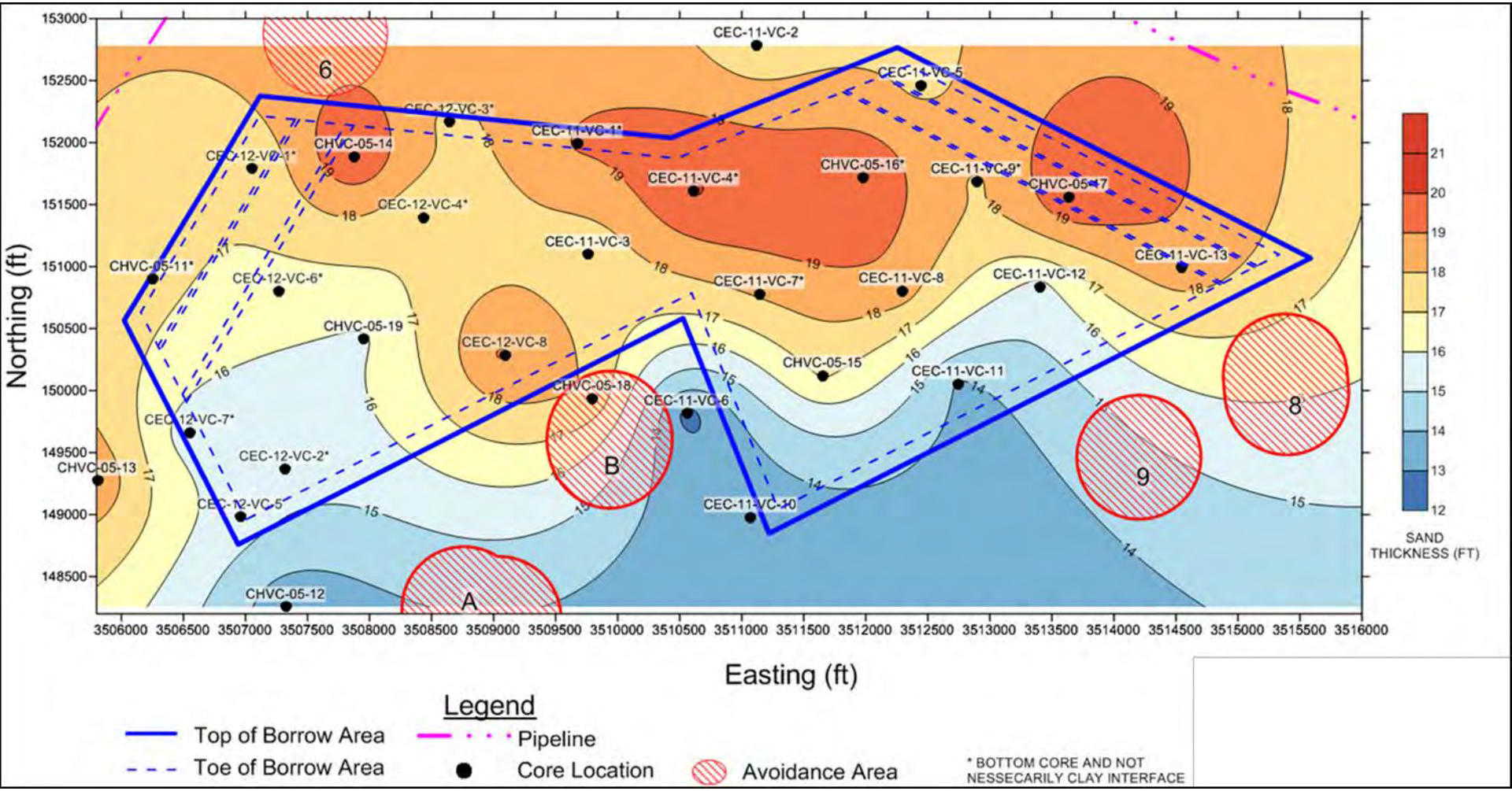
NOTES:

1. PIPELINE DATA FROM OSI, 2011.
2. BATHYMETRIC SURVEY CONDUCTED BY OSI, 2011.
3. ELEVATIONS HEREON ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88)
4. VIBRACORE DATA OBTAINED FROM CPE, 2005 AND OSI, 2011.
5. DATA DERIVED THROUGH SAMPLING ARE EXTRAPOLATED BY COASTAL ENGINEERING CONSULTANTS, INC. PROFESSIONAL GEOLOGIST TO RENDER AN OPINION ABOUT OVERALL SUBSURFACE CONDITIONS. ACTUAL CONDITIONS IN AREAS NOT SAMPLED MAY DIFFER FROM THOSE INFERRED TO EXIST.

Sediment Grain Size Distribution



Isopach Map of Sand Thickness



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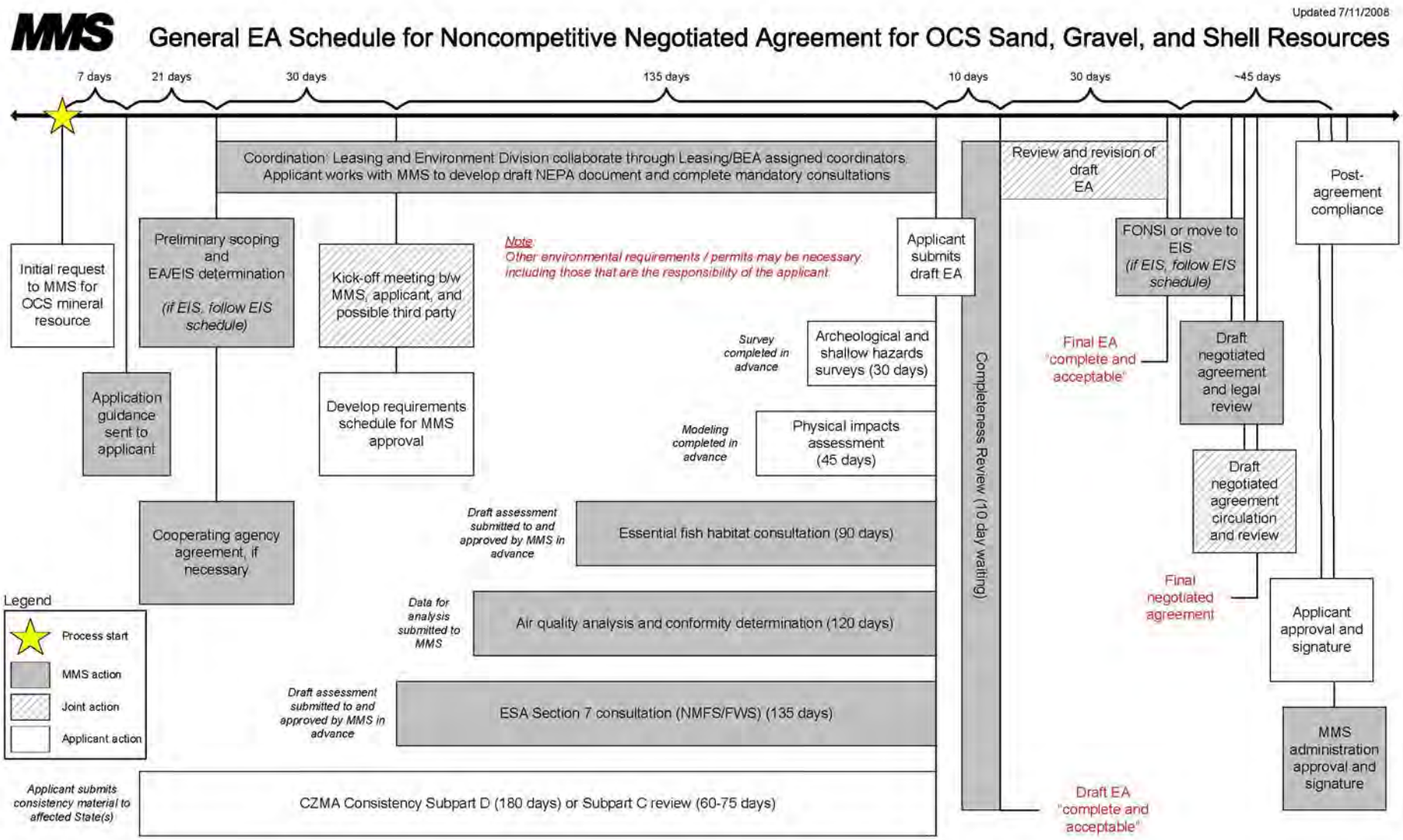

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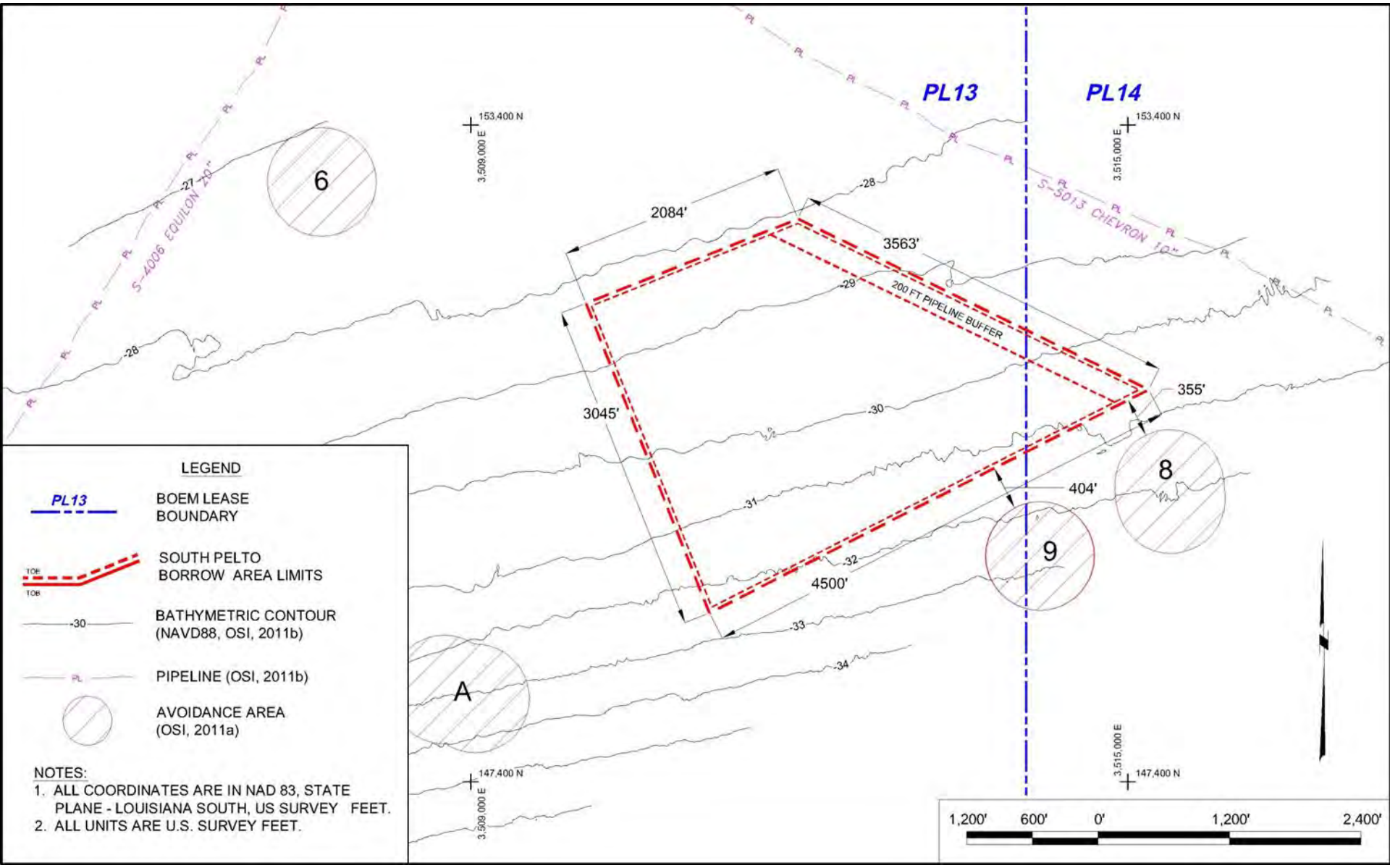
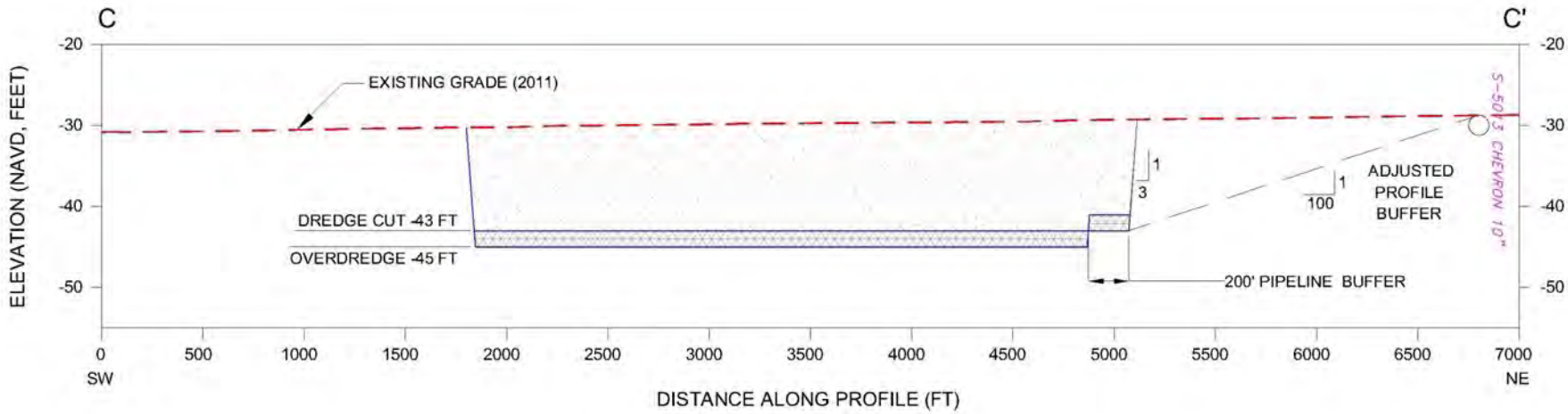
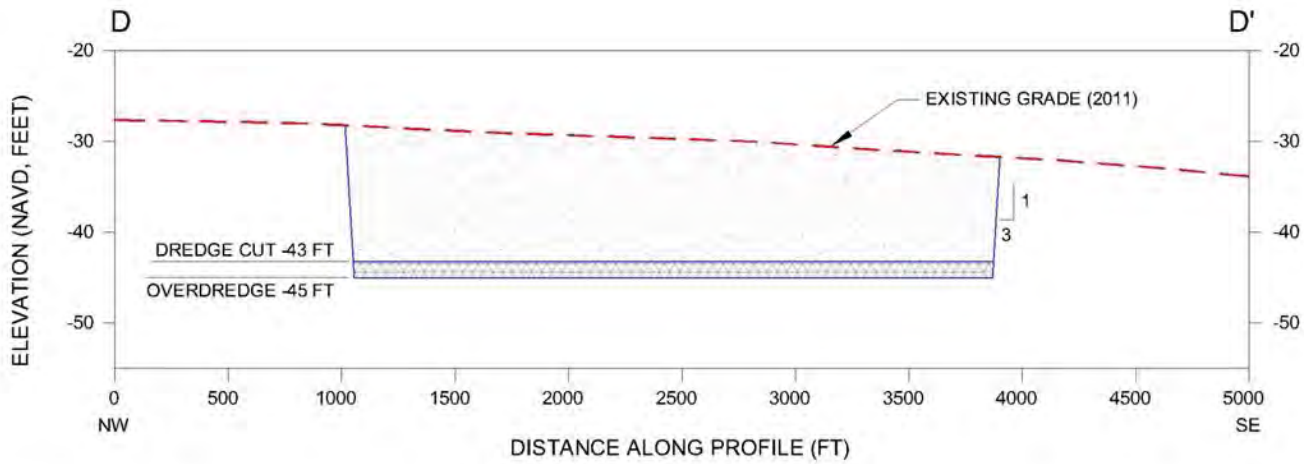
BA-45 Borrow Area Design



BA-45 Borrow Area Design





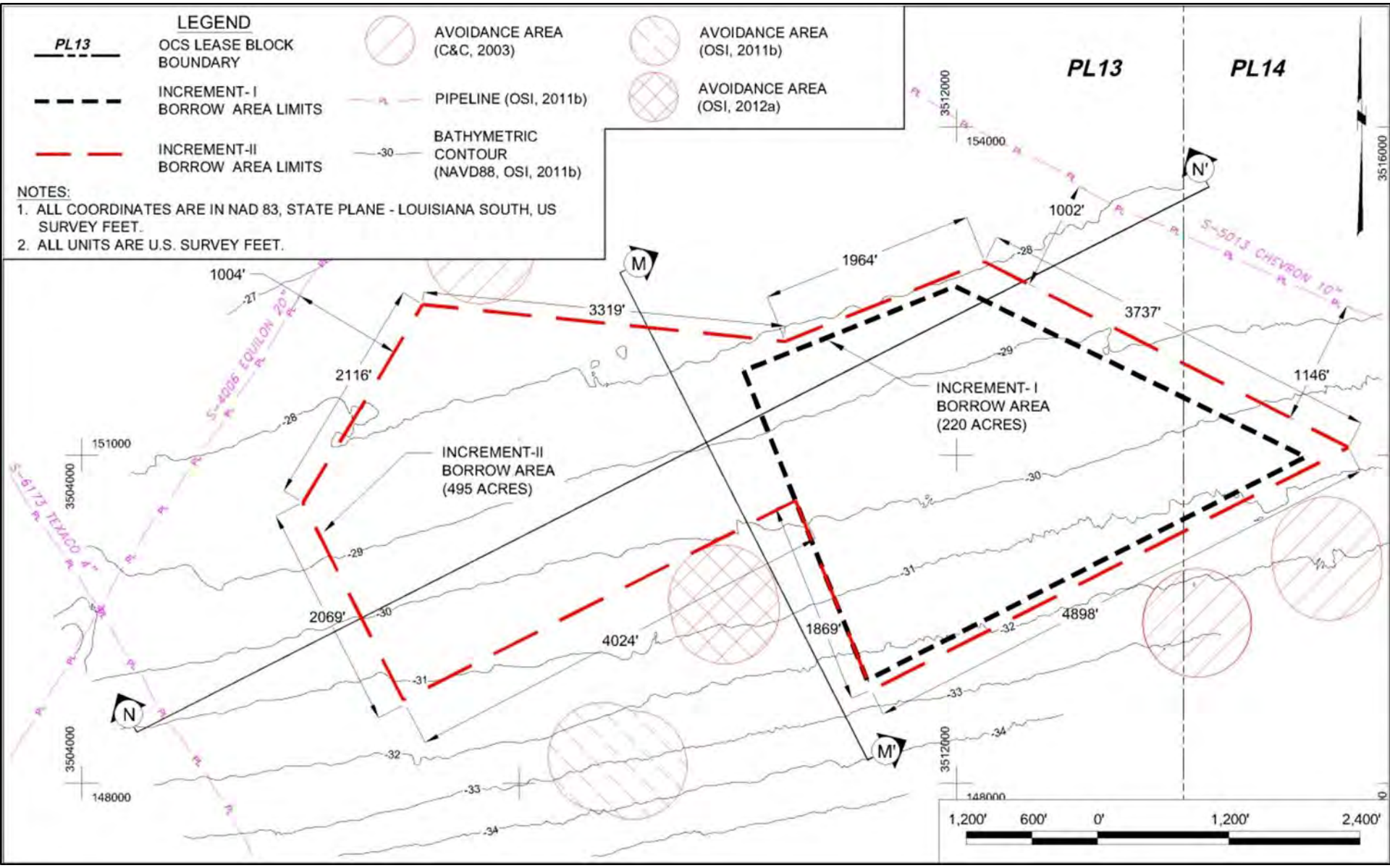
SCALE
H: 1" = 800'
V: 1" = 20'

LEGEND:

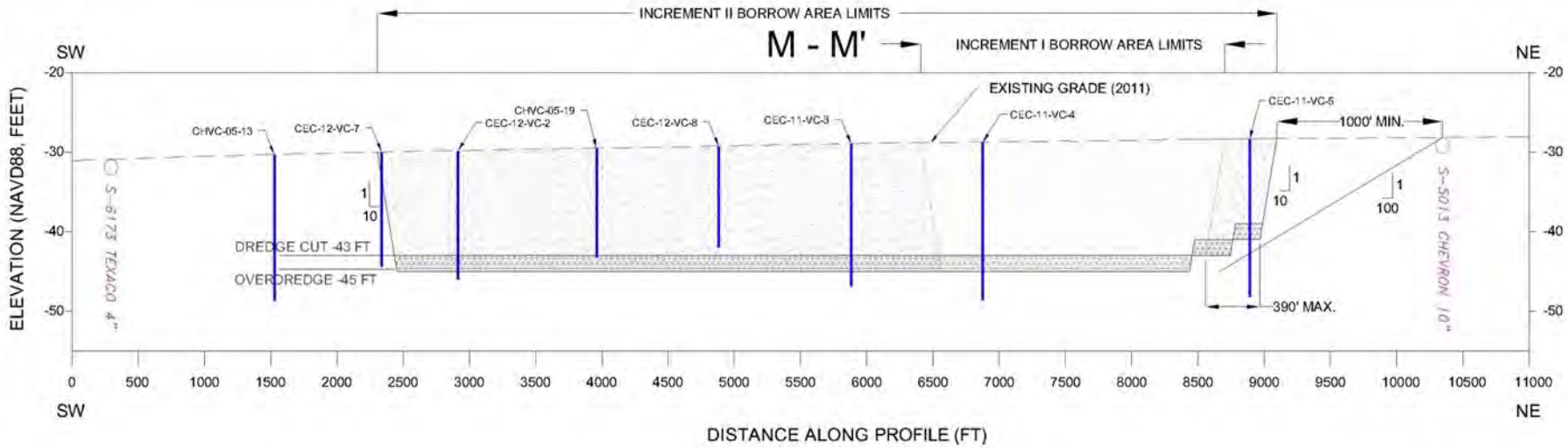
- BEACH / DUNE FILL CUT
- ALLOWABLE OVERDREDGE
- EXISTING GRADE (2011)
- DESIGN

NOTES:
1. PIPELINE DATA FROM C&C TECHNOLOGIES, 2003.
2. BATHYMETRIC SURVEY CONDUCTED BY OSI, 2011.
3. ELEVATIONS HEREON ARE REFERENCED TO NORTH AMERICAN VERITCAL DATUM 1988 (NAVD)

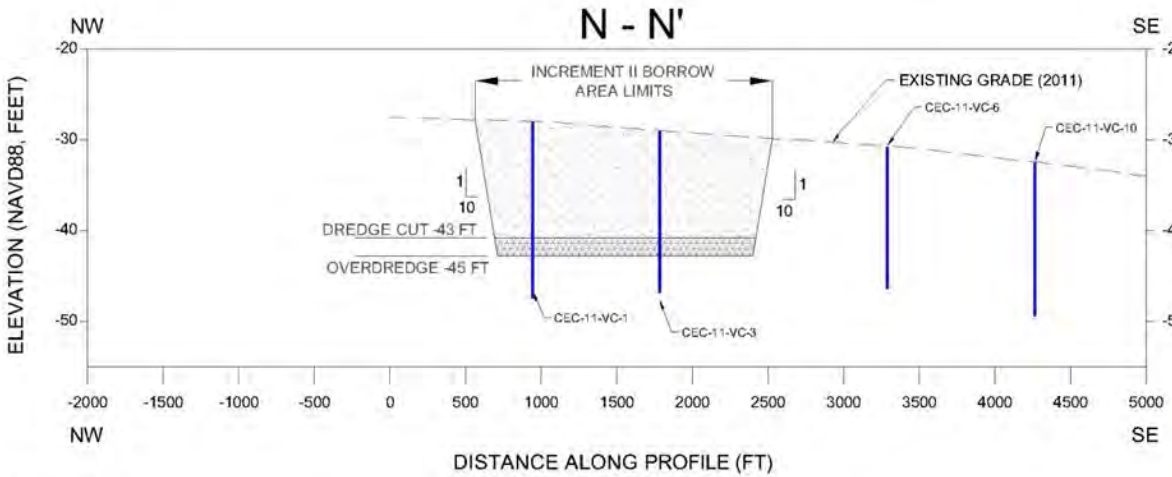
BA-143 Borrow Area Design



BA-143 Borrow Area Design



SCALE
H: 1" = 1200'
V: 1" = 20'

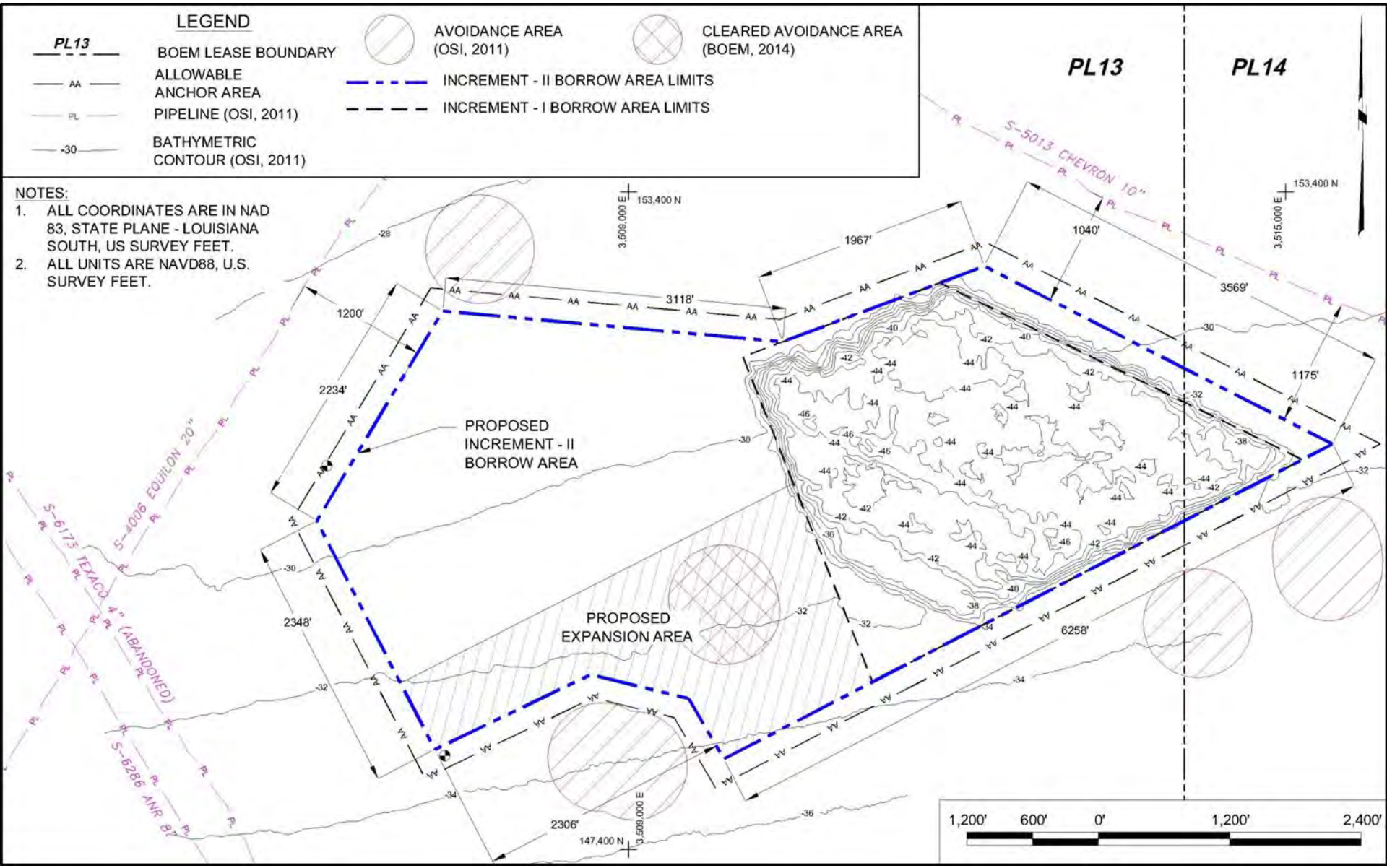


LEGEND:

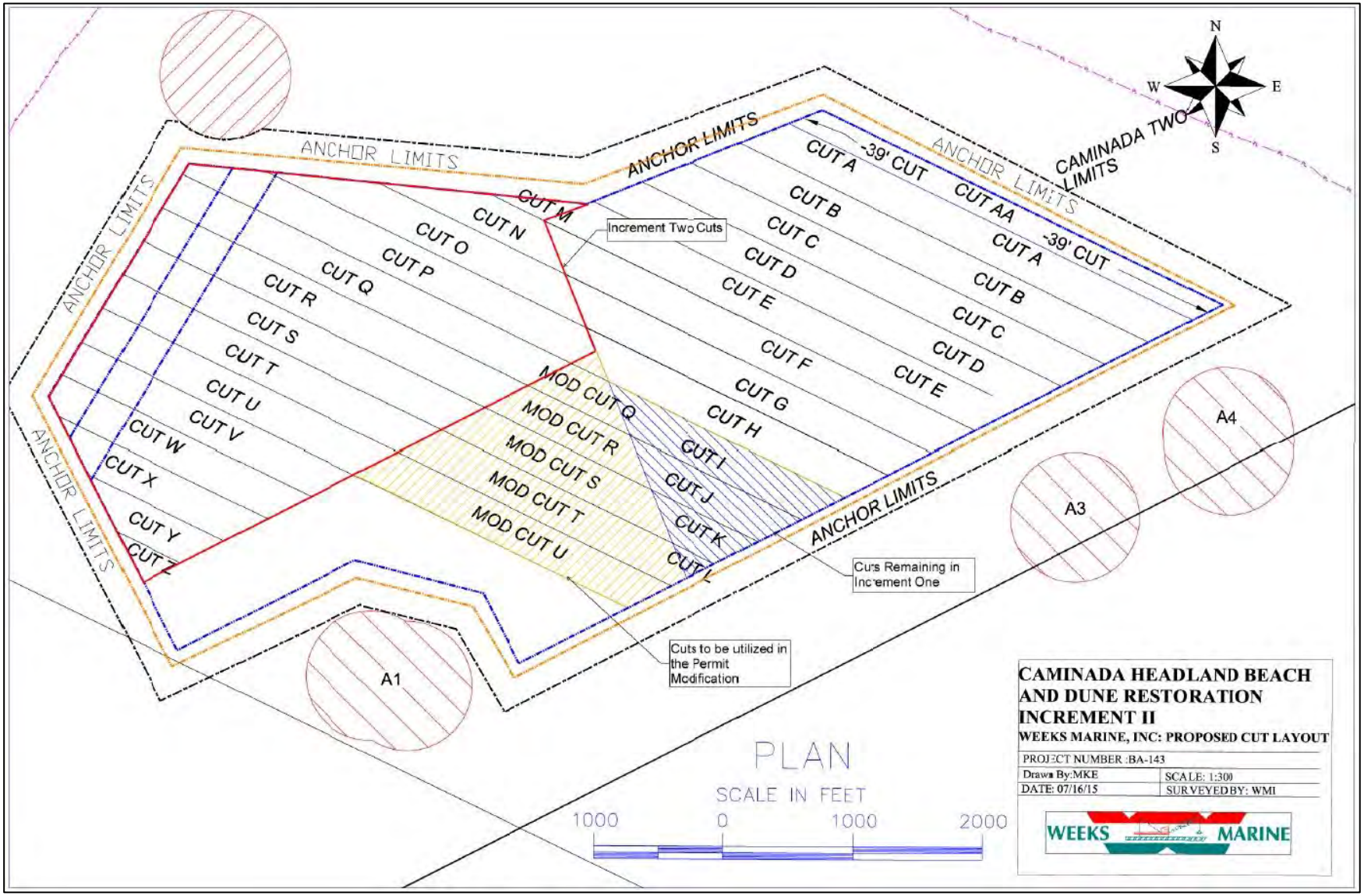
- DREDGE CUT
- OVERDREDGE TOLERANCE
- CHVC-05-13 (CPE VIBRACORE, 2005)
- CHVC-11-VC-3 (OSI VIBRACORE, 2011)
- CHVC-12-VC-2 (OSI VIBRACORE, 2012)

NOTES:
1. PIPELINE DATA FROM OSI, 2011b.
2. BATHYMETRIC SURVEY CONDUCTED BY OSI, 2011.
3. ELEVATIONS HEREON ARE REFERENCED TO NORTH AMERICAN VERITCAL DATUM 1988 (NAVD88).

BA-143 Borrow Area - Modification



BA-143 Borrow Area Cut Sequence



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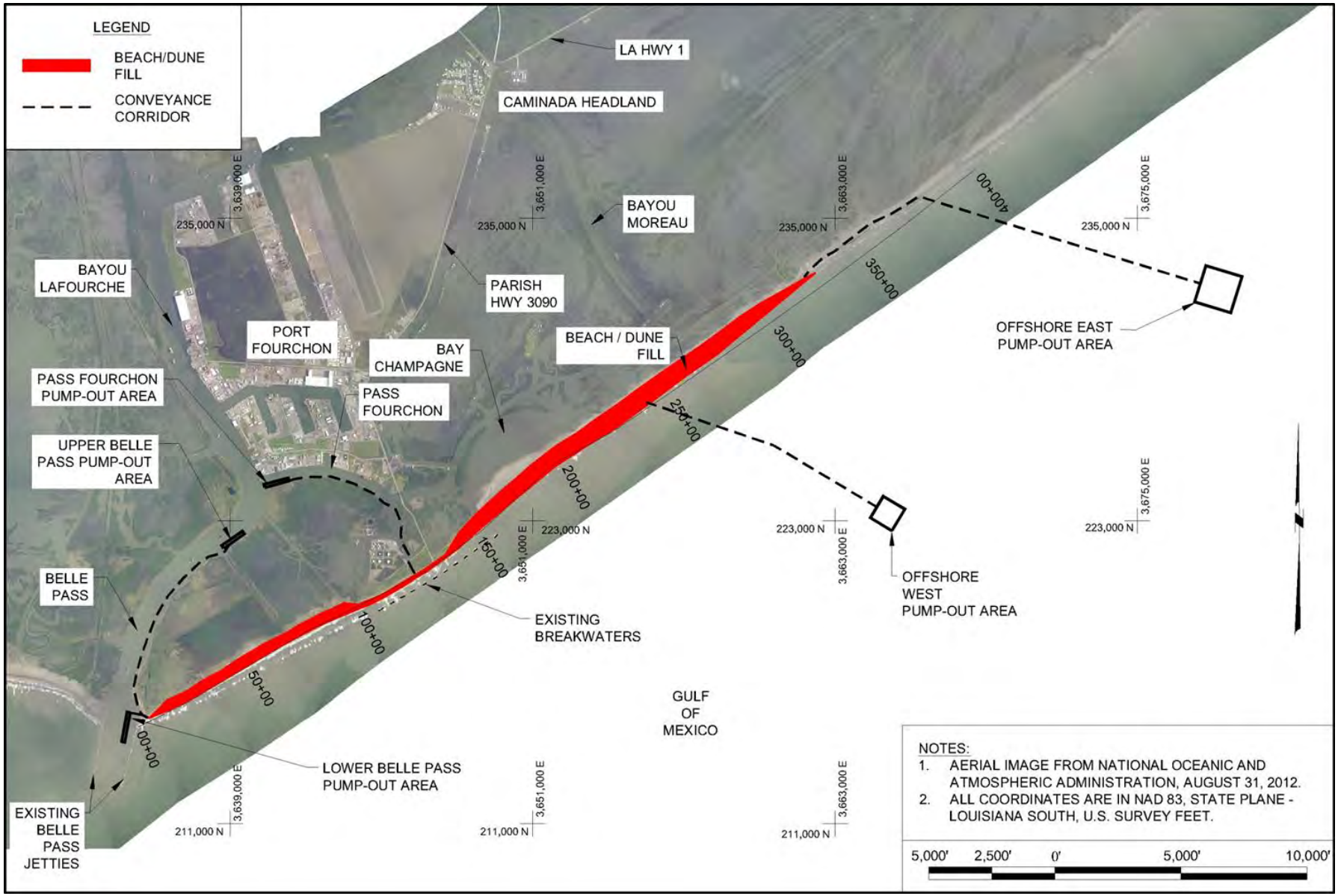
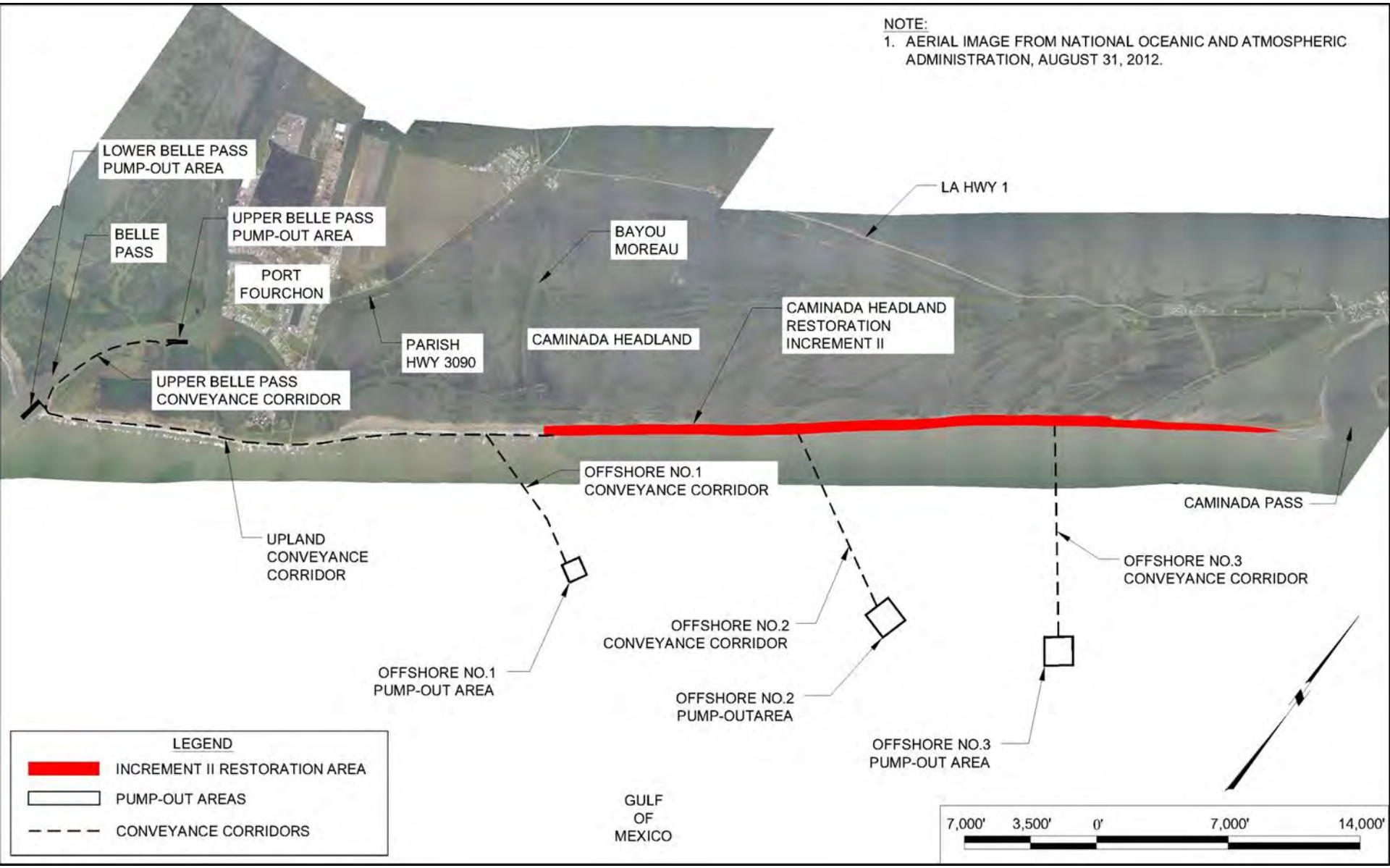
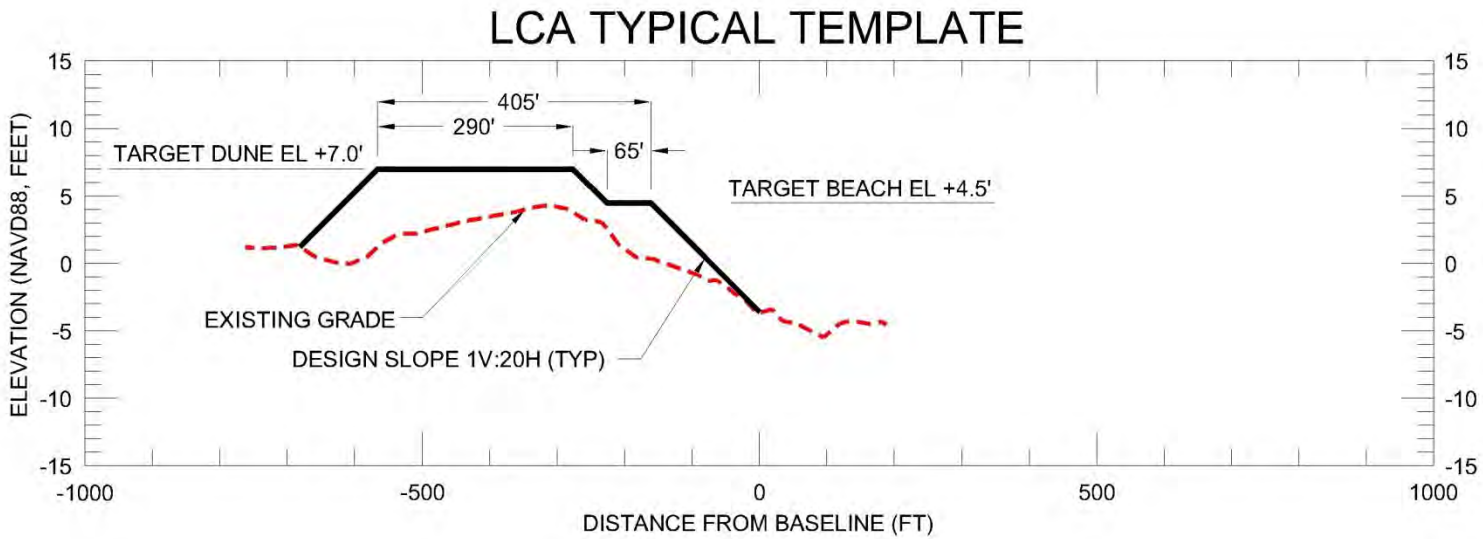
BA-45 Headland Overview

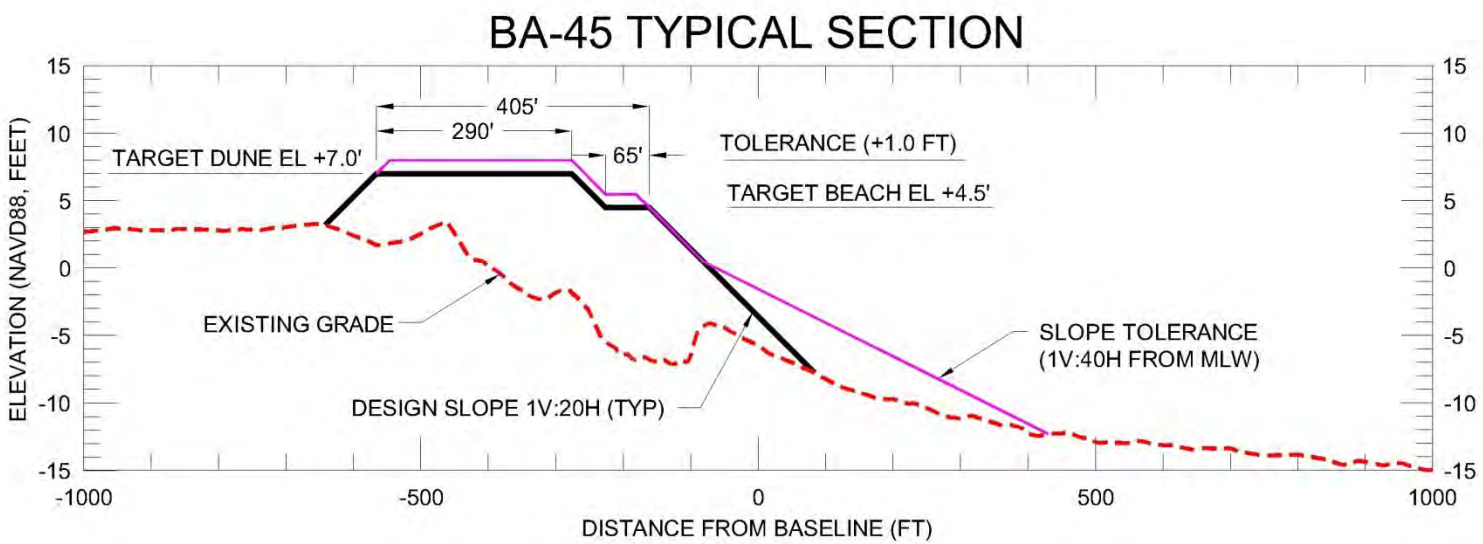


BA-143 Headland Overview

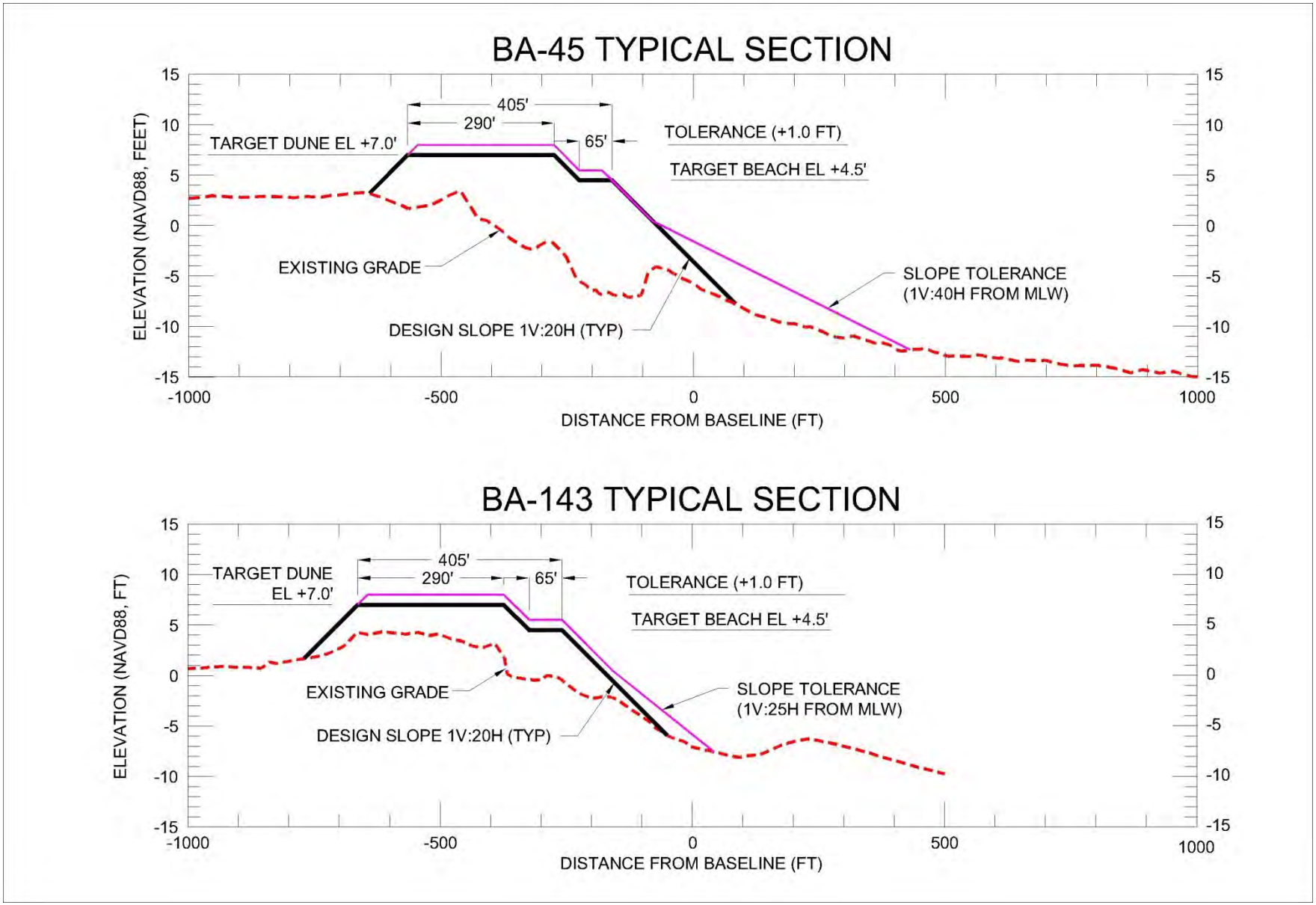


Typical Design Sections





Typical Design Sections



BA-45 / BA-143 Comparison

	BA-45	BA-143	
Beach Elev.	+4.5	+4.5	Ft. NAVD88
Beach Width	65	65	Average Ft.
Dune Elev.	+7.0	+7.0	Ft. NAVD88
Dune Crest Width	290	290	Average Ft.
Surface Area	303	489	Acres
Total Fill Volume	3,310,000	5,098,000	Cubic Yards
Total Length of Project	31,000	39,000	Linear Feet

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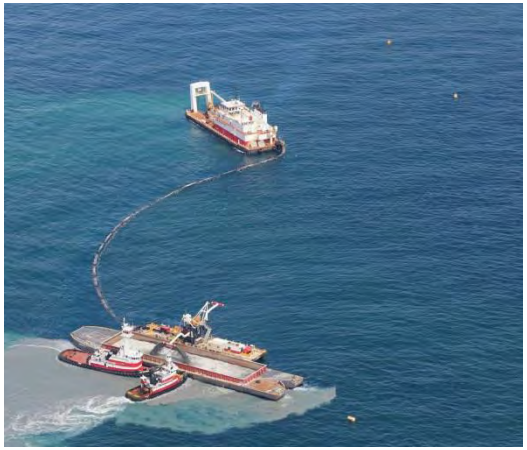
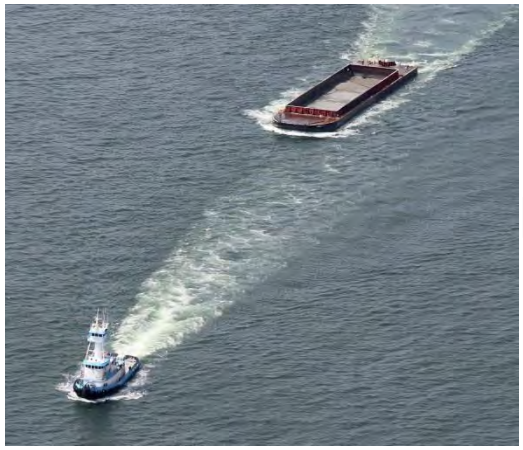
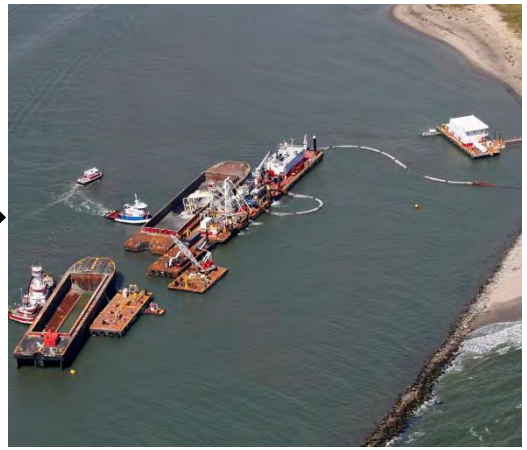
Sediment Transport Methods



Cutterhead Dredge Excavation and Filling Scow Barge via Spider Barge



Scow Barge Transport to Fill Area



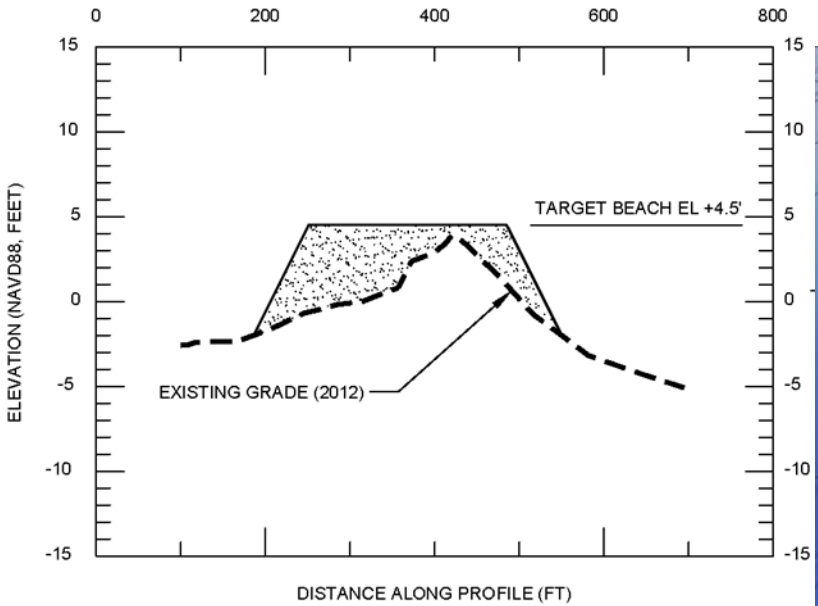
Hydraulic Unloading of Scow Barge and Pump to Fill Area

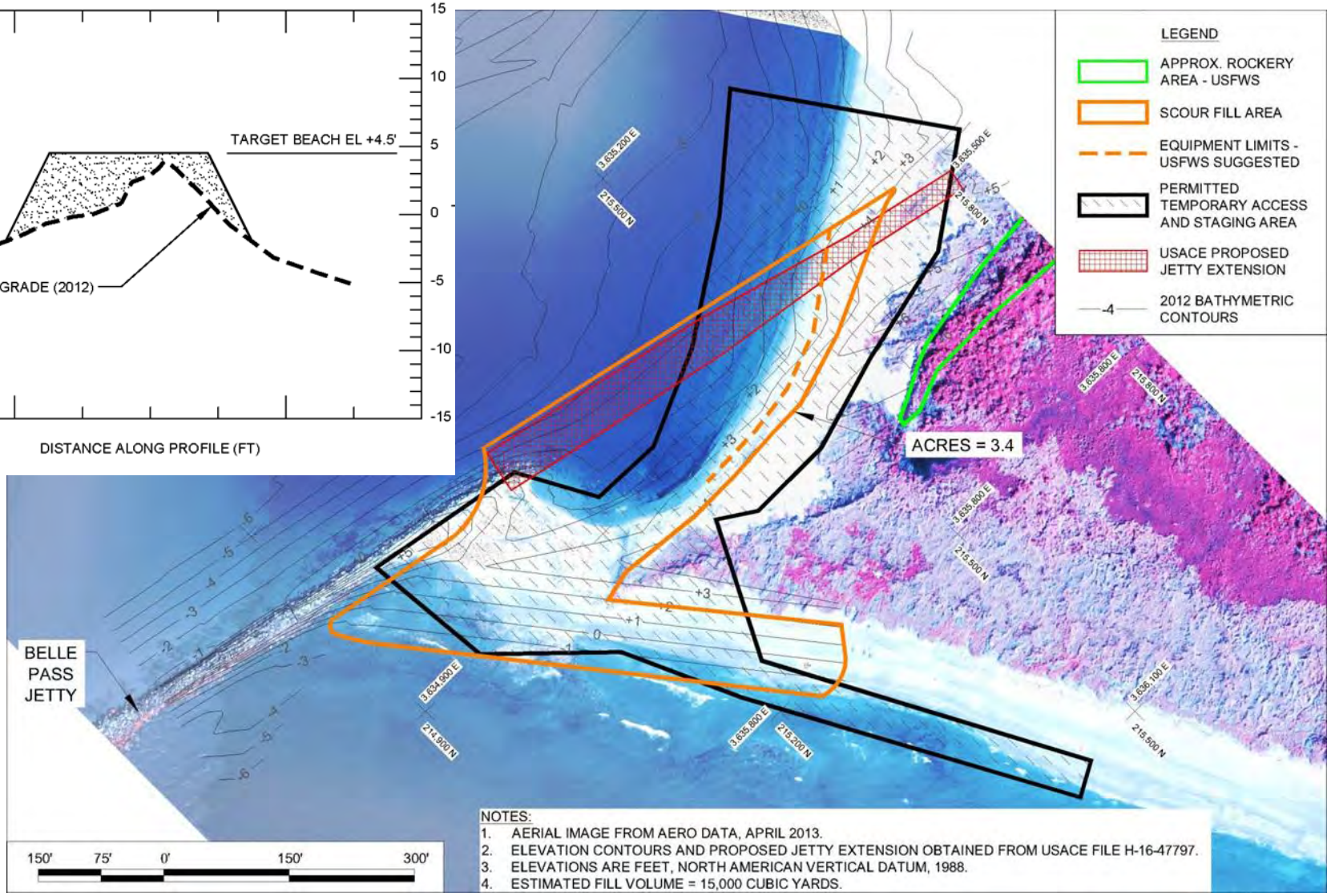
Hopper Dredge Excavation and Transport to Fill Area

Hopper Dredge Pump to Fill Area

Discharge at Fill Area

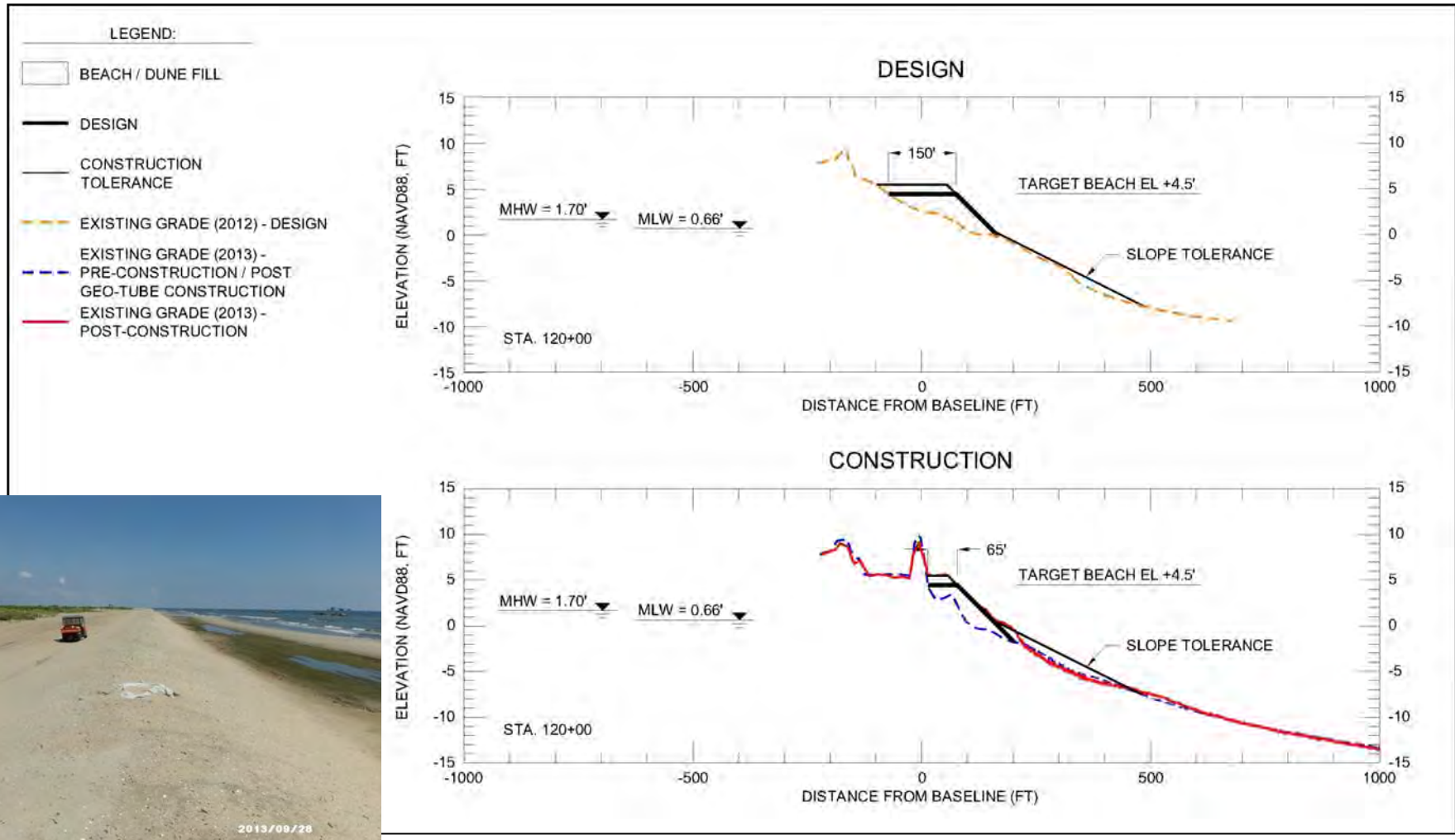
USACE Jetty Extension – Scour Fill Area

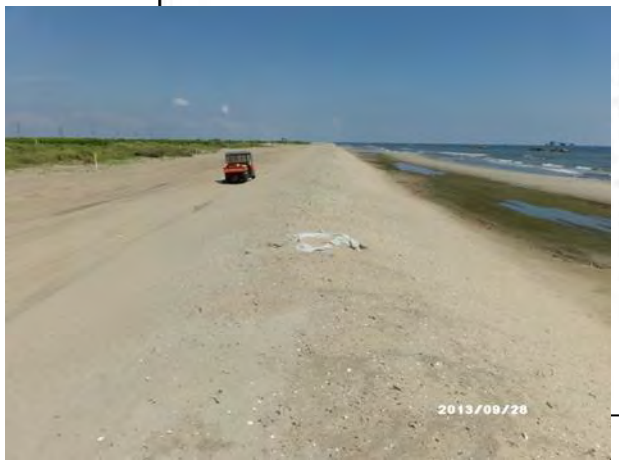




Subsidence Monitoring Control Stations

Port Fourchon Geo-Tube Project





Weather Delays

Dredge / Month	Mar-13	Apr-13	May-14	Jun-14	Jul-13	Aug-13	Sep-13	Oct-13
E.W. Ellefsen								
R.N. Weeks								
B.E. Lindholm								
Total Production (CYS) *	0	0	0	0	7,700	266,145	317,160	426,975
Weather Days	N/A	N/A	N/A	N/A	0	0	8	7

Dredge / Month	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14
E.W. Ellefsen								
R.N. Weeks								
B.E. Lindholm								
Total Production (CYS) *	73,245	222,195	277,545	0	0	0	22,865	155,060
Weather Days	23	10	5	N/A	N/A	N/A	0	0

Dredge / Month	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Totals
E.W. Ellefsen								226 days
R.N. Weeks								90 days
B.E. Lindholm								81 days
Total Production (CYS) *	46,100	0	229,610	748,540	279,980	133,575	0	3,206,695 CYS
Weather Days	0	N/A	4	3	0	0	N/A	60 days

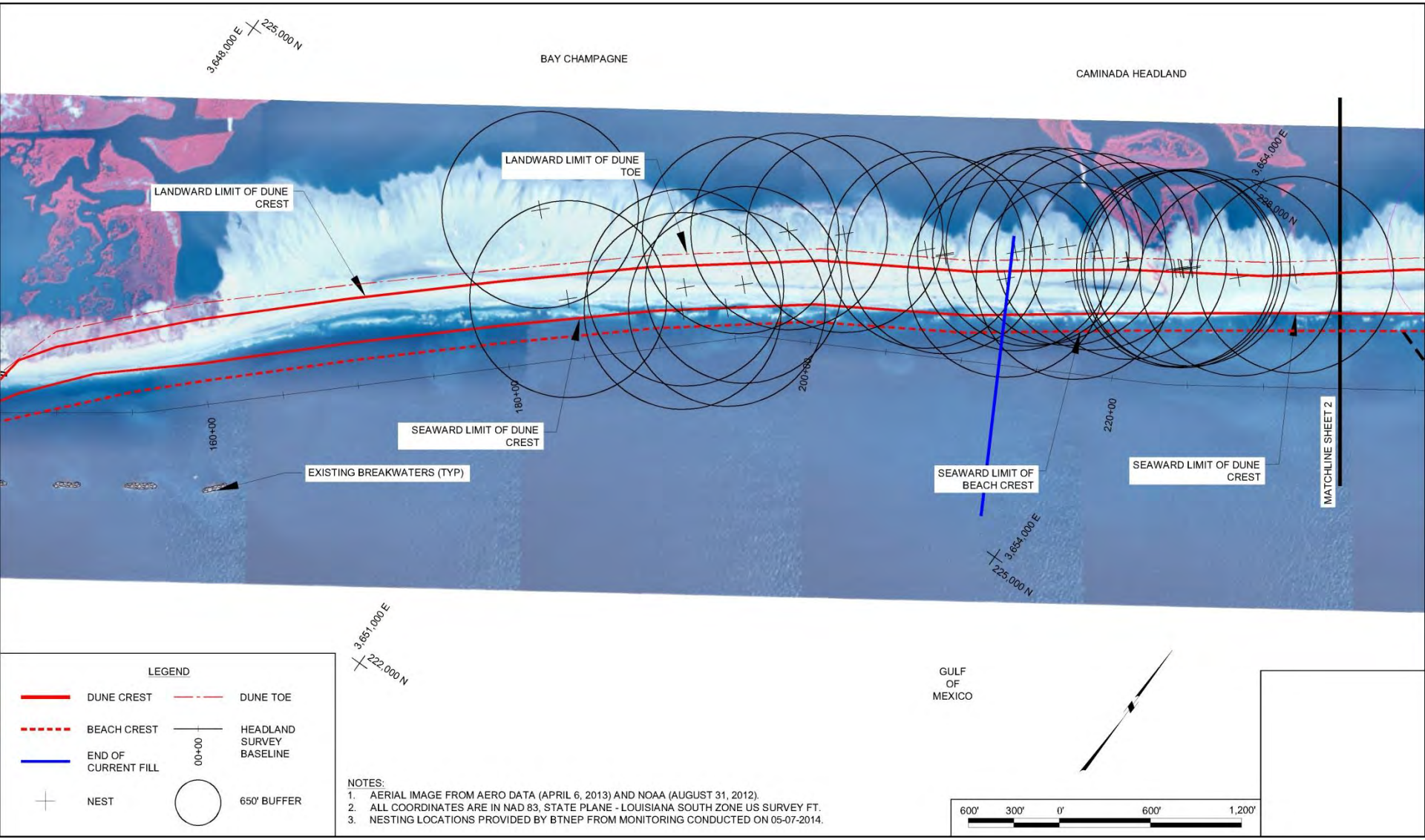
N/A = Not Applicable, Dredges not mobilized to Project

Arbitrary Demobilization

* Based on reporting from the Construction Contractor's Daily Progress Reports

Migratory Bird Nesting

Nesting Bird Abundance



Bird Abatement – Wind Rows

Sea Turtle Protections

Biological Opinion Requirements - Observers

ENDANGERED SPECIES OBSERVER PROGRAM

LOAD DATA FORM

USACE DISTRICT: New Orleans
CONTRACT #: BA-45 Maintenance ___ /New Work X PROJECT start date 5/22/2014
PROJECT NAME: Caminada Headlands II DREDGE NAME: B.E. Lindholm
DREDGE FIRM: Weeks Const
LOAD #: 1 LOAD start date: 6/19/2014 Times (24hrs): Start 2333 End ___

Condition of screening: Port Good Starboard Good Overflow Good

Number of dragheads in use: 1 Type of dragheads used: IHC Size of dragheads: 101
Draghead deflector? YES X NO ___ Condition of deflector: Good

Type of material dredged: Sand

Weather conditions: Clear
28.54 743 90 36.370

Tidal stage (CIRCLE ONE): Slack Rising High Falling Low Unknown

Beaufort Sea States (Winds/Wave Height) (CIRCLE ONE)
0 = <1 knot/ 0 ft; 3 = 7-10 knot/ 2 ft; 6 = 22-27 knot/10 ft; 9 = 41-47 knot/23 ft; 12 = >63 knot/45
1 = 1- 3 knot/ 0.25 ft; 4 = 11-16 knot/ 4 ft; 7 = 28-33 knot/14 ft; 10 = 48-55 knot/29 ft
2 = 4- 6 knot/ 0.5 ft; 5 = 17-21 knot/ 6 ft; 8 = 34-40 knot/18 ft; 11 = 56-63 knot/37 ft
Waves: 1-2 ft Wind (speed & direction): SW 8

AIR TEMP: 88 °C/°F (°F = 9/5 (°C) + 32; °C = 5/9 (°F - 32))
WATER TEMP: Surface 86 °C/°F Column (mid-depth) ___ °C/°F Bottom ___ °C/°F

SCREEN TYPE
X Inflow screening: None 25% 50% 75% 100%
X Overflow screening: None 25% 50% 75% 100%
X Other screening: None 25% 50% 75% 100%

~~PORT~~ SCREEN CONTENTS: Shell, rock, rope

~~STARBOARD~~ SCREEN CONTENTS: ___

Estimate number entrained on this load for the following:
Sturgeon (any species) ___
Shark (any species) ___
Horseshoe crab ___
Blue crab ___

TURTLE OR TURTLE PARTS PRESENT THIS LOAD: YES ___ NO X

SPECIES OF TURTLE TAKE: Unknown Loggerhead Green Kemp's ridley Hawksbill Leatherback

Comments: C&D

Number observers used/24hrs: 1 % Monitoring/24 hrs: None 25% 50% 75% 100%

Observer's name: Kerry Rollo Observer firm REMSA
Observer signature ___

ENDANGERED SPECIES OBSERVER PROGRAM

WEEKLY SUMMARY

PROJECT NAME: Caminada Headland Increment 1 USACE DISTRICT: New Orleans
DREDGE NAME: M/V R.N. Weeks Dredge Firm: Weeks Marine
Contract # BA-45 Maintenance ___ / New Work X

Dates: 5 / 26 / 2014 - 6 / 1 / 2014 Load #s: 10 / 21

Areas worked (Cut): A B C D E

Locations, Lat/Long: N 28 ° 55 . 024 x W 90 ° 36 . 664
Lat/Long: N 28 ° 54 . 761 x W 90 ° 36 . 348

Were there incidents involving endangered or protected species? YES ___ NO X

Which species? NA

Comments: material - Sand

Biota - flounder, eel, shell, blue crab, wood, rock, starfish, marine worms,

Abiota - metal, tires, plastic, rubber, chain, rope

5/30/14 ~ Down for repairs ~1600
5/31/14 ~ Dumpped Load #22 without offloading in order to go to Fuel Dock for Repairs

6/1/14 - @ Dock all day for Repairs

BRIDGE WATCH SUMMARY

Date/Time	Species	# Sightings/# Animals	Location/Comments
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	

Observers Names Kerry Rollo/ Kerry Rollo
Observer Firm REMSA, INC.

Sea Turtle Protections

Biological Opinion Requirements – Inflow / Outflow Screening

Sea Turtle Protections

Biological Opinion Requirements – Deflecting Draghead

Sea Turtle Protections

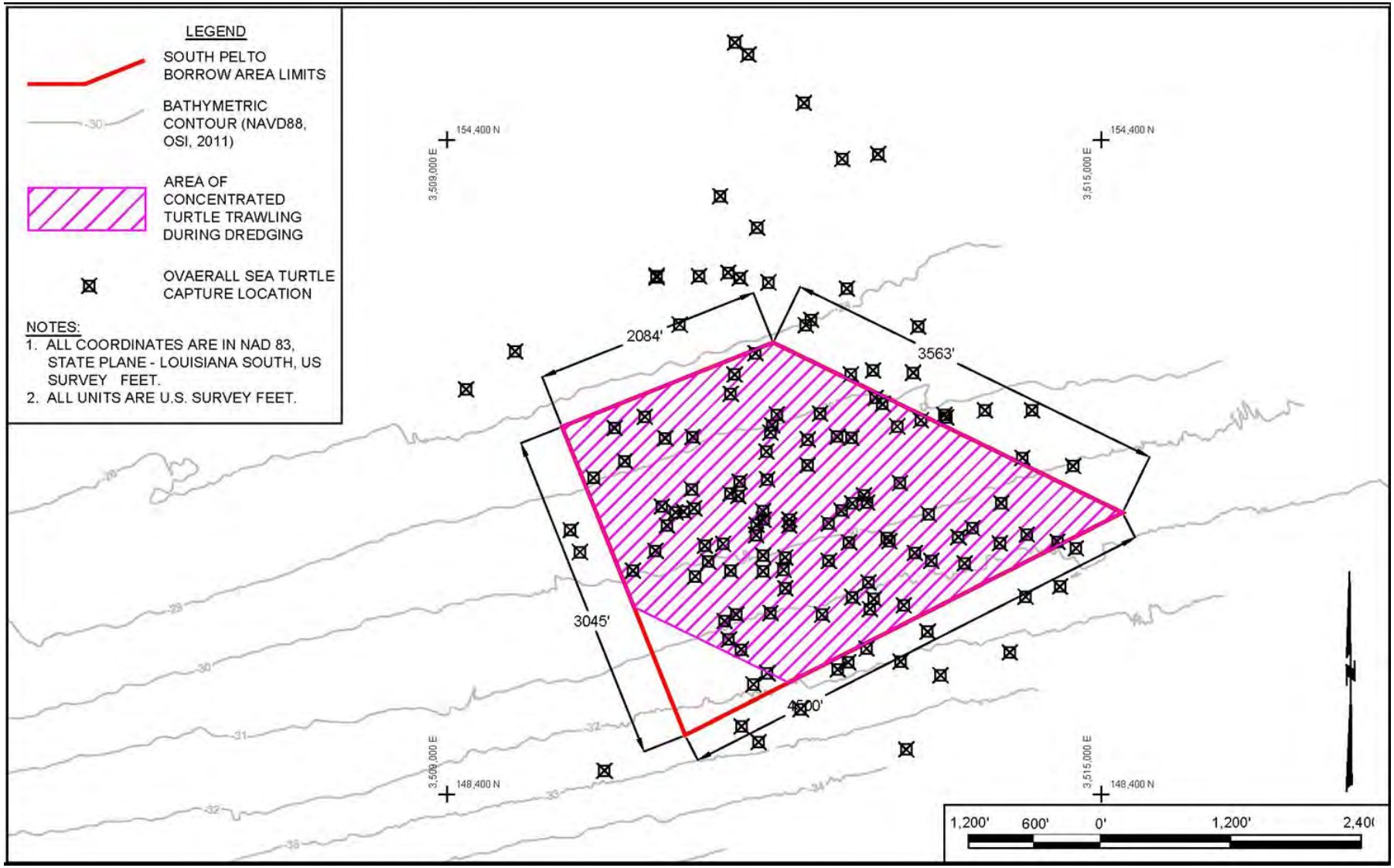
Biological Opinion Requirements – Relocation Trawling

Sea Turtle Relocation Trawling

- Total Allowable Take for Turtles to be Relocated Bi-Annually was 76.
- Turtle Relocation Trawling began in May 2014.
- 76th Turtle Relocated on June 7, 2014…
- BOEM re-initiated consultation with NMFS to continue and in total there were 157 relocations for this project, including 79 ridleys, 76 loggerheads, and 2 greens. No turtles were harmed during relocation trawling activities.
- Some of the highest numbers of mature male turtles ever tagged and released!

Sea Turtle Relocation Trawling

Relocation Trawling Capture Locations



Sea Turtle – Hopper Dredging / Trawling

- Total Hopper Dredging Days = 114
- Total Number of Hopper Loads = 384
- Volume of Sediment Excavated = 765,000cy
- Total Number of Relocation Trawls = 1,582
- Total Relocations = 157 (154 individual turtles)
  - Ridley = 83
  - Loggerhead = 69
  - Green = 2
- All relocated turtles were tagged and tissue sampled prior to release. ***Enormous amount of information gathered.***
- Unfortunately, there was one incidental take (loggerhead) by the dredge during the Project.

Sea Turtles

Guardians of the Sea

Left: Happy Turtle, Middle: Mike Miner of BOEM, Right: Rachel Sweeney of NMFS

BA-45 Completed Project

BA-45 Completed Project

BA-143 Under Construction

BA-143 Under Construction

Outline

- Project Overview
- Project Phases and Involvement
- Sediment Search
- Permitting / NNA
- Borrow Area Designs
- Headland Designs
- Construction Overview and Challenges
- ***Lessons Learned***

Lessons Learned

- Engage all agencies and stakeholders early and often during design and permitting.
- Design and permit as many construction access options as practical to allow the contractor flexibility.
- Plan for environmental contingencies in your design.
- Constant Communication with Regulatory Agencies is Essential.
- Expect the unexpected.

QUESTIONS

Mississippi Coastal Improvements Program (MsCIP)

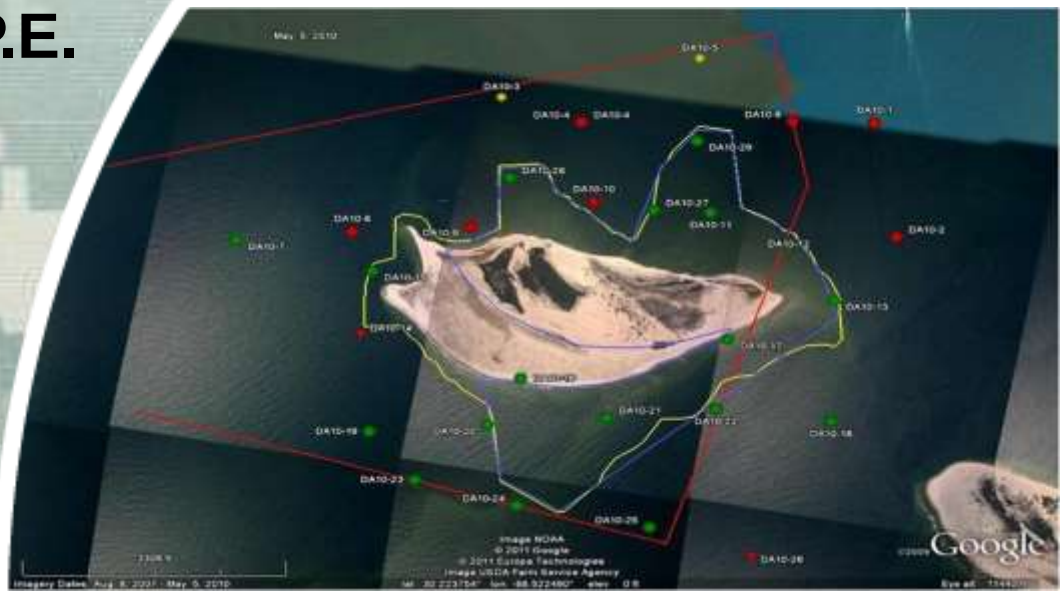
Comprehensive Barrier Island Restoration Plan

BOEM Gulf of Mexico

Sand Management Working Group

October 13, 2015

Justin McDonald, P.E.



US Army Corps of Engineers
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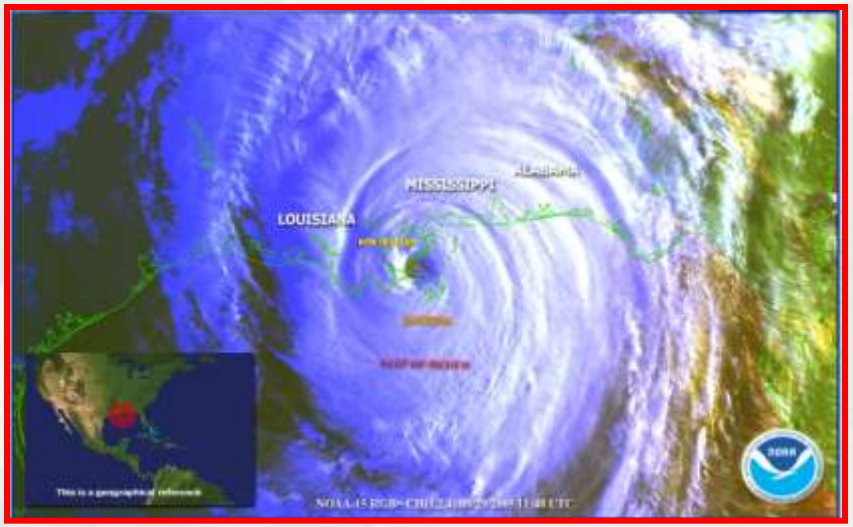
Presentation Outline

- History of the Mississippi Coastal Improvements Program (MsCIP)
- Overview of the Comprehensive Barrier Island Restoration Plan
- Sand Investigations, Borrow Area Design, & Agency Coordination for the Restoration of Ship Island
- Lessons Learned
- Questions



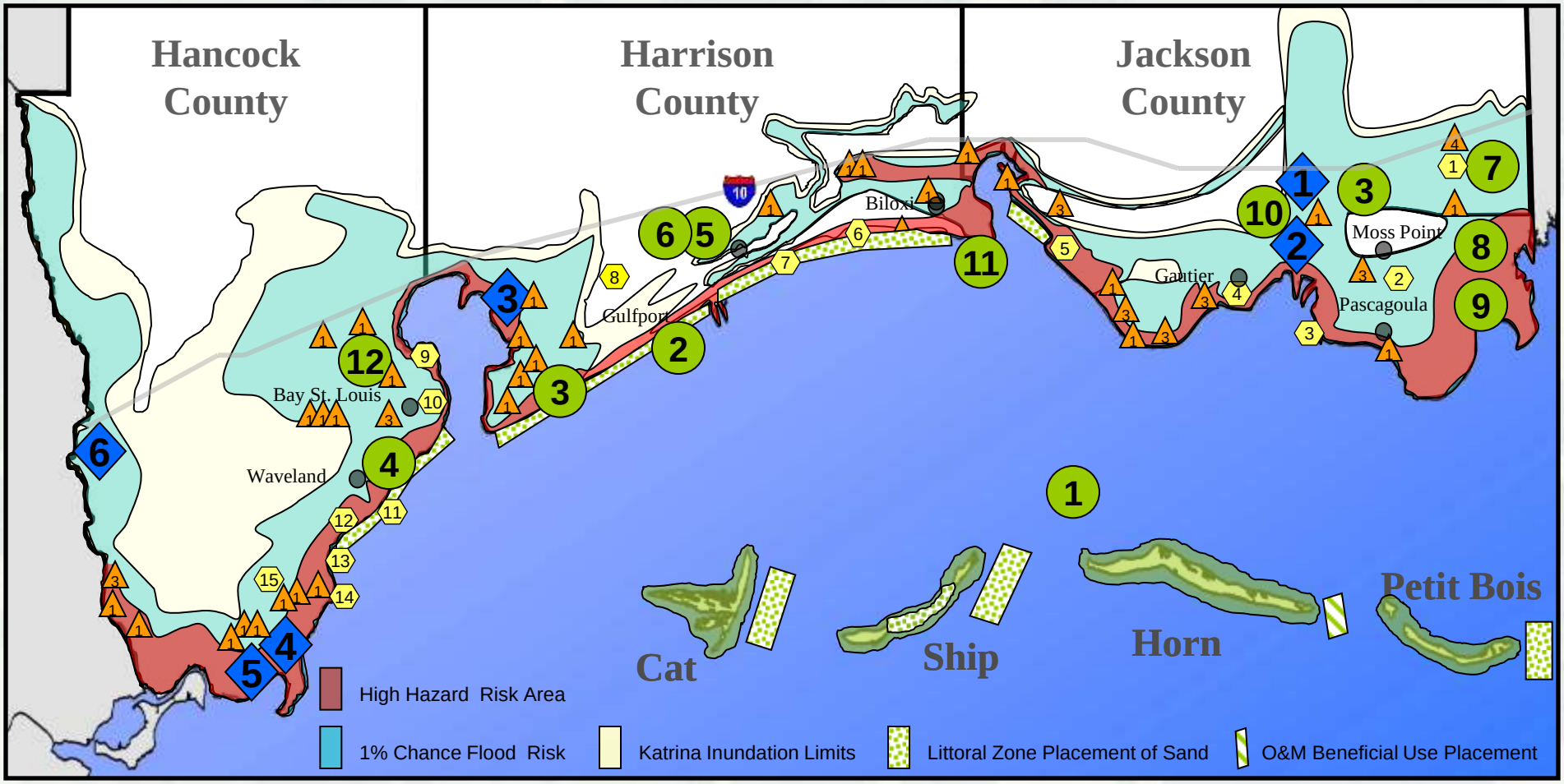
Mississippi Coastal Improvements Program

- P.L. 109-148, 30 December 2005
- Comprehensive Planning to Address
  - Hurricane and Storm Damage Reduction
  - Salt Water Intrusion
  - Shoreline Erosion
  - Fish and Wildlife Preservation
  - Other Water Related Resource Projects
- Cost Effective Projects in lieu of NED benefits
- No Incremental Benefit-Cost Analysis
- Report requirements
  - Interim Report within 6 months
  - Comprehensive Plan within 2 years
- Compatible with State Coastal Restoration Plan

MsCIP Restoration Elements

- ✓ Hurricane / Storm
- ✓ Salt Water Intrusion
- ✓ Shoreline Erosion
- ✓ Fish & Wildlife

Interim Projects | Phase I Projects | Ecosystem Restoration Studies | Other Studies



U.S.ARMY

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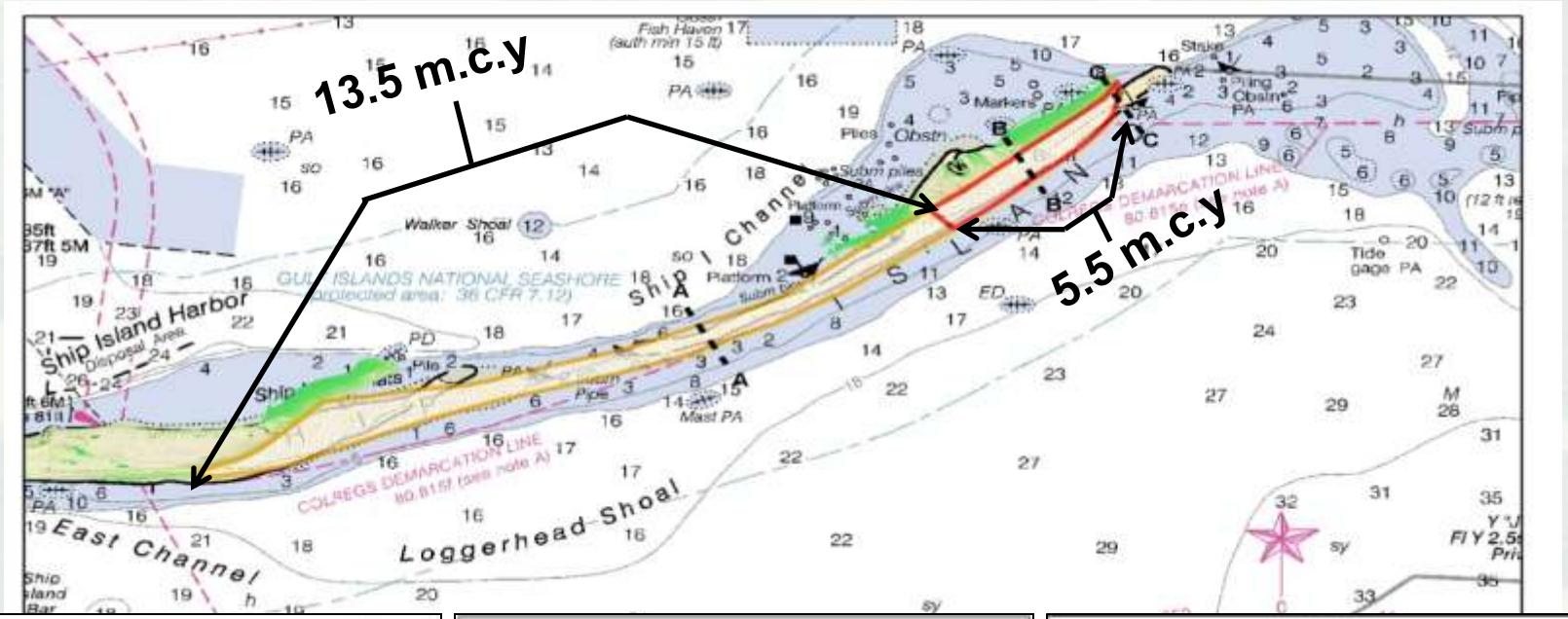
Objectives of Comprehensive Barrier Island Restoration Plan

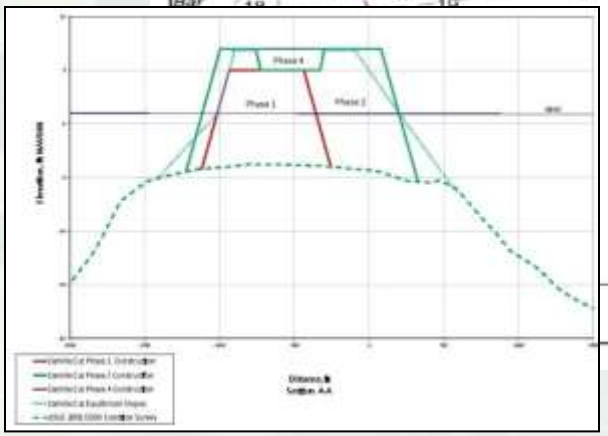
- Restore the barrier islands structure to reduce storm damage impacts on the mainland coast of Mississippi.
- Enhance the long-term littoral drift system for the Mississippi barrier islands.
- Maintain the estuarine ecosystem and resources of the Mississippi Sound.
- Preserve the natural and cultural resources of the Mississippi barrier islands.

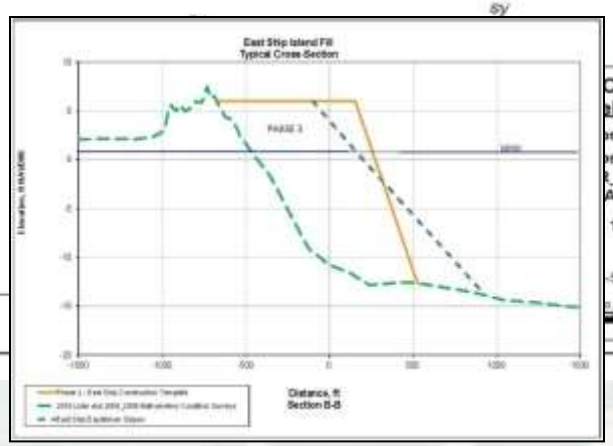
Comprehensive Barrier Island Restoration Plan Components

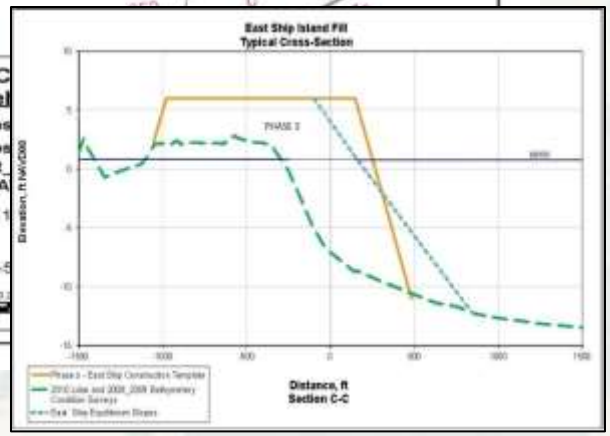
- Sediment budget of barrier island chain
- Eastern shoreline of Cat Island
- Revised dredge material disposal plan for Pascagoula navigation channel
- Northern shoreline of West Ship Island

Ship Island Restoration Design







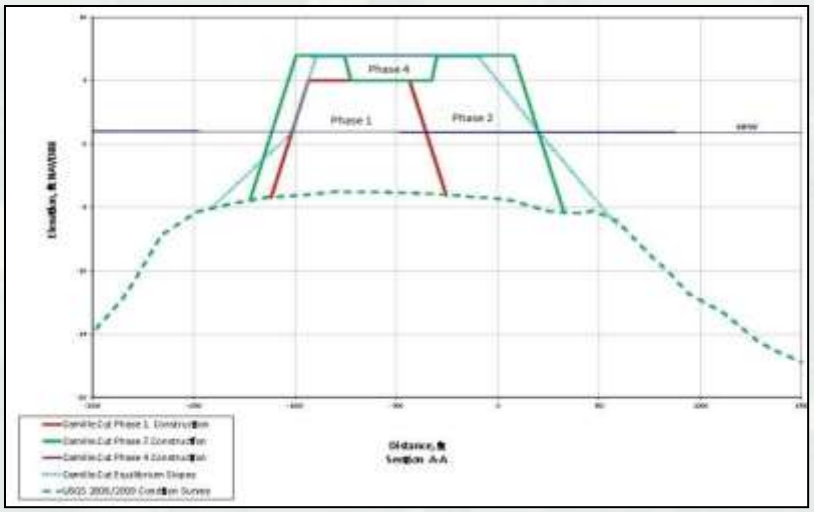


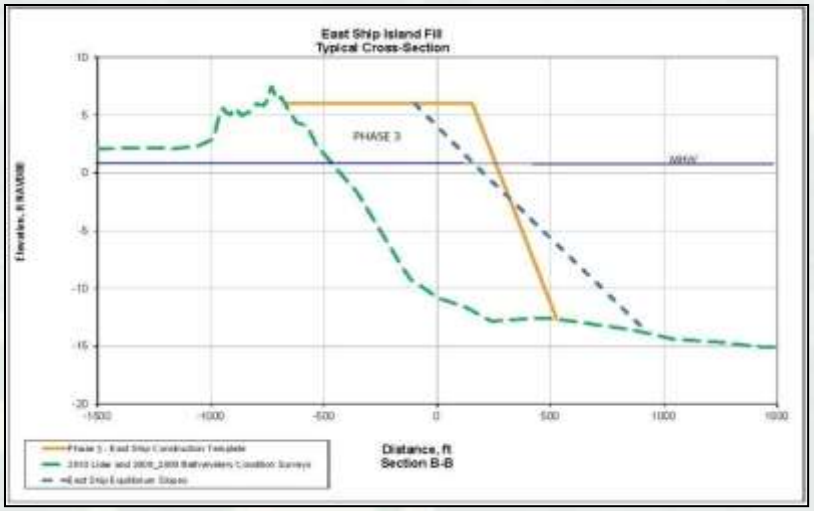
Ship Island Phases of Construction

- Construction Phases
  - Phase 1: (6.9 mcy)
    - Initial closure of Camille Cut
    - Top of Berm = EL. +5 ft NAVD88
    - Crest Width = 500 ft
    - Borrow Sites: PBP OCS East & West, HI Pass, & PBP MS
  - Phase 2 (5.5 mcy)
    - Widen and raise Camille Cut Fill
    - Top of Berm = EL. +7 ft NAVD88
    - Crest Width = 1,000 ft
    - Borrow Site: PBP OCS West
  - Phase 3 (5.5 mcy)
    - East Ship Island
    - Top of Berm = EL. +6 ft NAVD88
    - Crest Width = 1,100 ft
    - Borrow Sites: PBP OCS West & PB AL
  - Phase 4 (1.1 mcy)

    Cap Camille Cut Fill

    Borrow Site: Ship Island

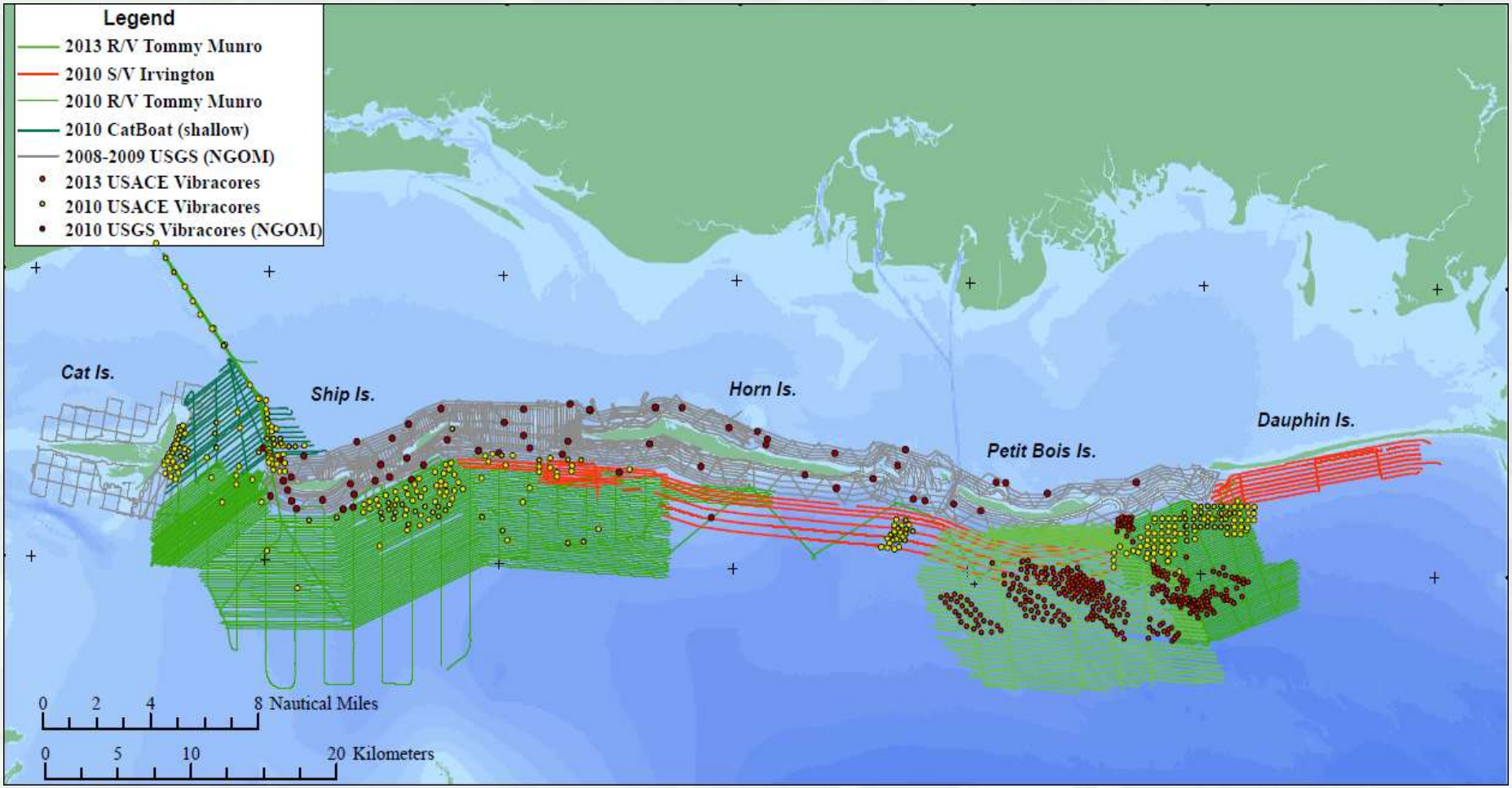




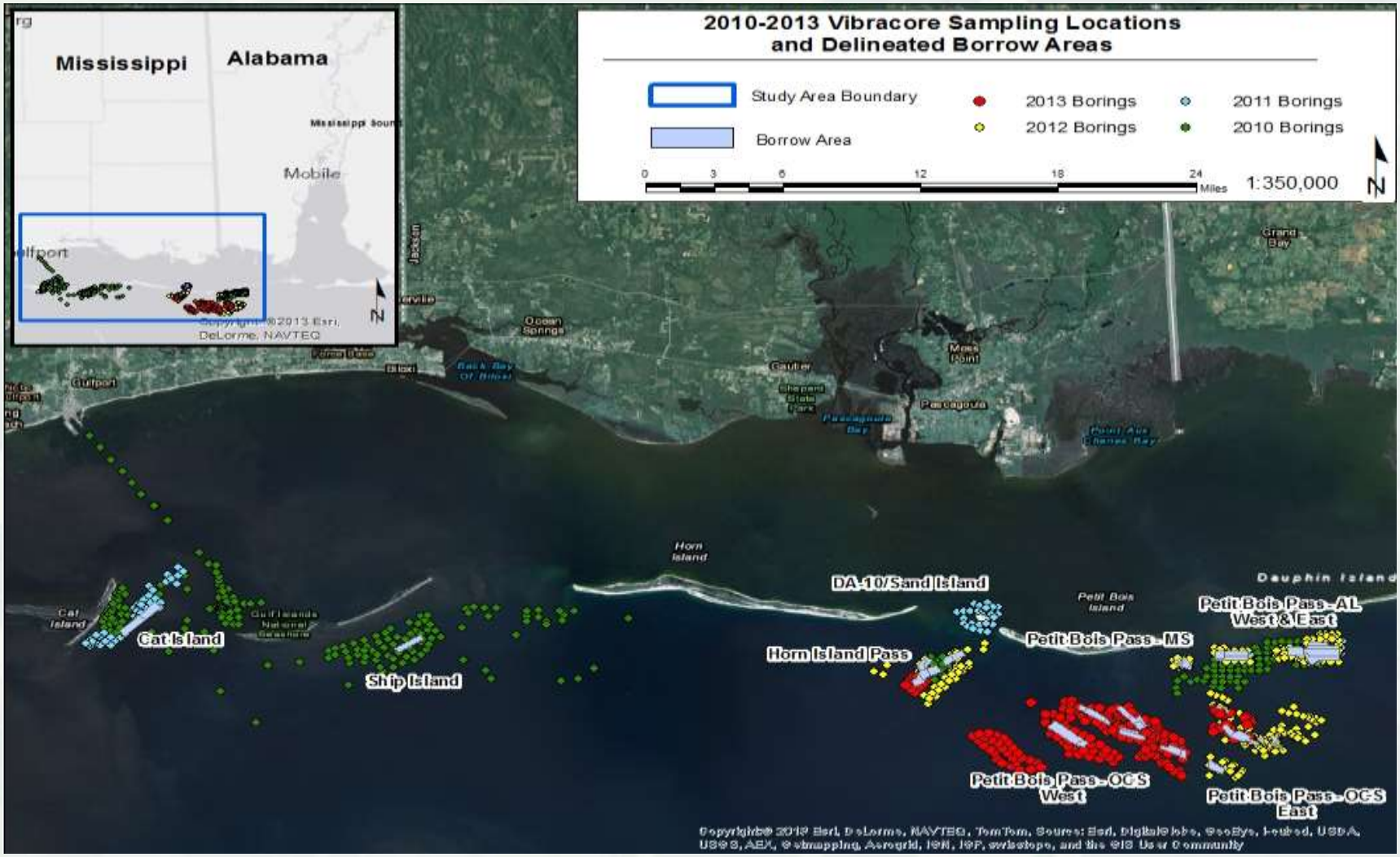
Criteria for Selection of a Borrow Source

- Sand compatibility
  - Particle shape (roundness)
  - Gradation (Avg D_{50} of sand on Ship Island = 0.30 mm)
  - Color
- Out of active littoral transport system
- Minimal wave focusing
- Cost

Geophysical Investigations – USGS & USACE



Geotechnical Investigations & Identified Borrow Sources



Borrow Area Quantities

Borrow Site	D50 (mm)	Required Dredge Volume (mcy)	Allowable Overdetph Volume (mcy)	Distance to Ship Island (miles)
Petit Bois Pass- AL East	0.33	12.0	2.7	37
Petit Bois Pass- AL West	0.31	3.9	1.2	34
Petit Bois Pass- MS	0.31	1.6	0.4	32
Petit Bois Pass- OCS East	0.29	3.0	1.2	35
Petit Bois Pass- OCS West	0.27	10.3	5.1	31
Horn Island Pass	0.29	2.8	2.1	23
Ship Island	0.21	2.1	0.6	3

Agency Coordination Approach

- Developed a multi-agency working group during the project study/EIS phase, starting in 2006, and continued this approach throughout the ongoing SEIS/design phase.
  - USACE, State of Mississippi, NPS, NMFS, FWS, EPA, FEMA, NOAA, NRCS, USGS and BOEM (during SEIS phase)
  - Objective was to be inclusive, transparent, and identify coordination needs/challenges early in the process
    - Weekly meetings with USACE, State of Mississippi, NPS, and USGS
    - Monthly meetings with the other agencies and more frequent coordination as needed
  - Approached MMS (i.e. BOEM) early in the project but decided to search for other sand options due to long approval time (potentially up to 5 years)
  - Ultimately, due to inability to locate adequate quantities of suitable sand in state waters, re-engaged with BOEM during expansion of sand investigation to the OCS
    - Worked closely with BOEM and USGS to target priority areas for additional geophysical and geotechnical investigations.
    - Very successful. Identified approximately 19.6 mcy of suitable sand.

Lessons Learned

1. Thoroughly investigate viability of all borrow options early during project development.
   - Understand challenges associated with location/ownership of sand resources and what it could mean to the execution of your project
2. Communicate early and often with all agencies/partners involved
   - Extremely helpful in building trust, identifying compliance/monitoring needs, and communicating the realities associated with the construction of large, complex dredging projects
3. Perform cultural resource surveys of borrow and placement sites immediately upon identification of the areas
   - Critical for identifying access corridors at placement site and ensuring the available quantities can be retrieved from borrow sites
4. Hold industry days to solicit feedback from the dredging industry during the project design
   - Allow contractors the opportunity for one-on-one feedback sessions

Lessons Learned (cont'd)

5. Understand risks associated with not thoroughly investigating viability of borrow sites during the feasibility phase of a project
   - Challenge with the new USACE "SMART" planning process. Risk is accounted for through higher construction cost contingencies resulting in lower benefit to cost ratios.
   - Will likely result in supplemental coordination for NEPA documents.

NATIONAL PARK SERVICE

US Army Corps of Engineers
South Atlantic Division

THE GREAT SEAL OF THE STATE OF MISSISSIPPI

US Army Corps of Engineers
Mobile District

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

U.S. DEPARTMENT OF HOMELAND SECURITY
FEMA

collaboration is everything

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

USDA NRCS Natural Resources Conservation Service

MsCIP
Mississippi Coastal Improvements Program

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

USGS
science for a changing world

US Army Corps of Engineers
Huntington District

BOEM
Bureau of Ocean Energy Management

U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER
CERL TEC ITL CRREL ERDC EL

U.S.ARMY

BUILDING STRONG®

QUESTIONS??

NRDA Caillou Lake Headlands Restoration Project (TE-100)

Greg Grandy[1] and Devyani Kar[2]

1 Coastal Engineering Consultants, Inc., Baton Rouge, LA
2 Louisiana Coastal Protection and Restoration Authority, Baton Rouge, LA

committed to **our coast**

FUNDING AGENCIES – CLIENT – LANDOWNER

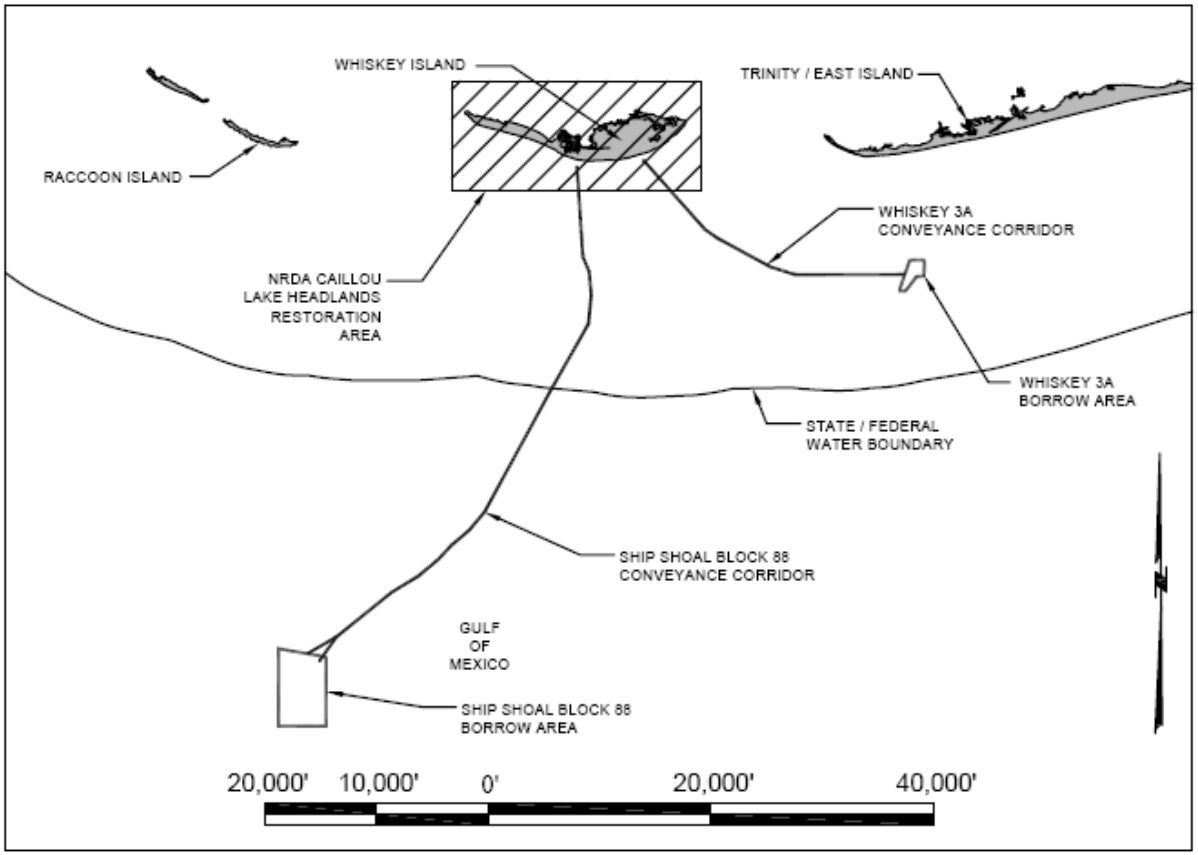
DESIGN TEAM

NRDA Caillou Lake Headlands

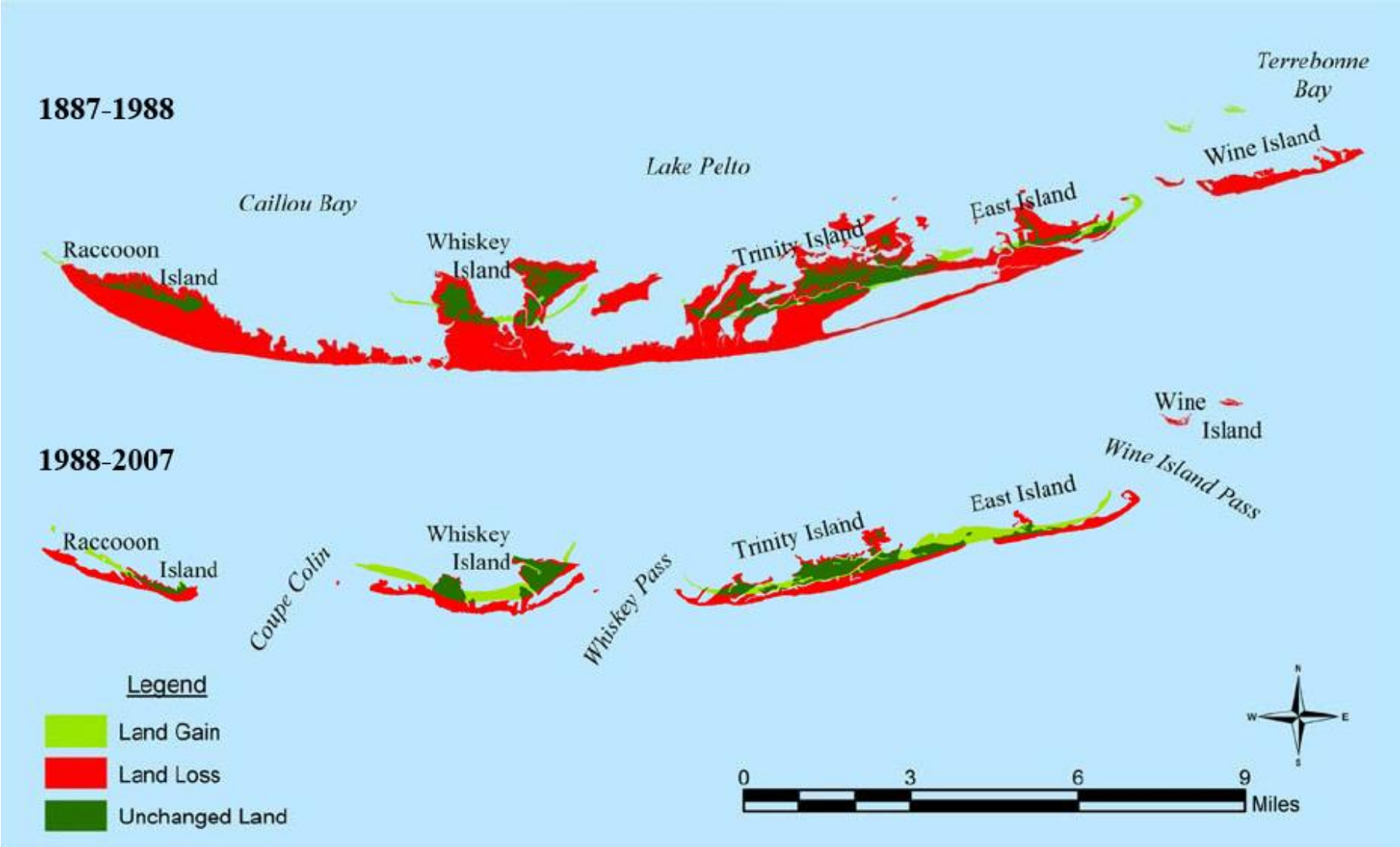
Project Information

- Originally Recommended Through LCA Terrebonne Basin Barrier Shoreline Feasibility Study (TBBSR) as the first component for construction of the National Ecosystem Restoration (NER) Plan.
- Engineering and Design: 2012-2015
- Project Footprint:
  - Approximately 754 ac. Beach/Dune Habitat Restoration
  - Approximately 178 ac. Marsh Habitat Restoration
- Bureau of Ocean Energy Management Sand Lease: Spring 2015.
- Bid Opening: September 2, 2015
- Anticipated Construction NTP: Fall 2015.

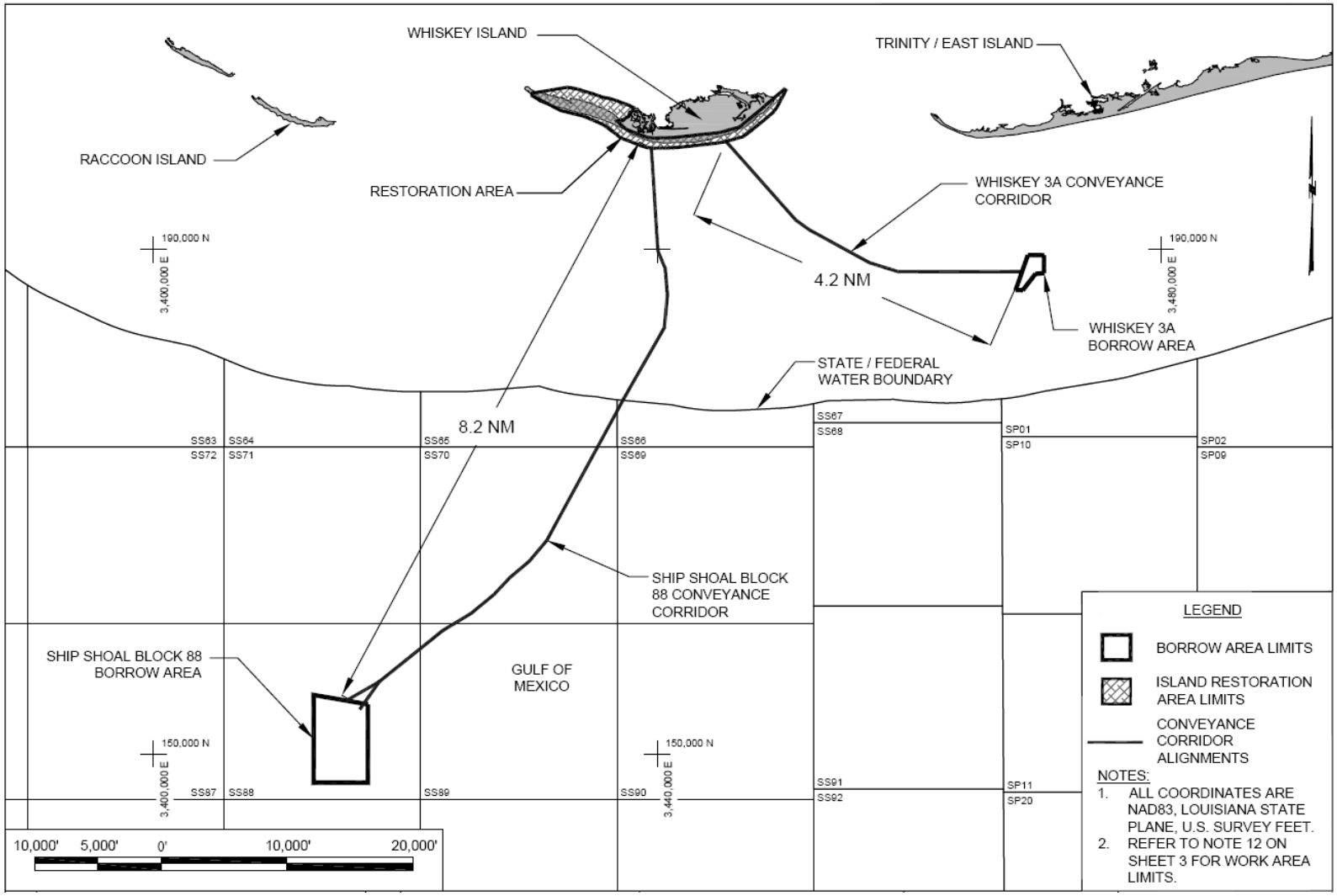
PROJECT VICINITY MAP



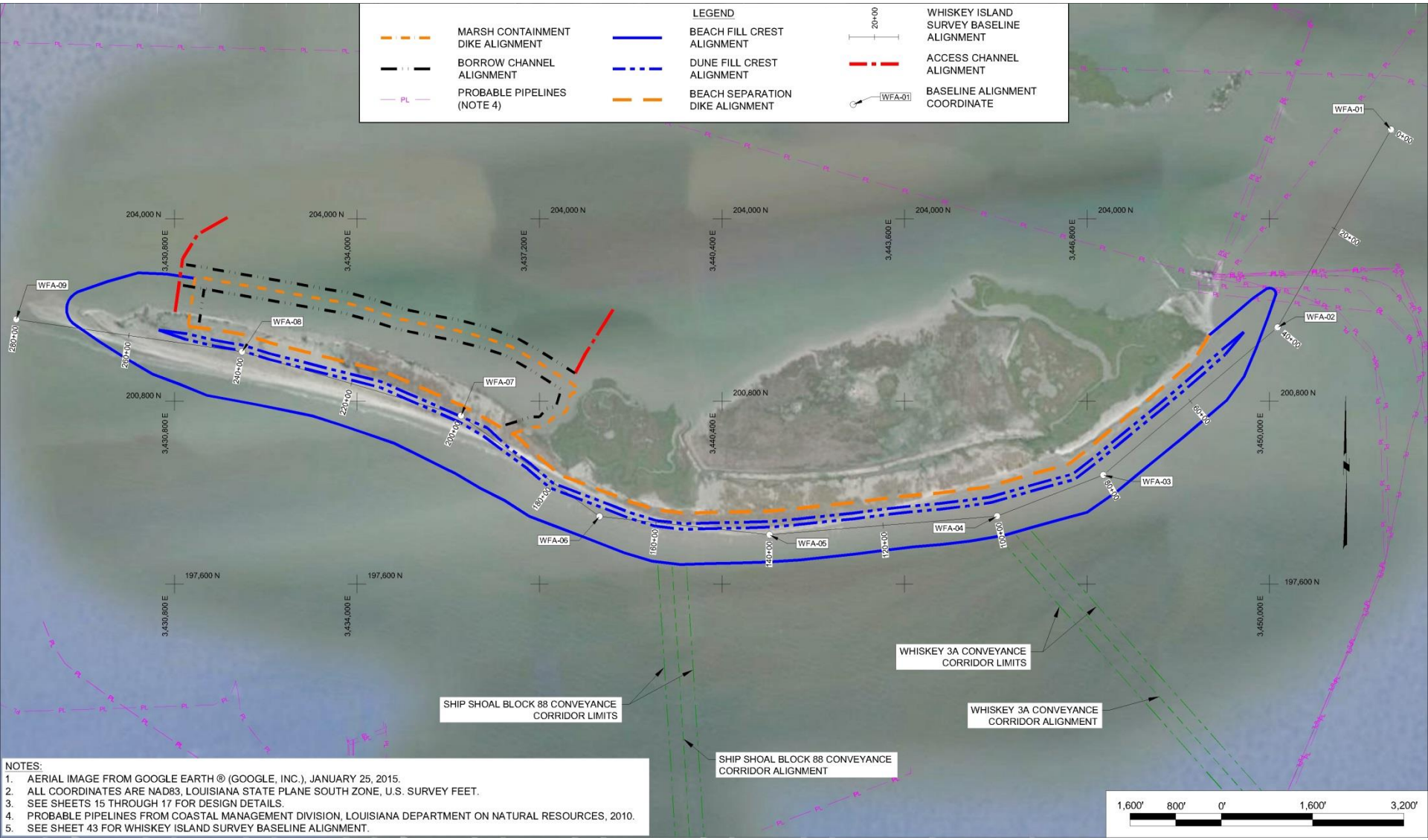
LAND LOSS MAP



CAILLOU LAKE HEADLANDS PROJECT
OVERVIEW MAP



RESTORATION AREA PLAN VIEW



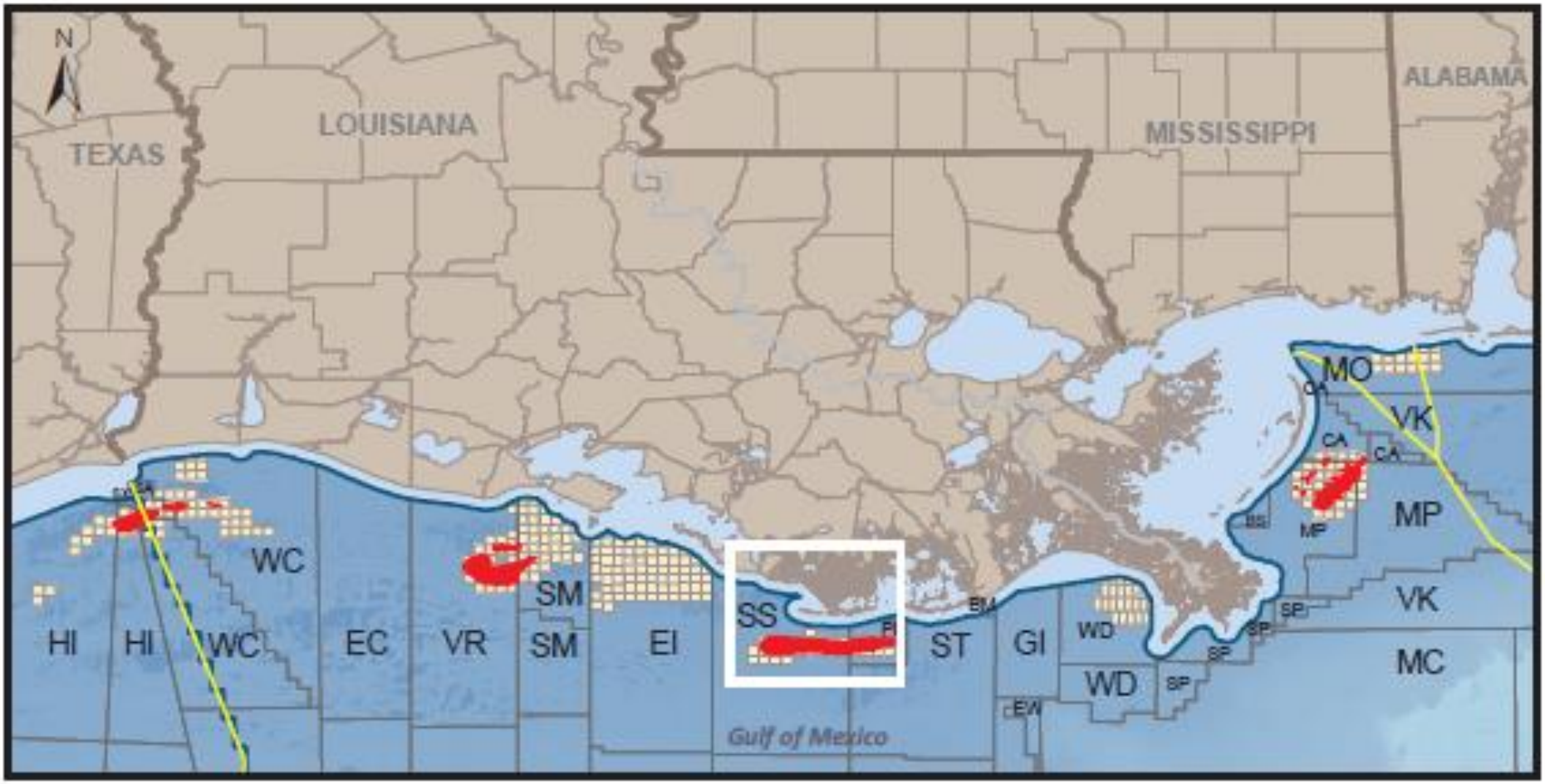
NOTES:
1. AERIAL IMAGE FROM GOOGLE EARTH ® (GOOGLE, INC.), JANUARY 25, 2015.
2. ALL COORDINATES ARE NAD83, LOUISIANA STATE PLANE SOUTH ZONE, U.S. SURVEY FEET.
3. SEE SHEETS 15 THROUGH 17 FOR DESIGN DETAILS.
4. PROBABLE PIPELINES FROM COASTAL MANAGEMENT DIVISION, LOUISIANA DEPARTMENT ON NATURAL RESOURCES, 2010.
5. SEE SHEET 43 FOR WHISKEY ISLAND SURVEY BASELINE ALIGNMENT.

Summary of Estimated Quantities

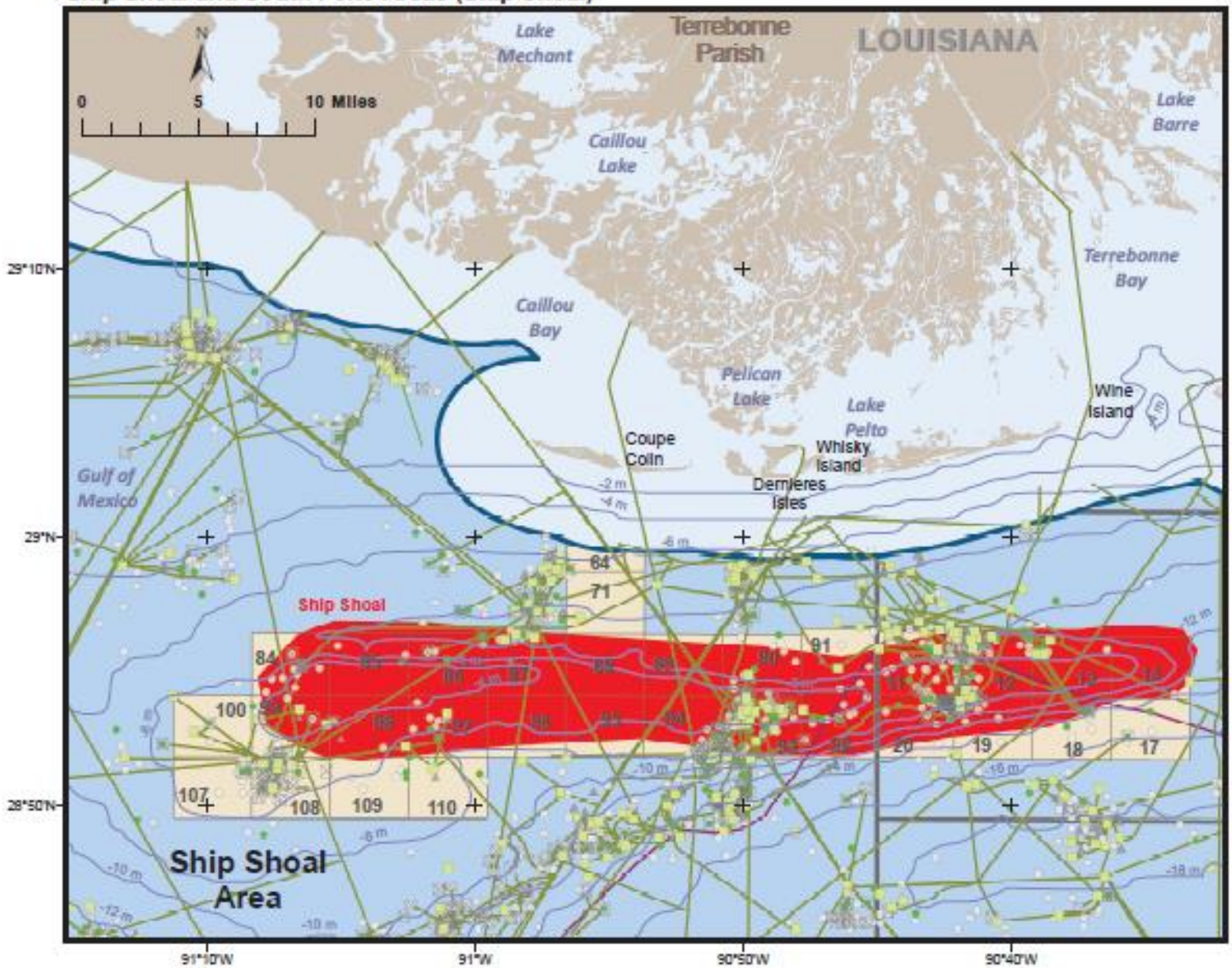
• Beach/Dune Fill:	9.4M CY (Cut)
• Marsh Creation:	1.0M CY (Cut)
• Beach/Dune Separation Dike:	19,600 LF
• Marsh Containment Dike:	9,530 LF
• Settlement Plates	10
• Sand Fencing	22,200 LF

Bureau of Ocean Energy Management
Gulf of Mexico Region
Significant Outer Continental Shelf Sediment Resources

Marine Minerals Program
www.boem.gov/Non-Energy-Minerals/
Managing-Multiple-Uses-in-the-Gulf-of-Mexico.aspx



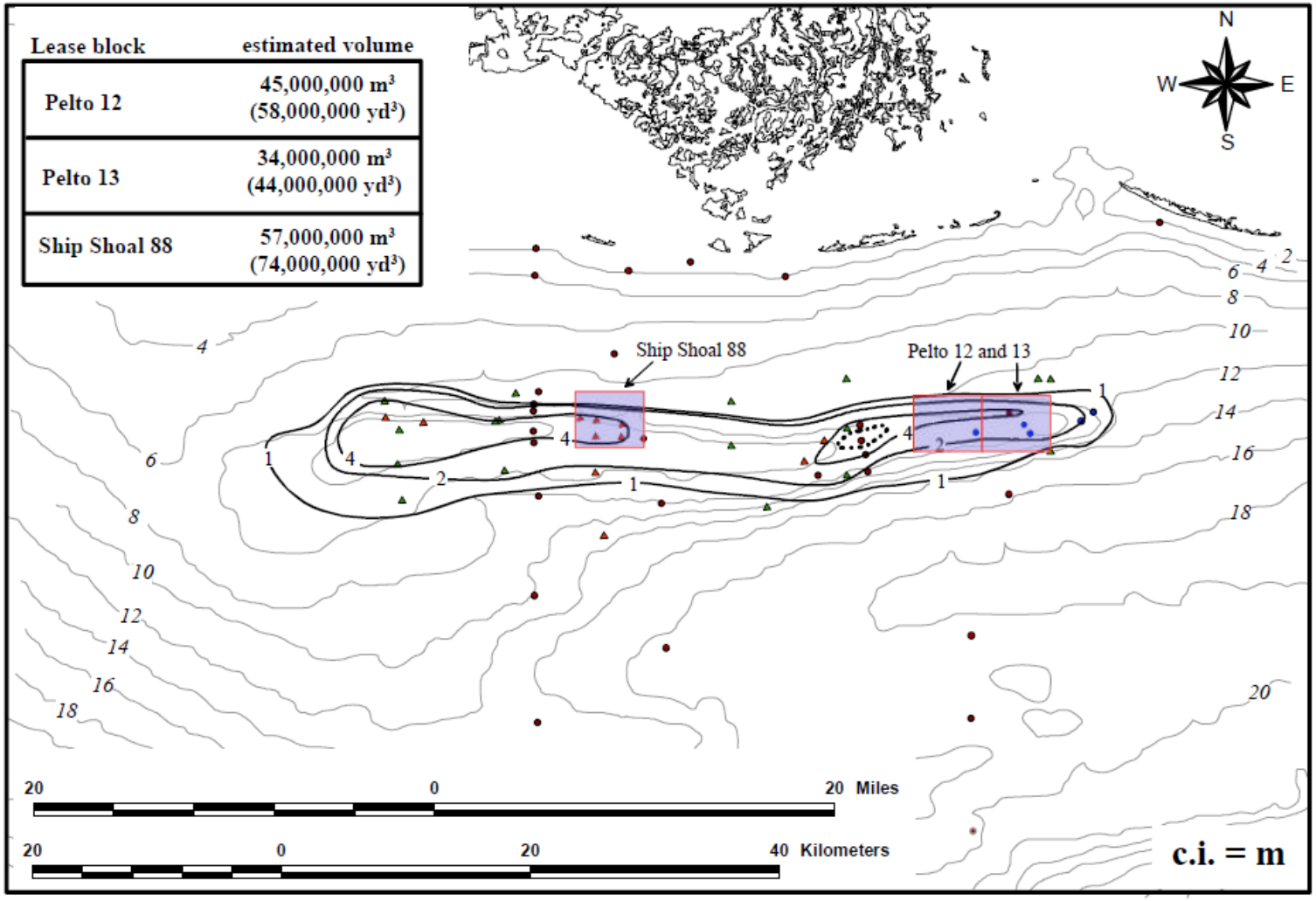
Ship Shoal and South Pelto Areas (Ship Shoal)



PREVIOUS STUDIES

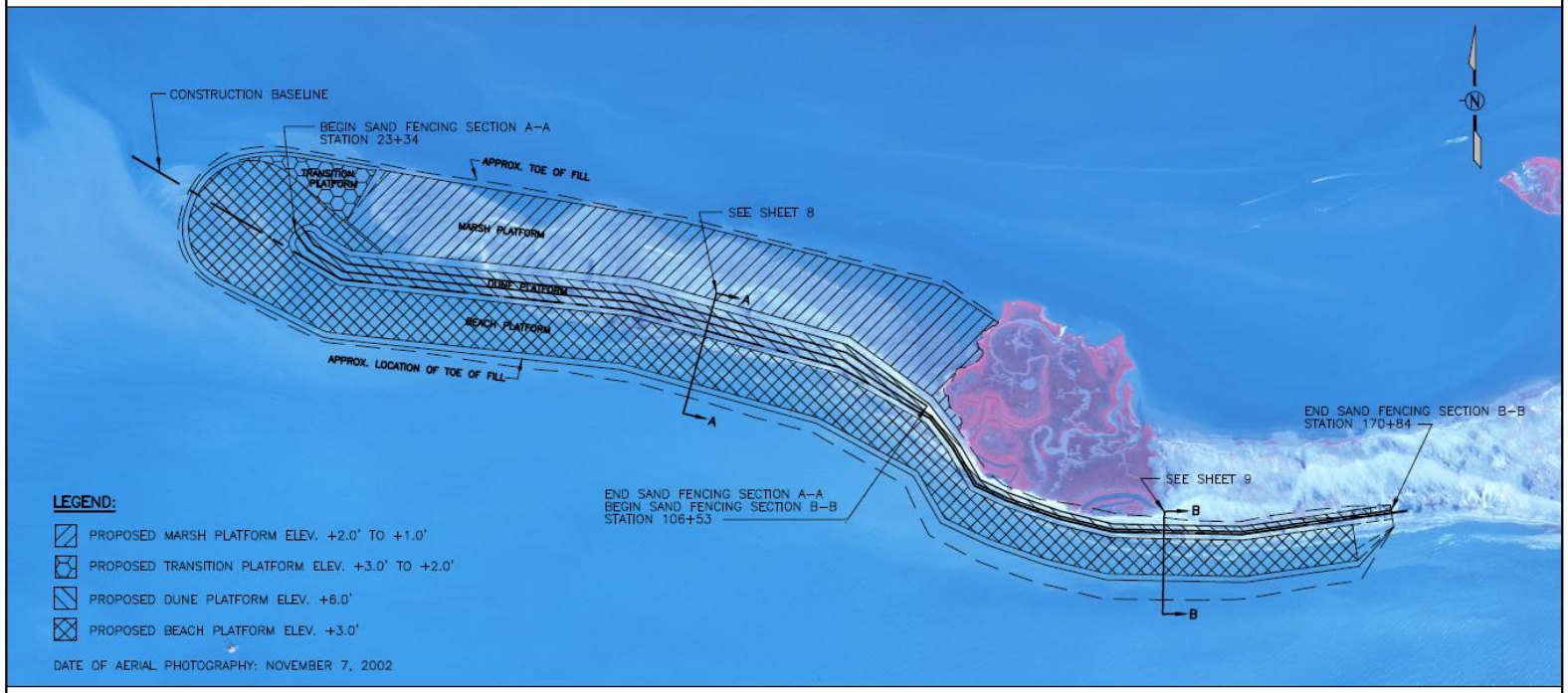
- Penland et al, 1989. Holocene Sand Shoals Offshore of the Mississippi River Delta Plain.
- Ramsey and Penland, 1991.Geologicl Framework and Sand Resource of Ship Shoal, Northern Gulf of Mexico Exclusive Economic Zone.
- Kulp et al, 2001. Ship Shoal: Sand Resource Synthesis Report.
- Louisiana Geological Survey conducted seismic surveys in the 1980s.
- Louisiana Geological Survey collected vibracores in 1983, 1986, and 1993
- USGS collected vibracores in 2001.

Isopachous Map of the Ship Shoal Sand Body (Kulp et al. 2001. Figure 19)



WHISKEY WEST FLANK PROJECT

CWPPRA TE-47



HORIZONTAL GRAPHIC SCALE

1200' 600' 0' 1200' 2400'

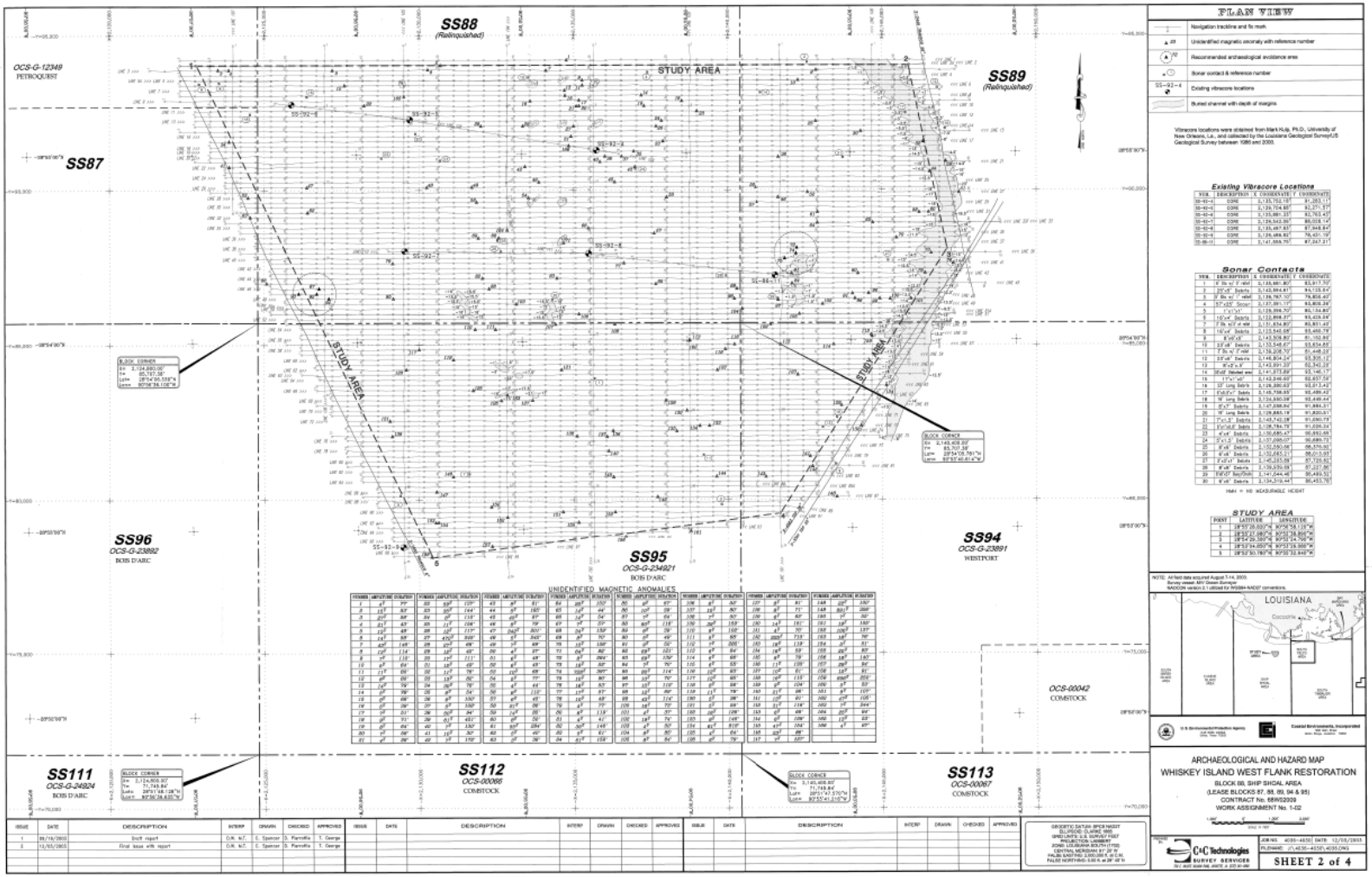
REV.	DATE	DESCRIPTION	BY

DMJM HARRIS
1555 POYDRAS ST. - SUITE 1860
NEW ORLEANS, LOUISIANA 70112
PHONE: (504) 529-4533 FAX: (504) 522-2085
DRAWN BY: J. SCHEXNAYDER DESIGNED BY: J. LOUP

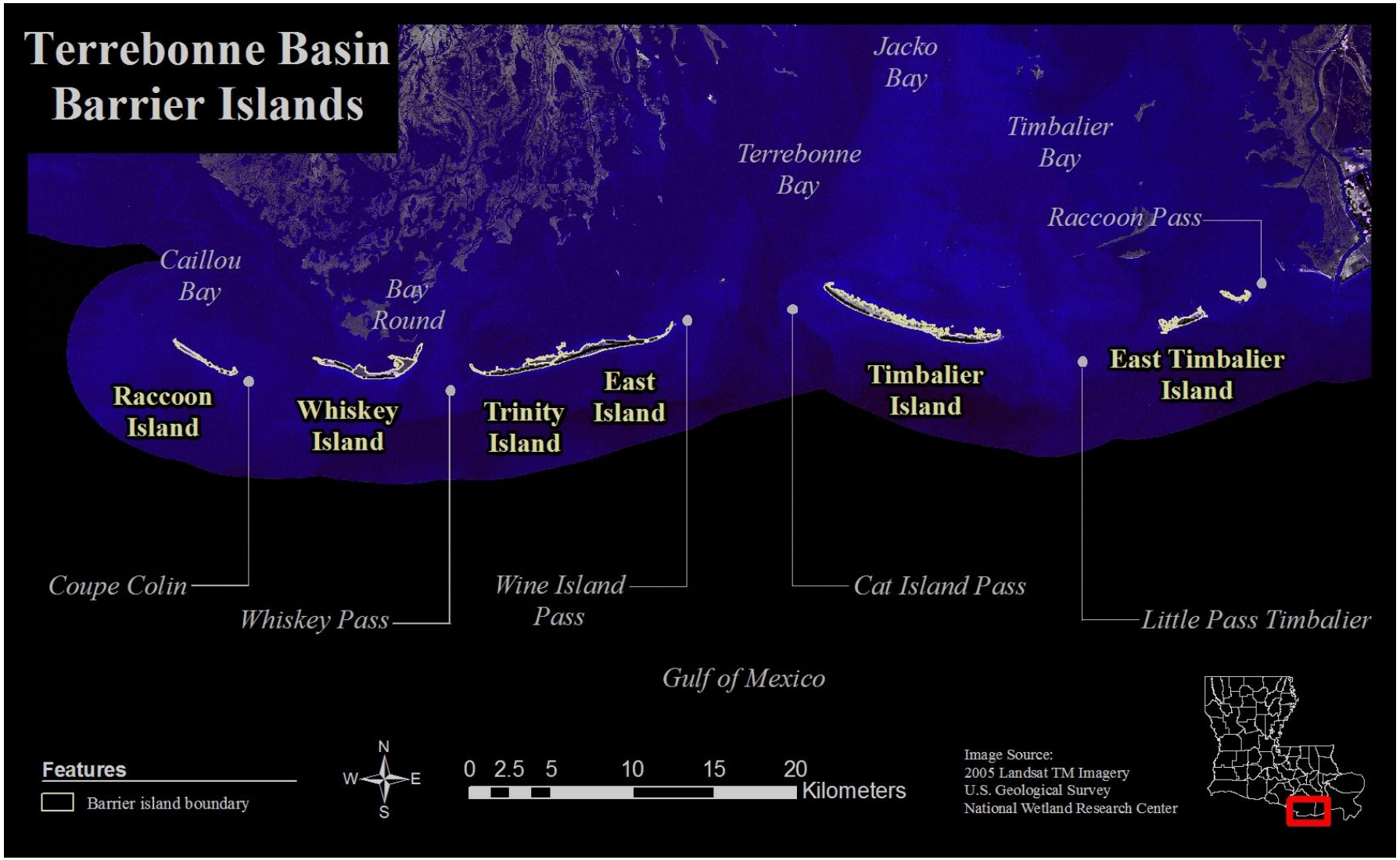
SHIP SHOAL - WHISKEY ISLAND WEST FLANK RESTORATION
STATE PROJECT NUMBER: TE - 47
FEDERAL PROJECT NUMBER: TE - 47
APPROVED BY: PRELIMINARY

SAND FENCE LAYOUT
DATE: APRIL 2005
SHEET 7 OF 24

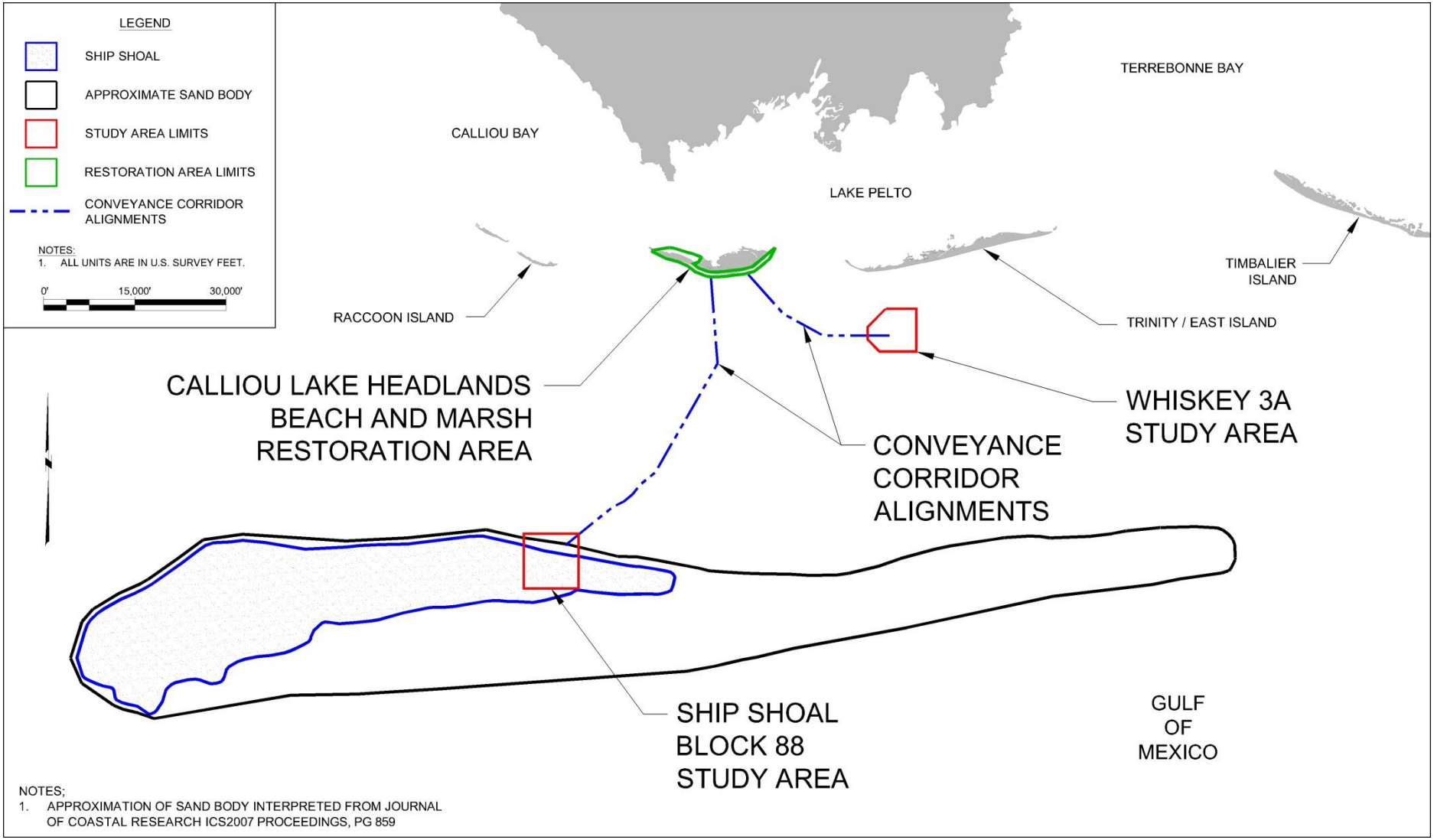
TE47 Geophysical Survey of Ship Shoal (C&C Technologies, 2003)



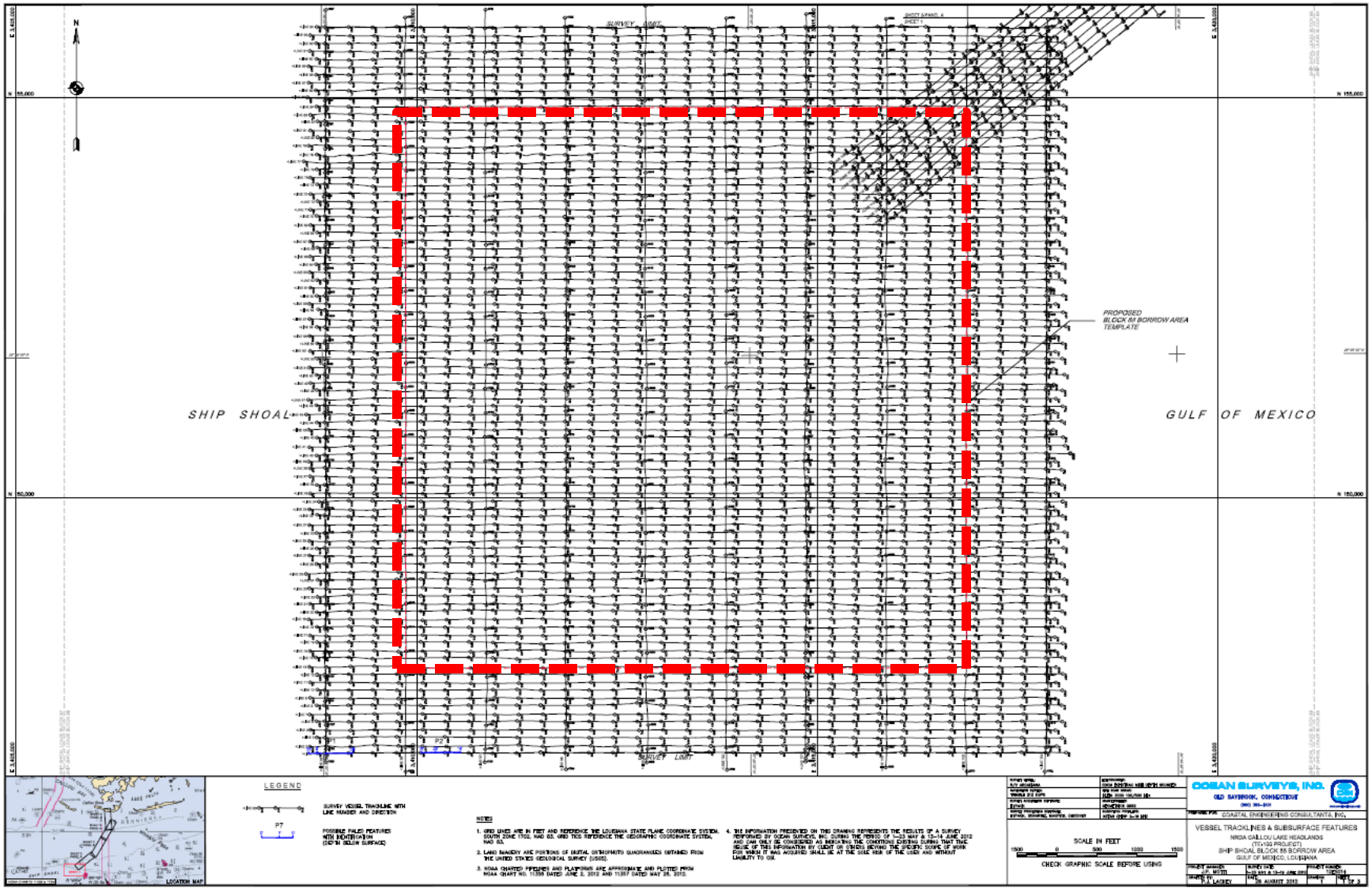
LCA TBBSR Study Area Map



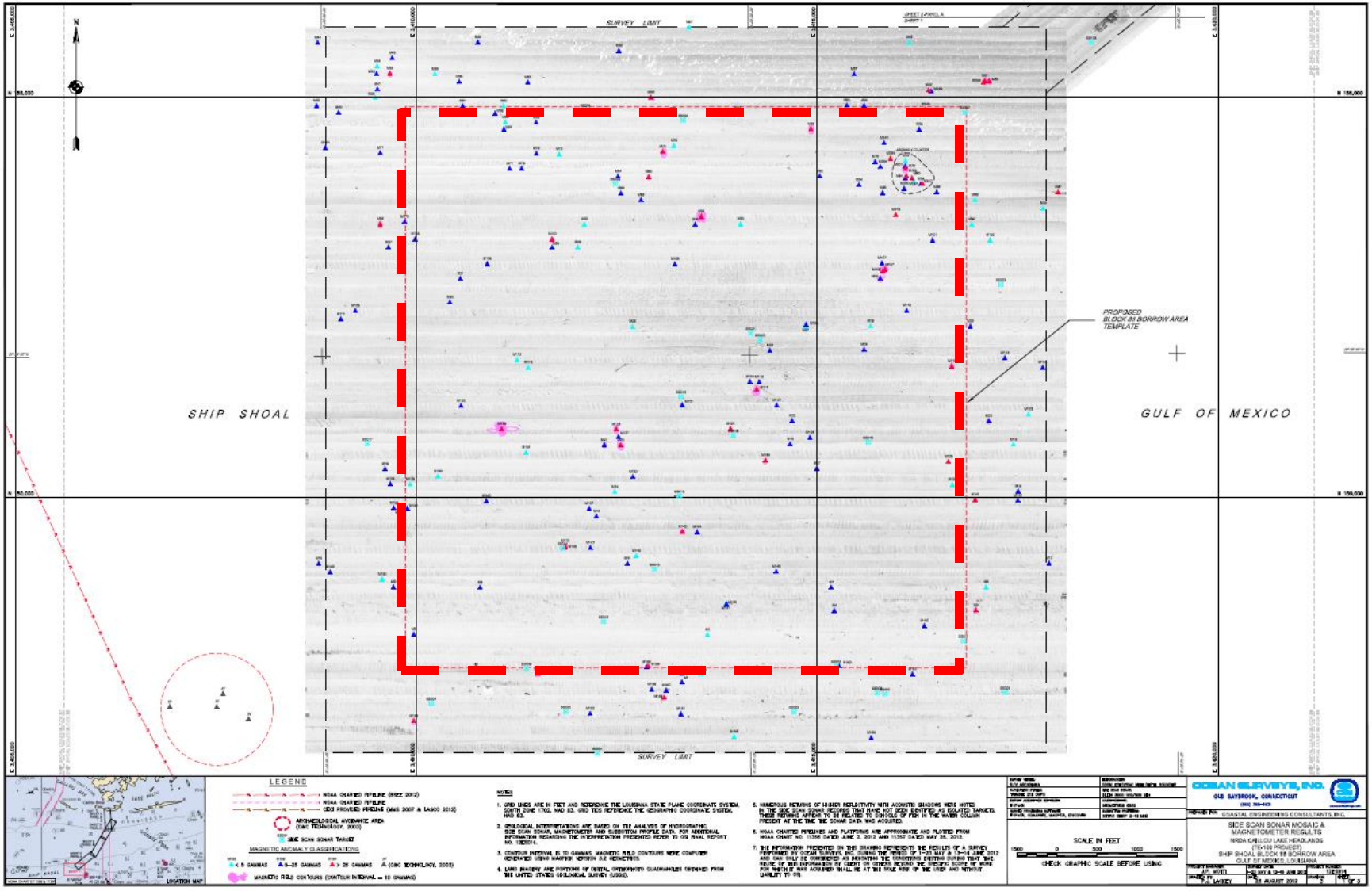
OVERVIEW MAP



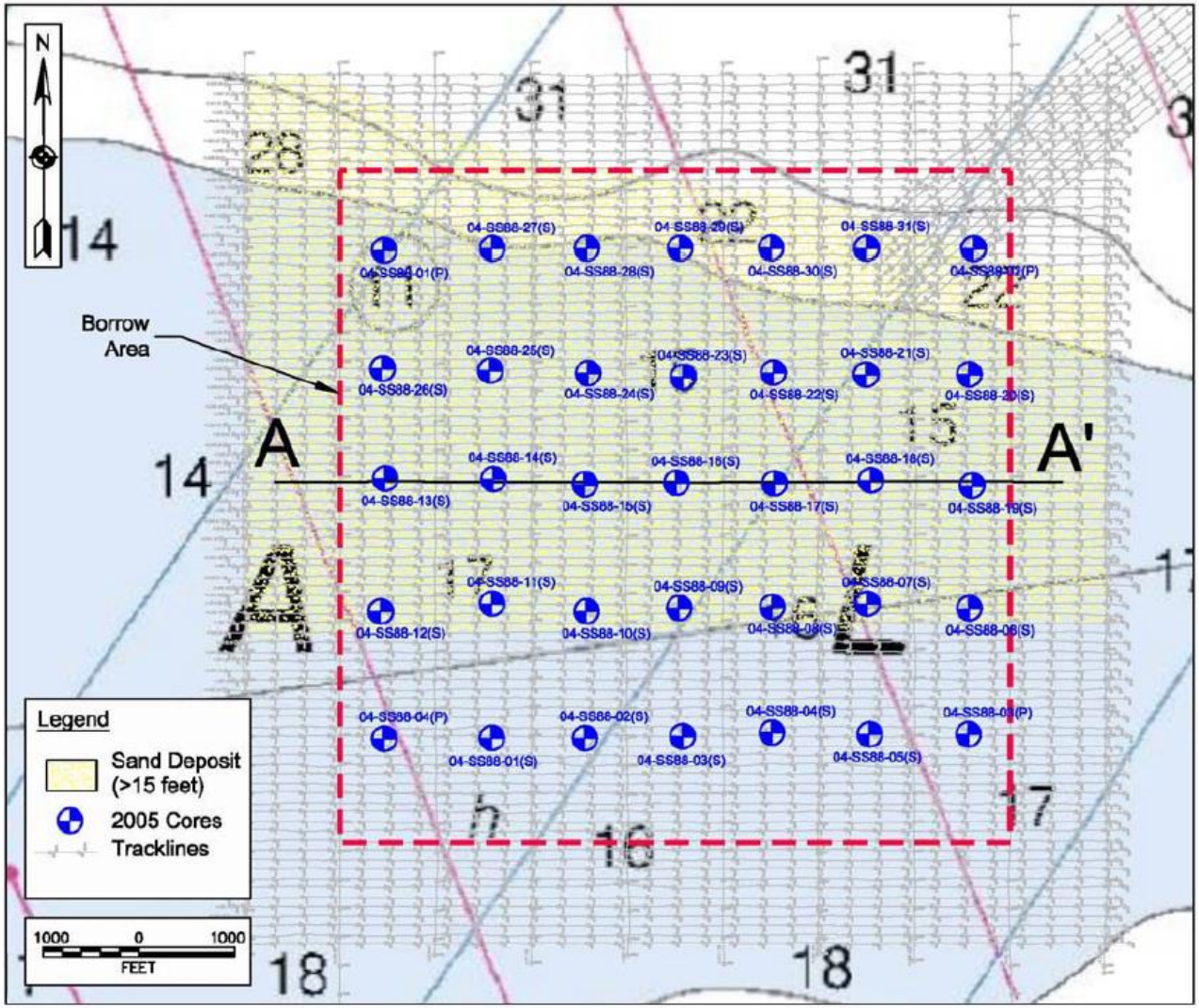
TE-100 SS Block 88 Survey Track Lines



TE-100 SS Block 88 Side Scan Sonar



TE-100 SS Block 88 Area Plan View



TE-100 SS Block 88 Geologic Sections

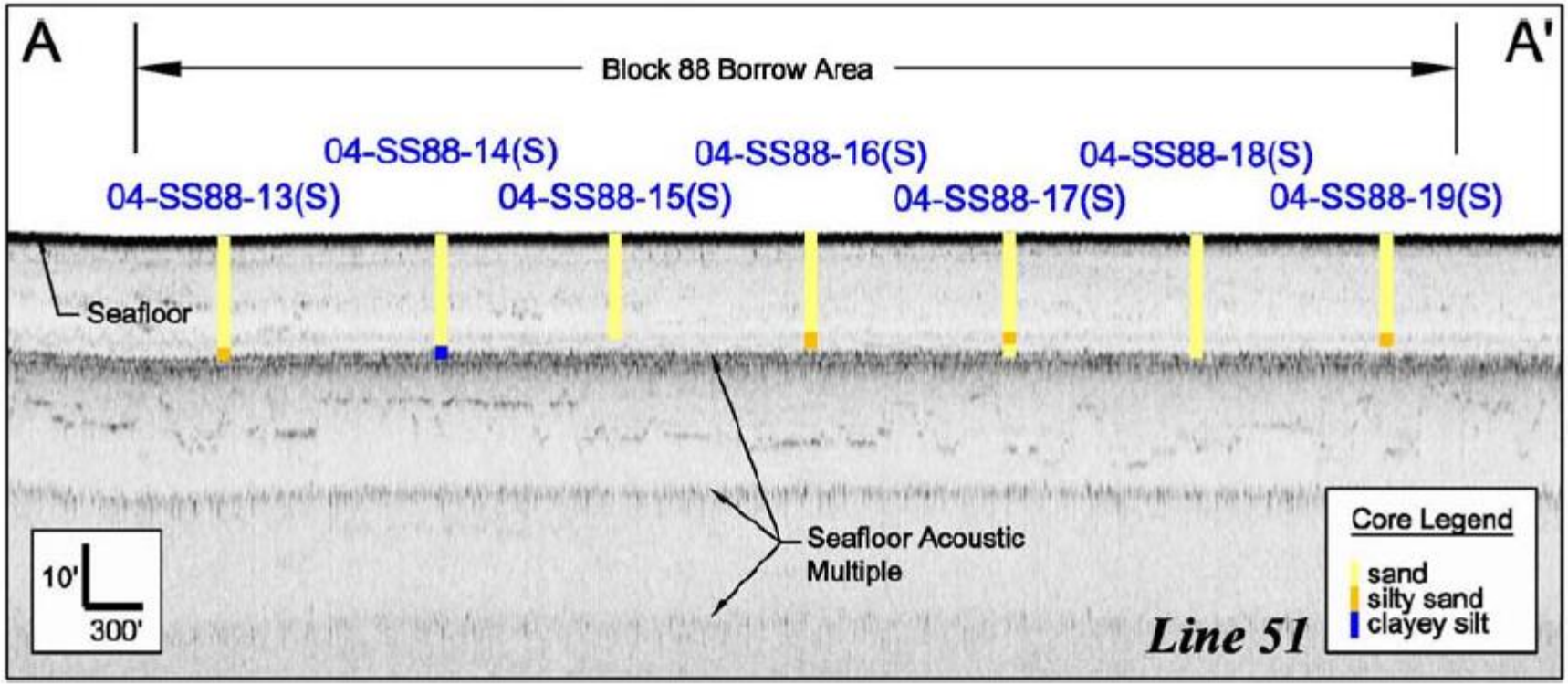
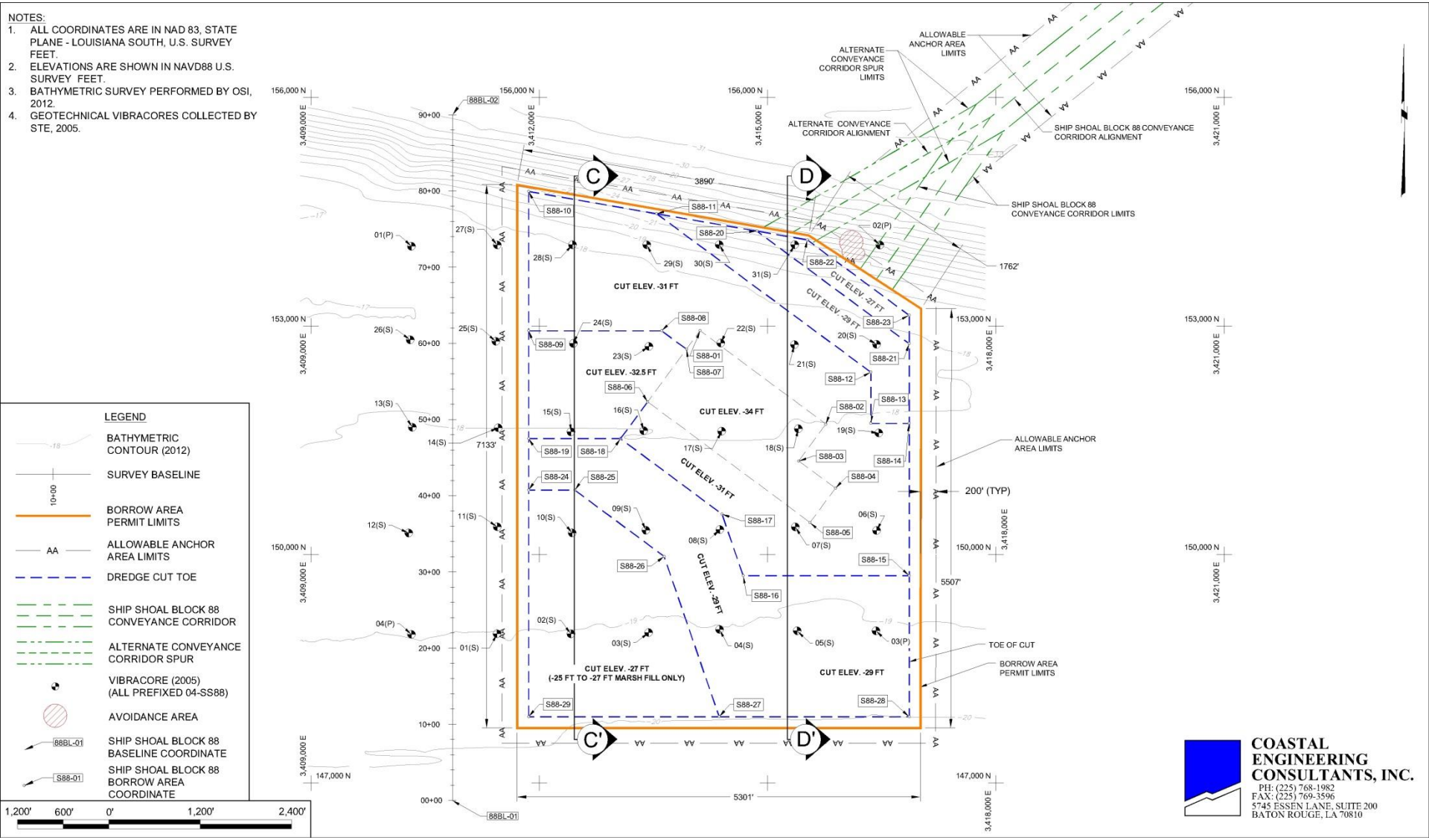
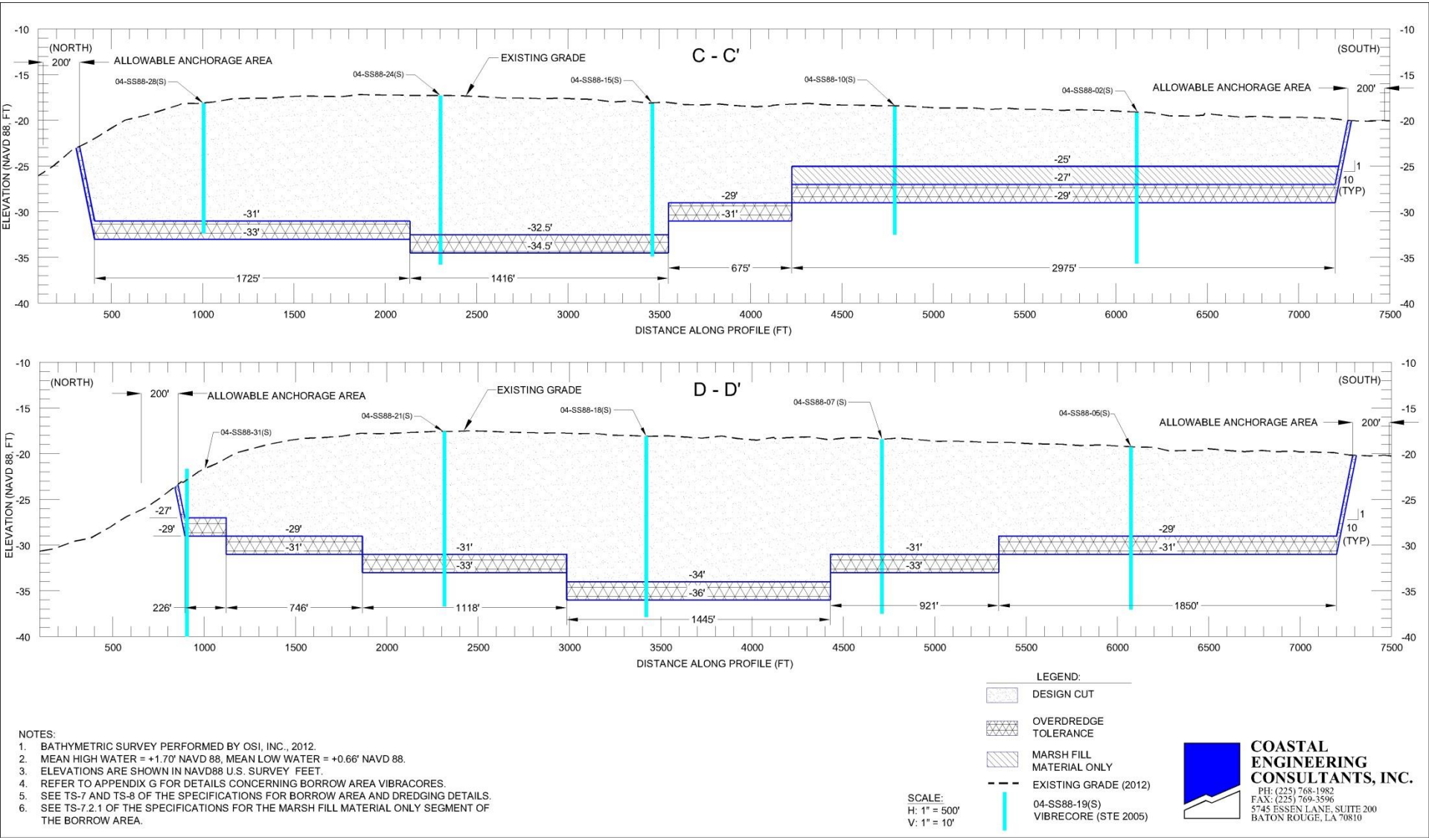


Figure 10. (Upper) Plan view layout of tracklines, historic vibratory cores, and alignment of Transect A-A'. Area highlighted in yellow is thickest surficial sand identified using historic core and subbottom profiler data. (Lower) Transect A-A' Line 51 subbottom profile with 2005 vibratory cores overlain.

BORROW AREA PLAN



BORROW AREA SECTIONS



NOTES:
1. BATHYMETRIC SURVEY PERFORMED BY OSI, INC., 2012.
2. MEAN HIGH WATER = +1.70' NAVD 88, MEAN LOW WATER = +0.66' NAVD 88.
3. ELEVATIONS ARE SHOWN IN NAVD88 U.S. SURVEY FEET.
4. REFER TO APPENDIX G FOR DETAILS CONCERNING BORROW AREA VIBRACORES.
5. SEE TS-7 AND TS-8 OF THE SPECIFICATIONS FOR BORROW AREA AND DREDGING DETAILS.
6. SEE TS-7.2.1 OF THE SPECIFICATIONS FOR THE MARSH FILL MATERIAL ONLY SEGMENT OF THE BORROW AREA.

TE-100 SS Block 88 Conveyance Corridor

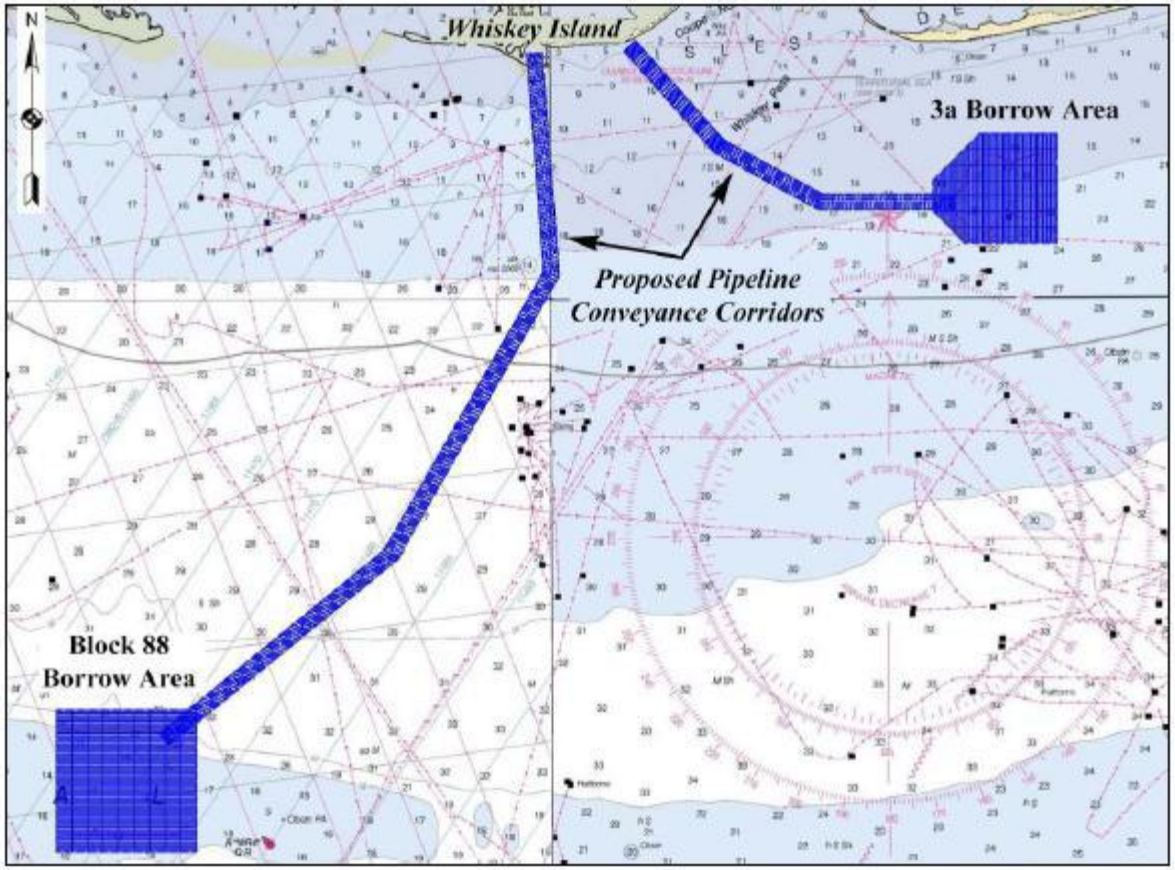
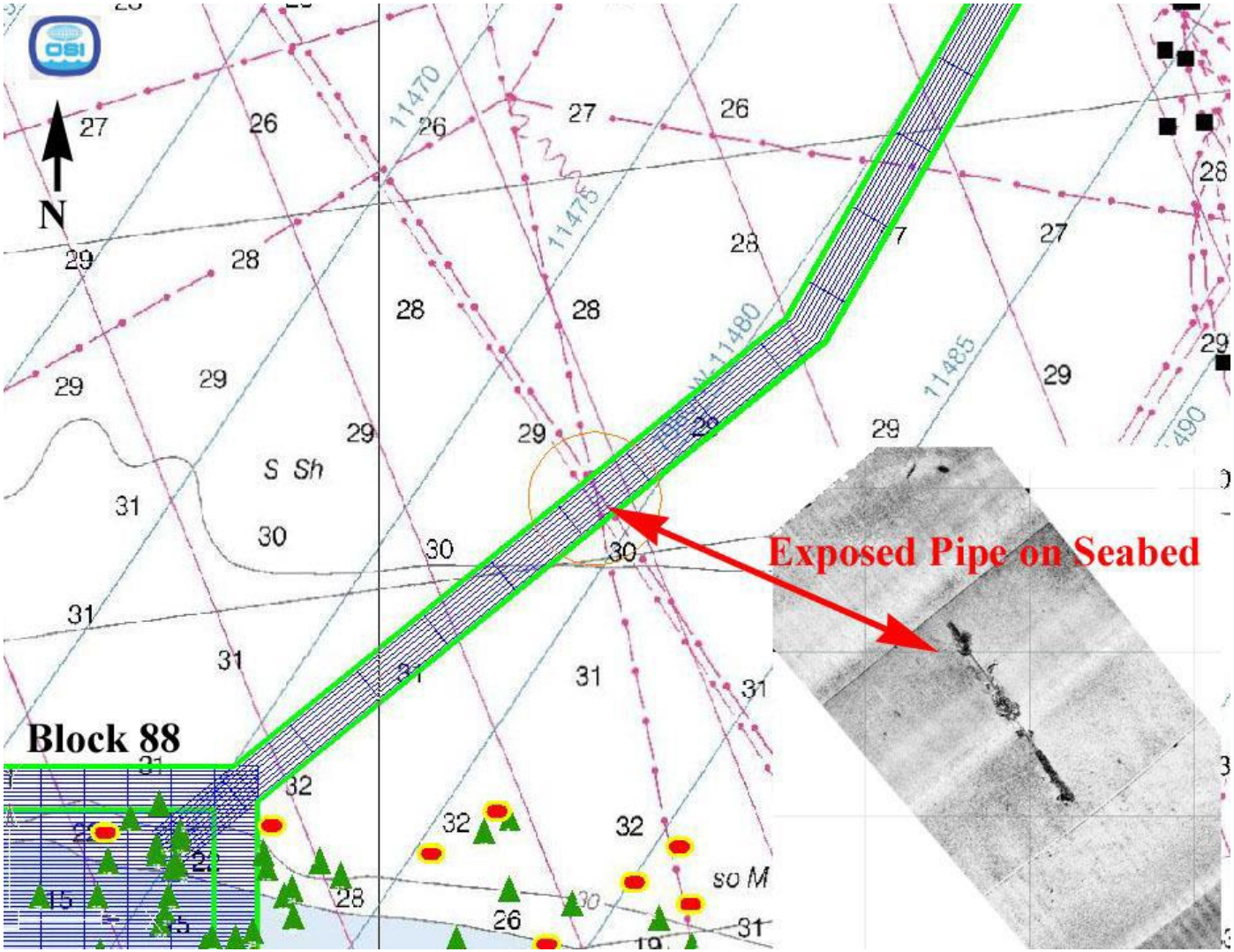
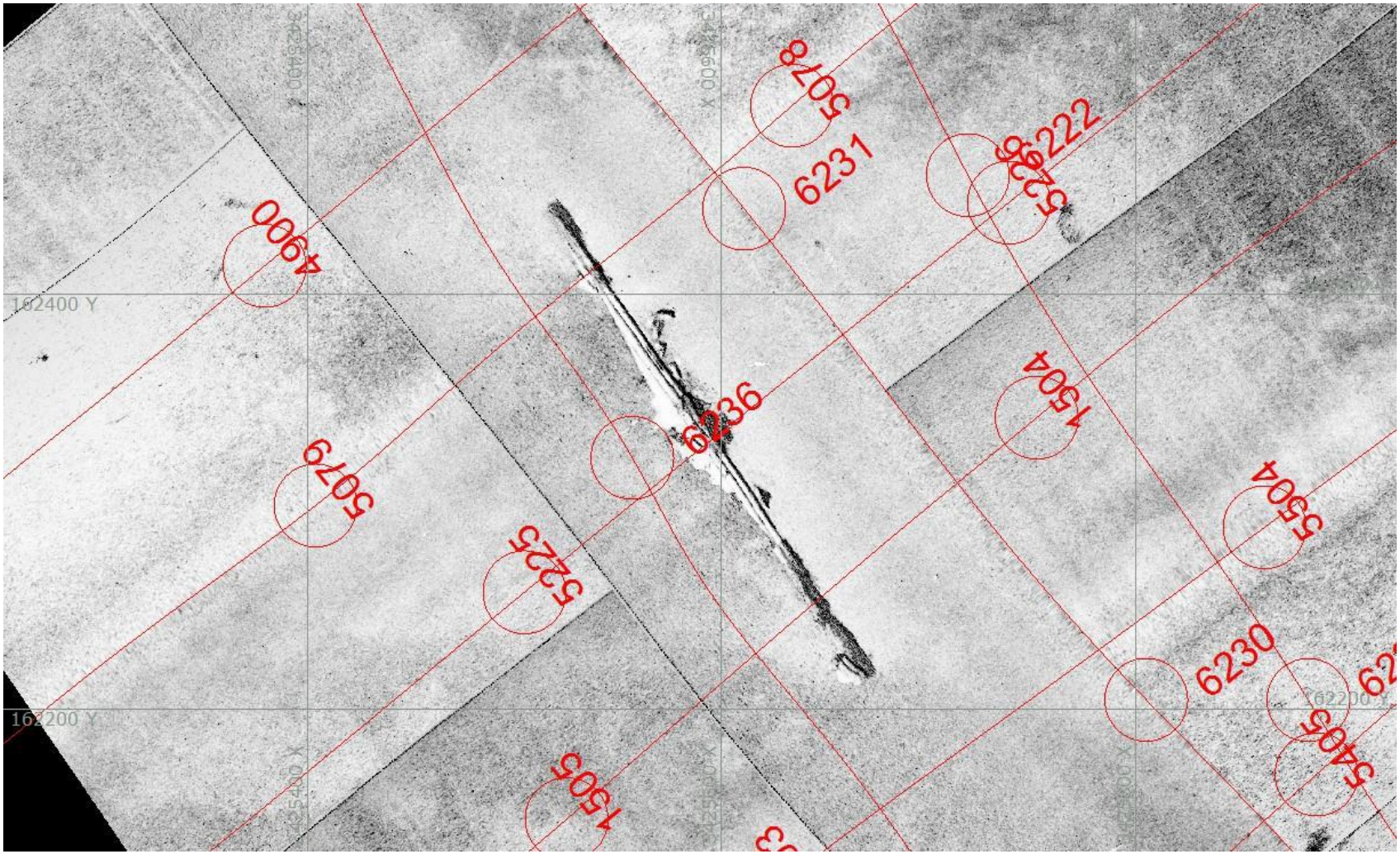


Figure 6. Proposed survey line layout in Ship Shoal Block 88 and Whiskey 3a borrow areas and proposed pipeline conveyance corridors to Whiskey Island (NOAA Chart Nos. 11356 and 11357 shown in background).

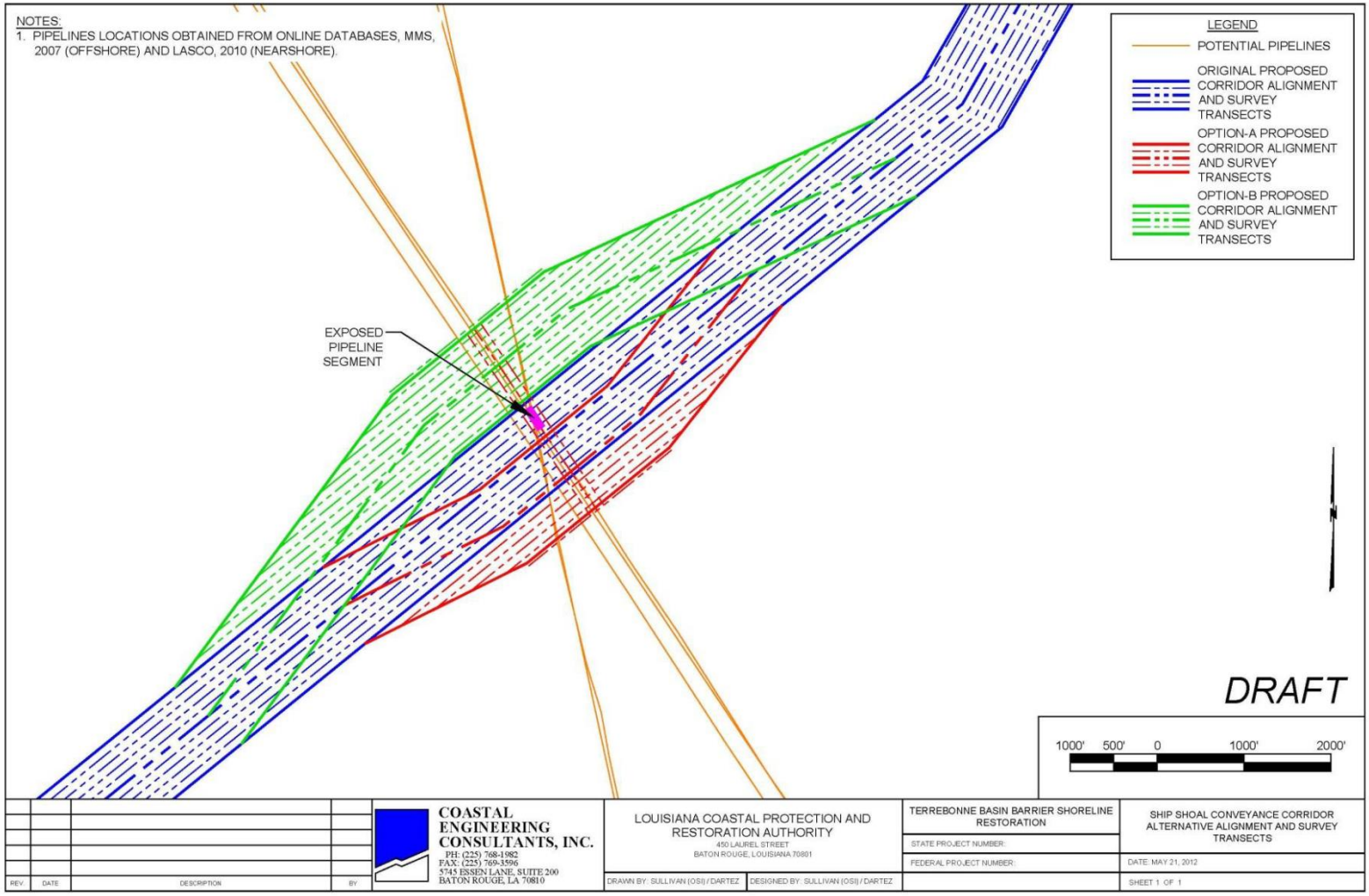
SHIP SHOAL CONVEYANCE CORRIDOR



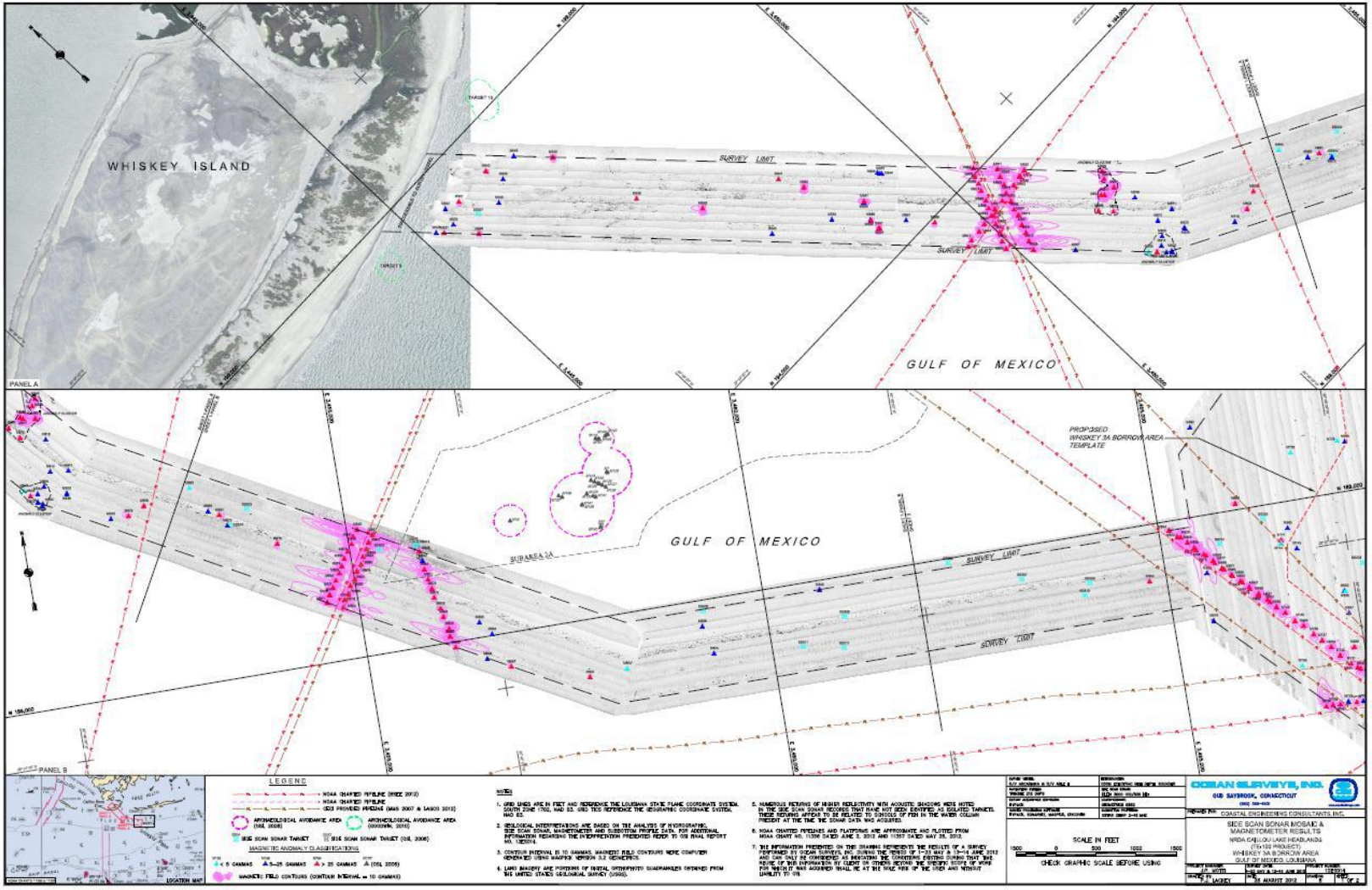
EXPOSED PIPELINE IMAGE



SUPPLEMENTAL SURVEY



CONVEYANCE CORRIDOR SIDE SCAN SONAR



Coordination of Design & NEPA

- Regularly Scheduled Bi-Weekly Project Team Conference Calls
  - Detailed Agenda
  - Meeting Minutes
- Data Collection Review Meeting
- Preliminary Design Report
- Final Design Report
- Regulatory Agency Coordination
  - Pre-Permit Application Meeting
  - Biological Opinion
- NEPA Compliance
  - Draft Environmental Assessment

REGULATORY TIMELINE

- Pre-Permit Meeting: 12/11/12
- Permit Submitted: 12/19/12
- Revised Biological Assessment Submitted to USFWS: 7/13/13
- Revised USFWS Biological Opinion: 8/12/13
- LDNR Coastal Use Permit (Original): 10/29/13
- USACE 10/404 Permit (Original): 12/18/14
- LDNR Coastal Use Permit (Modification): 9/30/14
- USACE 10/404 Permit (Modification): 12/15/14

NEPA Compliance & Sand Lease

- April 2004 EA for Whiskey West Flank (MMS)
- April 2012: LCA TBBSR FEIS Record of Decision (USACE)
- April 2012: Sand Lease Request Letter Submitted to BOEM for the Caillou Lake Headlands Project
- October 2014. Record of Decision for PEIS for Deepwater Horizon Oil Spill: Final Programmatic & Phase III Early Restoration Plan & Early Restoration PEIS
- December 2014: USACE EA (10/404 Permit)
- February 2015: Caillou Lake Headlands Project FONSI (BOEM)
- May 2015: Sand Lease (BOEM & CPRA)

QUESTIONS