OCS Sand
for
Coastal Louisiana Restoration

Syed M. Khalil
Office of Coastal Protection & Restoration Authority

Mineral Management Services
Mid-Atlantic OCS Sand Management Working Group Meeting
Charleston, SC
September 16, 2008

Collaborators

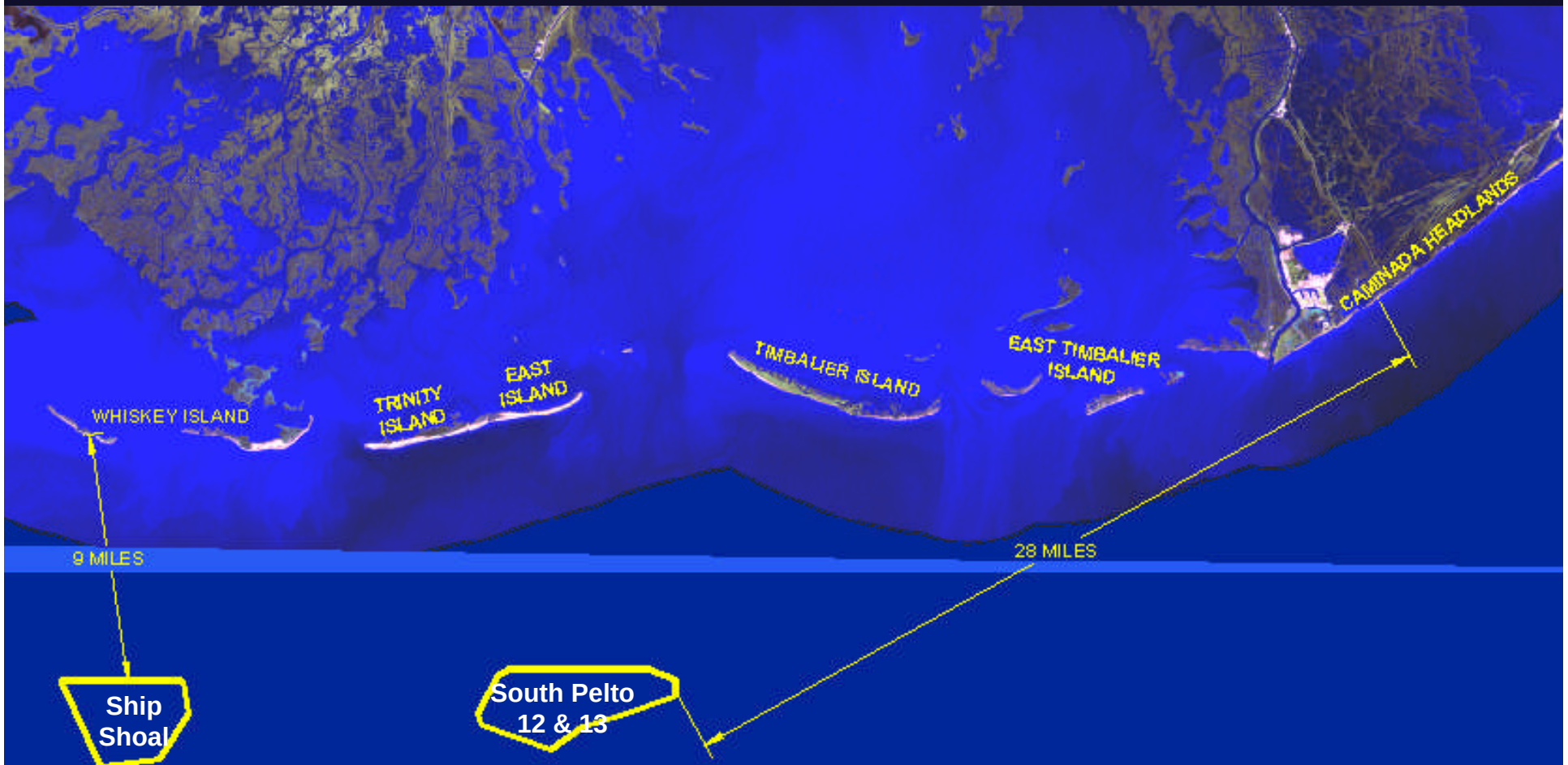
Harry Roberts
Gregory Stone
&
DeWitt Braud

Coastal Studies Institute
Louisiana State University
Baton Rouge

Today's discussions

1. Sand vs. coastal restoration
2. Potential locales for offshore sand
3. LASMWG - MMS & LDNR Cooperative
4. Gulf Coast Sand Studies *(Offshore Sand Studies for the Post-2005 Hurricane)*
5. Coastal Restoration Projects using OCS Sand
6. Conclusions

Coastal Restoration Projects



1. Need for large volumes of sand for barrier island restoration and levees (?)
2. Difficult to find good quality sand in a muddy deltaic environment
3. Inaccessibility of barrier islands
4. Sand is scarce and expensive

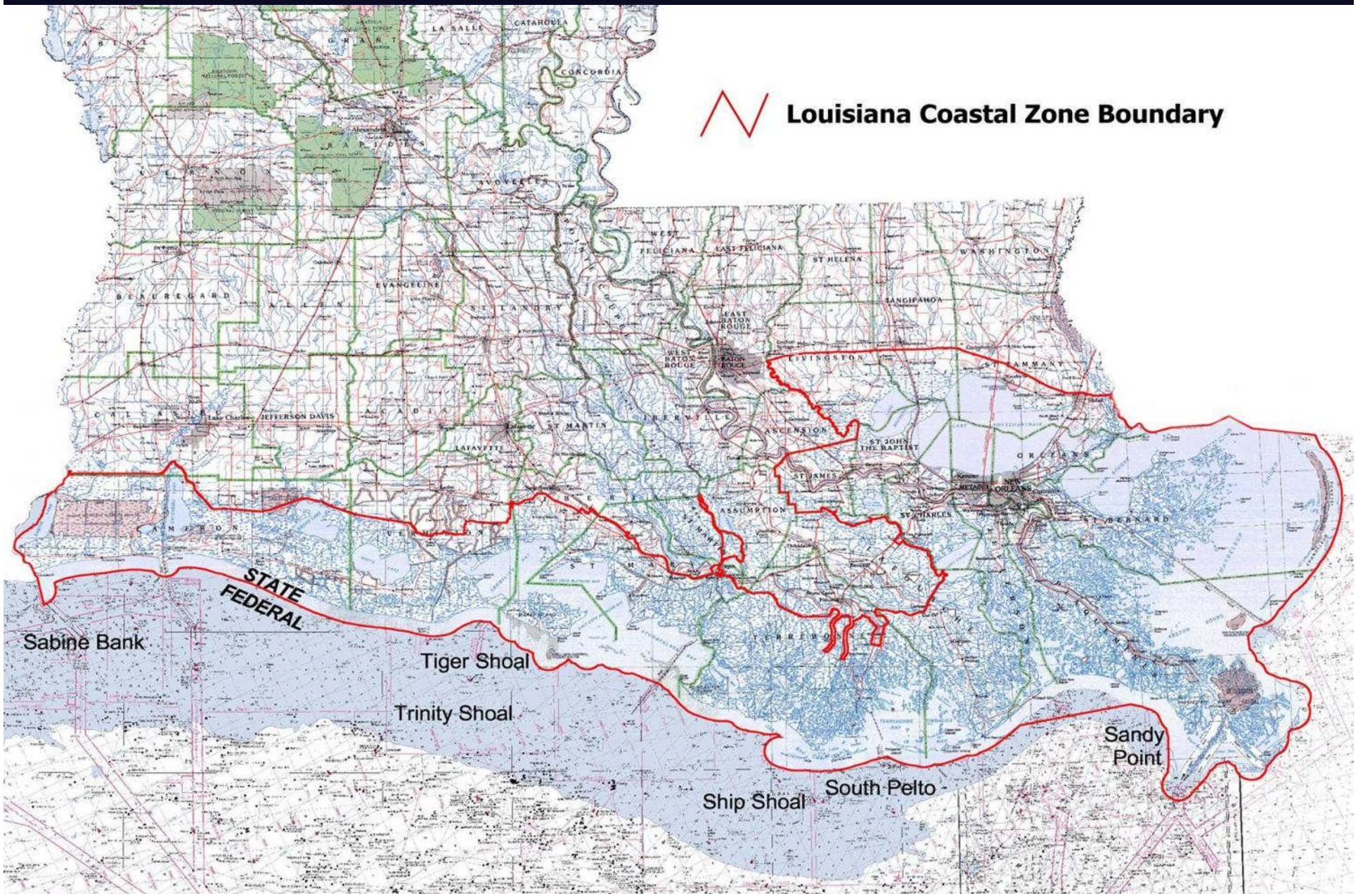
Today's discussions

1. Sand vs. coastal restoration
2. Potential locales for offshore sand
3. LASMWG - MMS & LDNR Cooperative
4. Gulf Coast Sand Studies *(Offshore Sand Studies for the Post-2005 Hurricane)*
5. Coastal Restoration Projects using OCS Sand
6. Conclusions

Potential Locales for Sand

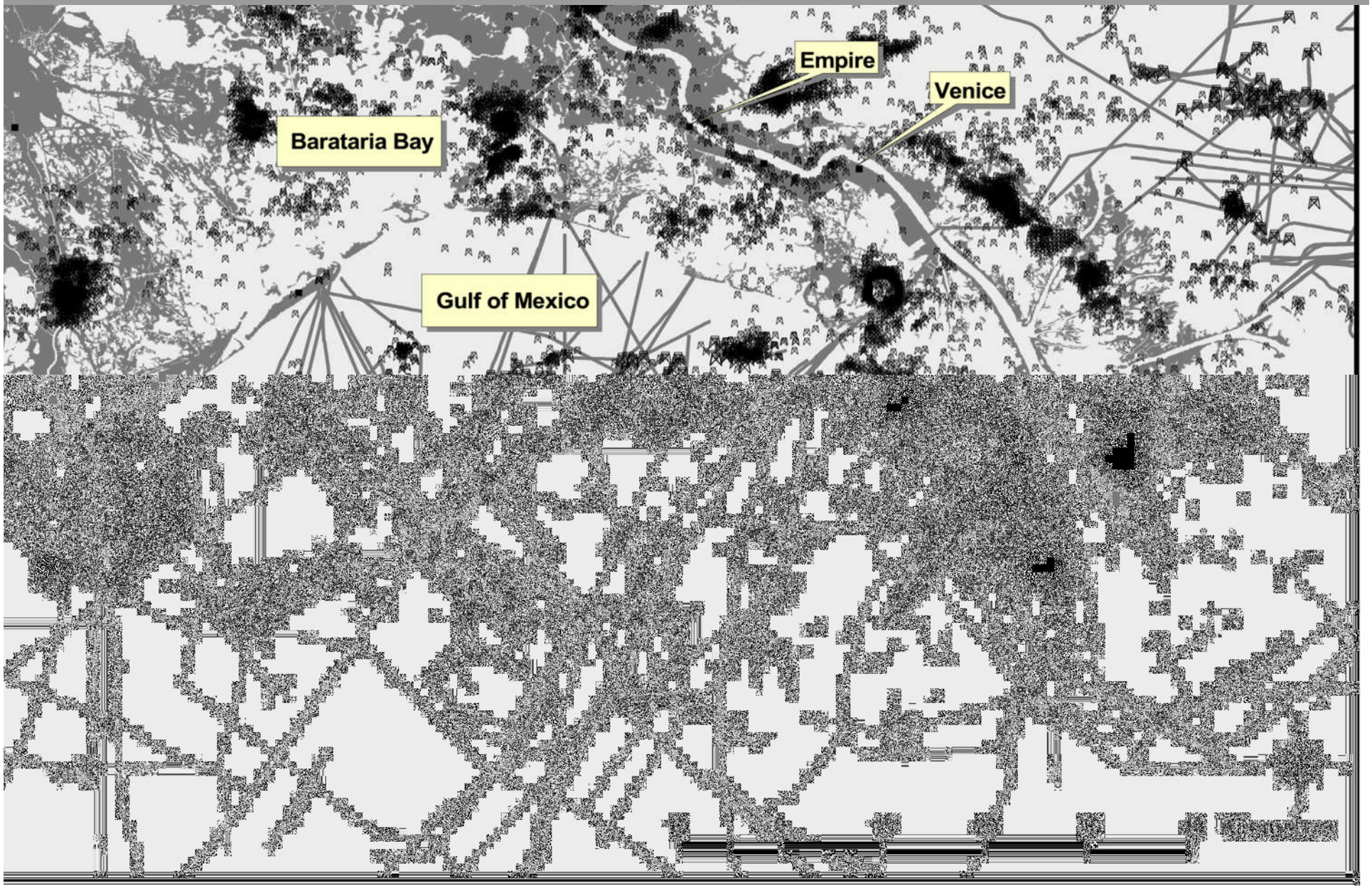
- Fluvial Sand (Lower Mississippi River)
- Abandoned delta complexes
  - Paleo-distributaries
  - Paleo-interdistributaries
- Ebb and flood shoals in modern and relict inlets
- Delta front sand bodies – shoals

OCS Sand Sources



Sand Deposits ≠ Accessible Sand

Buffer width associated with Oil and Gas Infrastructures



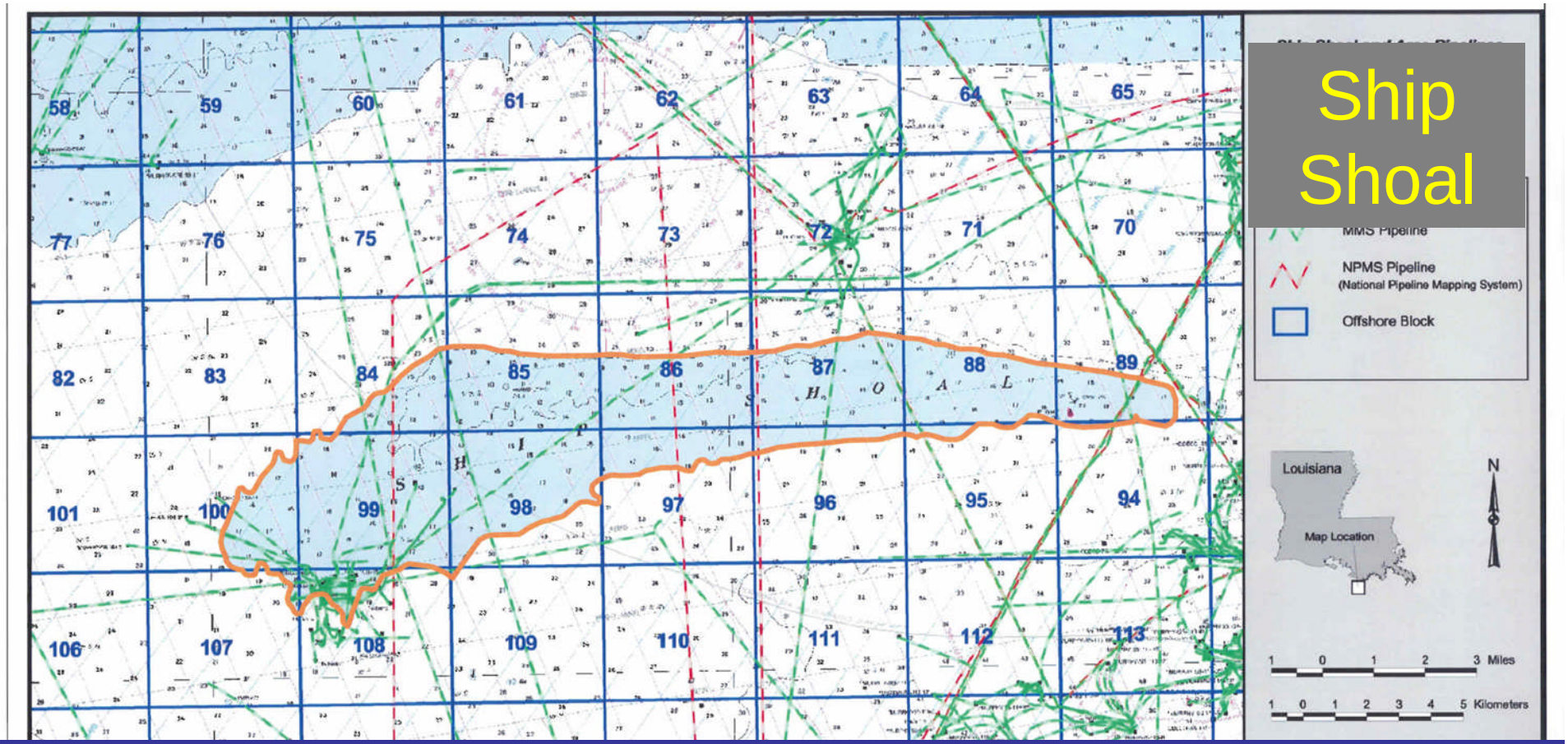
Today's discussions

1. Sand vs. coastal restoration
2. Potential locales for offshore sand
3. LA SMWG (2003) - MMS & LDNR Cooperative
4. Gulf Coast Sand Studies *(Offshore Sand Studies for the Post-2005 Hurricane)*
5. Coastal Restoration Projects using OCS Sand
6. Conclusions

LOIUSIANA SAND MANAGEMENT WORKING GROUP MEETING - 2003

A Multi-Year Cooperative between MMS & LA DNR

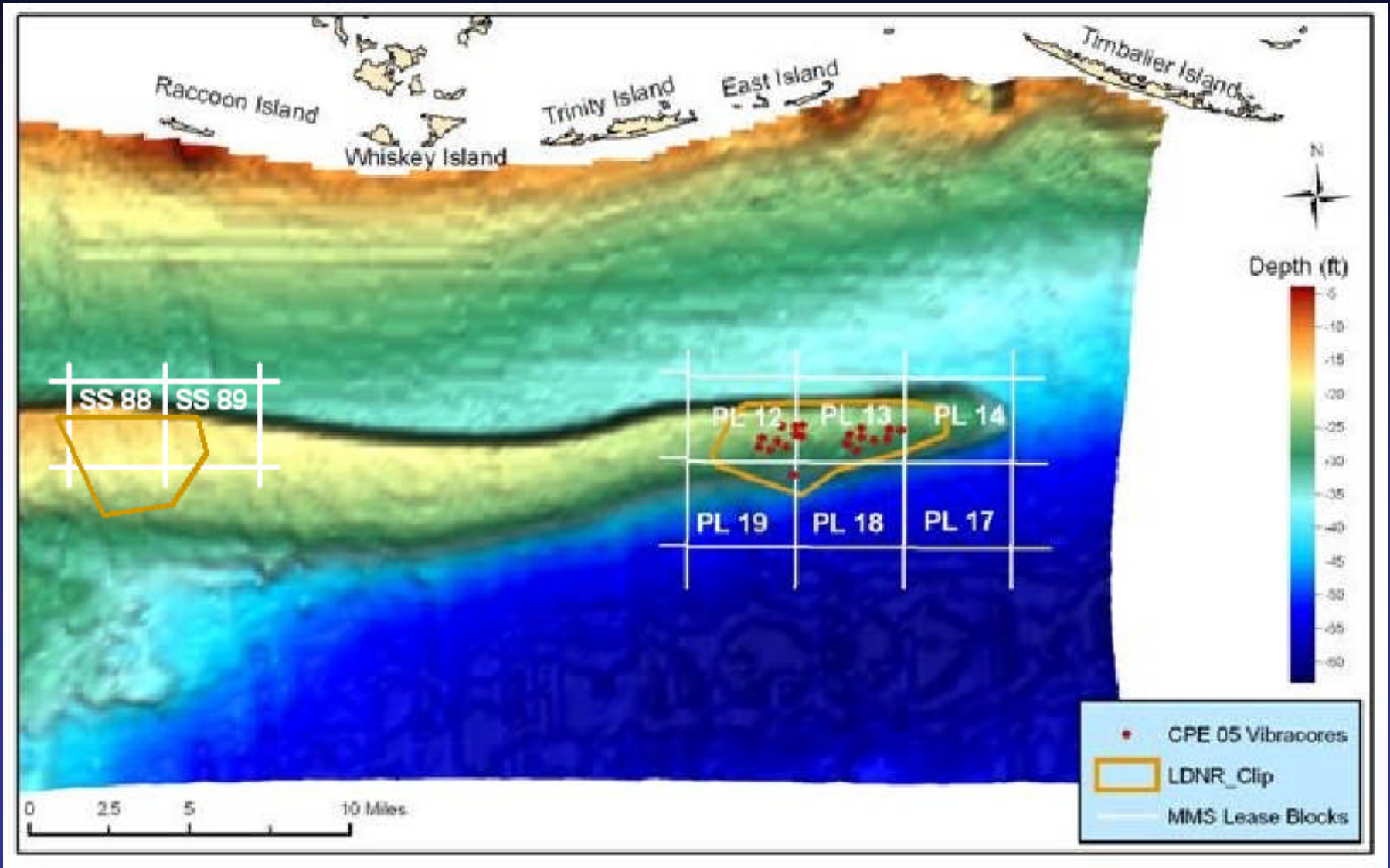
1. Evaluation/Assessment of Offshore Sand Sources along the Outer Continental Shelf of Louisiana
2. Geo-scientific Data Management



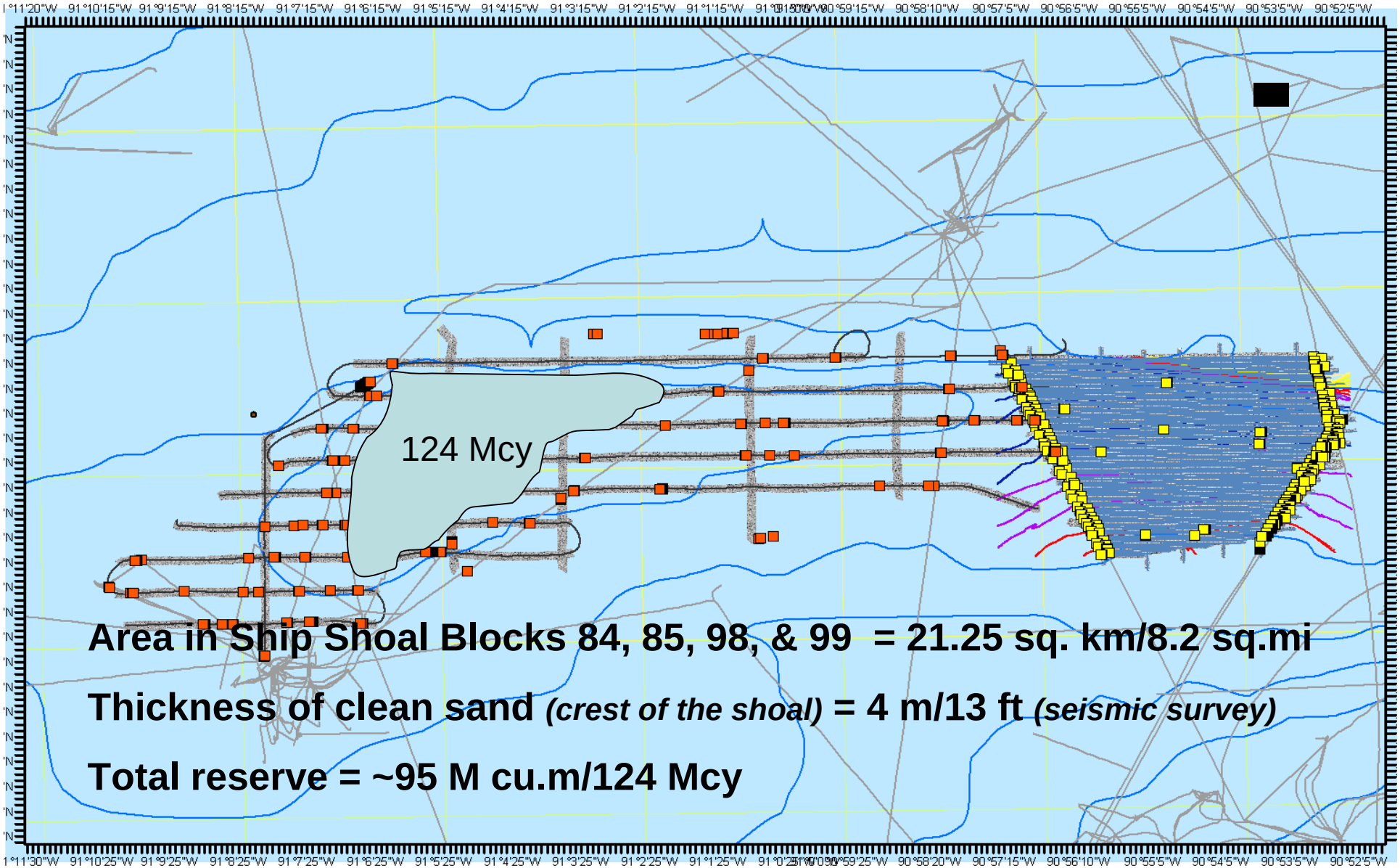
1. Remnant of an ancient barrier shoreline modified by transgression and submergence of the Maringouin delta complex - a transgressive feature migrating landward
2. Large (31 miles) submerged shoal & Holocene sand body containing approx 1.56 billion cy of sand (reconnaissance level exploration)
3. Deposits in Ship Shoal are constrained by the presence of oil and gas *infrastructures* and *obstructions* (pipelines, flow lines, rigs, abandoned pipes, wrecks) & *cultural issues*

Krawiec 1966; Frazier 1967; Penland et. al. (1986); Brynes (1991)

Ship Shoal 88-89 & South Pelto 12-13



Potential Sand Deposit in Western Ship Shoal



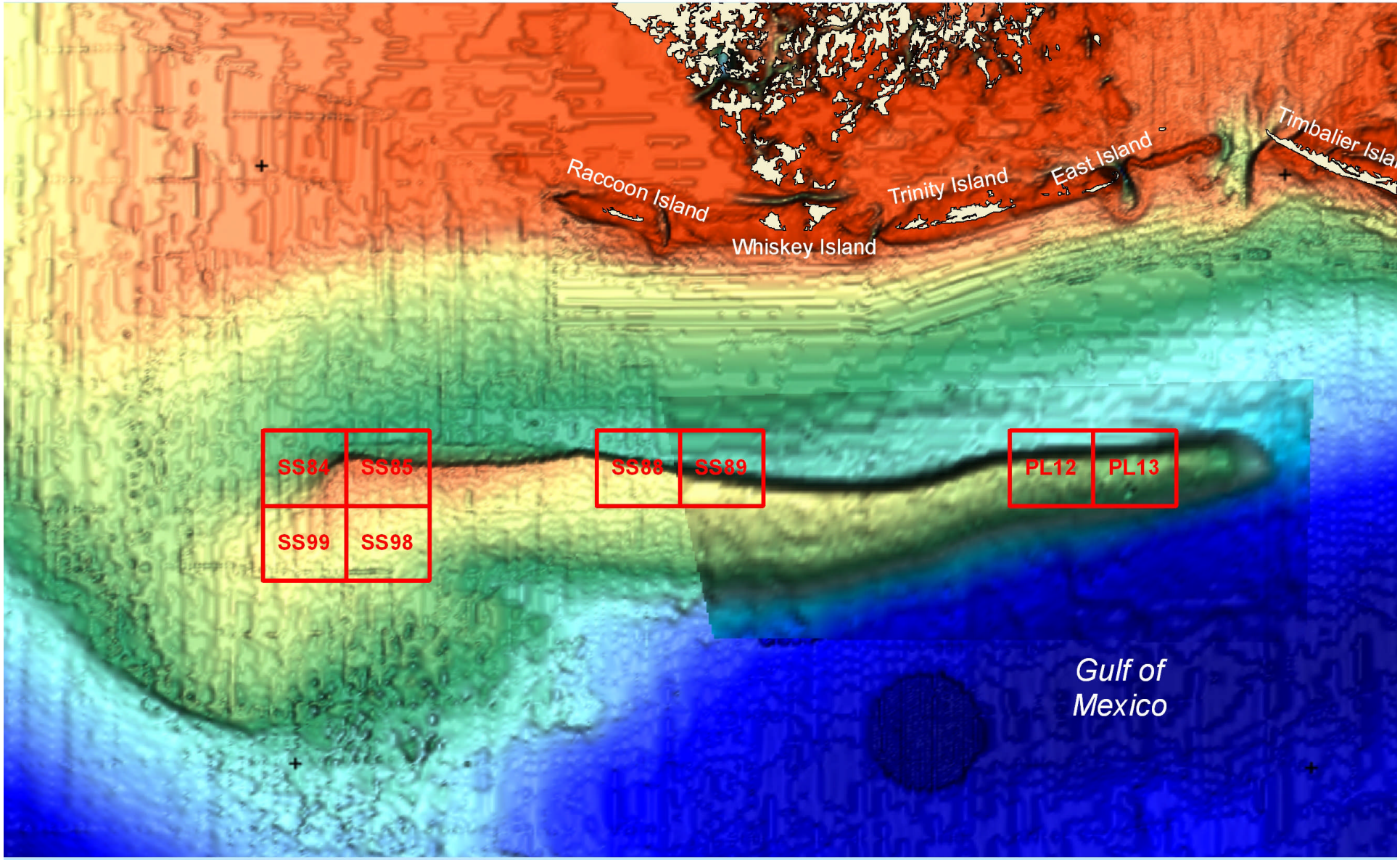
Area in Ship Shoal Blocks 84, 85, 98, & 99 = 21.25 sq. km/8.2 sq.mi

Thickness of clean sand *(crest of the shoal)* = 4 m/13 ft *(seismic survey)*

Total reserve = ~95 M cu.m/124 Mcy

0 1.25 2.5 5 7.5 10 Kilometers

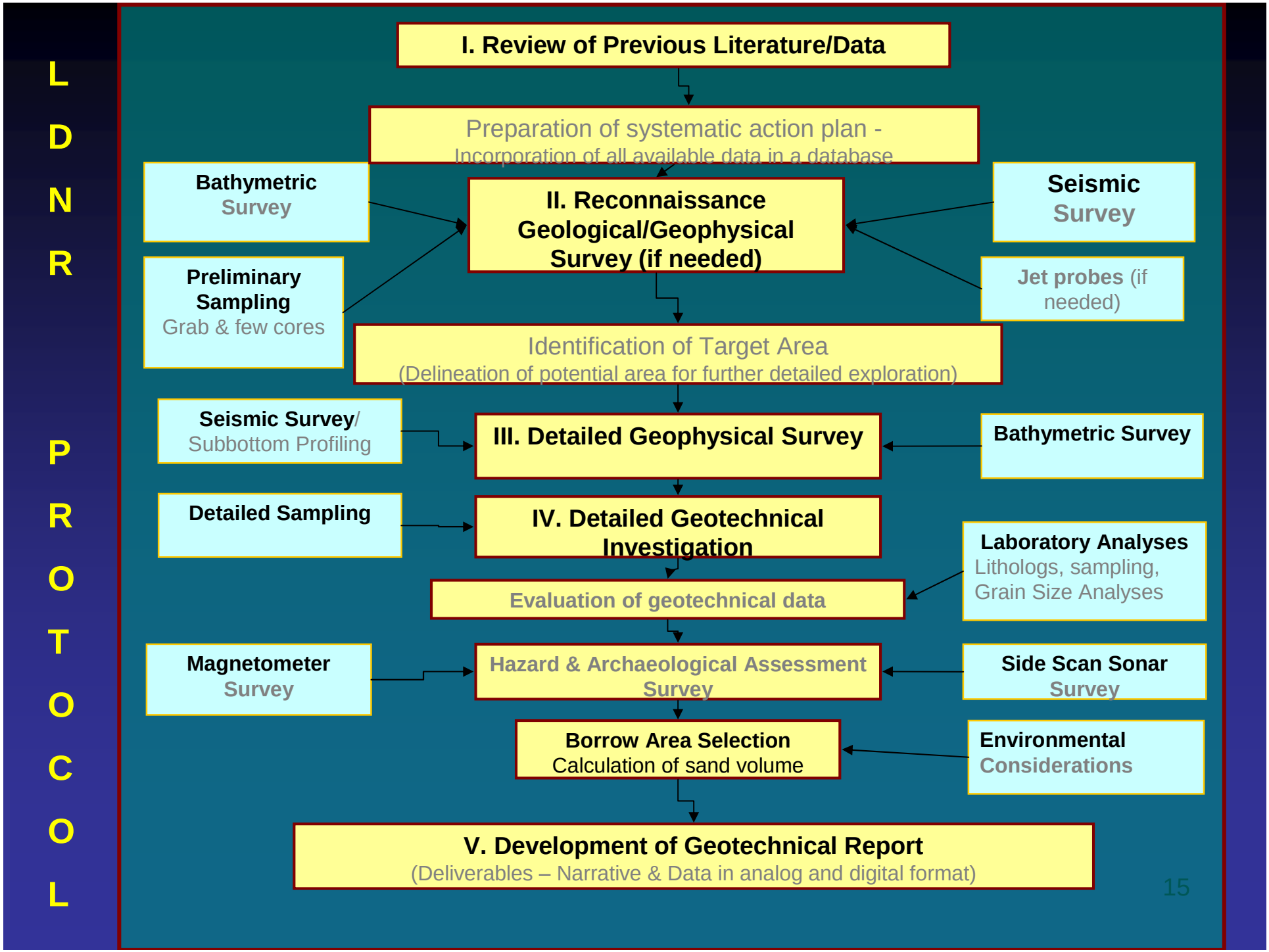
U.S. Environmental Protection Agency
C&C Technologies
Coastal Studies Institute, Louisiana State University
NAD27 State Plane Louisiana South



Legend

MMS Lease Blocks

0 2 4 8 Miles


L D N R P R O T O C O L
I. Review of Previous Literature/Data
Preparation of systematic action plan -
Incorporation of all available data in a database
Bathymetric Survey
Preliminary Sampling
Grab & few cores
II. Reconnaissance Geological/Geophysical Survey (if needed)
Seismic Survey
Jet probes (if needed)
Identification of Target Area
(Delineation of potential area for further detailed exploration)
Seismic Survey/
Subbottom Profiling
III. Detailed Geophysical Survey
Bathymetric Survey
Detailed Sampling
IV. Detailed Geotechnical Investigation
Laboratory Analyses
Lithologs, sampling,
Grain Size Analyses
Evaluation of geotechnical data
Magnetometer Survey
Hazard & Archaeological Assessment Survey
Side Scan Sonar Survey
Borrow Area Selection
Calculation of sand volume
Environmental Considerations
V. Development of Geotechnical Report
(Deliverables – Narrative & Data in analog and digital format)

Geo-scientific Data Management
Louisiana Sand Resources Database (LASARD)

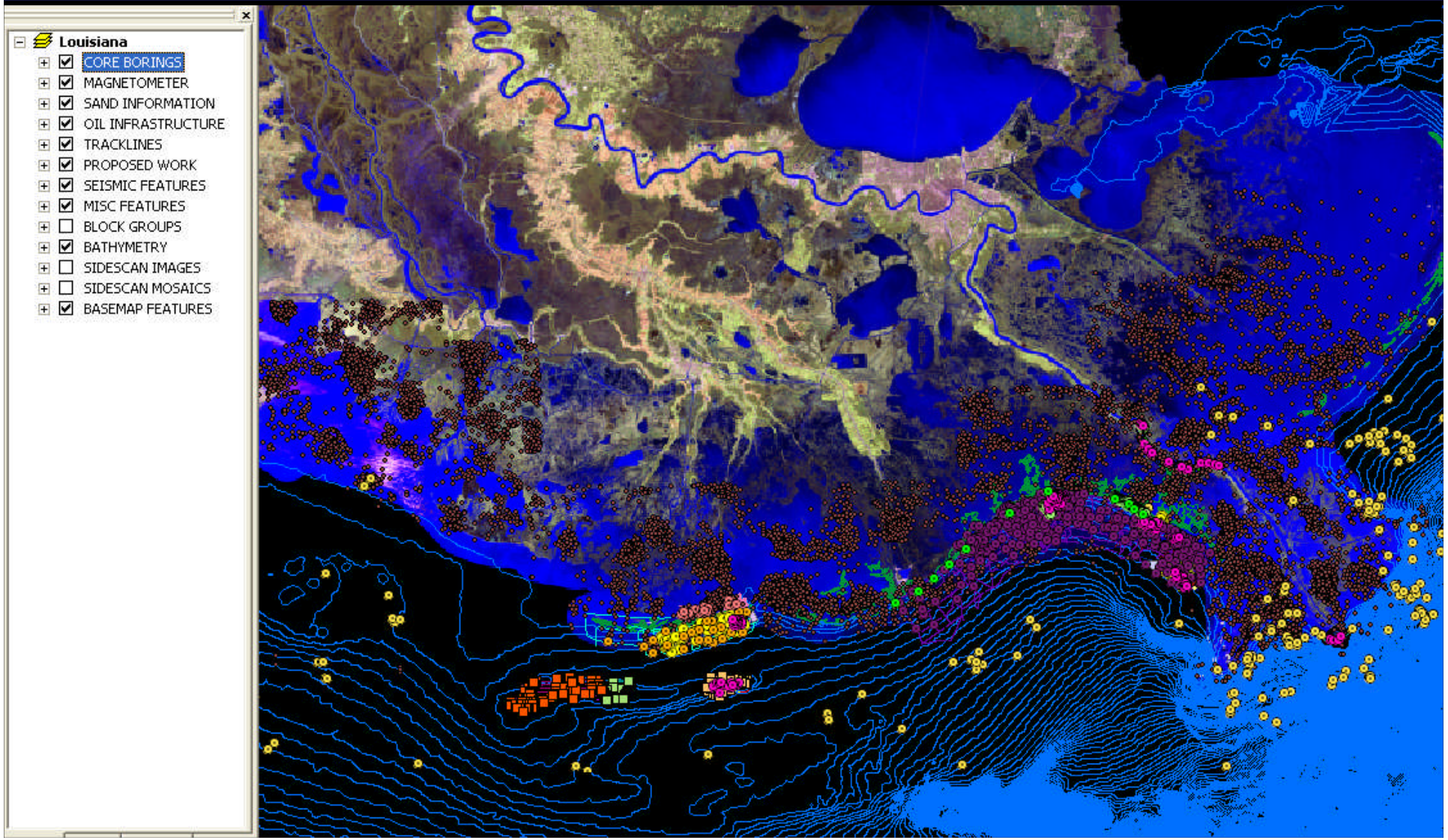
- a single source of information on sand/sediment resources for the engineers, policy makers, coastal planners, environmentalists, and public on *engineering scale*

- a database for *entire coastal Louisiana* containing geological and all the related data / information pertaining to sand/sediment resources which will be accessible to the public via internet

Critical Data Sets

- Boreholes and cores logs
- Sediment grain size
- High resolution seismic profiles
- Side-scan sonar data
- Bathymetric data
- Magnetic data
- Pipeline locations
- Man-made structures
- Debris

Louisiana Sand Resources Database (LASARD)



LASARD

(Louisiana Sand Resources Database)

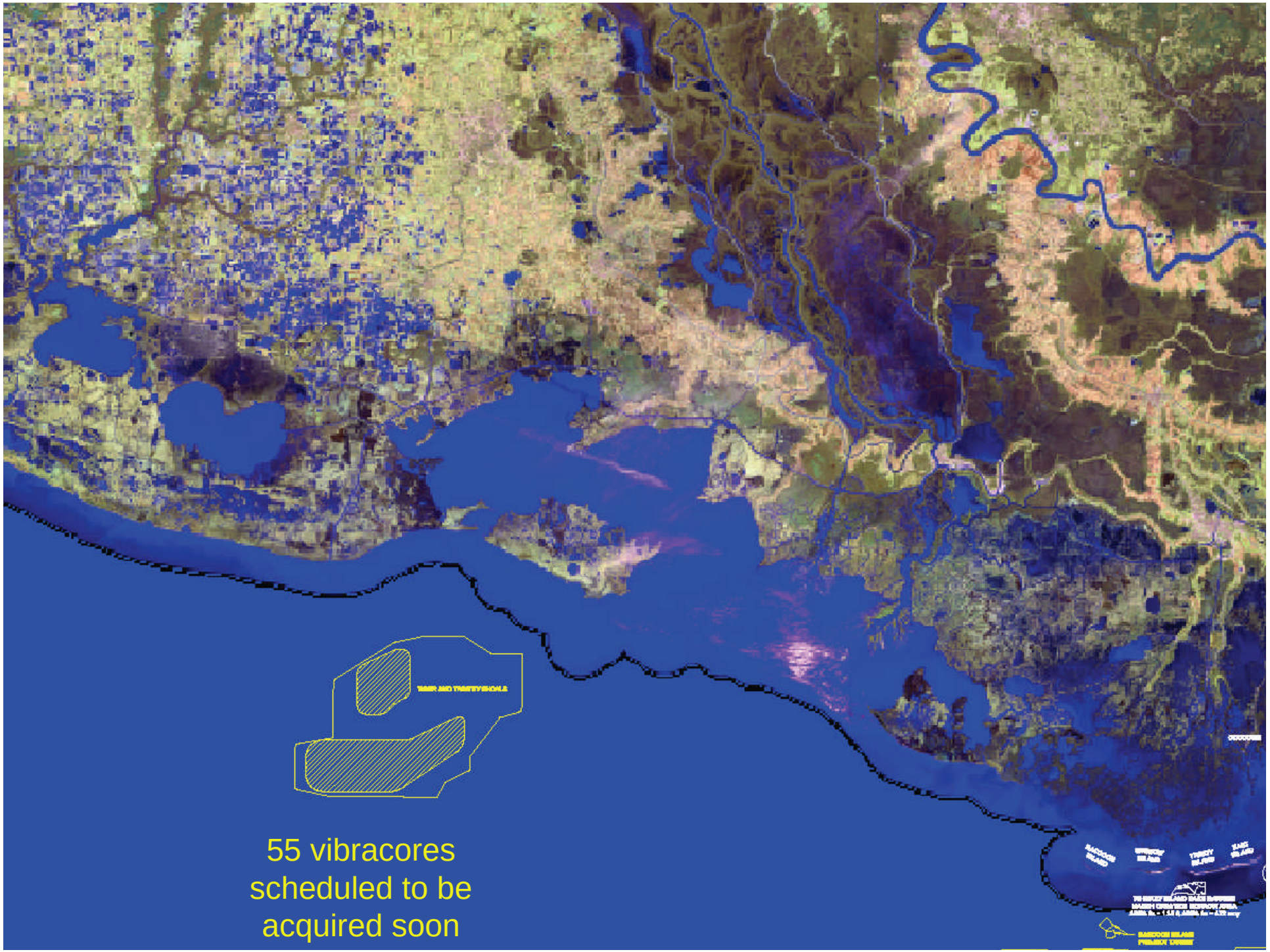
Standardization of geo-scientific data acquisition

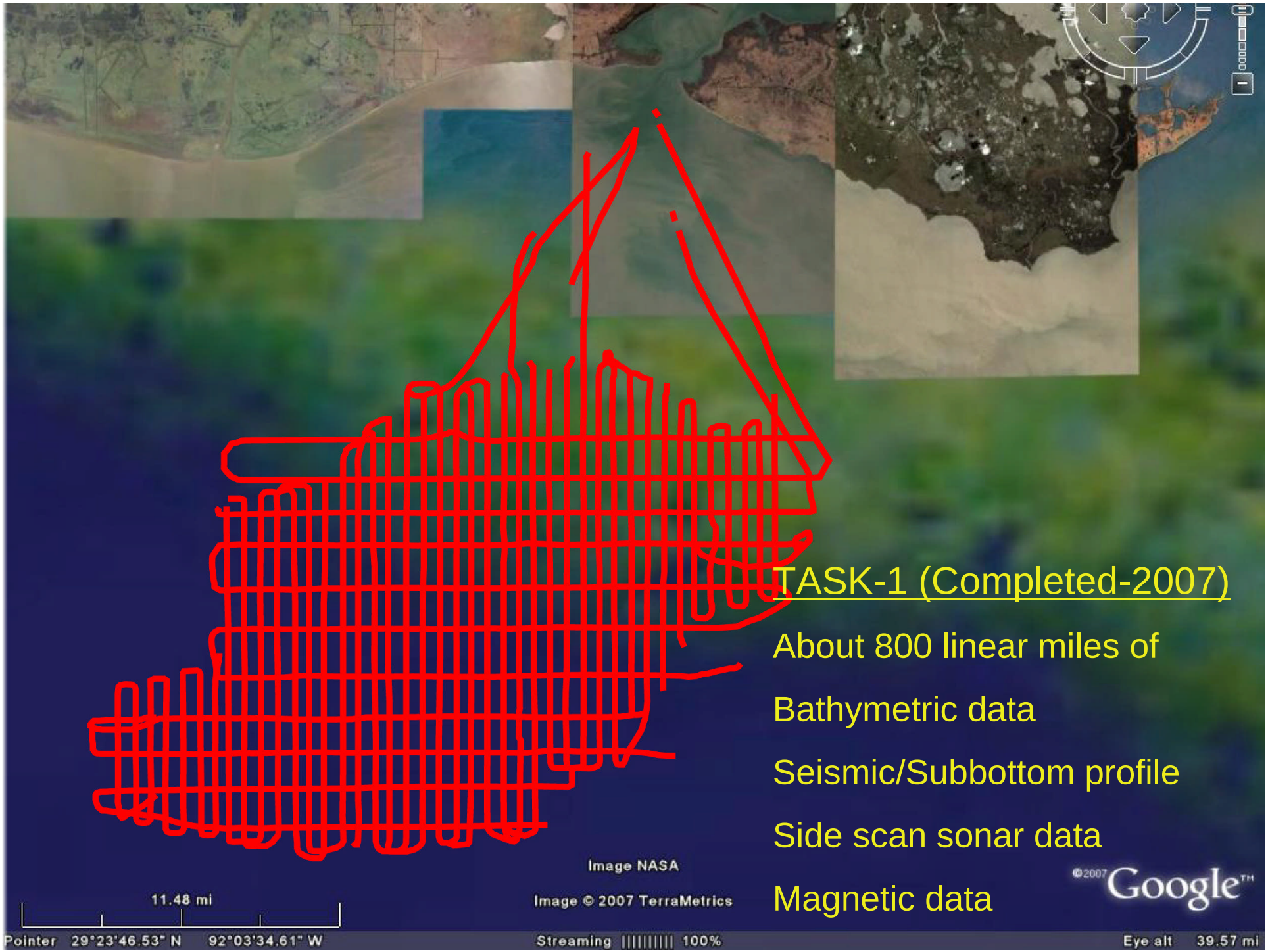
General guidelines for data acquisition to maintain the uniformity in data collection

1. **VECTOR GEOSPATIAL FORMAT: ESRI GIS shape file for point, line, and polygon features.**
   1. Point data may be submitted in ASCII x,y,z delimited format with trailing attribute fields.
2. **RASTER IMAGE FORMAT (e.g. side scan sonar): GeoTIFF or Erdas Imagine .img format.**
3. **PROJECTION:**
   1. Vector spatial data should be in geographic (latitude/longitude) coordinates, NAD 83 Datum.
   2. Raster imagery should be in UTM Zone 15 NAD83 Datum.
4. **ELEVATION DATUM: NAVD 88 - Vertical data will be provided in the North American Vertical Datum of 1988 (NAVD '88), U.S. survey feet.**
5. **METADATA: Should be supplied in FGDC compliant format. If this is not feasible, then the CONTENT FOR METADATA RECORD should be supplied as enumerated.**
6. **SIDE SCAN SONAR: GeoTIFF files should not exceed 2 GB in size. Larger files should either be split or converted to Erdas Imagine .img format.**
   1. Side Scan Mosaics in GeoTIFF format are acceptable provided that individual lines are also included.
7. **SUBBOTTOM PROFILE: Should be provided in html format with profile image as tiff or jpg.**

Today's discussions

1. Sand vs. coastal restoration
2. Potential locales for offshore sand
3. LA SMWG - MMS & LDNR Cooperative
4. Gulf Coast Sand Studies *(Offshore Sand Studies for the Post-2005 Hurricane)*
5. Coastal Restoration Projects using OCS Sand
6. Conclusions


55 vibracores
scheduled to be
acquired soon



TASK-1 (Completed-2007)

About 800 linear miles of

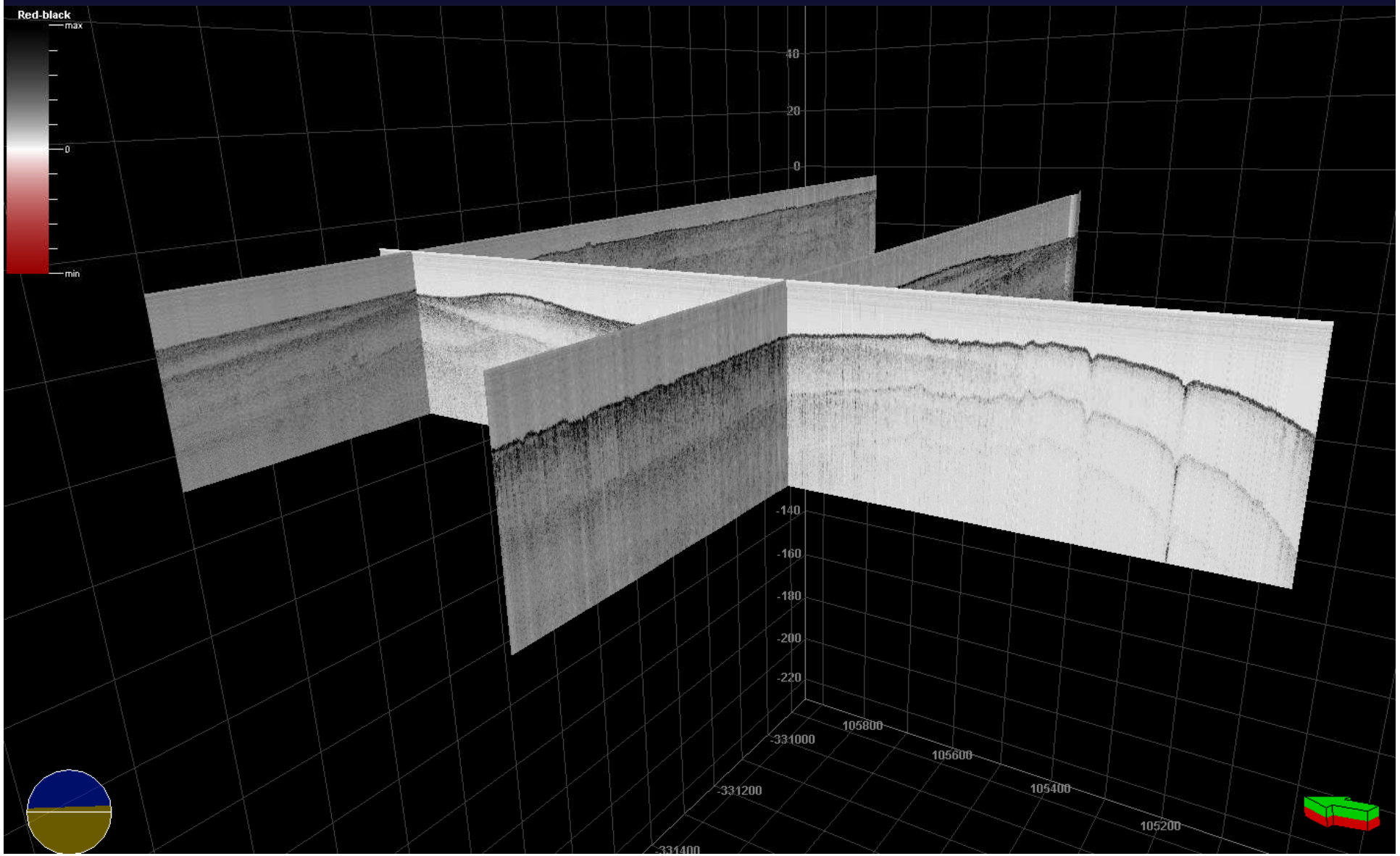
Bathymetric data

Seismic/Subbottom profile

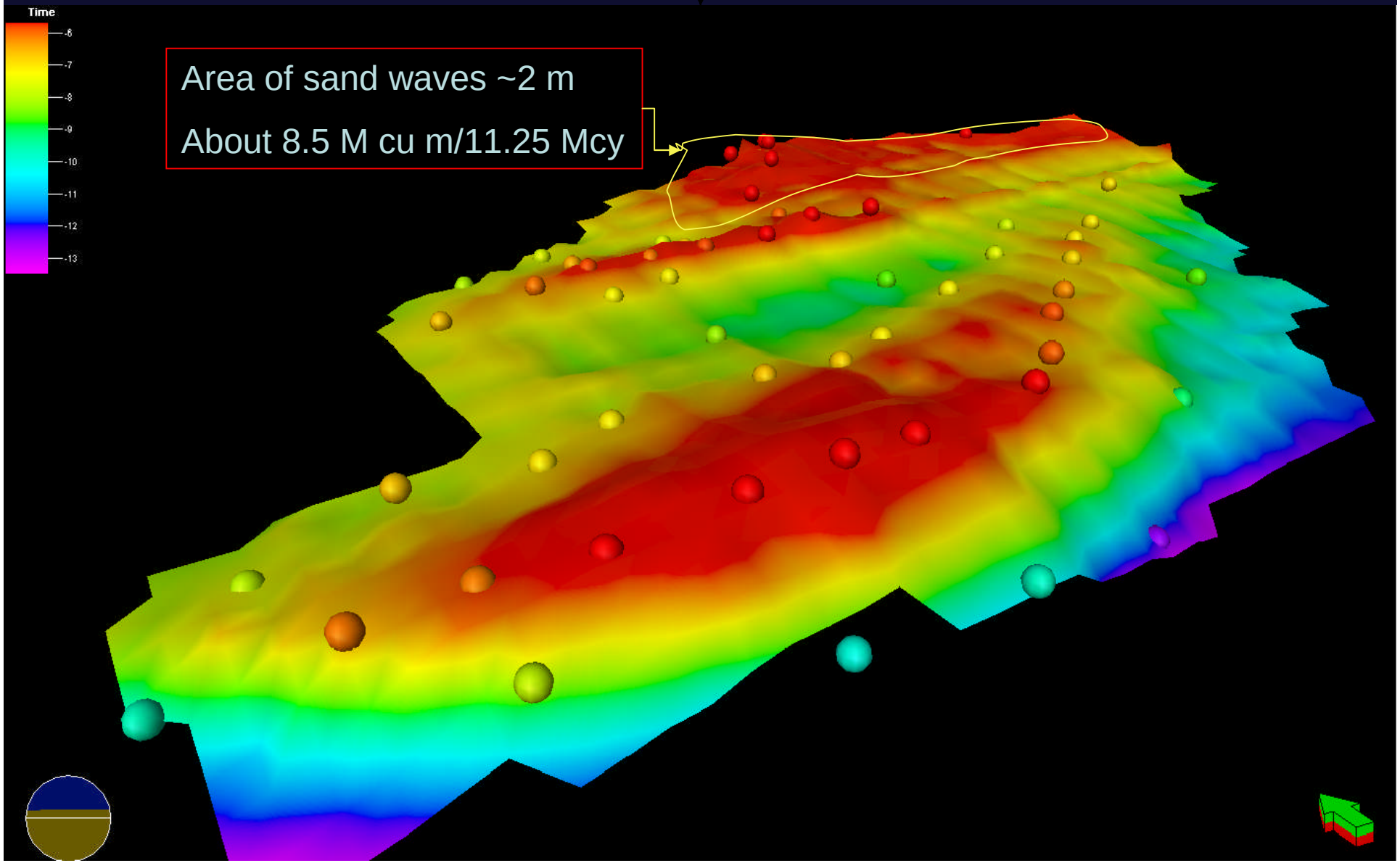
Side scan sonar data

Magnetic data

Processing of High Resolution Seismic Data (Petrel software, Schlumberger)

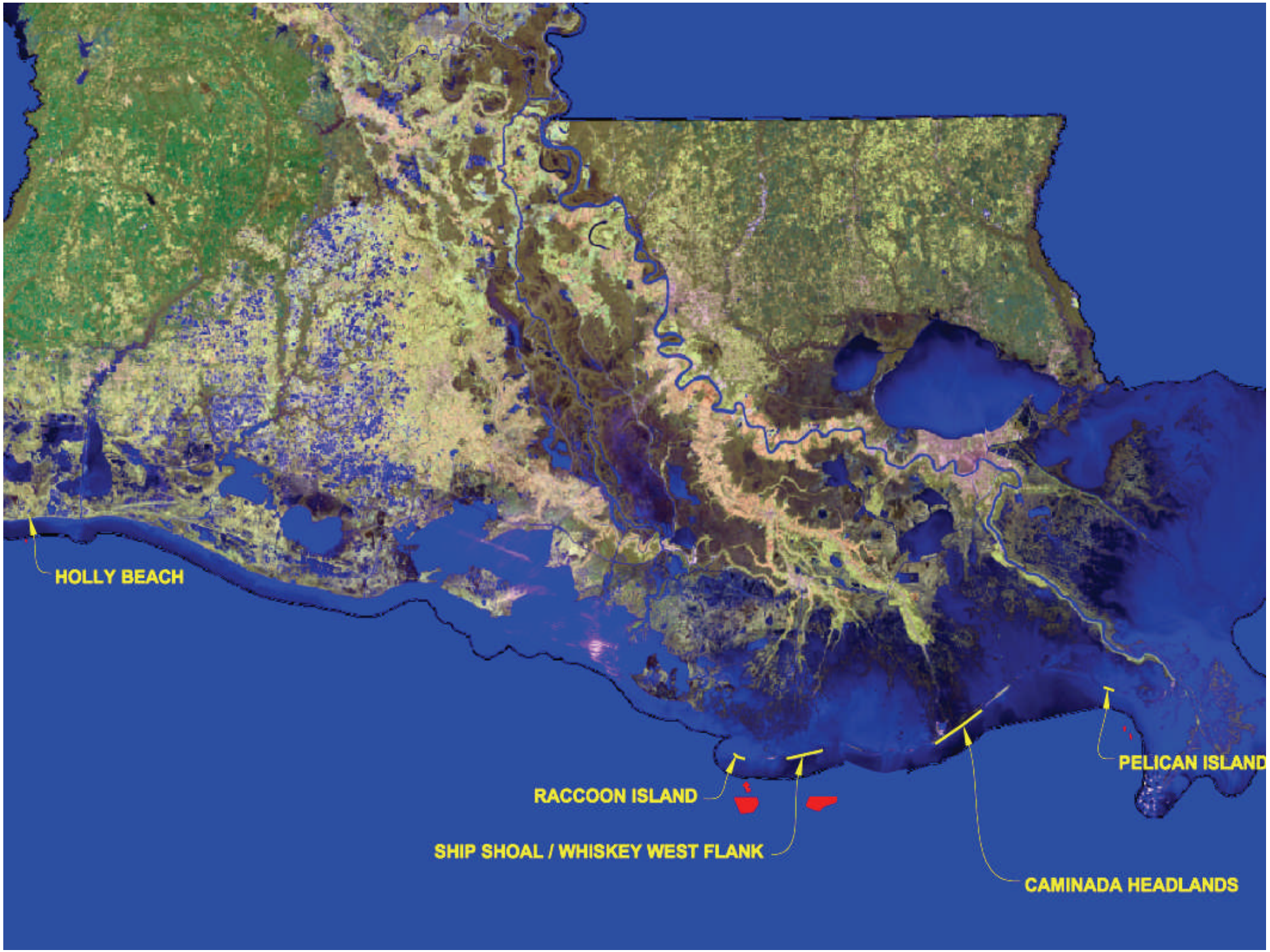


Task – 2
Proposed Vibracore (55) Locations



Today's discussions

1. Sand vs. coastal restoration
2. Potential locales for offshore sand
3. LASMWG - MMS & LDNR Cooperative
4. Gulf Coast Sand Studies **(***Offshore Sand Studies for the Post-2005 Hurricane)*
5. Coastal Restoration Projects using OCS Sand
6. Conclusions

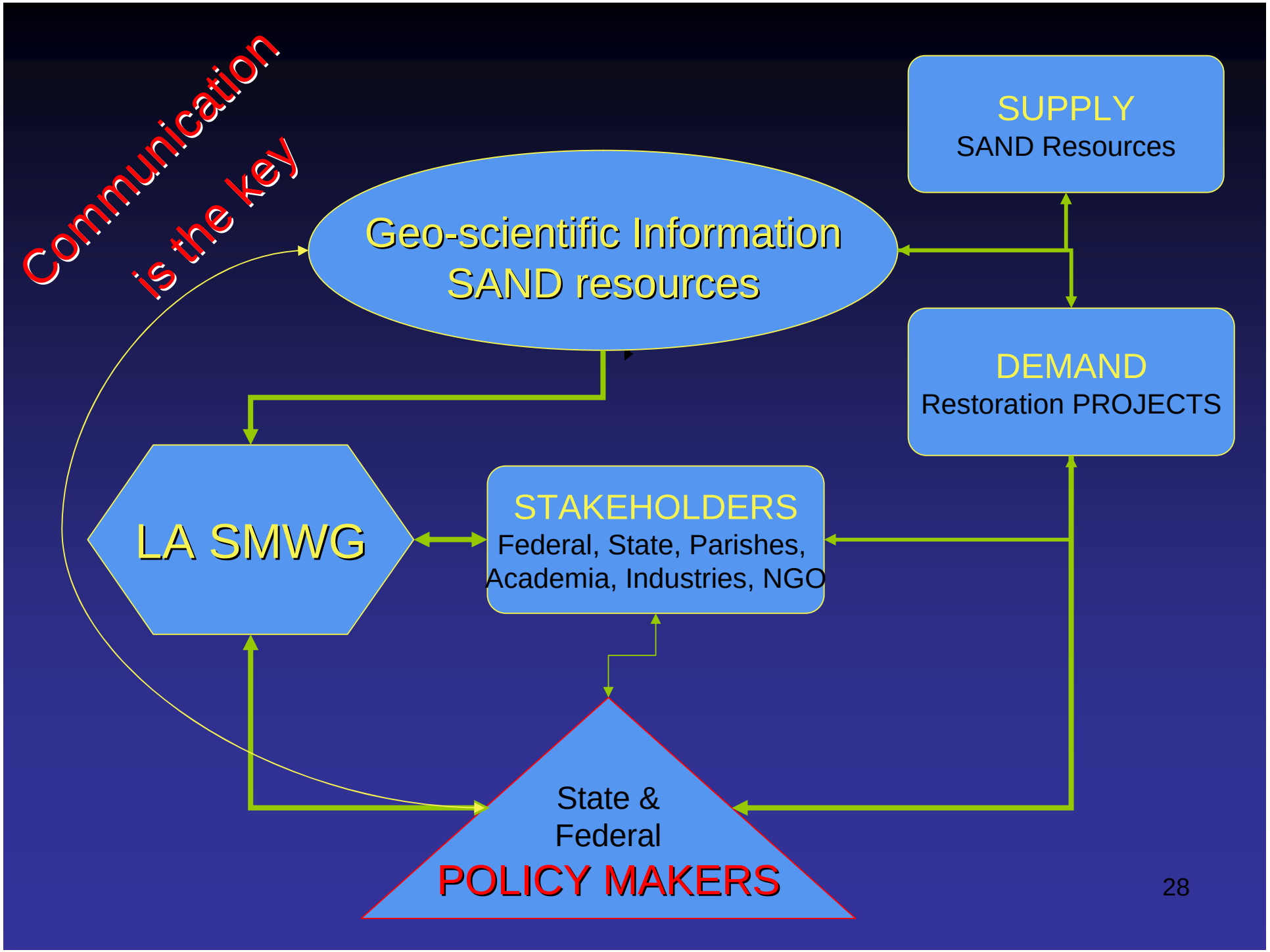

HOLLY BEACH
RACCOON ISLAND
SHIP SHOAL / WHISKEY WEST FLANK
CAMINADA HEADLANDS
PELICAN ISLAND

Today's discussions

1. Sand vs. coastal restoration
2. Potential locales for offshore sand
3. LASMWG - MMS & LDNR Cooperative
4. Gulf Coast Sand Studies **(***Offshore Sand Studies for the Post-2005 Hurricane)*
5. Coastal Restoration Projects using OCS Sand
6. Conclusions

LA Sand Management Working Group

- Annual Assembly of almost all the primary stakeholders *(representatives from governmental agencies, academic institutions, consultants, and non-governmental organizations)* involved in coastal restoration
- New sponsored studies to maintain the momentum of the LA SMWG so that members aren't reviewing the same items at every meeting
- Coordination of efforts outside of the LA SMWG with stakeholders involved with the planning and implementation of projects proposed to use the resource for projects and with stakeholders whose work interests are in and around the resource area.
- Clearly articulated need and mission of the LA SMWG
- Annual meetings to sustain the momentum of the LA SMWG with agendas distributed prior to the meetings and distribution of post-meeting minutes
- Communication is the key & LA SWMG aids


Communication is the key
Geo-scientific Information SAND resources
SUPPLY
SAND Resources
DEMAND
Restoration PROJECTS
LA SMWG
STAKEHOLDERS
Federal, State, Parishes, Academia, Industries, NGO
State & Federal
POLICY MAKERS

Conclusions

1. Sand is critical for restoration in Louisiana
2. Difficult & expensive to find adequate quantities of sand in deltaic regime
3. Regional Sediment Management & Sediment Data Management helps in cost effective and planned approach to restoration
4. LA SMWG played a crucial & successful role in bringing the various stakeholders together & in communicating
5. Ideas of various studies sponsored by MMS stemmed from LA SMWG annual meetings
6. Successful evaluation of OCS sand, data management and development of protocols are due to MMS funding
7. Co-ordination with MMS and Oil & Gas industries is vital to protect the available sand deposits, refine the buffer width between borrow area and pipelines, and trackline spacing for cultural resources surveys