

Coastal Protection and
Restoration Authority of Louisiana

Barrier Island Comprehensive Monitoring (BICM): History, Framework, & Future

March 20, 2014



committed to our coast



Project Specific Monitoring

Project Goals and Objective Basis

Topography

Vegetation

Combined Monies

TE-20/24/25/27/30

Limited Budgets

20 yrs @ \$127,000 on TE-27

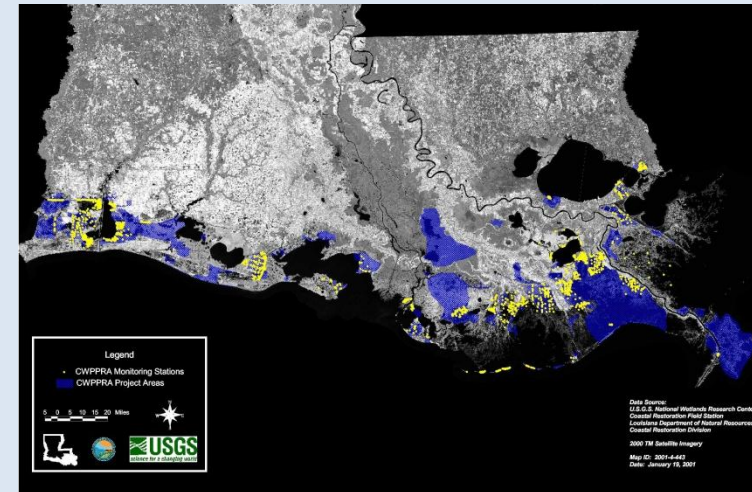
Missing Items

Bathymetry

Process Data

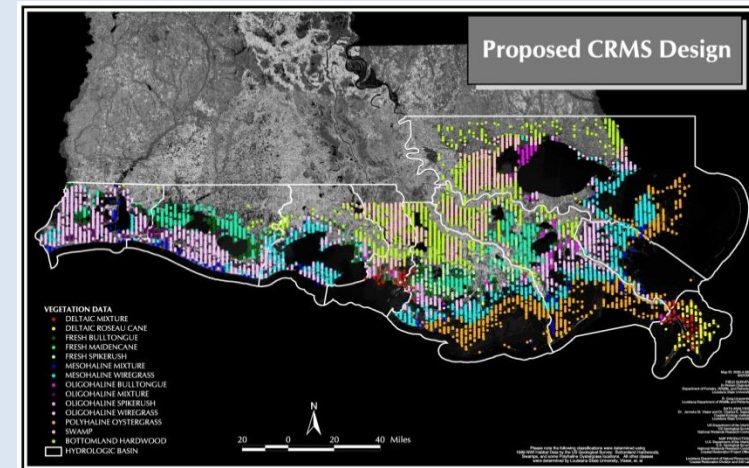
Early Restoration Monitoring –

Inconsistent variables measured, short data records



Comprehensive Monitoring –

Spatial and temporal sampling
Suite of variable





BICM - *Development Process*

TEAM – within LA CPRA

Issues that need information

- Aerial Extent of Islands

- Sub-aqueous Extent of Islands

- Habitat Classification

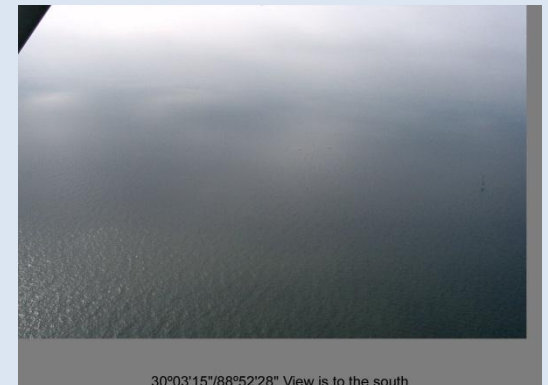
- Sediment Properties/Geotechnical

- Environmental Processes

- Vegetation Composition

LCA SSRT Review

- build on historic datasets



BICM - Barrier Island Comprehensive Monitoring Program

The goal of the BICM is to provide long-term data on Louisiana's barrier islands to be used to plan, design, evaluate, and maintain current and future barrier island restoration projects.

- Aerial Extent of Islands
- Sub-aqueous Extent of Islands (Depth of Closure)
- Habitat Classifications
- Sediment Properties/Geotechnical
- Environmental Processes
- Vegetation Composition





2005 Hurricanes *Katrina & Rita*

June 16, 2001



September 28, 2005





LCA S&T FUNDING

System-wide Wetland Assessment & Monitoring Program (SWAMP)

CRMS - Wetlands (CWPPRA)

CRMS – Waters

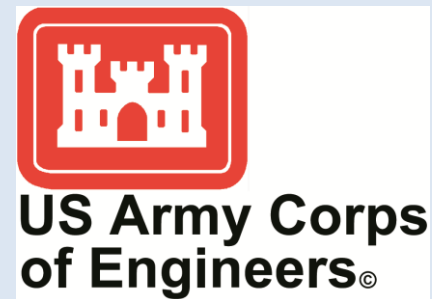
BICM

Storm assessment

Baseline response datasets

Historic datasets

Beta Test Program





BICM – *Framework*

Aerial Photos –

Shoreline position – 1880's, 1920-30's,
1998, 2004, 2005

Habitat Mapping (7 habitats – beach,
marsh, bare land, barrier vegetation,
inter-tidal, structure, water)
Land Loss

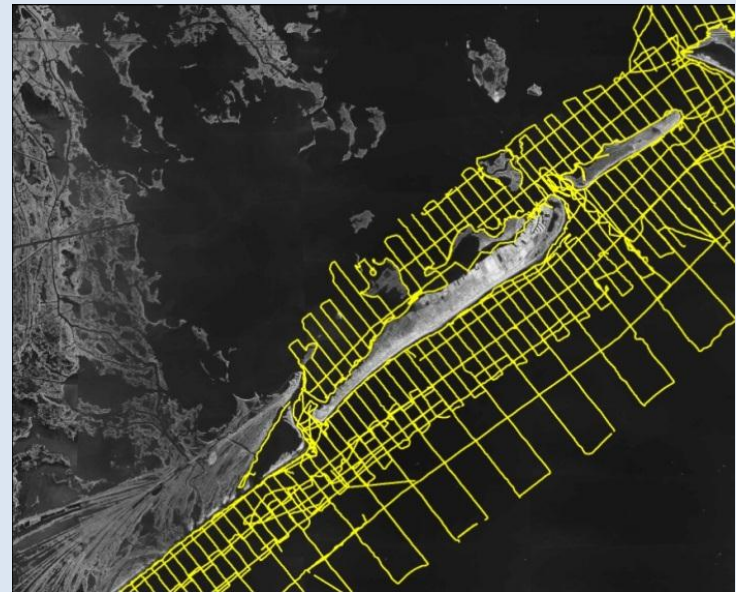
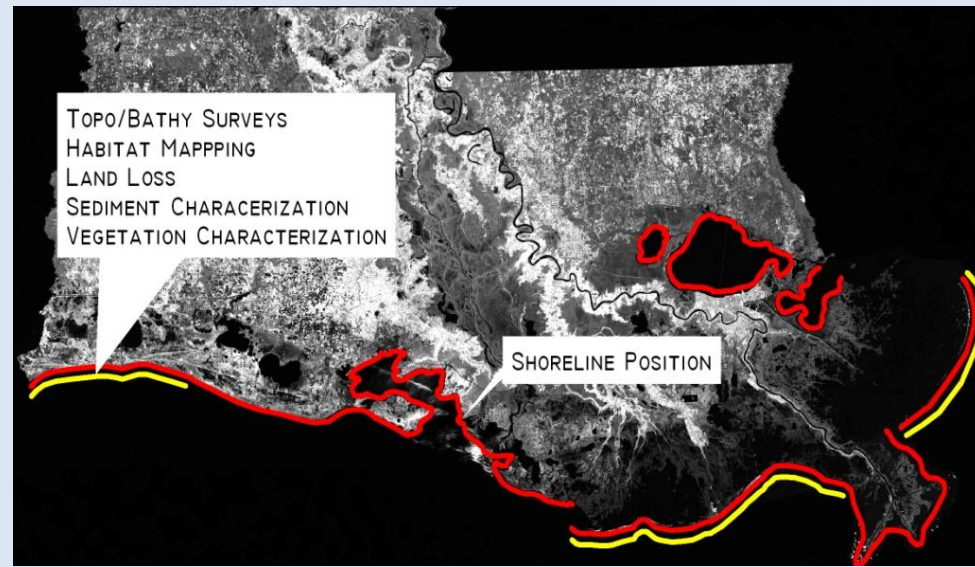
Topographic Surveys - LiDAR (entire sandy beach
or entire island if not attached to headland)

Bathymetric Surveys - 1500' perpendicular line
spacing bayside to 6600' offshore, 3000' and 6000'
shore parallel lines, 2500' grid outside of 2 mi

Sediment Sampling - 7 grab samples from offshore
DoC, cross-shore to bays

Vegetation Sampling – to be determined

Process Data Sampling – to be determined
(Winds, waves, currents, precipitation, etc...)





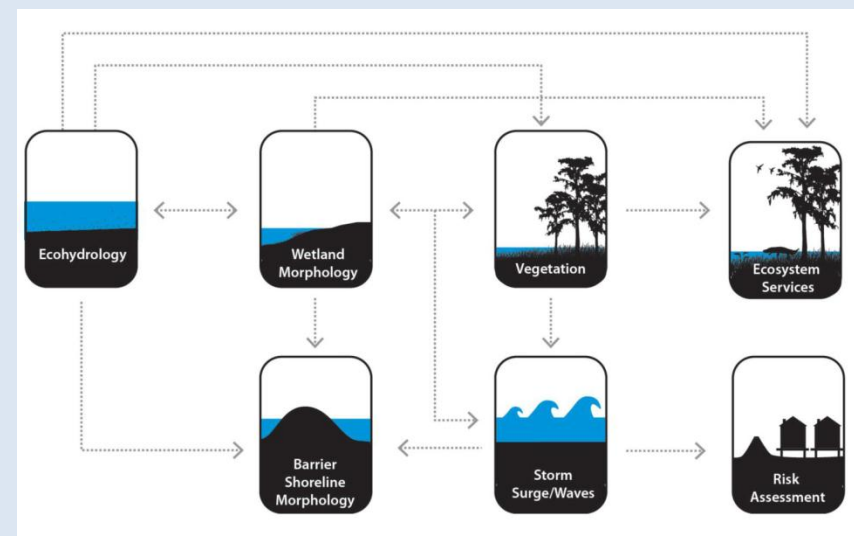
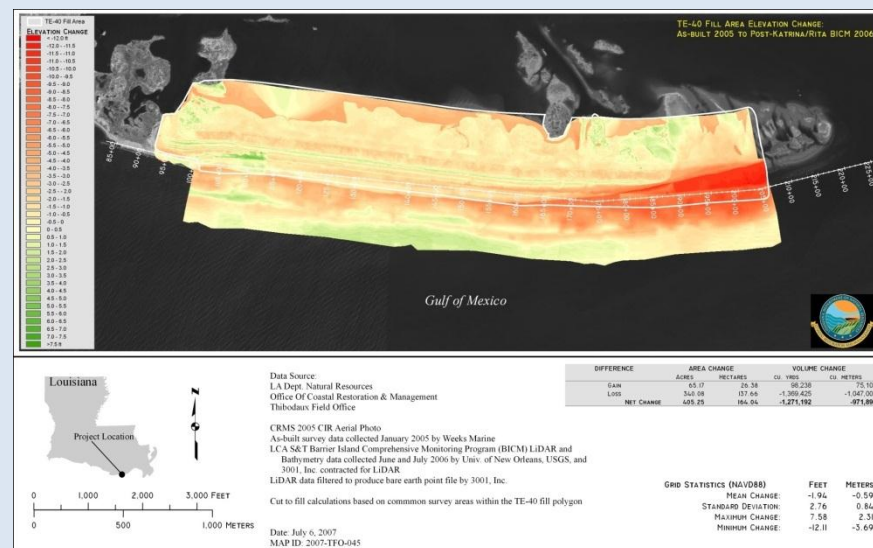
Scope of Work

Barrier Shoreline Assessment
Shoreline Configuration and Change
Habitat/Land Cover Change
LiDAR Topographic Surveys
Bathymetric Surveys
Surficial Sediment Sampling
Workshops
Project Administration and Final Report



Product Usage

- LCA Feasibility Studies
 - Terrebonne Shoreline
 - Point-au-Fer to Caillou Boca
 - Chenier Plain
- CWPPRA - Designs/Monitoring/Outreach
- Storm Damage Assessment / FEMA Claims
- LCA S&T Studies
- Public Information
- MC252 Oil Spill
- 2012 Master Plan



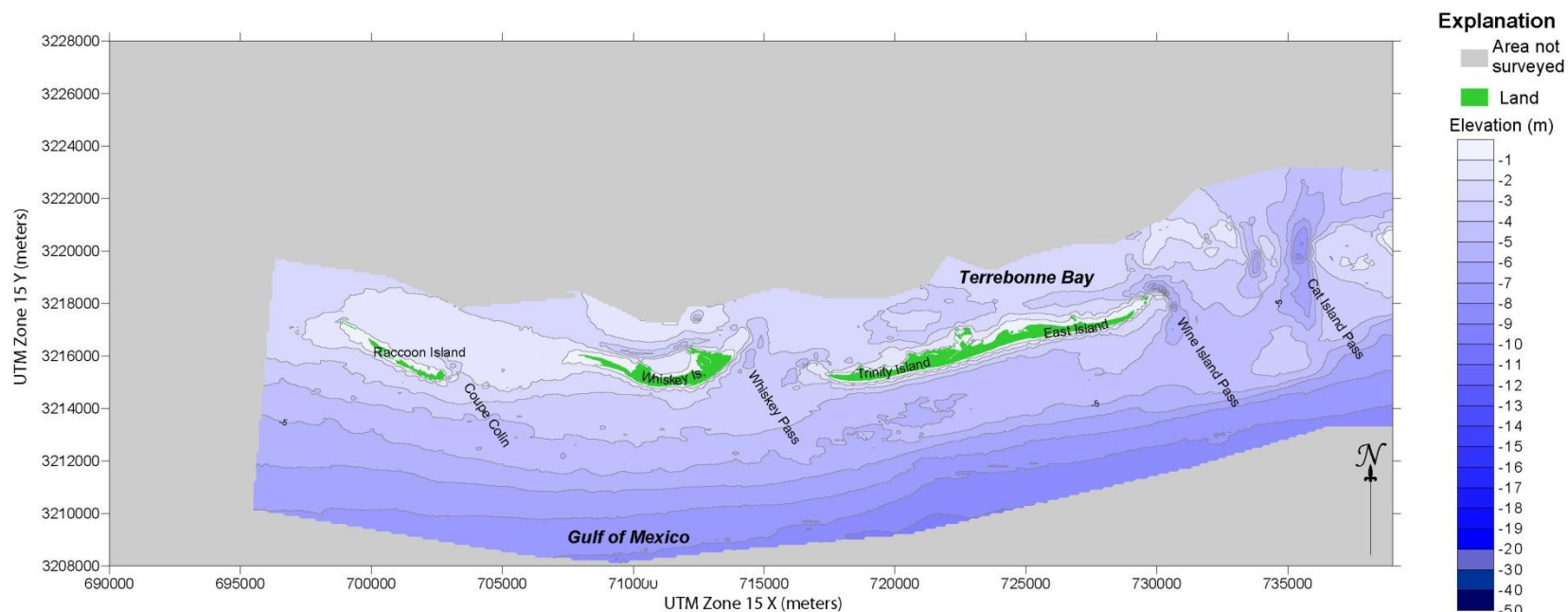


Product Usage

Trinity Island – Madonna Statute



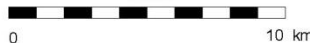
Isles Derniere Region 2006 Bathymetry



Bathymetric Data

The bathymetric data on this map was acquired from hydrographic surveys conducted in 2006 by UNO-PIES and USGS. Depths are given relative to North American Vertical Datum 1988 (NAVD88). Not to be used for navigation purposes.

Scale:



Vertical datum: NAVD88 (GEOID03 Rev. 10/2006)
Horizontal datum: North American Datum 1983 (2004.65)

Supratidal Areas

The areas shown in green were assigned an elevation value of 0.5 meters. Shoreline data from 2005 were derived from a combination of Digital Ortho-Quarter Quads (DOQQs) and Digital Globe Quickbird satellite imagery obtained by UNO-PIES. The shorelines were derived from thematic land/water classifications produced from these image datasets and subsequent GIS editing by UNO-PIES.

Central Coast Seafloor Change Volumes 1980's to 2006

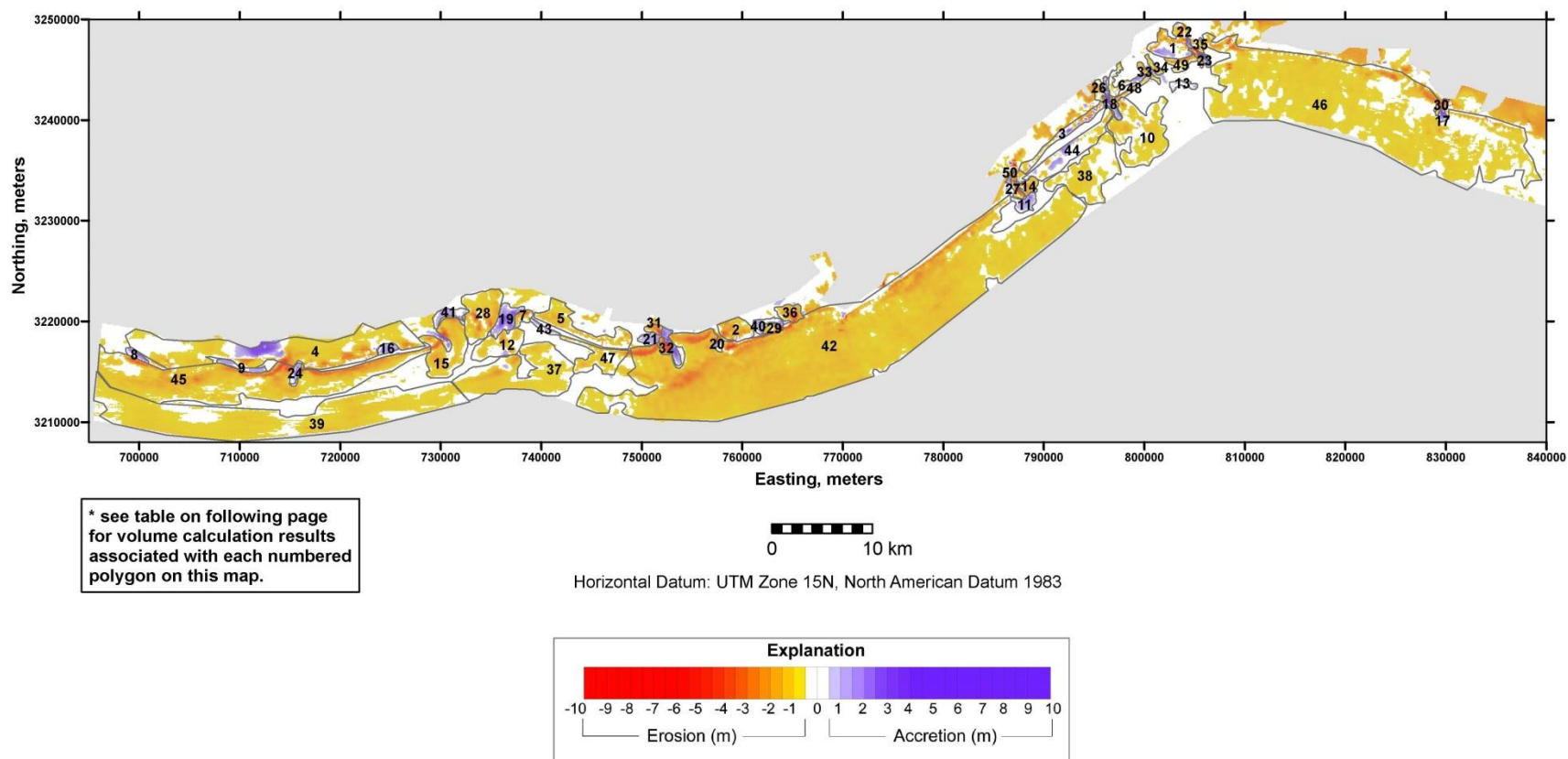


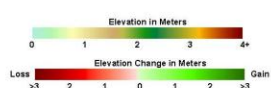
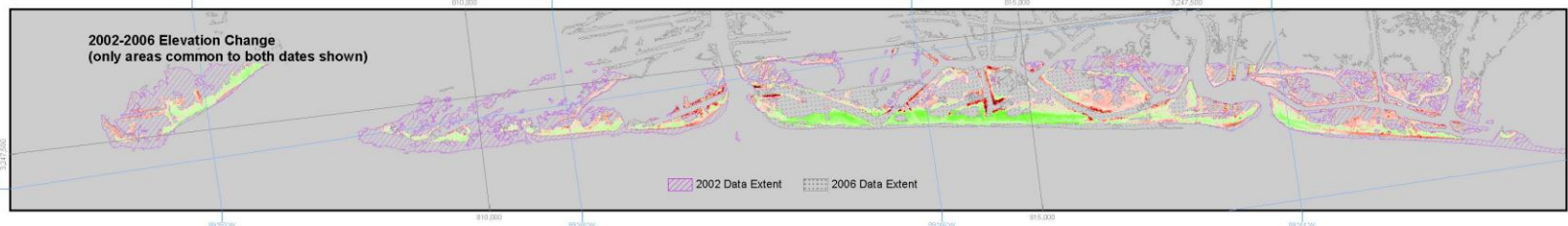
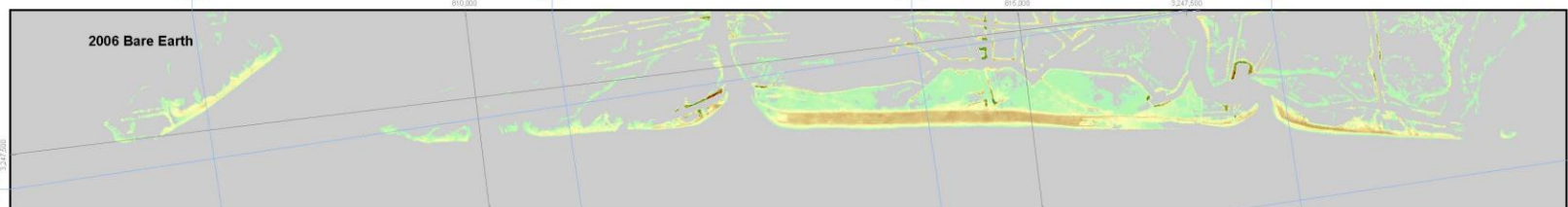
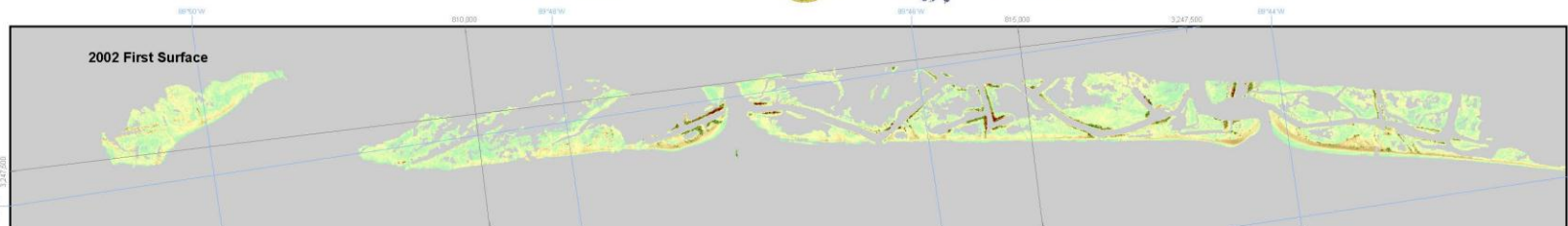
Figure 22

Topography

BARRIER ISLAND COMPREHENSIVE MONITORING PROGRAM (BICM)
LOUISIANA DEPARTMENT OF NATURAL RESOURCES



BAY LONG -- MODERN DELTA REGION -- LOUISIANA
2002 and 2006 ELEVATION and 2002-2006 ELEVATION CHANGE

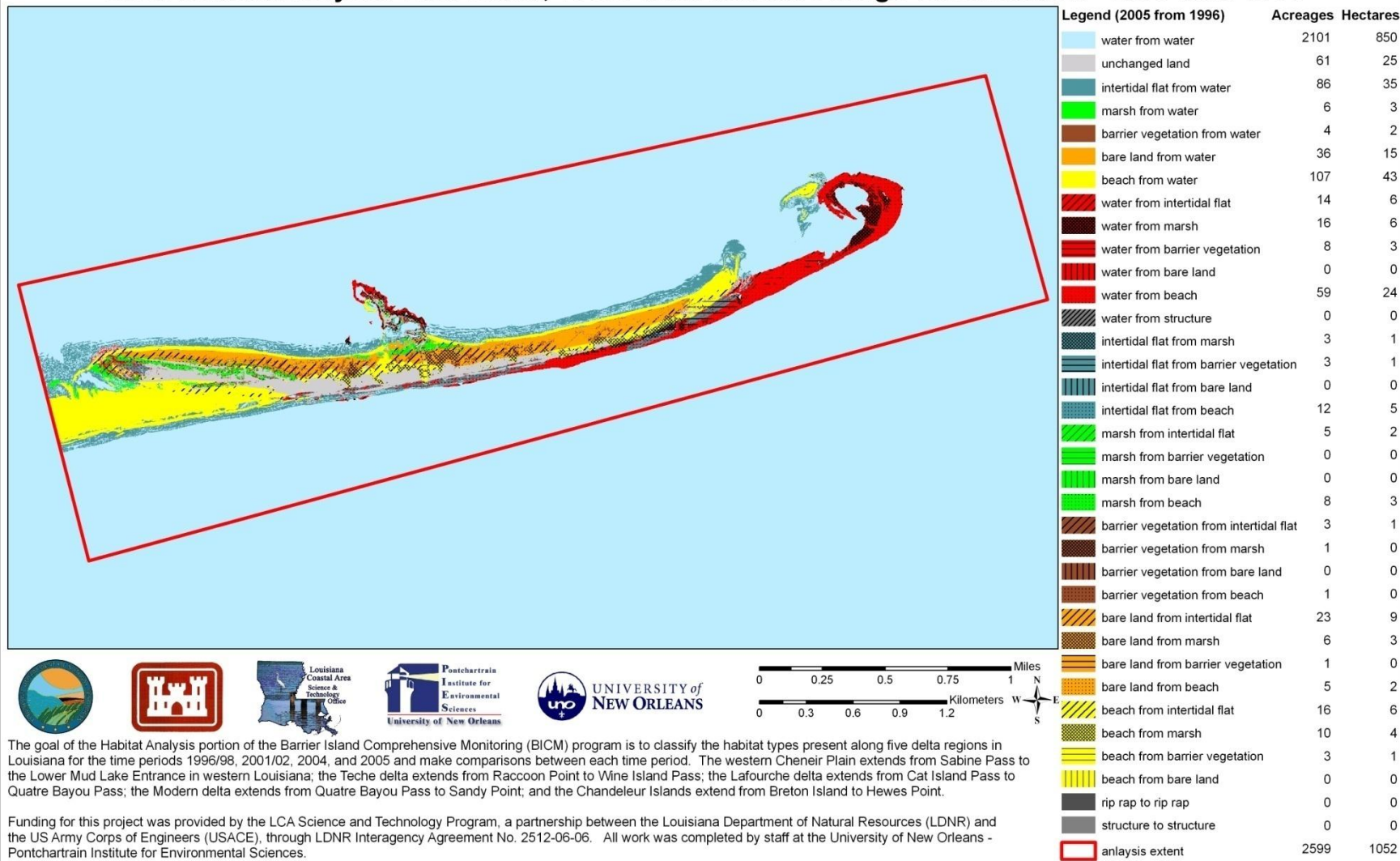


Bay Long -- Modern Delta Region
2002 and 2006 Elevation
and 2002-2006 Elevation Change



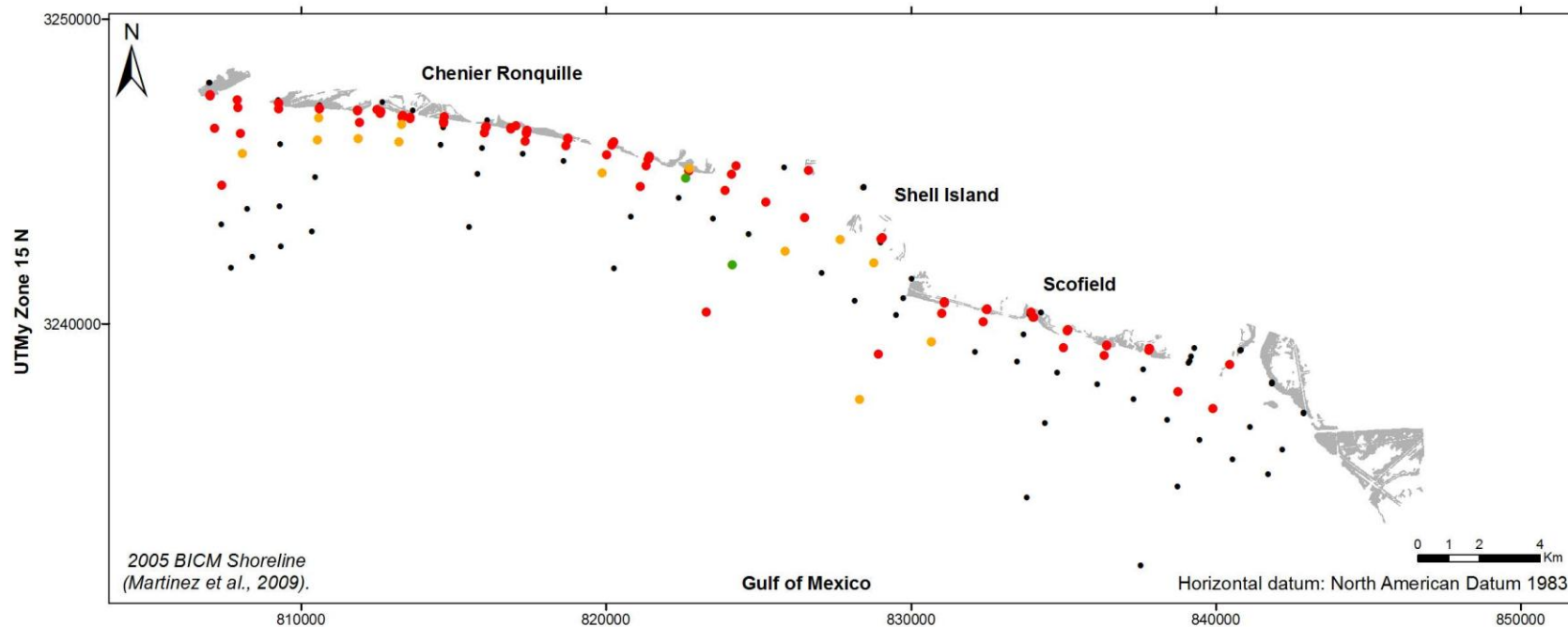
Maps show lidar data areas only, not actual island extent.
Only elevations above Mean High Water are included.
Lidar: 2002 Out USGS ATM3 first surface elevation.
2006 In: Contractor bare earth elevation.
Vertical Datum: NAVD83, Geoid: 2003.
Projection: UTM zone 16N, NAD 1983. Units: Meter.

BICM Habitat Analysis: East Island, Teche delta Habitat Change Classification - 2005 from 1996



Modern Delta Region - 2008 - Percent Composition Sand

Indicated by Particle Size Analysis



LEGEND

Percent Sand for Visual Estimates of $\geq 70\%$ Sand

- $\leq 70.0\%$
- 70.1 - 80.0 %
- 80.1 - 90.0 %
- 90.1 - 100.0 %

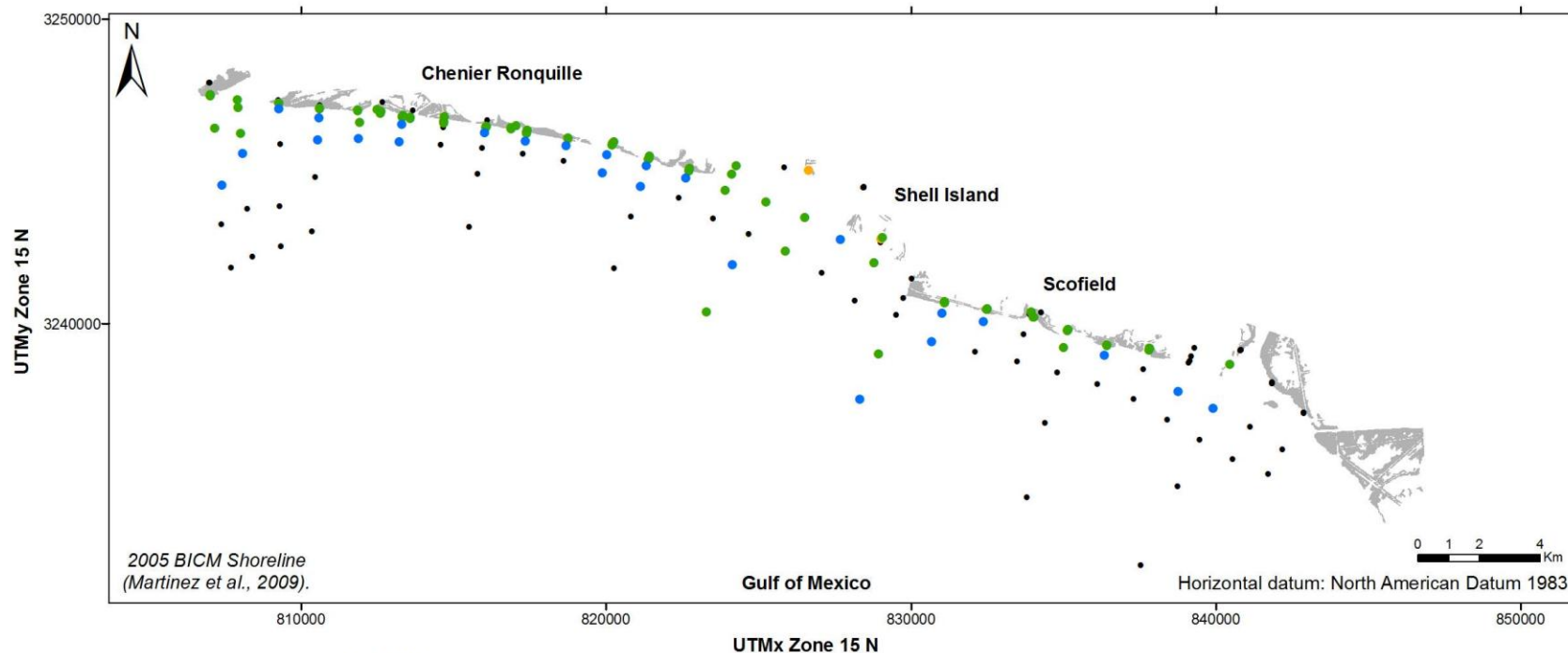
• Visually estimated at $< 70\%$ Sand
(not analyzed with particle size instrument)

Grain Size Analysis

Samples from this location were taken by surface scooping on land and by bottom grab sampling in the water. They were then analyzed visually for percent composition of sand. Samples that were estimated to be greater than 70 percent sand were quantitatively described using laser particle size diffraction methods.

Modern Delta Region - 2008 - D₅₀ Values

Indicated by Particle Size Analysis



LEGEND

D₅₀ Values for Visual Estimates of $\geq 70\%$ Sand

- ≤ 0.125 mm
- 0.126 - 0.250 mm
- 0.251 - 0.500 mm
- ≥ 0.501 mm

• Visually estimated at $< 70\%$ Sand
(not analyzed with particle size instrument)

Grain Size Analysis

Samples from this location were taken by surface scooping on land and by bottom grab sampling in the water. They were then analyzed visually for percent composition of sand.

Samples that were estimated to be greater than 70 percent sand were quantitatively described using laser particle size diffraction methods. The D₅₀ value represents a median value of the sediment size for which 50% of the sediment is finer and 50% is coarser.



Data Access

Coastal Protection and Restoration Authority

State of Louisiana, Governor Bobby Jindal

Search... Search

About CPRA What's At Stake A Common Vision Our Work Newsroom Resources Calendar

Projects

Oil Spill Restoration

Emergency Response

Key Initiatives

Our Work

Protection **Restoration** **Resiliency**

Since 2005, Louisiana has faced the devastating impacts of Hurricanes Katrina, Rita, Gustav, Ike, and Isaac and in 2011, record high water on the Mississippi River challenged flood protection systems statewide — resulting in one of the largest flood-fighting efforts in Louisiana's history.

Further, our state continues to be at the forefront of the worst oil spill in our nation's history — the Deepwater Horizon disaster. Over three years after the platform explosion and tragic deaths of 11 Americans, our state continues to experience re-oiling associated with this devastating oil spill.

The challenges we've faced in recent years highlight the importance of funding and implementing preventative measures for flood control and coastal restoration.

<ftp://ftp.coastal.la.gov/BICM>



ftp://ftp.coastal.la.gov/BICM

The screenshot shows a Windows XP desktop with a taskbar on the left containing icons for Internet Explorer, Word, PowerPoint, Excel, PDF Reader, Firefox, and several folders. The Internet Explorer window is open to the FTP site 'ftp://ftp.dnr.state.la.us/BICM'. The browser's address bar shows the URL, and the page title is 'Index of /BICM'. Below the title is a table listing the contents of the directory.

Name	Size	Date Modified
[parent directory]		
Atchafalaya/		9/18/12 12:00:00 AM
BICM Regions map.pdf	111 kB	7/29/10 12:00:00 AM
BICM--README.txt	341 B	2/4/13 10:03:00 AM
Vol1--Barrier Shoreline Post-Storm Assessment/		8/25/10 12:00:00 AM
Vol2--Shoreline-Change/		8/25/10 12:00:00 AM
Vol3--Bathymetry/		4/14/10 12:00:00 AM
Vol4--LIDAR/		8/25/10 12:00:00 AM
Vol5--Habitat-Analysis/		8/25/10 12:00:00 AM
Vol6--Sediments/		2/4/13 10:03:00 AM



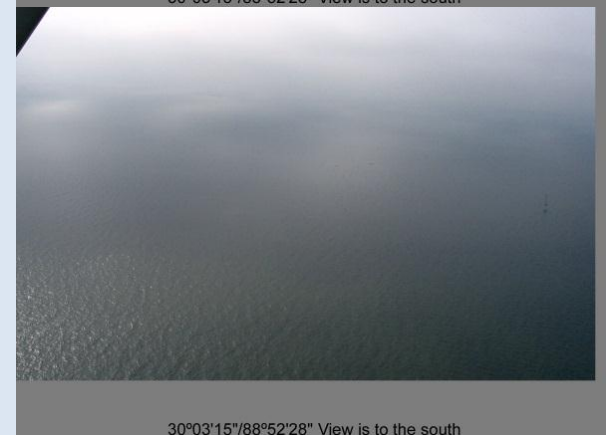
BICM - *Development Process*

Issues that need information

- ★ Aerial Extent of Islands
- ★ Sub-aqueous Extent of Islands
- ★ Habitat Classification
 - Sediment Properties/Geotechnical
 - ★ Surficial Characterization
 - Overwash/Accretion
 - Compaction
- Environmental Processes
- Vegetation Composition

LCA SSRT Review

- ★ build on historic datasets





BICM - *Lessons Learned*

Temporal Scales

- semi-decadal

- annual monitoring

Data Collection

- Standardize Methods

- Additional Coverage

- Additional Variables

- New Technology

Quality Assurance/Quality Control

Process Data (CRMS – Waters)

Tools –

- WVA Model Revision

- Master Plan Modeling

- Operational Sediment Budget

- Structured Decision Criteria Models

Data Management & Access



30°03'15"/88°52'28" View is to the south



30°03'15"/88°52'28" View is to the south



BICM - Work Plan

Shoreline Assessment – 2005, 2006/07, **2013-16**
continue historic time series development

Shoreline position – 1880's, 1920-30's, **1950's, 1980's**, 1998, 2004, 2005, **2008, 2012**

Habitat Mapping/Land Loss – **1980's**, 1996*, 2002*, 2004*, 2005*, **2008, 2012**

Topographic Surveys – **1997, 2001**, 2002*, 2006*, **2013-16**,

Bathymetric Surveys – 1880's*, 1930's*, 1980's, 2006/07, **2013-16**

Sediment Characterization – 2008, **2013-16**

Subsidence – 2013-16

determine methods, scale, and implement (needs to integrate with CRMS)

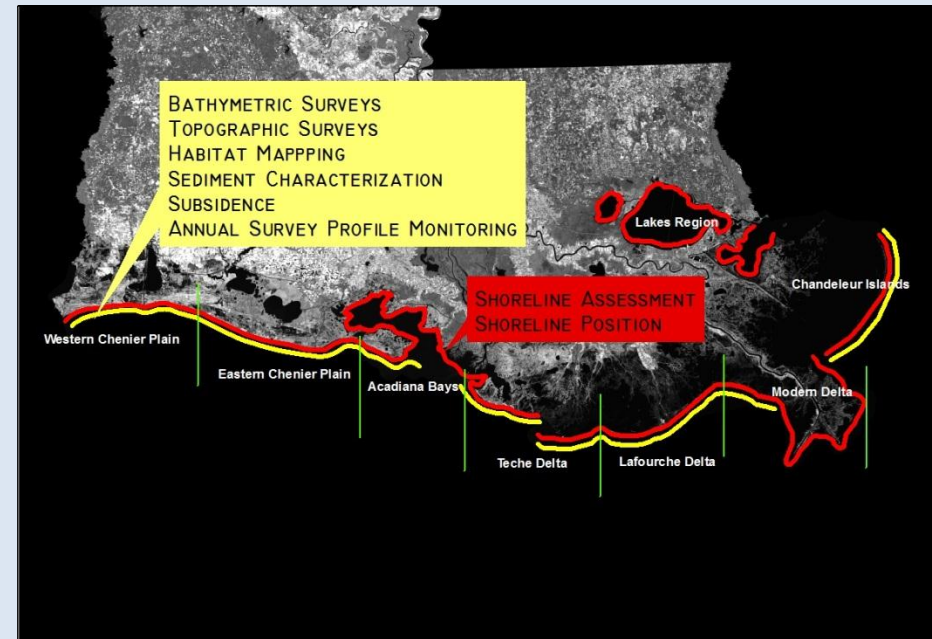
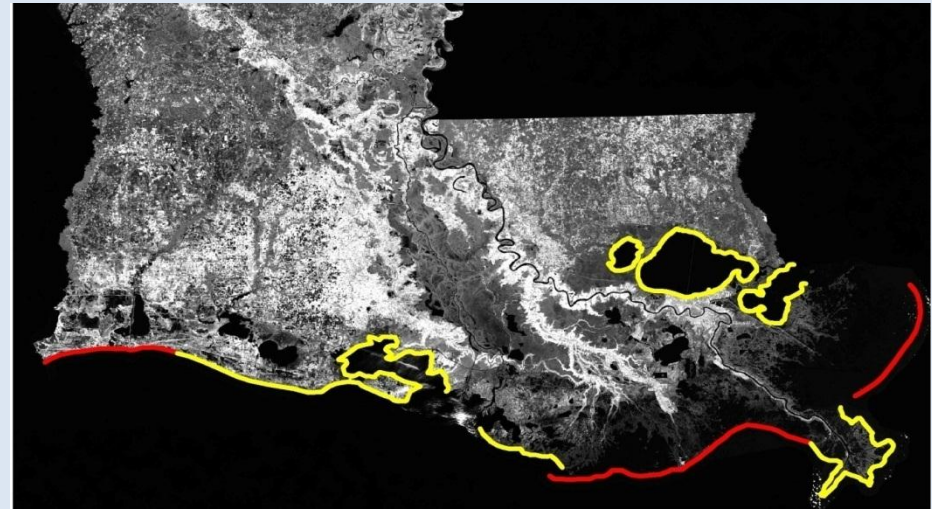
Annual Profile Monitoring – 2013-16

determine methods, scale, and implement (Storm Impacts and over wash focus)

Vegetation Sampling – 2013 CIAP Project

Develop Methods and determine costs for full Implementation

Process Data Sampling – to be determined (winds, waves, currents, precipitation, etc...)





BICM – *Projected Budget*

Collection Effort	Fiscal Year					TOTALS
	FY2012/13	FY2013/14	FY2014/15	FY2015/16	FY2016/17	
Shoreline Assessment	\$ 165,240.00	\$ -	\$ -	\$ -	\$ -	\$ 165,240.00
Shoreline Erosion	\$ 113,904.00	\$ 113,904.00	\$ -	\$ -	\$ -	\$ 227,808.00
Bathymetry	\$ -	\$ 810,000.00	\$ 340,000.00	\$ 880,000.00	\$ -	\$ 2,030,000.00
Topography (LiDAR)	\$ -	\$ 539,000.00	\$ 297,000.00	\$ 200,000.00	\$ -	\$ 1,036,000.00
Habitat	\$ -	\$ 207,000.00	\$ -	\$ -	\$ -	\$ 207,000.00
Sediment	\$ -	\$ 88,400.00	\$ 37,570.00	\$ 97,240.00	\$ -	\$ 223,210.00
Subsidence	\$ 60,600.00	\$ 60,600.00	\$ 60,600.00	\$ 60,600.00	\$ 60,600.00	\$ 303,000.00
Annual Sampling	\$ 252,500.00	\$ 152,500.00	\$ 210,000.00	\$ 142,500.00	\$ 252,500.00	\$ 1,010,000.00
FINAL REPORTS	\$ -	\$ -	\$ -	\$ -	\$ 200,000.00	\$ 200,000.00
OCPR PROJECT ADMINISTRATION	\$ 170,000.00	\$ 170,000.00	\$ 170,000.00	\$ 170,000.00	\$ 170,000.00	\$ 850,000.00
Fiscal Year Totals	\$ 762,244.00	\$ 2,141,404.00	\$ 1,115,170.00	\$ 1,550,340.00	\$ 683,100.00	
					GRAND TOTAL	\$ 6,252,258.00





BICM – *Future Issues*

- Program Assessment
 - SWAMP Integration
 - Changes
 - Future Timelines (5 yr cycles)
 - Budget Realities(how to budget?)
 - Continue to add historic data
 - Realistic Timeline
 - Contracting Issues
 - Products
 - Topobathy DEM
 - Shoreline Classification



30°03'15"/88°52'28" View is to the south



30°03'15"/88°52'28" View is to the south



Questions ?

Darin M. Lee
Coastal Protection and Restoration Authority
Operations Branch - Thibodaux Regional Office
darin.lee@la.gov

Syed Khalil
Coastal Protection and Restoration Authority
Planning and Research Branch
syed.khalil@la.gov