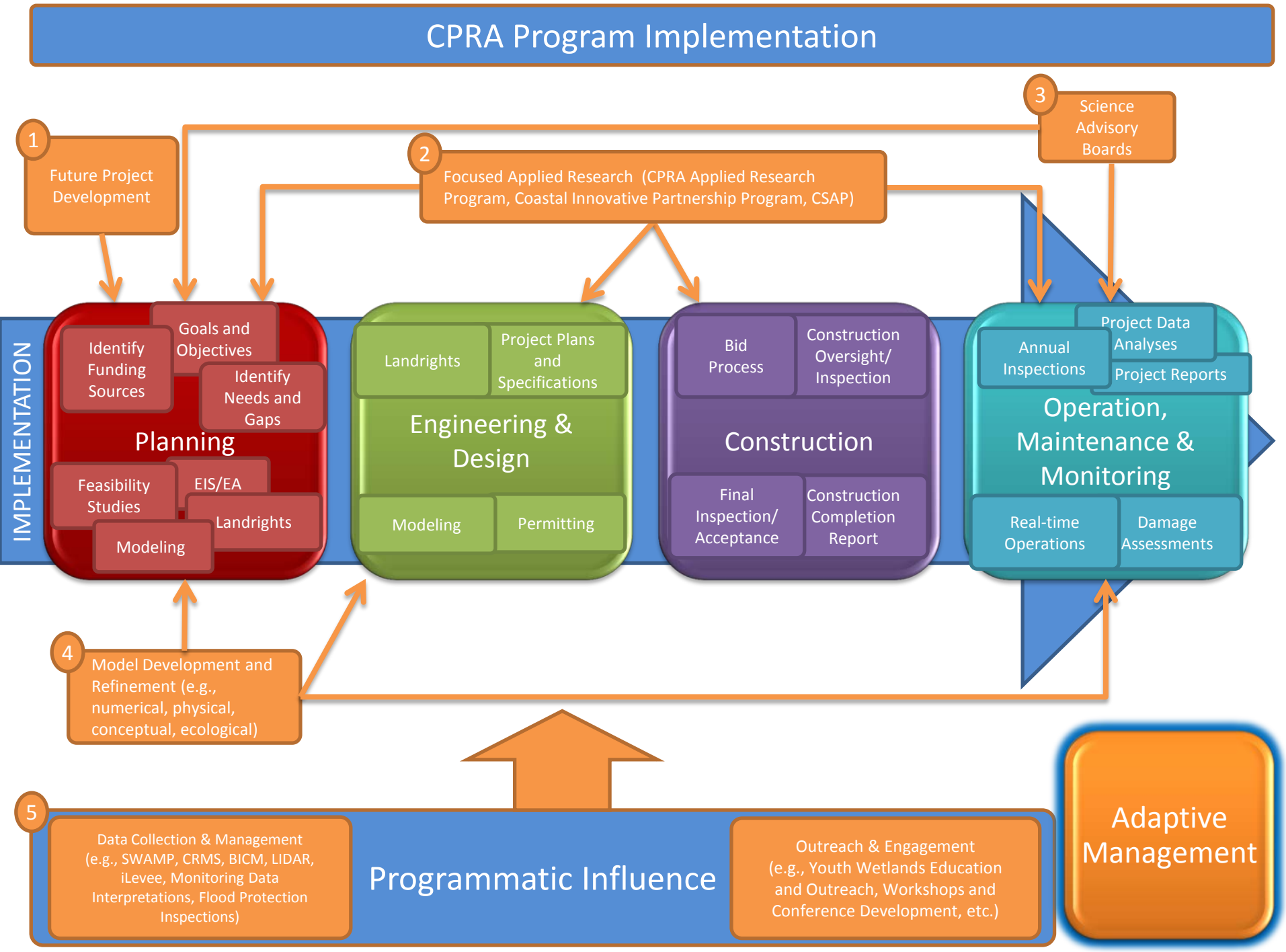
CPRA
Coastal Protection and Restoration Authority of Louisiana

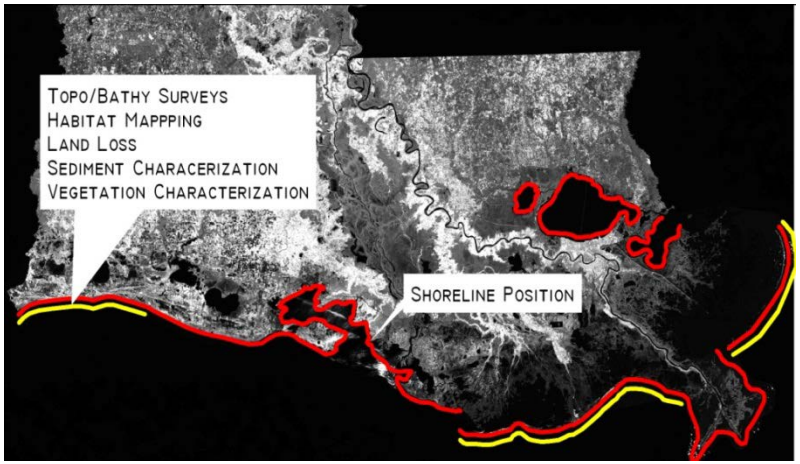
Monitoring Wetlands and Waters in Coastal Louisiana

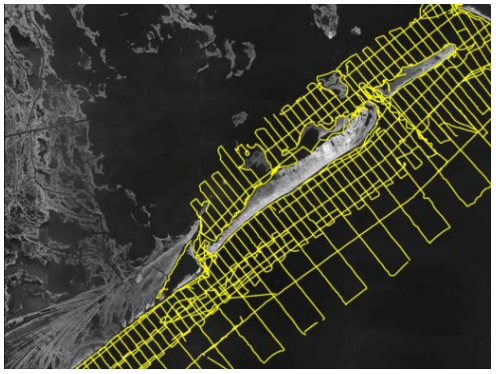
Richard Raynie
Coastal Protection and Restoration Authority

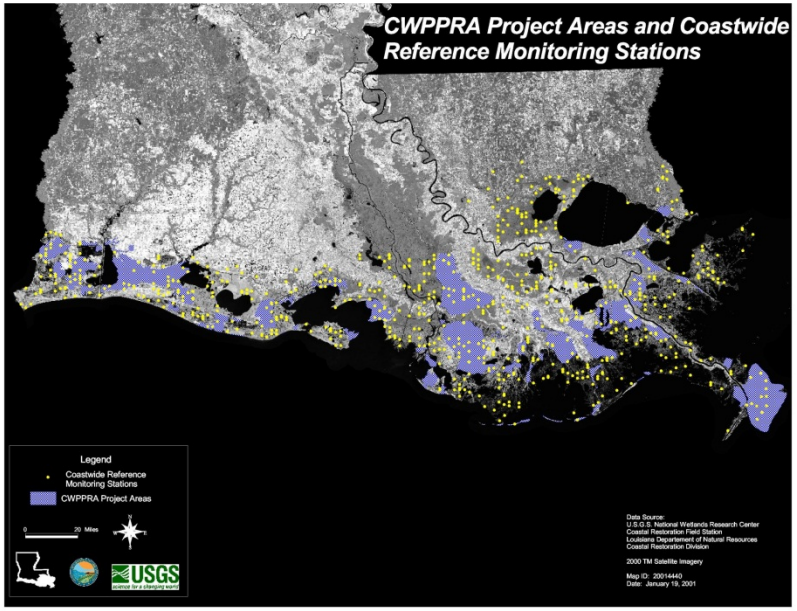
committed to **our coast**

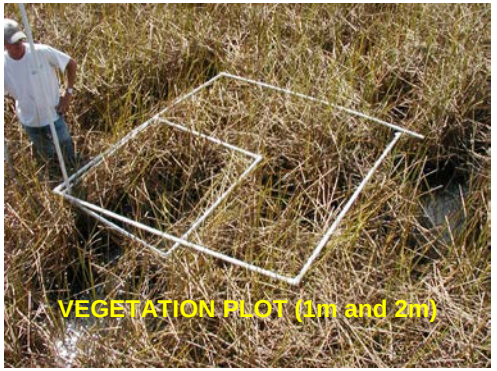

CPRA Program Implementation
1
Future Project Development
2
Focused Applied Research (CPRA Applied Research Program, Coastal Innovative Partnership Program, CSAP)
3
Science Advisory Boards
IMPLEMENTATION
Planning
Goals and Objectives
Identify Funding Sources
Identify Needs and Gaps
Feasibility Studies
EIS/EA
Landrights
Modeling
Engineering & Design
Landrights
Project Plans and Specifications
Modeling
Permitting
Construction
Bid Process
Construction Oversight/ Inspection
Final Inspection/ Acceptance
Construction Completion Report
Operation, Maintenance & Monitoring
Annual Inspections
Project Data Analyses
Project Reports
Real-time Operations
Damage Assessments
4
Model Development and Refinement (e.g., numerical, physical, conceptual, ecological)
5
Data Collection & Management (e.g., SWAMP, CRMS, BICM, LIDAR, iLevee, Monitoring Data Interpretations, Flood Protection Inspections)
Programmatic Influence
Outreach & Engagement (e.g., Youth Wetlands Education and Outreach, Workshops and Conference Development, etc.)
Adaptive Management

Monitoring Program Evolution









CWPPRA Restoration Projects

Project Specific to Programmatic Monitoring

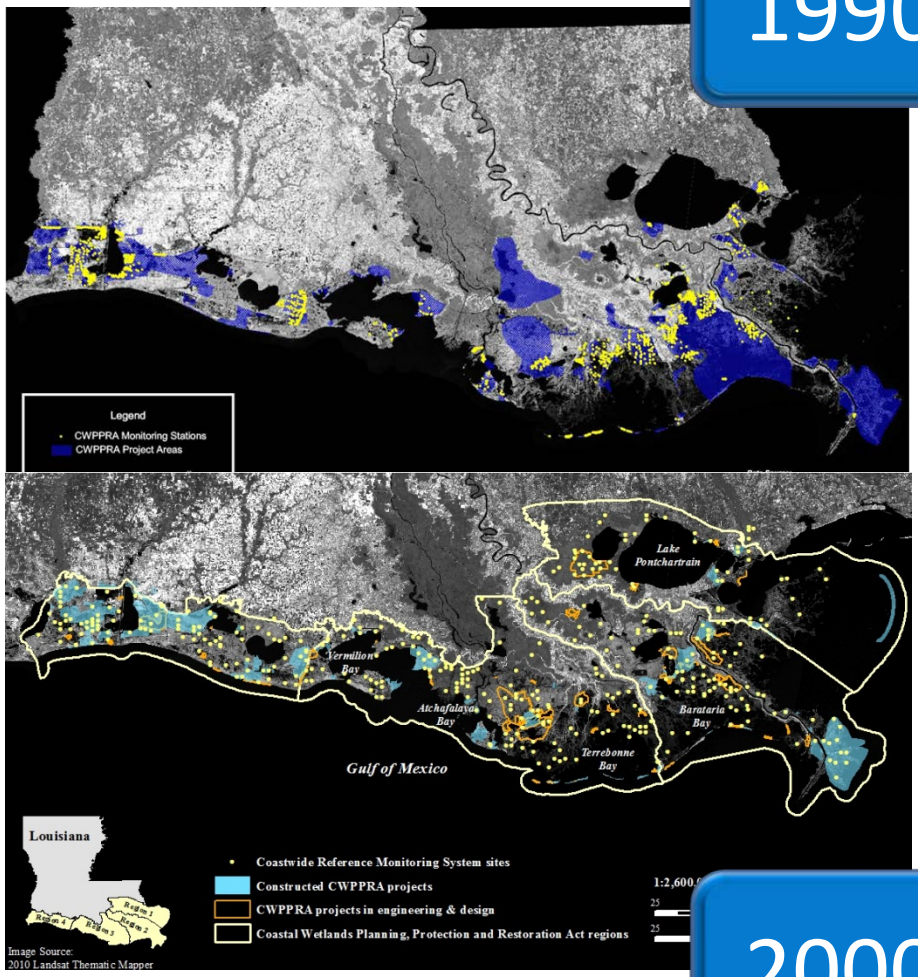
1990's

Project-Specific

- Inconsistent variables
- Short term data records
- Inadequate spatial coverage
- Unsuitable or no reference areas

Programmatic (CRMS)

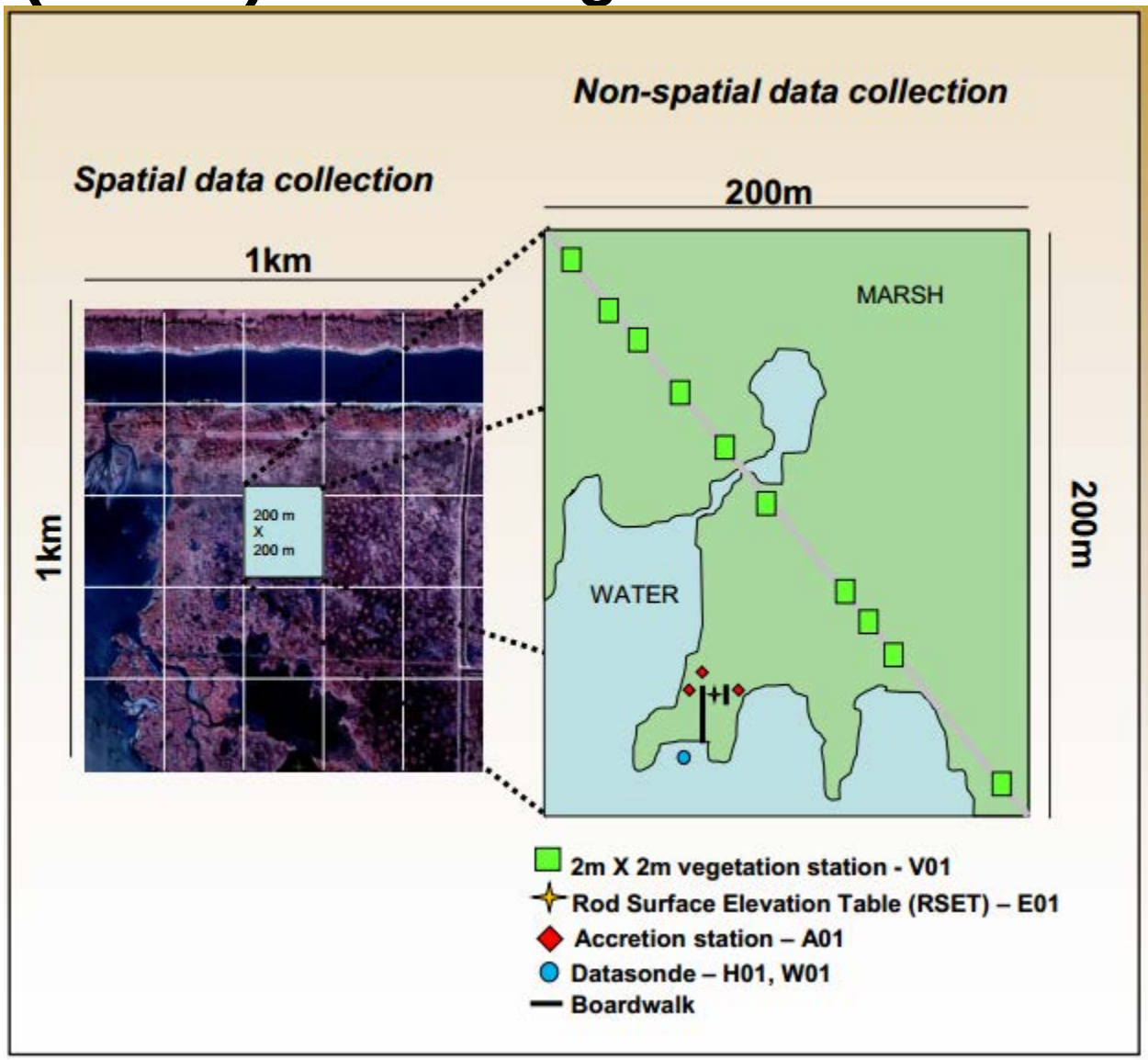
- Coverage in all marsh types
- Consistent variables
- Monitoring sites inside and outside of project boundaries
- Provides improved baseline for unconstructed projects
- Population of reference sites
- Evaluate wetlands at multiple scales



2000's

Coastwide Reference Monitoring System (CRMS) Site Design

2000's



Typical Marsh Site

Typical Swamp Site

Barrier Island Comprehensive Monitoring (BICM)

2000's

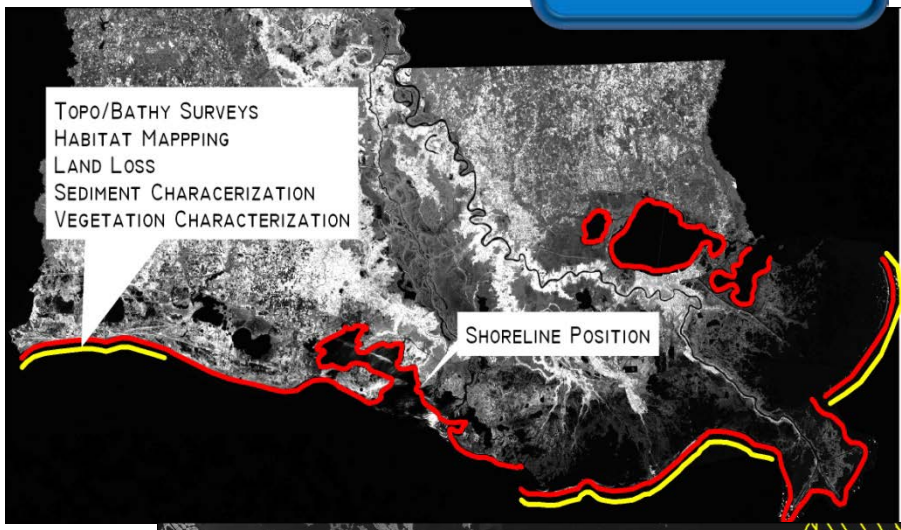
Aerial Photos –

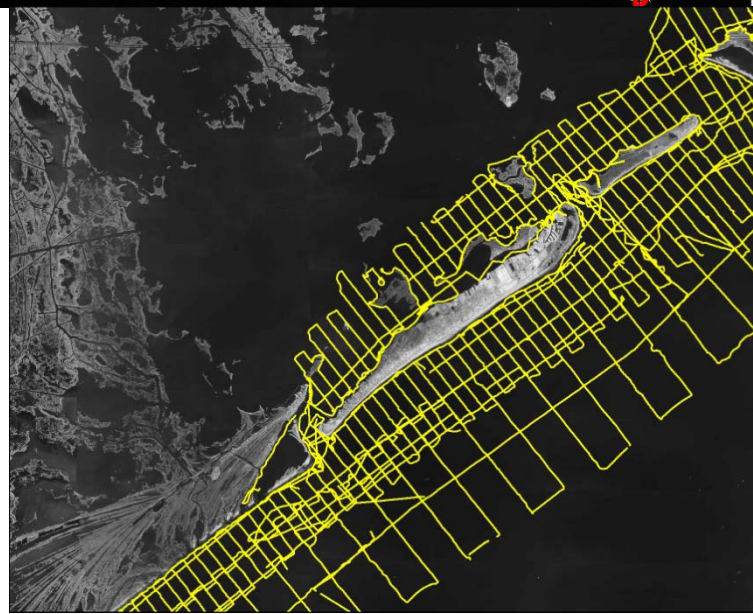
- *Shoreline position* – 1880's, 1920-30's, 1998, 2004, 2005
- *Habitat Mapping* - (7 habitats – beach, marsh, bare land, barrier vegetation, inter-tidal, structure, water)
- *Land Loss*

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

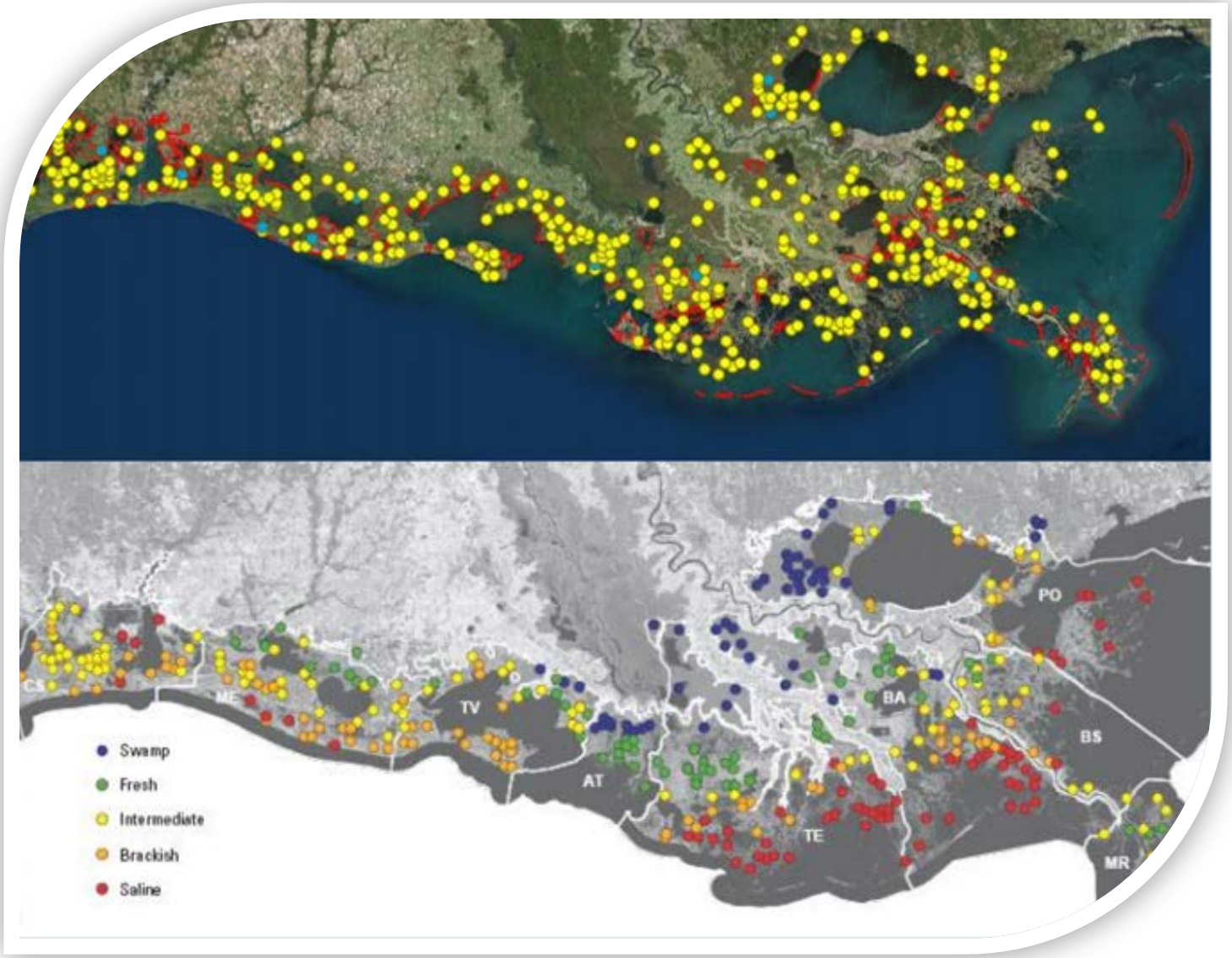
Bathymetric Surveys - 1500' perpendicular line spacing bayside to 6600' offshore, 3000' and 6000' shore parallel lines, 2500' grid outside of 2 mi

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

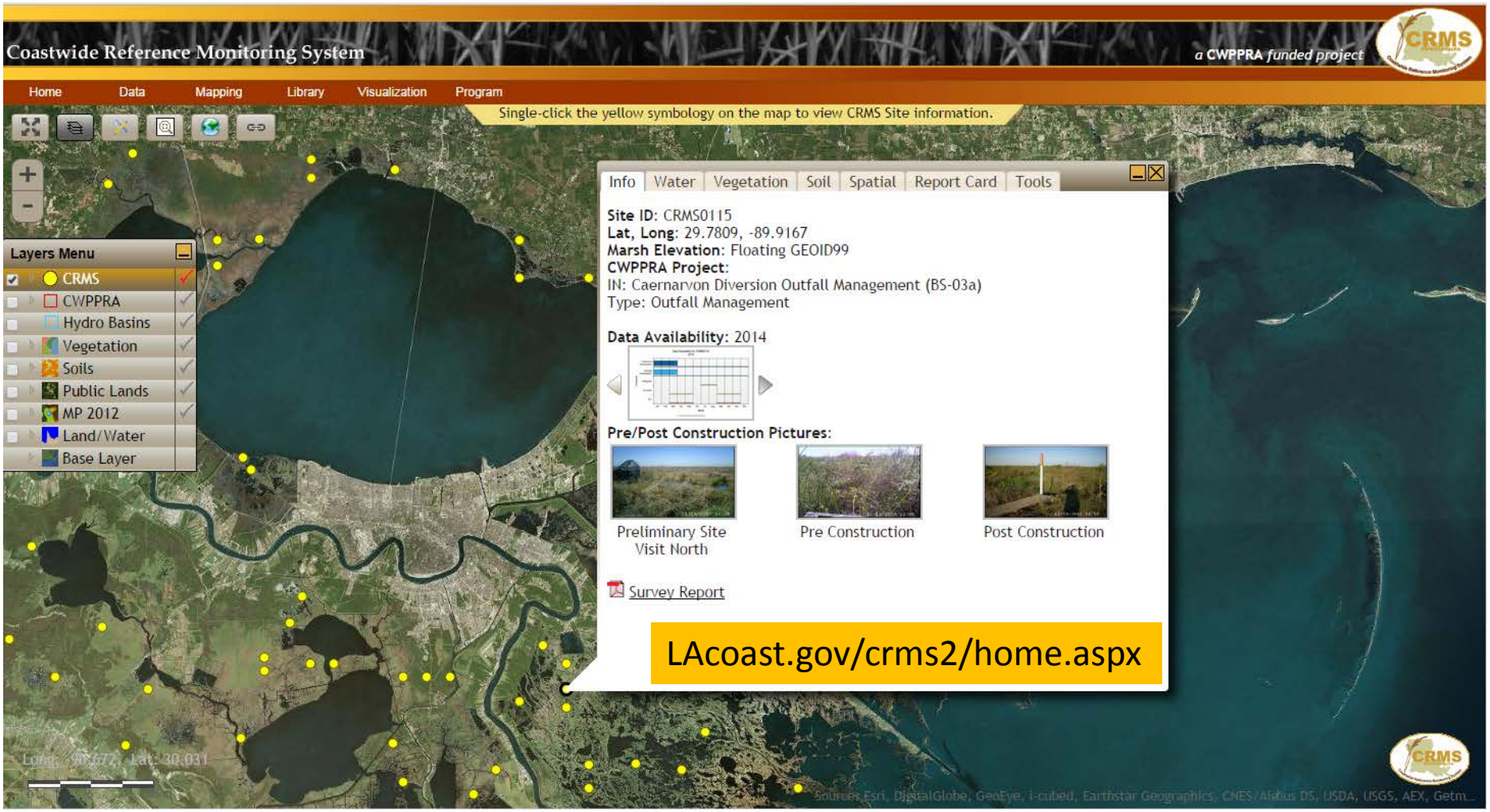


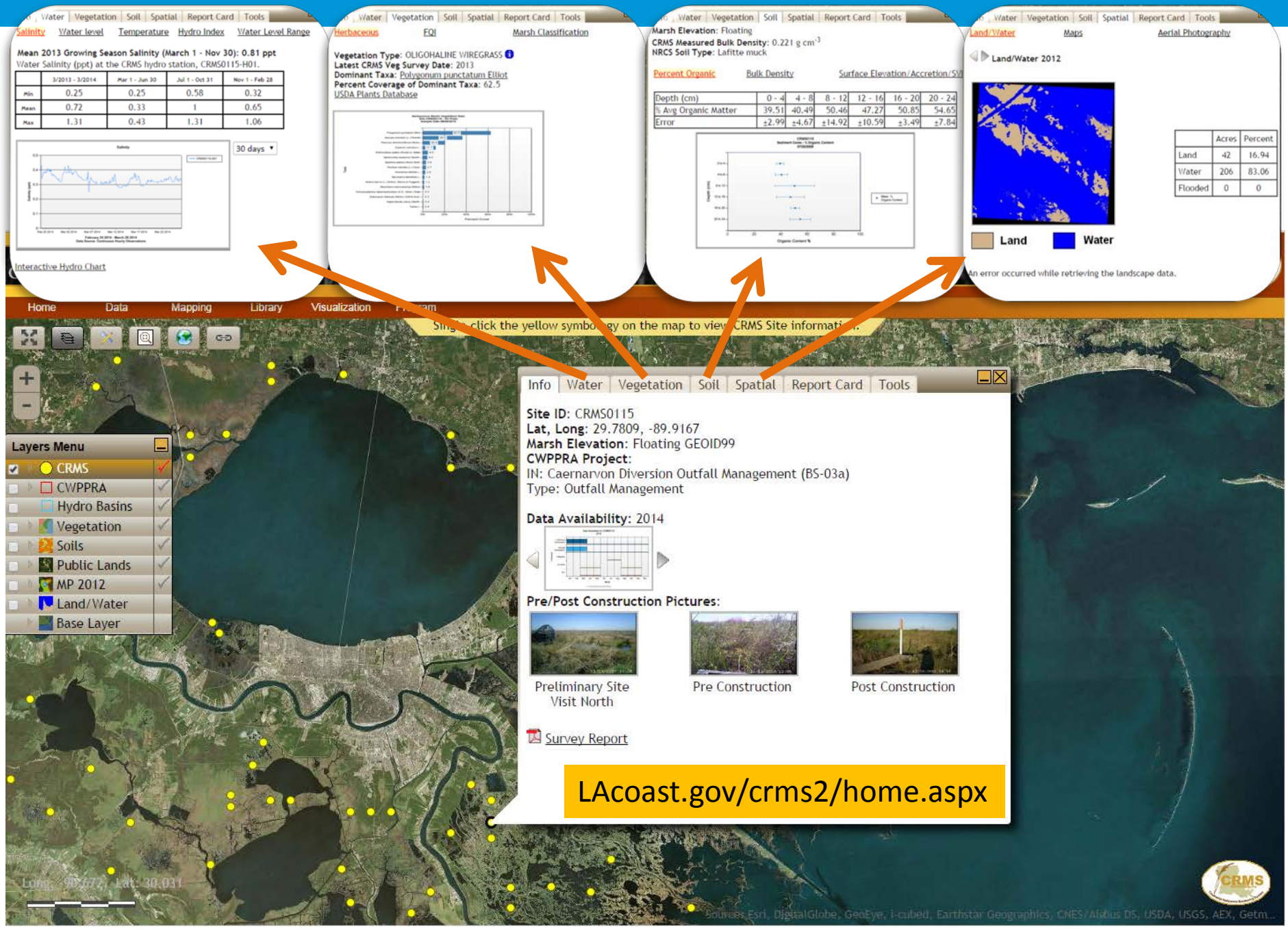


Data Management & Analytical Tools



Coastwide Reference Monitoring System(CRMS) Data Management

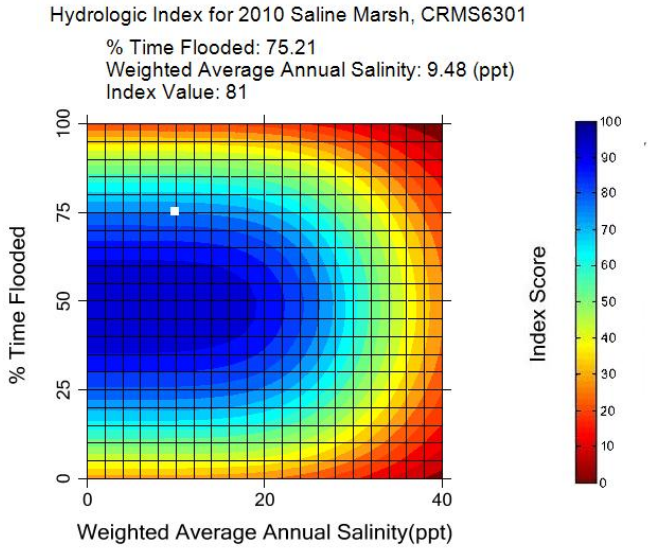



Water | Vegetation | Soil | Spatial | Report Card | Tools
Salinity | Water level | Temperature | Hydro Index | Water Level Range
Mean 2013 Growing Season Salinity (March 1 - Nov 30): 0.81 ppt
Water Salinity (ppt) at the CRMS hydro station, CRMS0115-H01.
3/2013 - 3/2014 | Mar 1 - Jun 30 | Jul 1 - Oct 31 | Nov 1 - Feb 28
Min 0.25 0.25 0.58 0.32
Mean 0.72 0.33 1 0.65
Max 1.31 0.43 1.31 1.06
30 days
Interactive Hydro Chart
Water | Vegetation | Soil | Spatial | Report Card | Tools
Herbaceous | FQI | Marsh Classification
Vegetation Type: OLIGOHALINE WIREGRASS
Latest CRMS Veg Survey Date: 2013
Dominant Taxa: Polygonum punctatum Elliot
Percent Coverage of Dominant Taxa: 62.5
USDA Plants Database
Water | Vegetation | Soil | Spatial | Report Card | Tools
Marsh Elevation: Floating
CRMS Measured Bulk Density: 0.221 g cm-3
NRCS Soil Type: Lafitte muck
Percent Organic | Bulk Density | Surface Elevation/Accretion/SV
Depth (cm) 0 - 4 4 - 8 8 - 12 12 - 16 16 - 20 20 - 24
% Avg Organic Matter 39.51 40.49 50.46 47.27 50.85 54.65
Error ±2.99 ±4.67 ±14.92 ±10.59 ±3.49 ±7.84
Water | Vegetation | Soil | Spatial | Report Card | Tools
Land/Water | Maps | Aerial Photography
Land/Water 2012
Acres Percent
Land 42 16.94
Water 206 83.06
Flooded 0 0
Land
Water
An error occurred while retrieving the landscape data.
Home Data Mapping Library Visualization
Layers Menu
CRMS
CWPPRA
Hydro Basins
Vegetation
Soils
Public Lands
MP 2012
Land/Water
Base Layer
Info | Water | Vegetation | Soil | Spatial | Report Card | Tools
Site ID: CRMS0115
Lat, Long: 29.7809, -89.9167
Marsh Elevation: Floating GEOID99
CWPPRA Project:
IN: Caernarvon Diversion Outfall Management (BS-03a)
Type: Outfall Management
Data Availability: 2014
Pre/Post Construction Pictures:
Preliminary Site Visit North
Pre Construction
Post Construction
Survey Report
LAcoast.gov/crms2/home.aspx

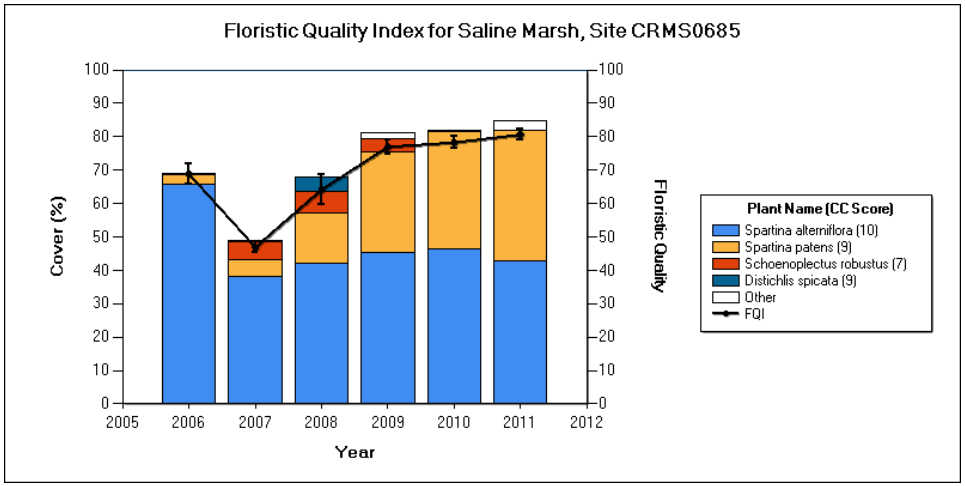
CRMS Indices

Comparison across multiple spatial scales

- **Hydrologic** – HI suitability of average salinity and % time flooded in maximizing vegetative primary productivity

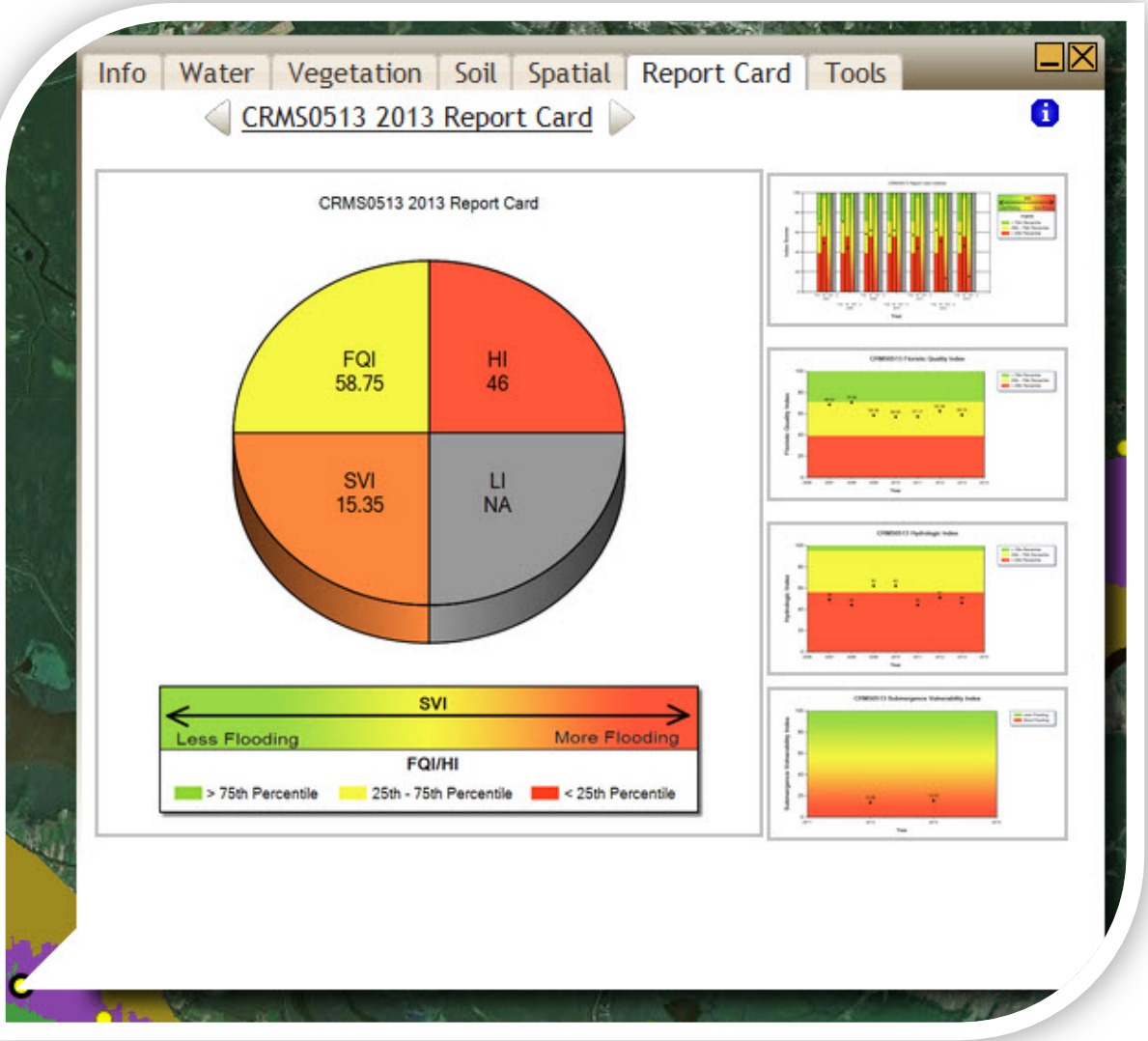


- **Floristic Quality** - FQI Species assigned scores based on fidelity to a marsh type and whether they indicate wetland stability or disturbance

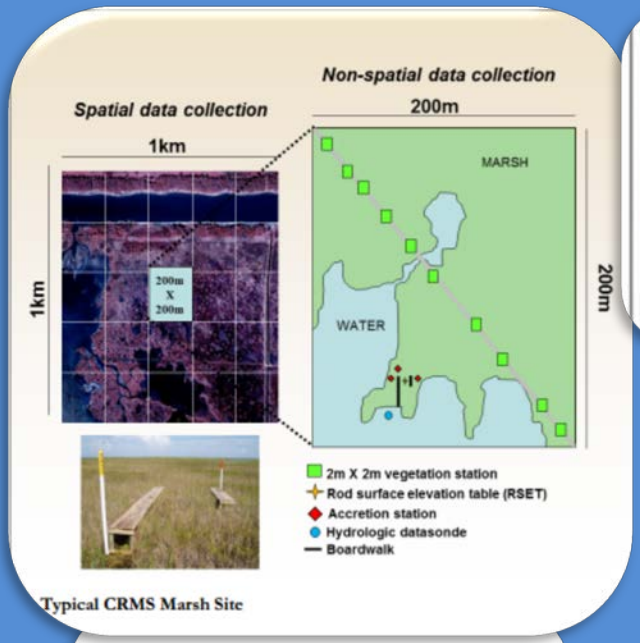


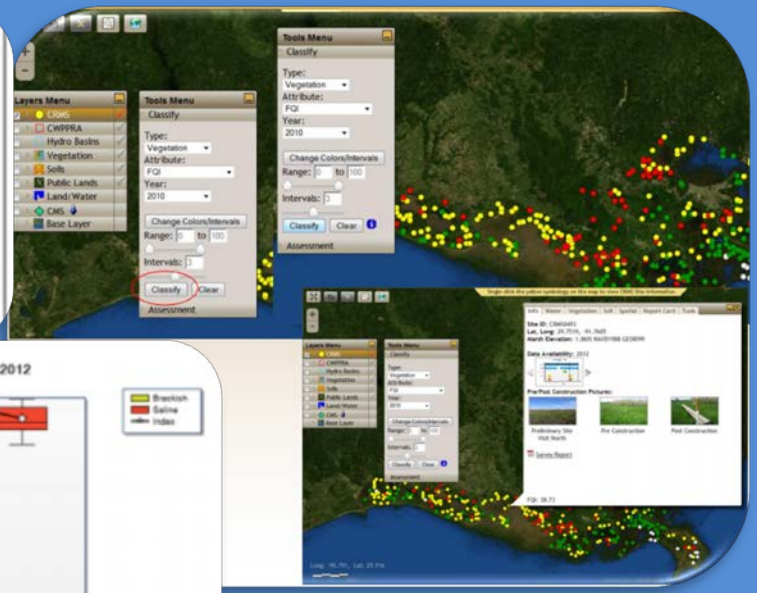
CRMS Report Cards

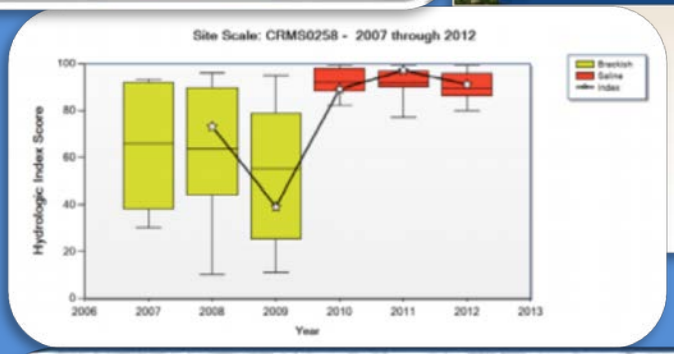
- Baseline period from 2006-2009 was established to assess existing distribution of index scores of all CRMS sites
- FQI=Floristic Quality
- HI=Hydrologic
- SVI=Submergence Vulnerability
- LI= Land Index (in development)

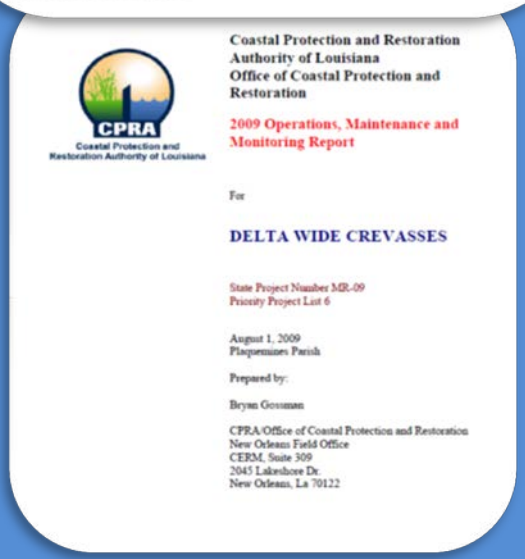


How are Data Utilized?









Coastal Protection and Restoration Authority of Louisiana
Office of Coastal Protection and Restoration

CPRA
Coastal Protection and Restoration Authority of Louisiana

2009 Operations, Maintenance and Monitoring Report

For

DELTA WIDE CREVASSES

State Project Number MR-09
Priority Project List 6

August 1, 2009
Plaquemines Parish

Prepared by:

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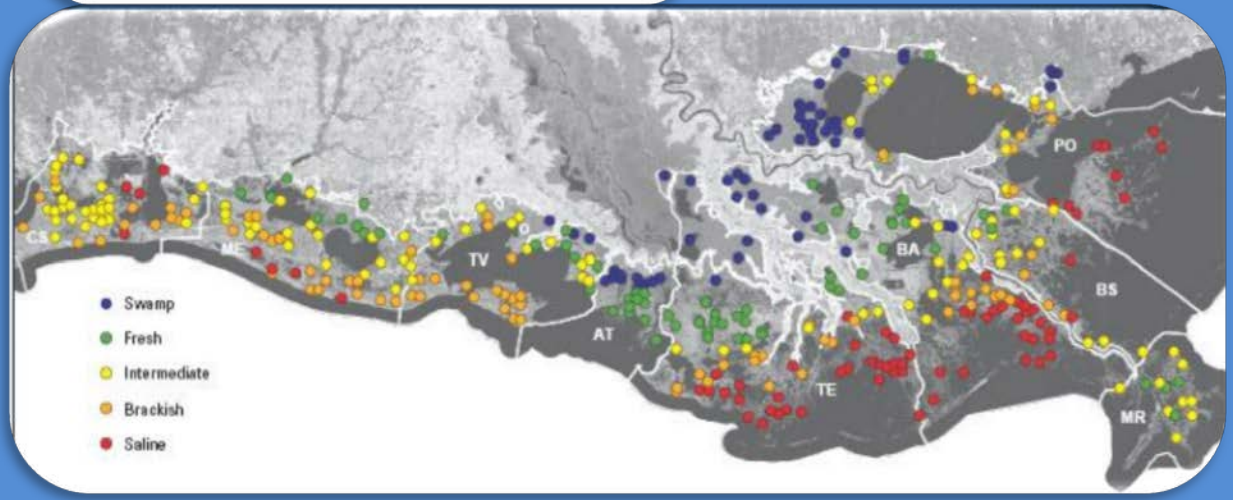
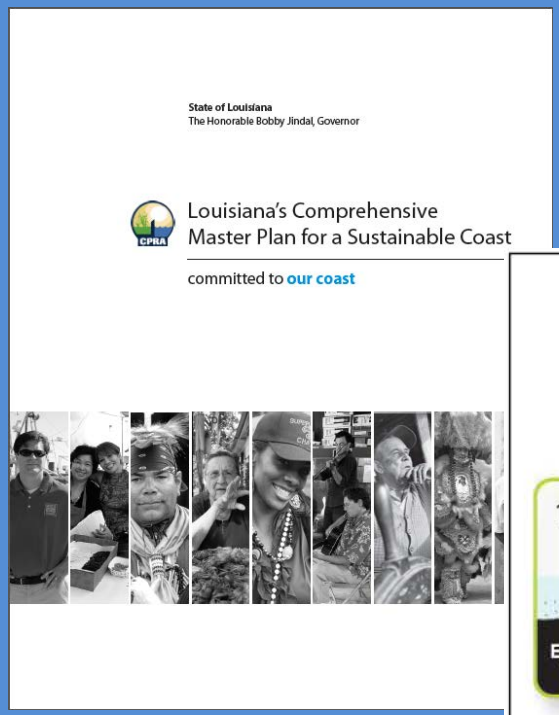
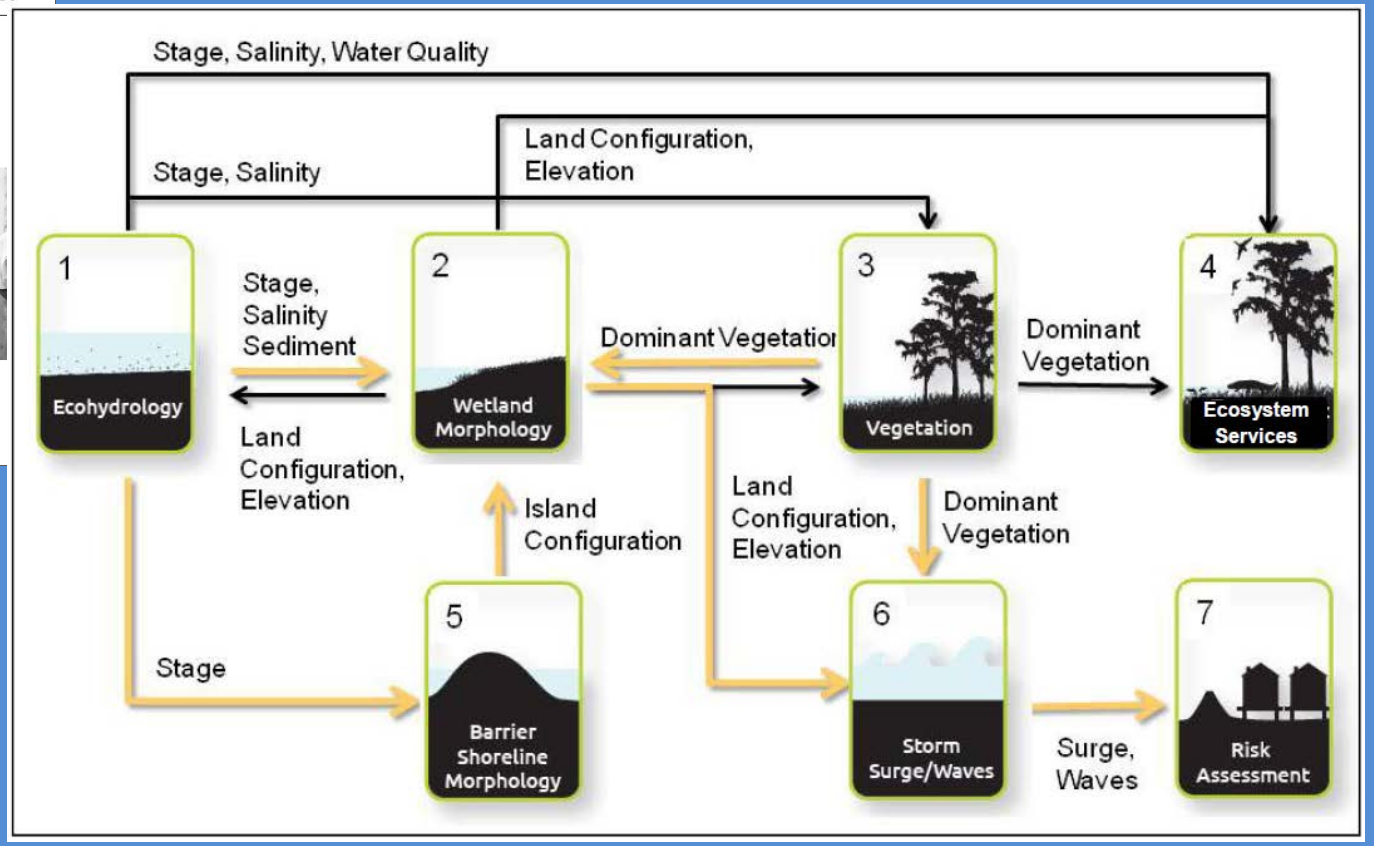
New Orleans, La 70122



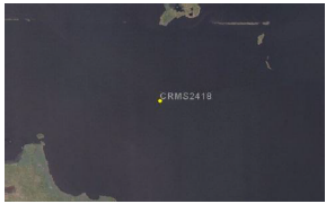
Data Utilization
Master Plan Models

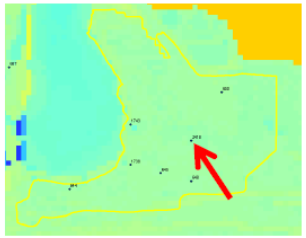


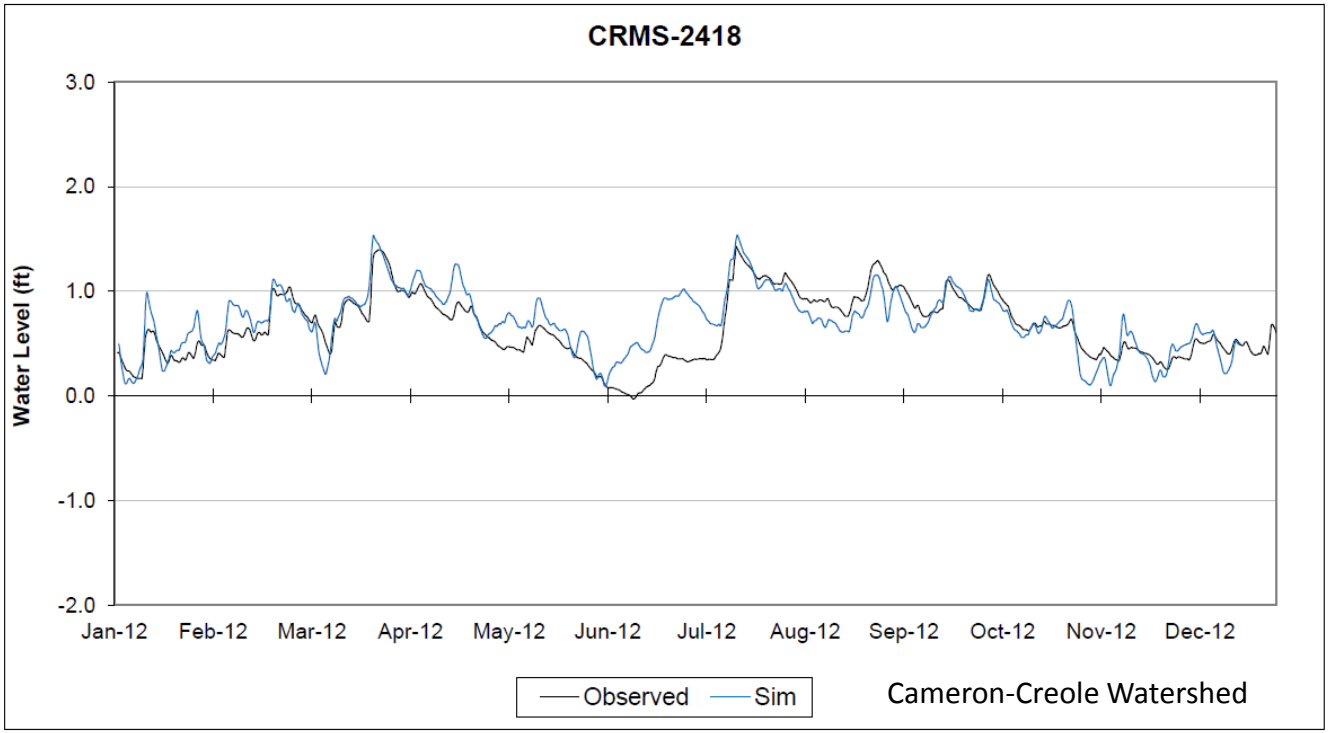


Data Utilization
Project Planning: hydrologic models

CRMS–2418

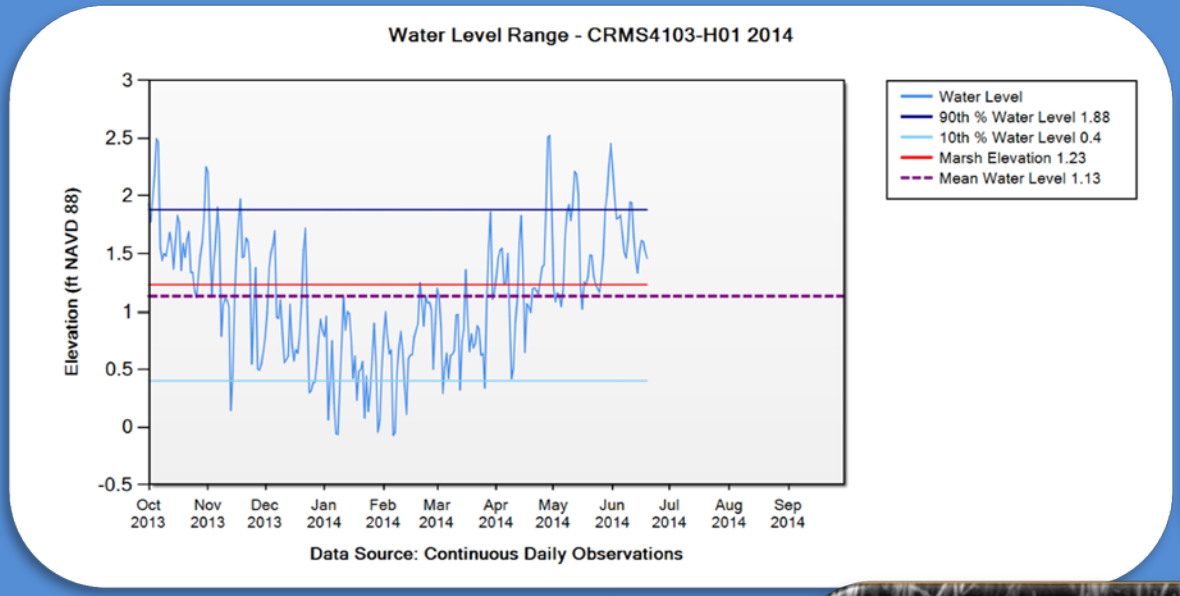


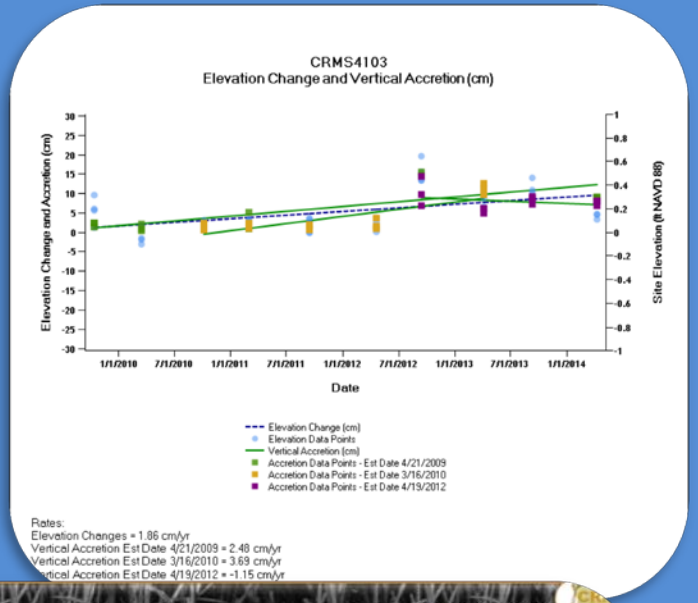


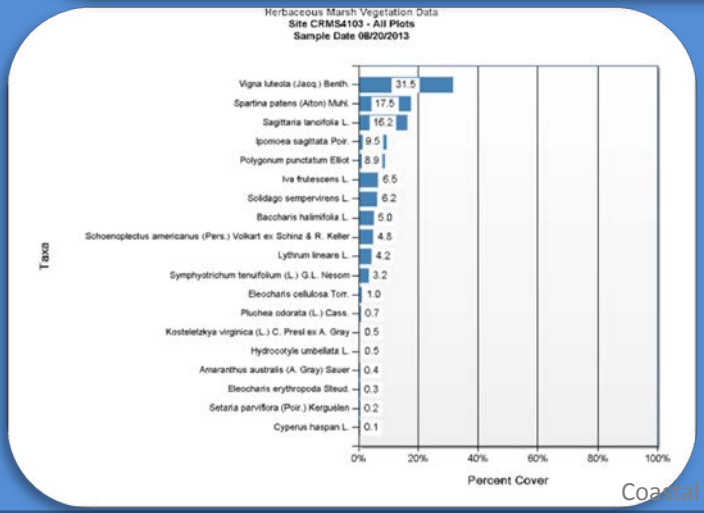


Cameron-Creole Watershed

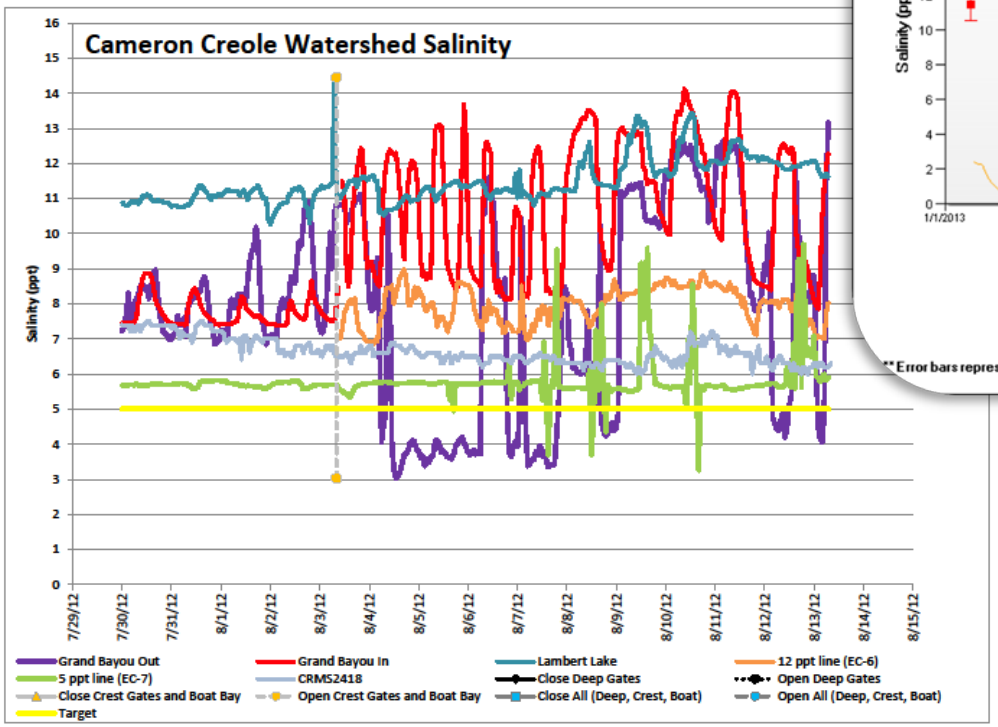
Data Utilization
Engineering & Design:

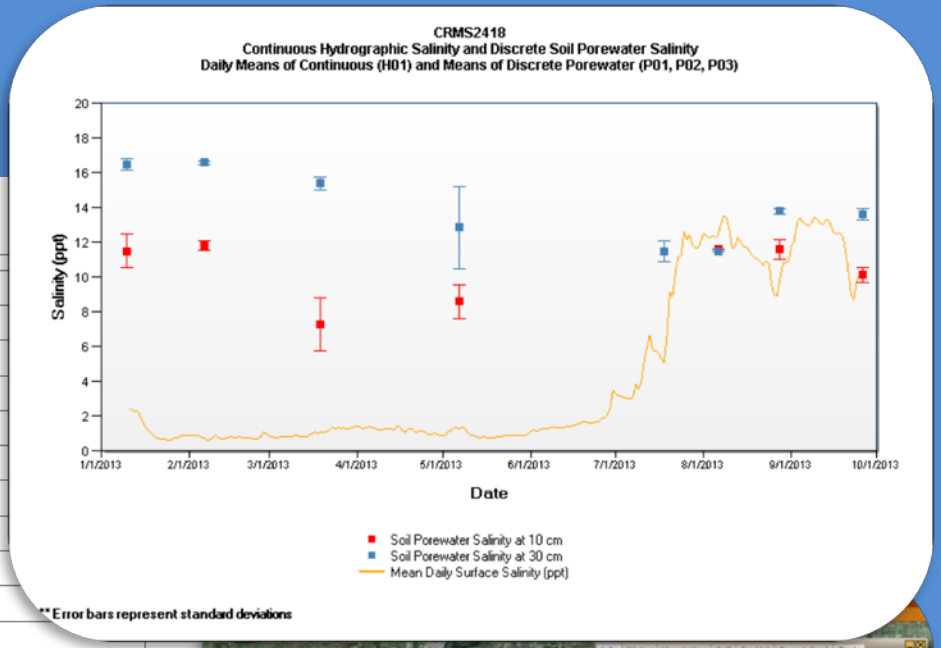


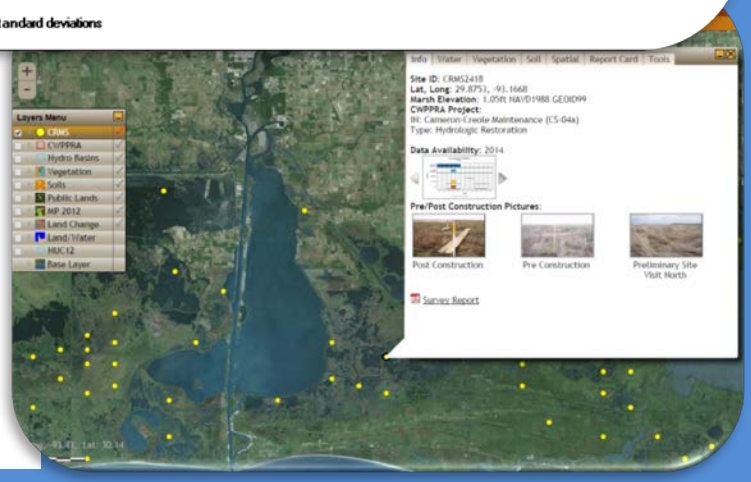




Data Utilization (operation, maintenance, monitoring, and adaptive management)
OMMAM and Performance Assessment

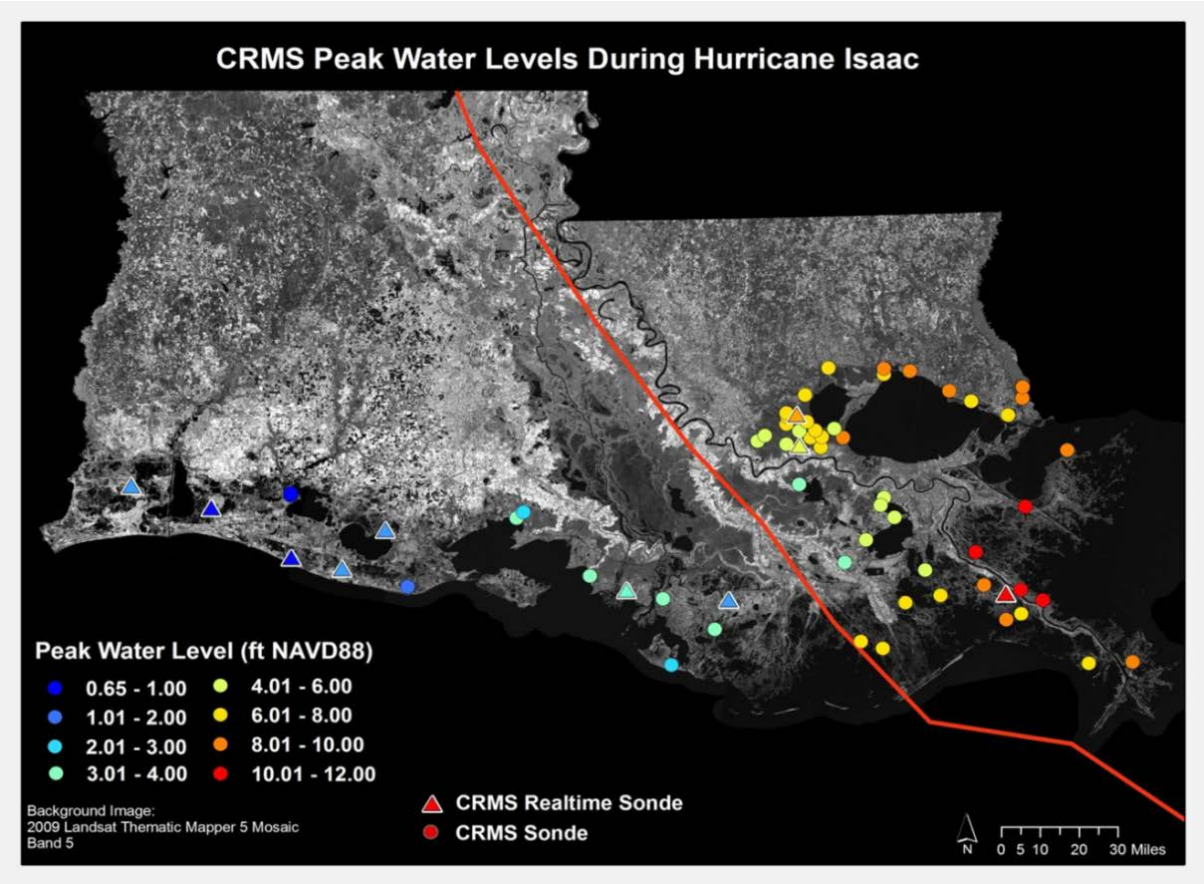






Data Utilization

Damage Assessment: following a major disturbance

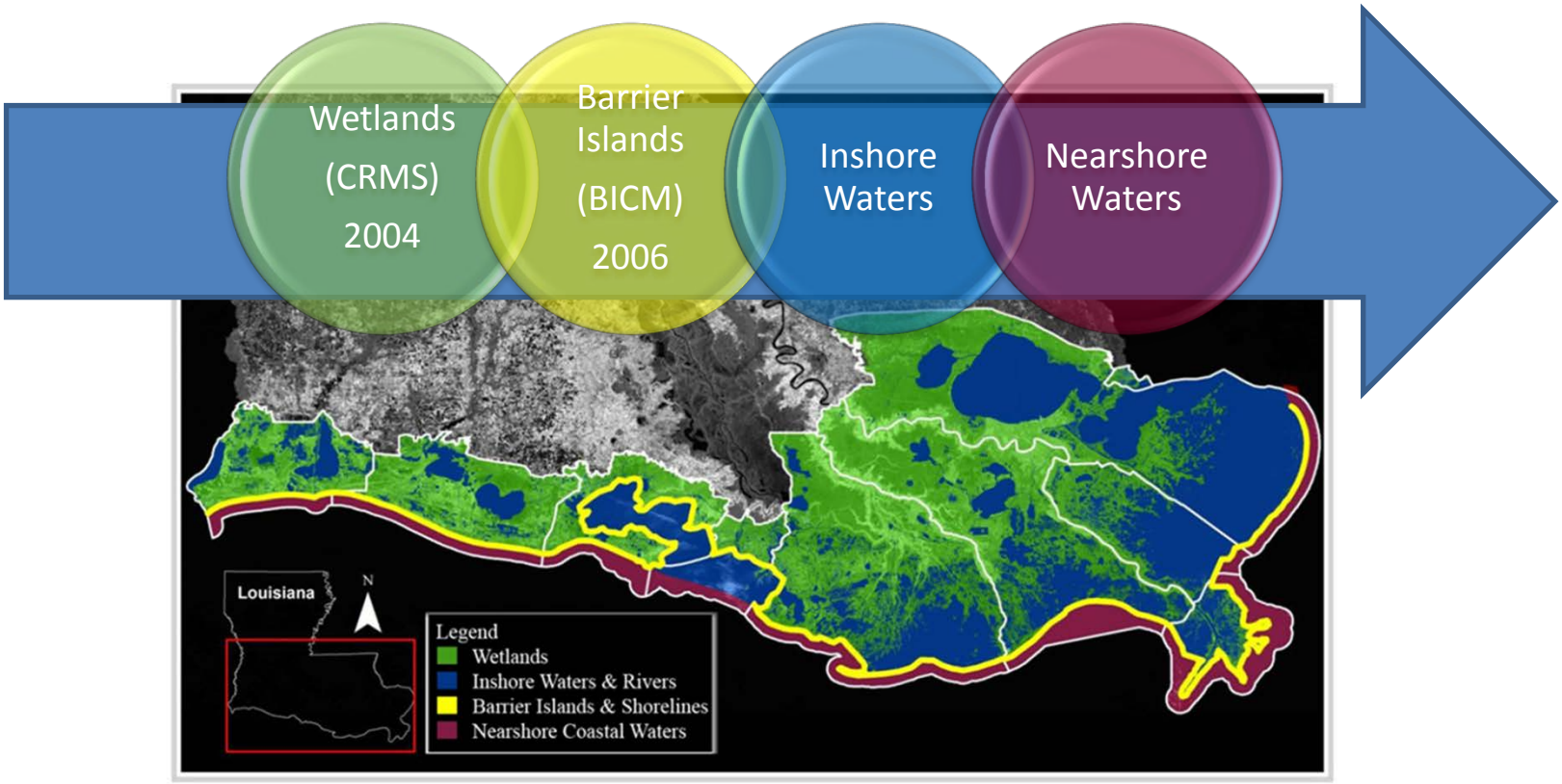


Damage assessments underway when sites are accessible

Original Concept for

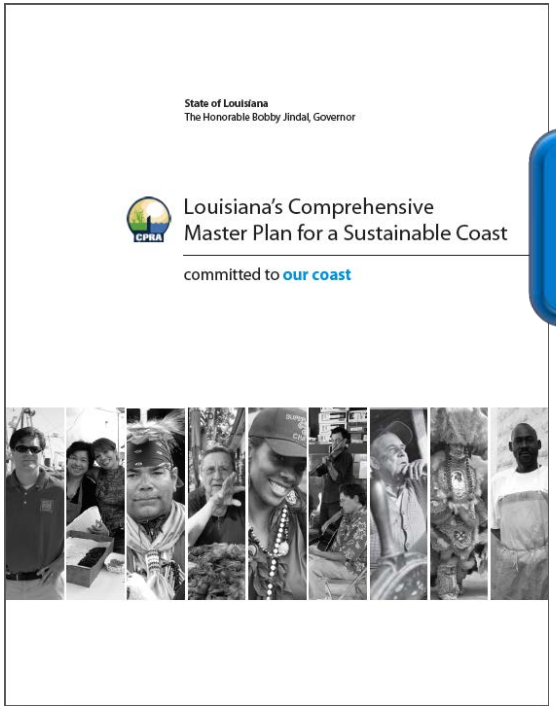
System-Wide Assessment and Monitoring Program

- Proposed in LCA program in 2004
- Original concept was restoration-centric

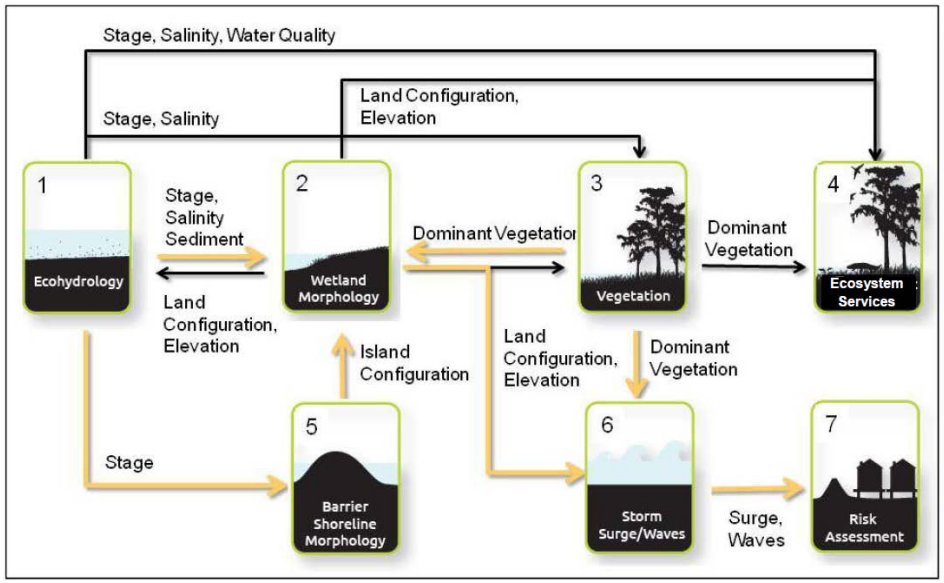


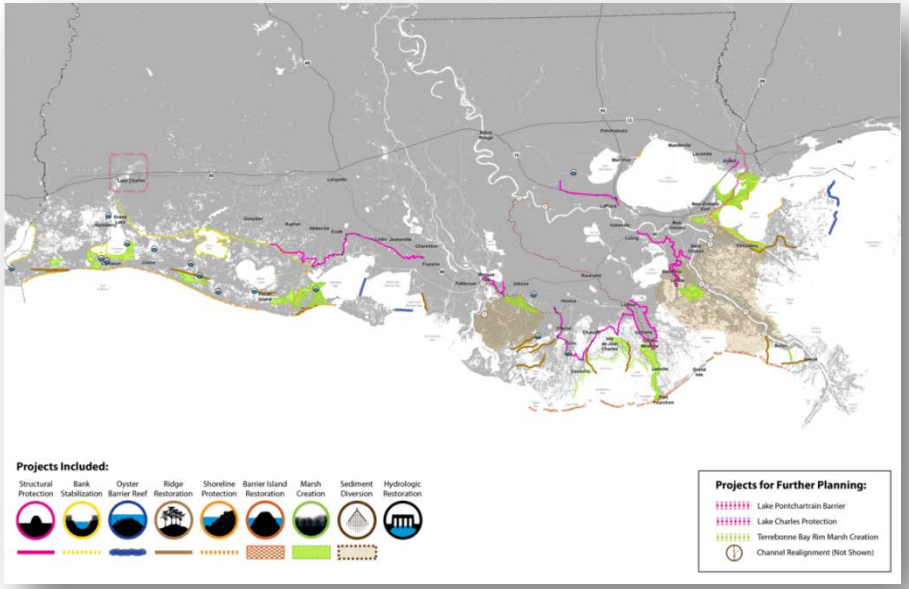
Data Needs

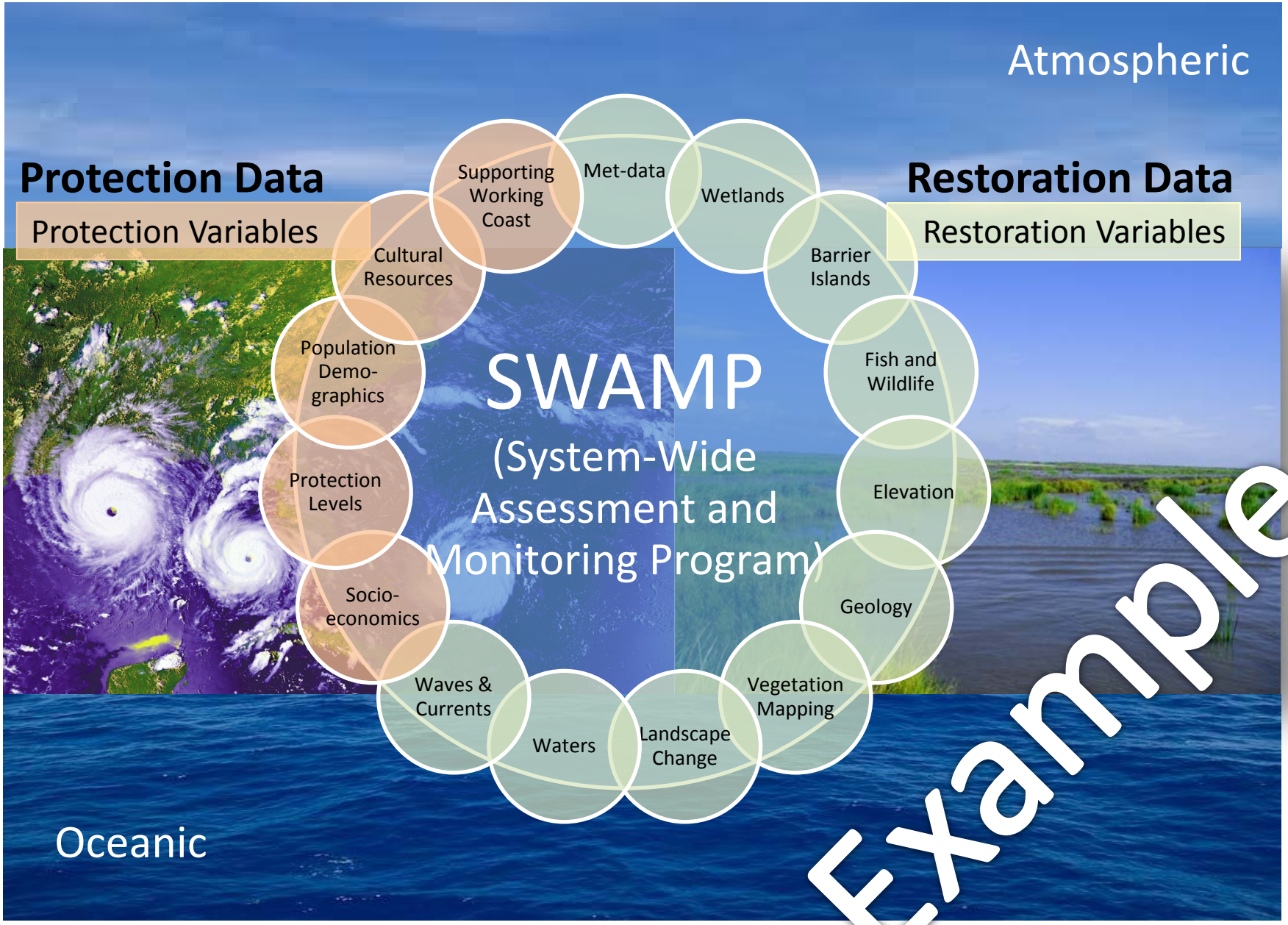
- Support Master Plan tools
- Resolve Uncertainties
- Actively and adaptively manage projects and programs
- Evaluate effectiveness of projects and collective effects
- Evaluate socio-economics
- Evaluate risk reduction



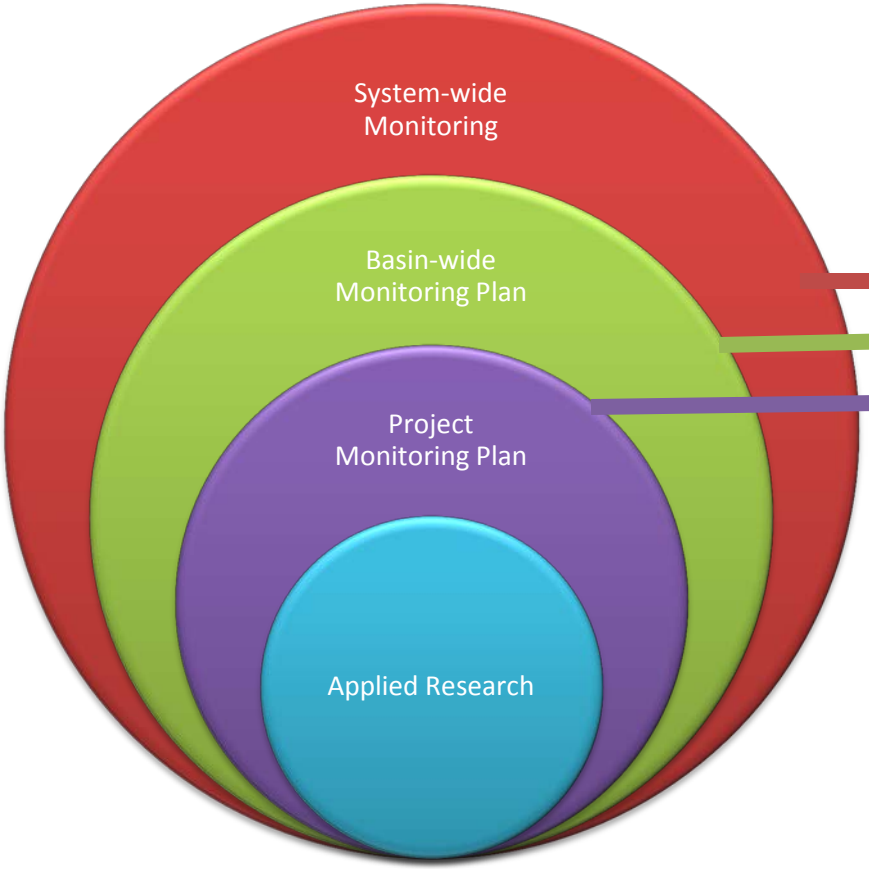
2010's

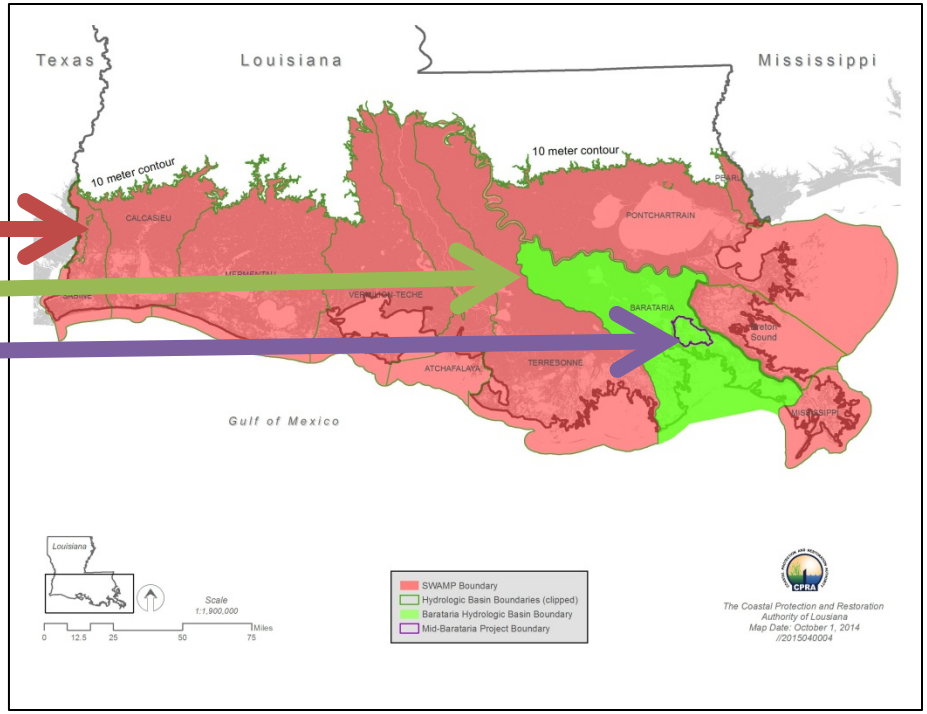





Atmospheric
Protection Data
Protection Variables
Restoration Data
Restoration Variables
SWAMP
(System-Wide Assessment and Monitoring Program)
Supporting Working Coast
Met-data
Wetlands
Barrier Islands
Fish and Wildlife
Elevation
Geology
Vegetation Mapping
Landscape Change
Waters
Waves & Currents
Socio-economics
Protection Levels
Population Demo-graphics
Cultural Resources
Oceanic
Example

SWAMP Scalability



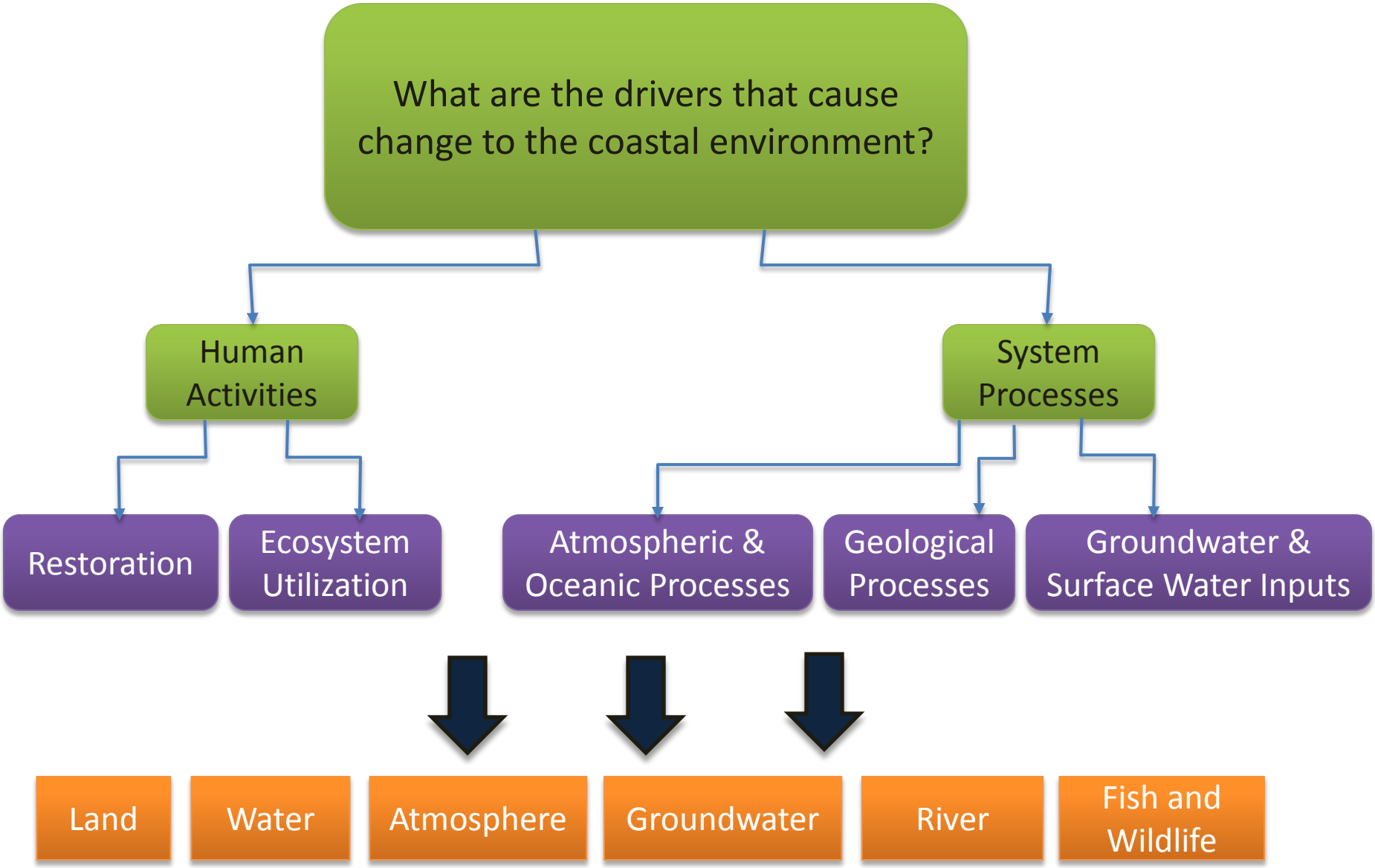


SWAMP Milestones

1. Develop a **framework** that:
   - Identifies the key parameters necessary for understanding the overall coastal system (***natural and built***) and supporting the coastal protection and restoration program.
2. Develop an **inventory** of ongoing/active monitoring efforts.

(from: Water Institute, 2014)

SWAMP Framework: Coastal Drivers



System Responses

(from: Water Institute, 2014)

Agencies Currently Collecting Data

State Agencies

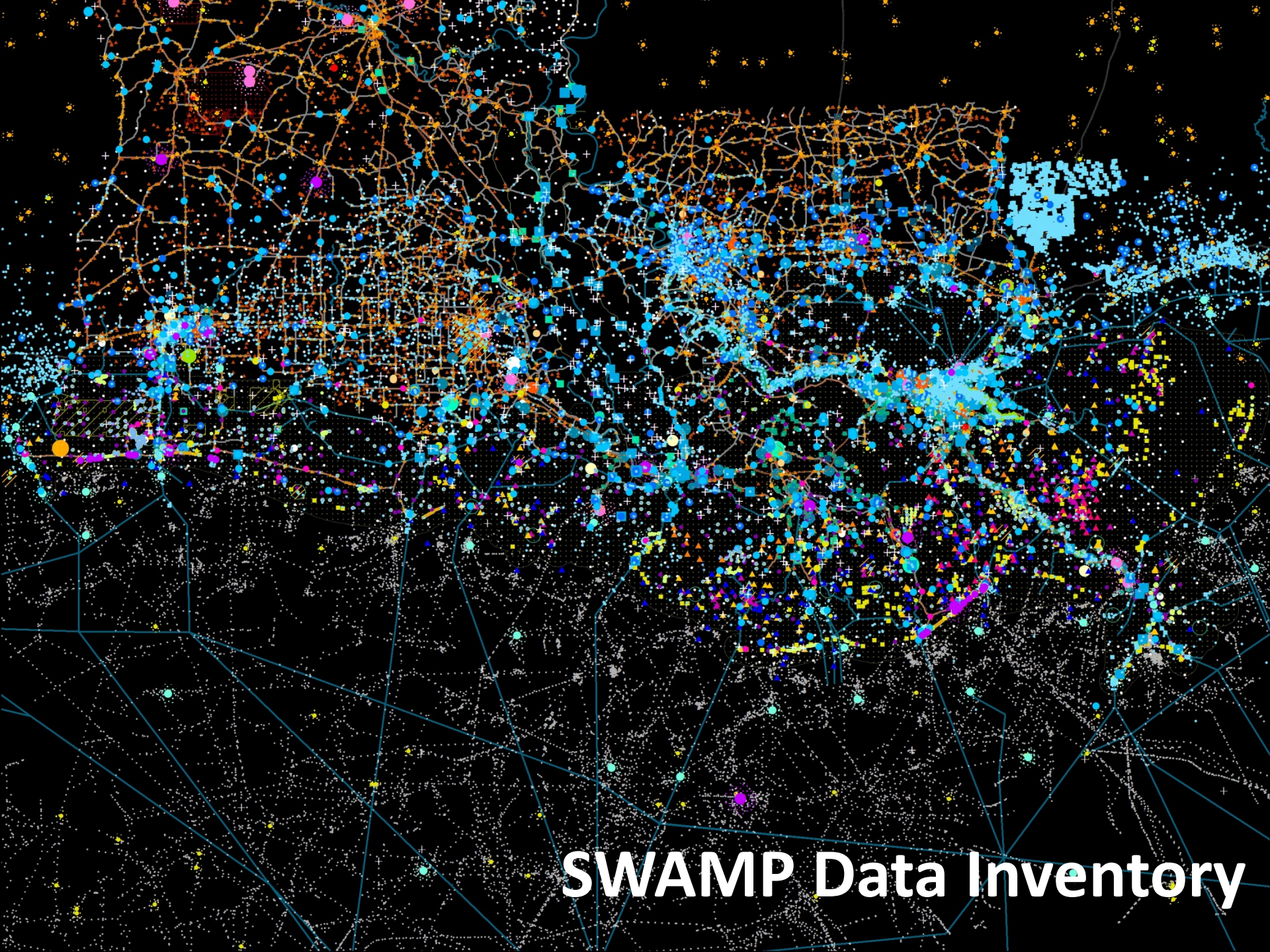
- CPRA
- LDWF
- LDEQ
- LDNR
- DHH
- LED
- GOHSEP
- Dept. Insurance

Federal Agencies

- USGS
- USACE
- NOAA
- USFWS
- EPA
- NRCS
- FEMA
- US. Census Bureau

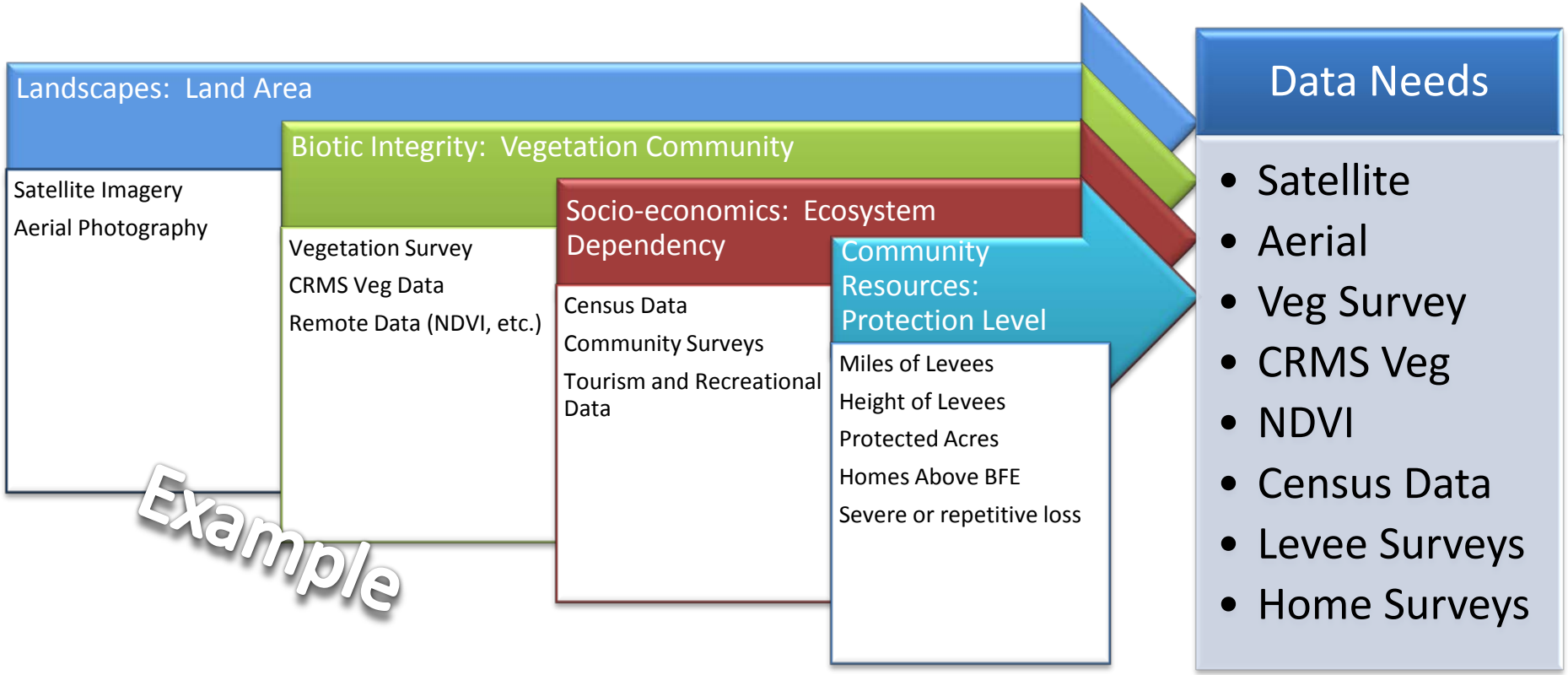
Other

- National Audubon Society
- Lake Pontchartrain Basin Foundation
- The Nature Conservancy
- Levee Districts
- Local Governments and Communities

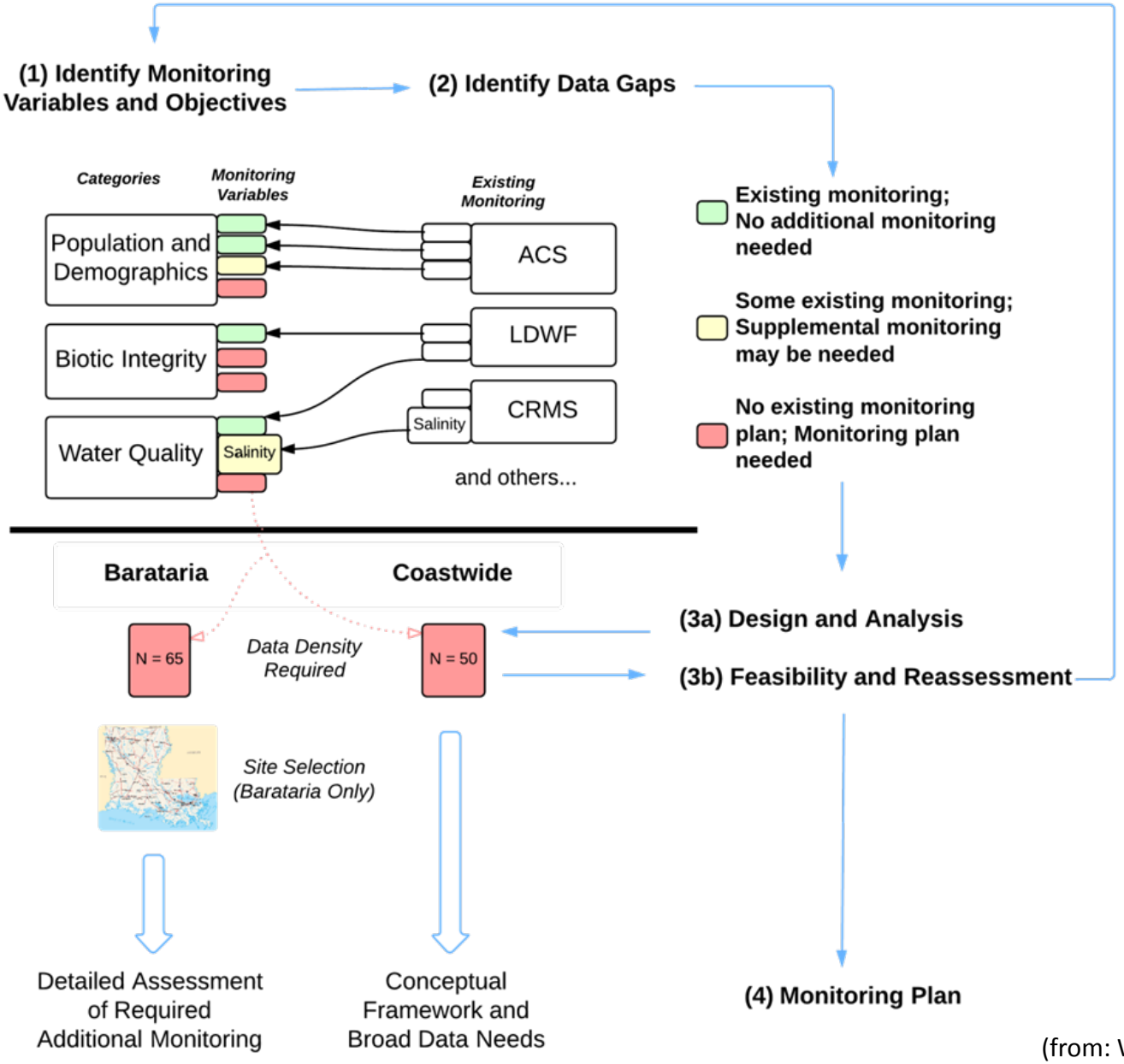

SWAMP Data Inventory

What do we need?

- What data do we need to address CPRA's objectives

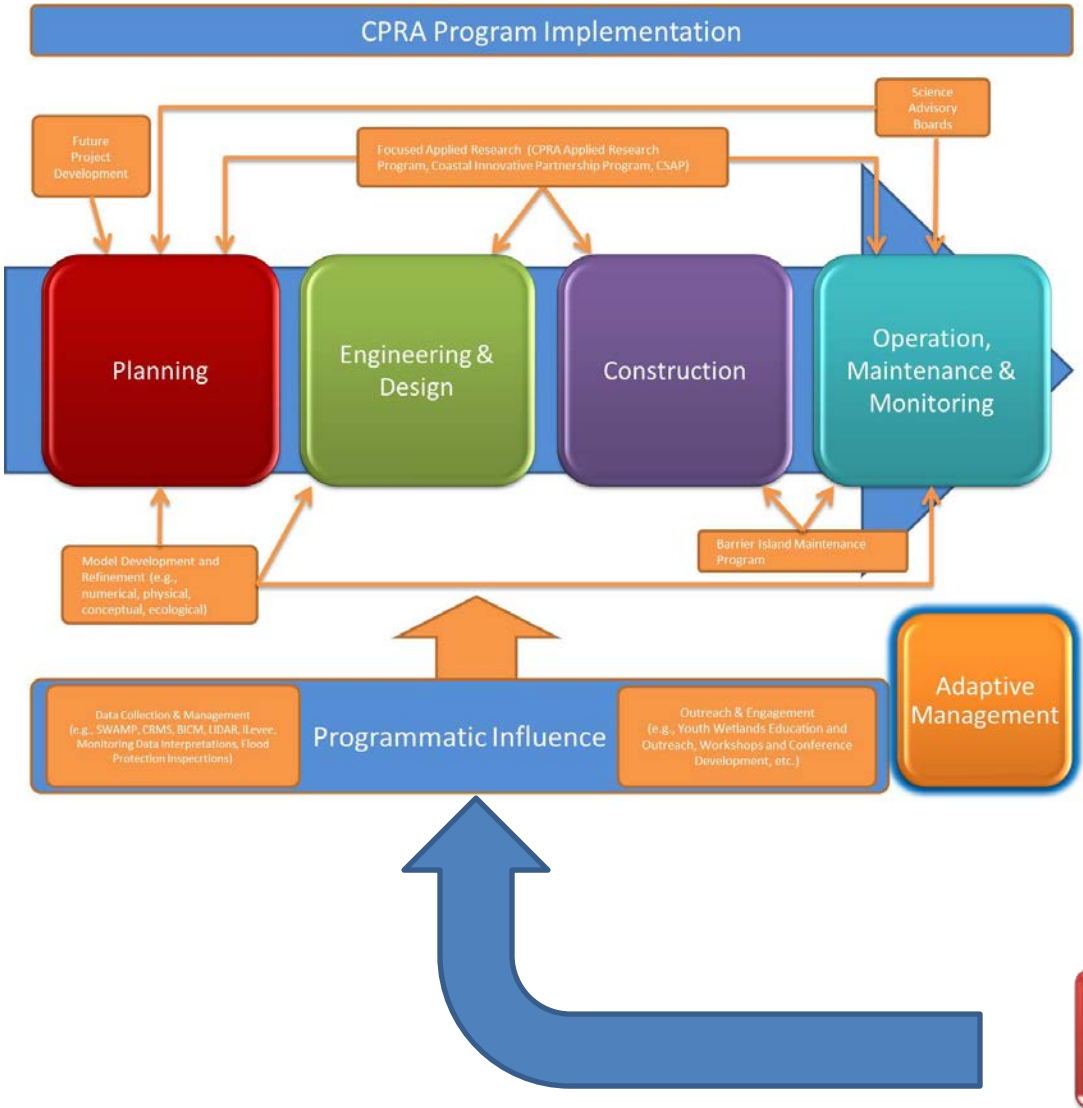


SWAMP Development Process



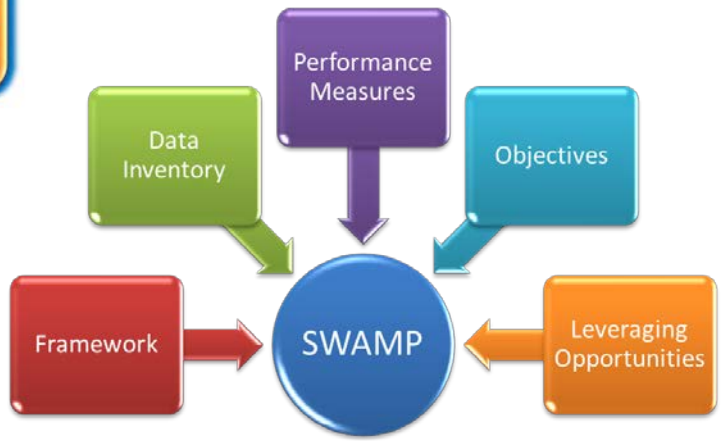
(from: Water Institute, 2014)

SWAMP & Adaptive Management

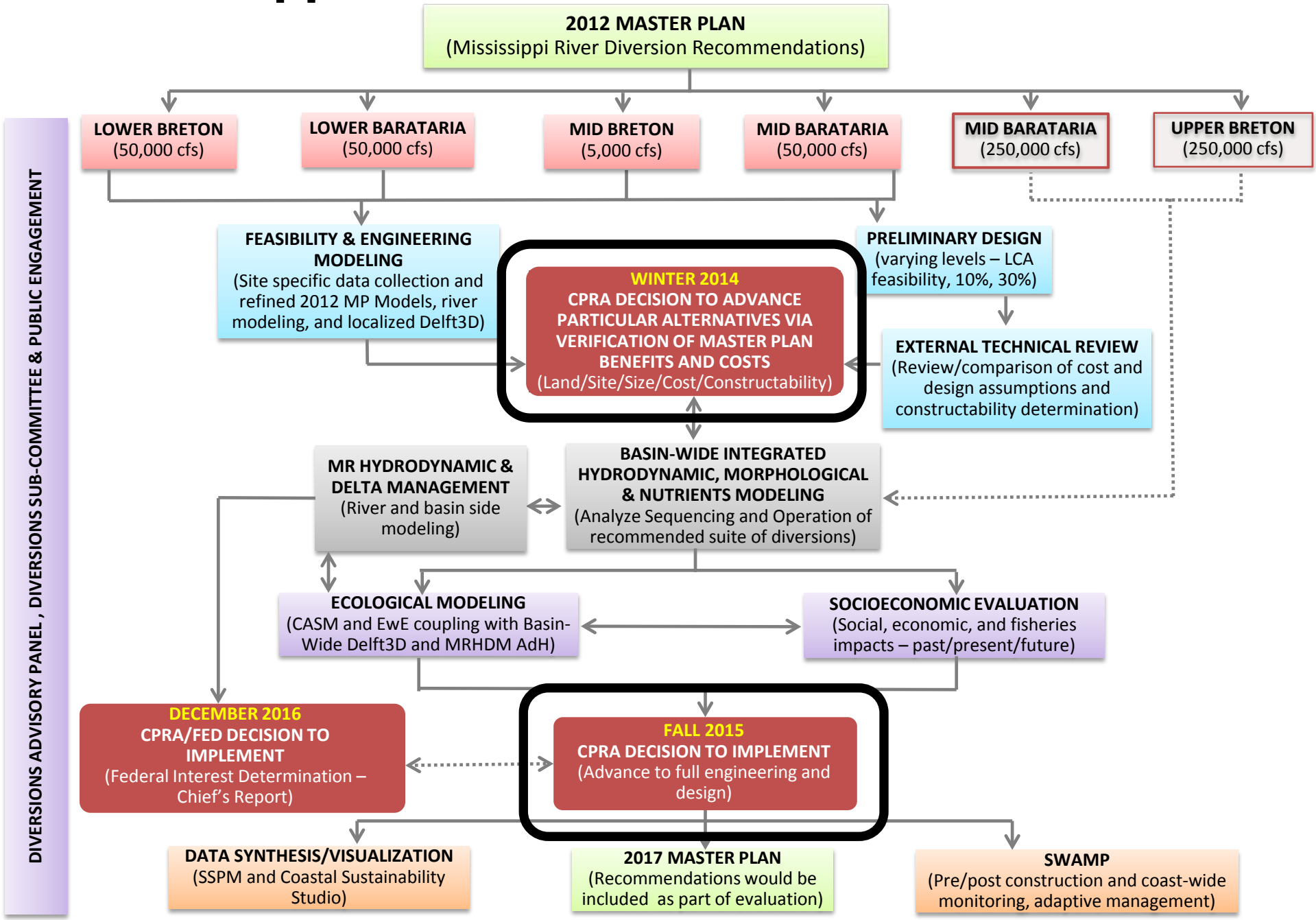


SWAMP supports:

- Adaptive Management
- Planning
- E&D
- Construction
- O&M
- Project/Program assessment
- Focused Applied Research
- Support predictive models
- Informed Decision-making



Mississippi River Sediment Diversions: Process



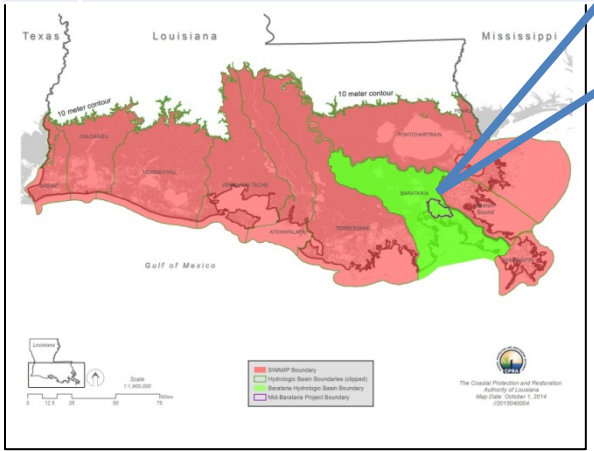
	SWAMP DESIGN & IMPLEMENTATION TIMELINE	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4	…
Adaptive Management (living doc)							
SWAMP **Design**							
	Coastwide Framework						
	BA Pilot Plan	BA diversions					
	BS, PO, MR Plans		BS, PO diversions				
	Add'l Basins						
SWAMP **Implementation**							
	BA Pilot Plan						
	BS, PO, MR Plans						
	Add'l Basins						

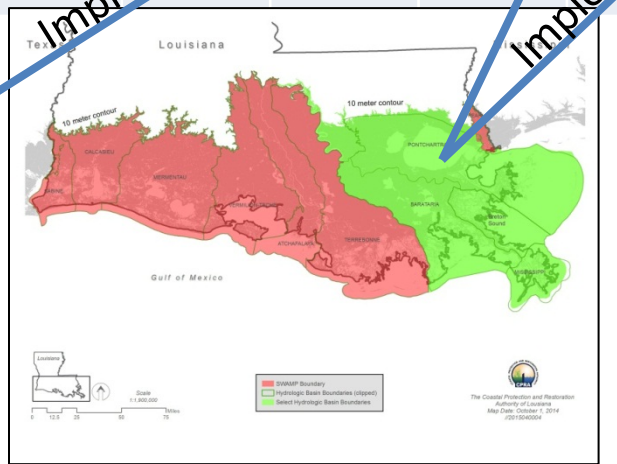
Design

Implement

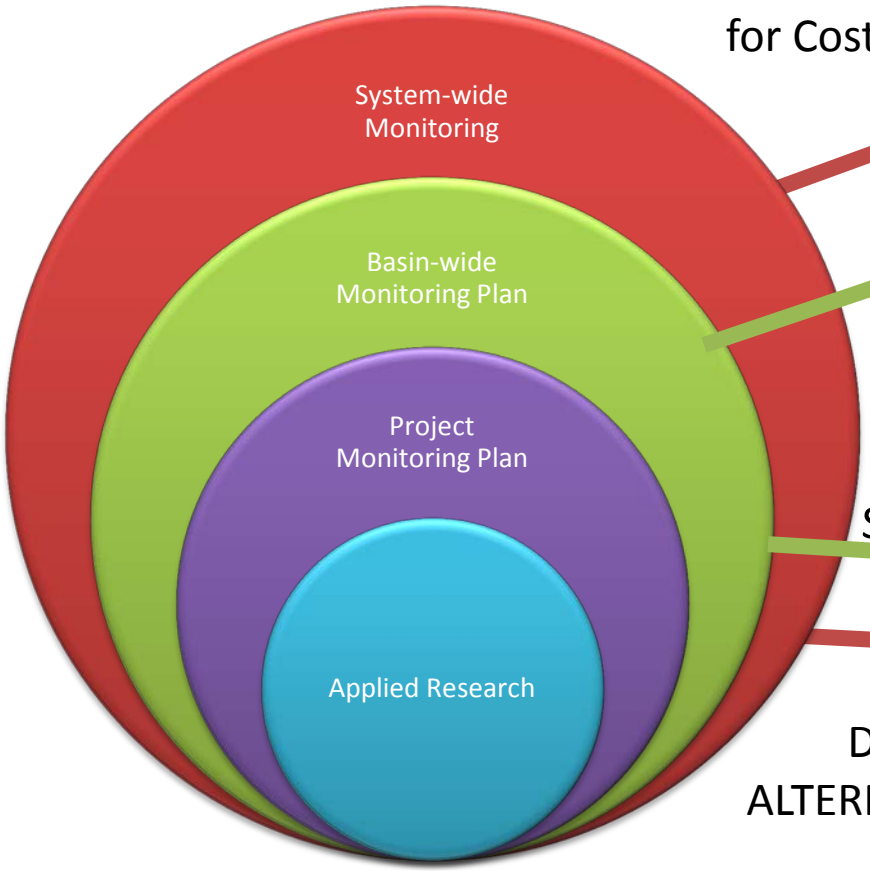
Design

Implement



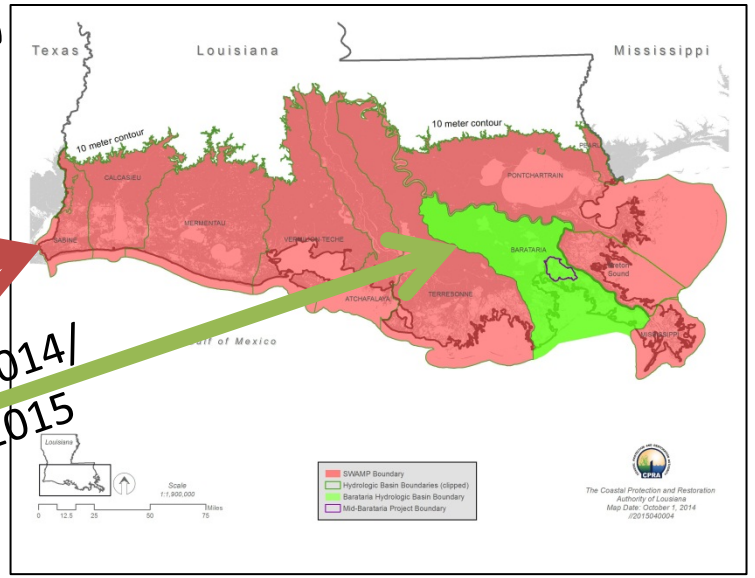


SWAMP Design/Implementation Timeline

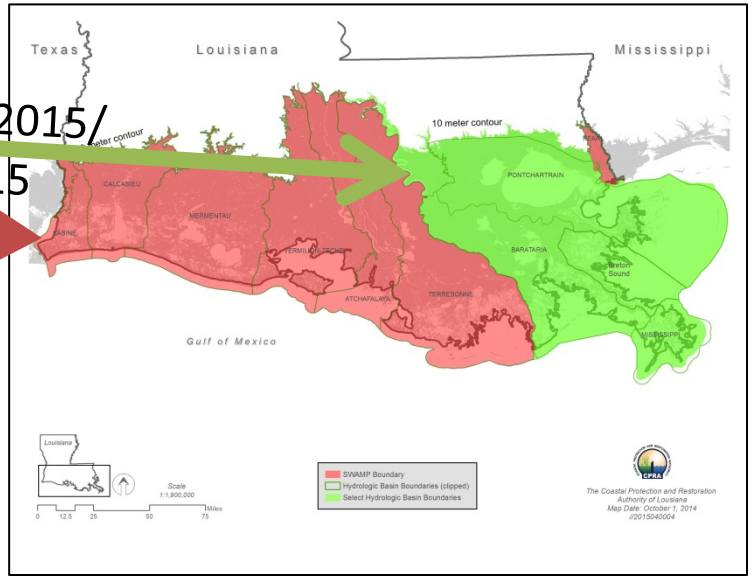


Decision: ALTERNATIVES for Cost/Benefit

Winter 2014/ Spring 2015



Summer 2015/ Fall 2015



Decision: ALTERNATIVES for E&D

System-Wide Assessment and Monitoring Program


Landscape Topography


Weather & Climate

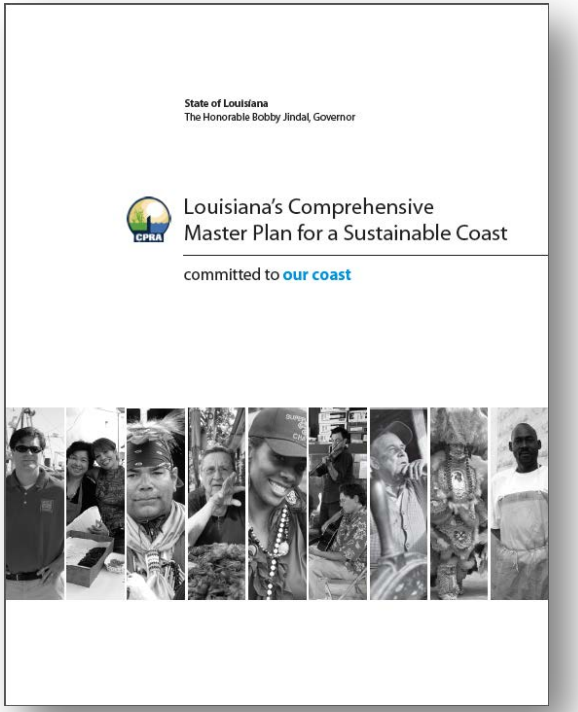

Hydrogeomorphology


Water Quality


Biotic Integrity


Protection and Socioeconomics

Questions?




Stay Tuned


More to Come

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