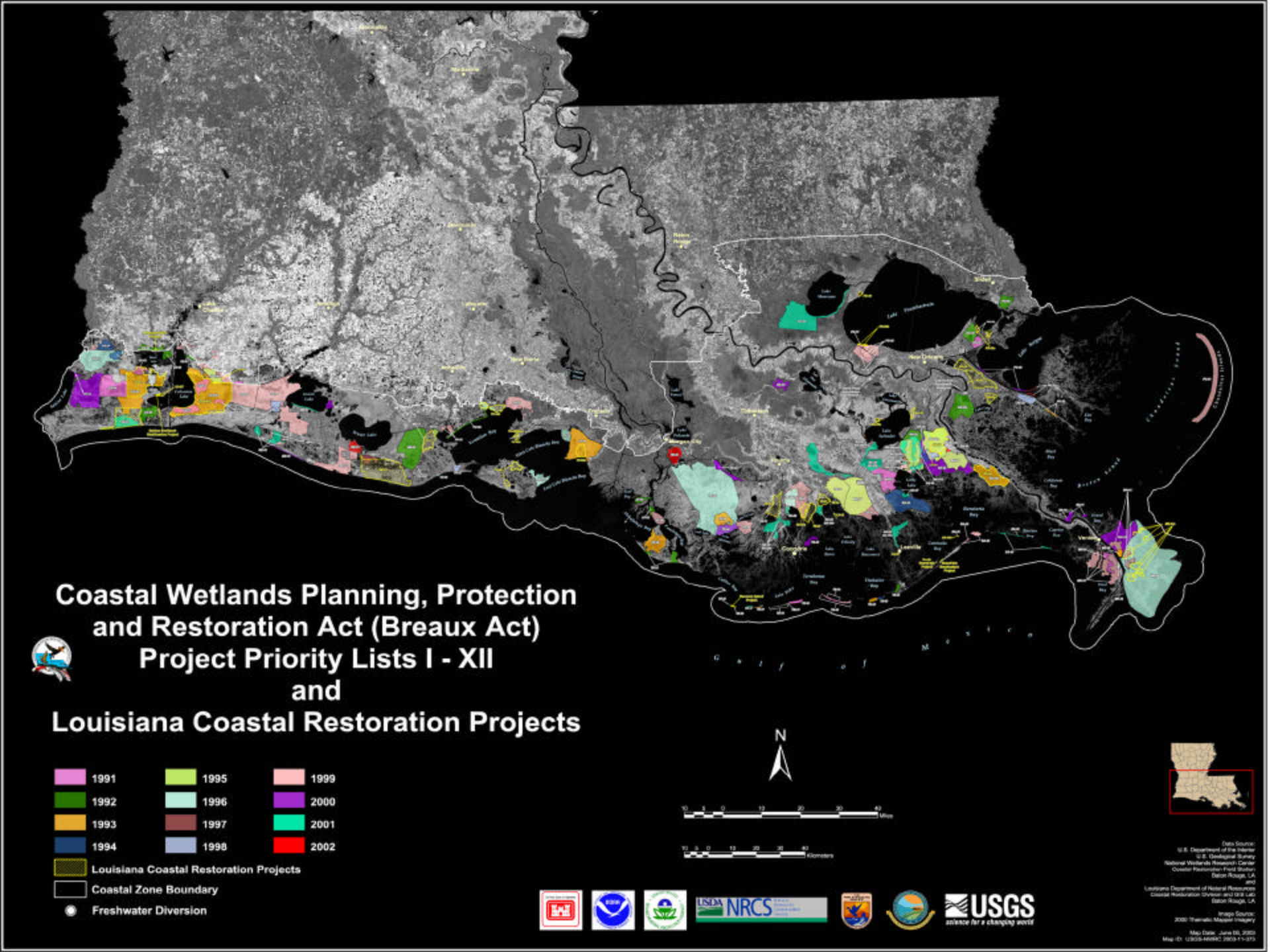
Value-Added Monitoring Beyond Project Evaluation

LOUISIANA DEPARTMENT OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION

Rick Raynie, Biological Monitoring Section Manager


Coastal Wetlands Planning, Protection and Restoration Act (Breaux Act) Project Priority Lists I - XII and Louisiana Coastal Restoration Projects
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Louisiana Coastal Restoration Projects
Coastal Zone Boundary
Freshwater Diversion
N
Miles
Kilometers
Gulf of Mexico
USGS
science for a changing world
Data Source:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station
Baton Rouge, LA
and
Louisiana Department of Natural Resources
Coastal Restoration Division and GIS Lab
Baton Rouge, LA
Image Source:
2000 Thematic Mapper Imagery
Map Date: June 08, 2003

Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA)

- CWPPRA legislation has two monitoring mandates:
  - To evaluate the effectiveness of individual restoration projects.
  - To scientifically evaluate the effectiveness of all projects in creating, restoring, protecting and enhancing Louisiana coastal wetlands.
- CWPPRA Task Force in 1992 focused on addressing the first mandate (individual restoration projects).

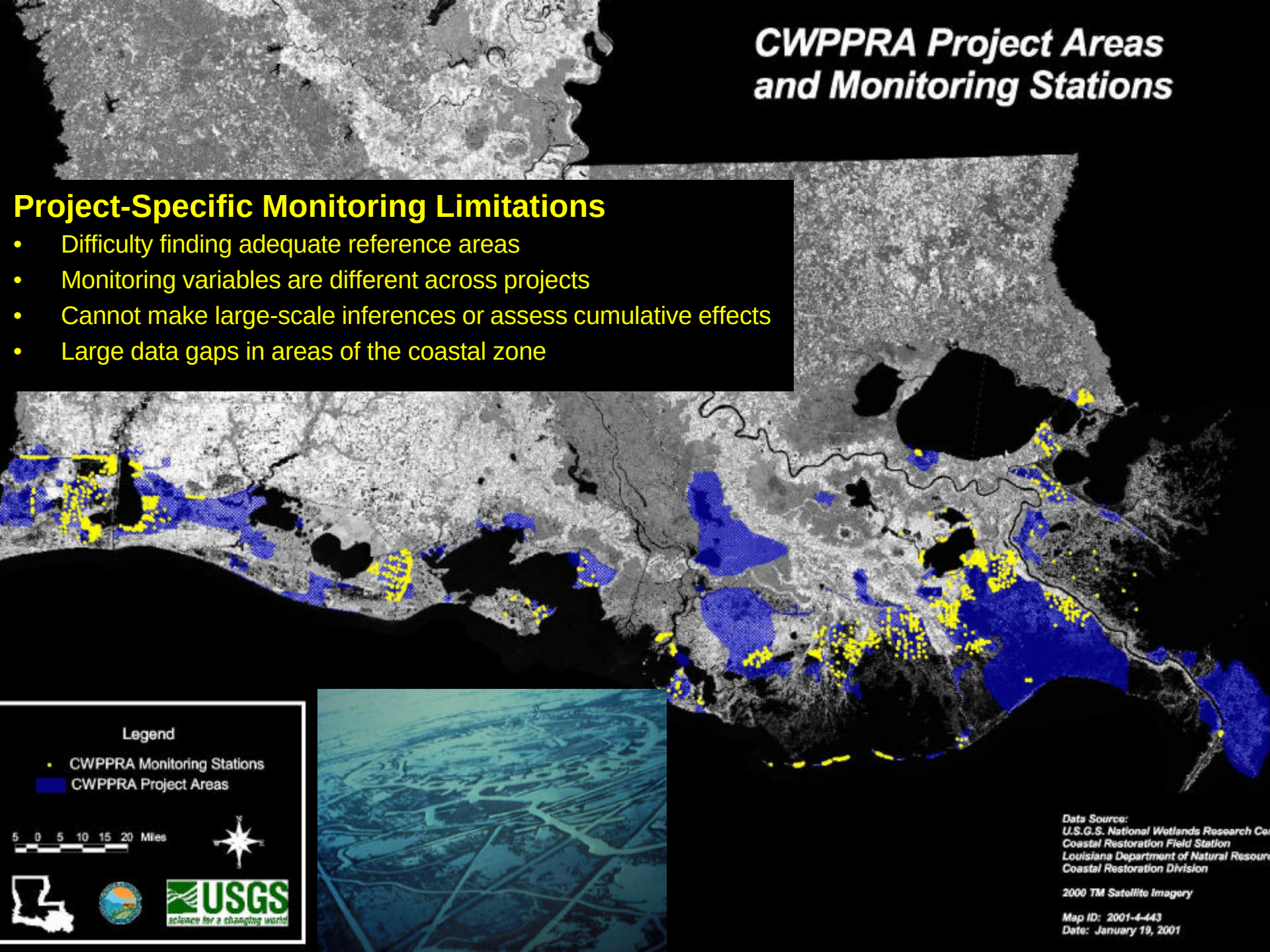
Project-Specific Monitoring

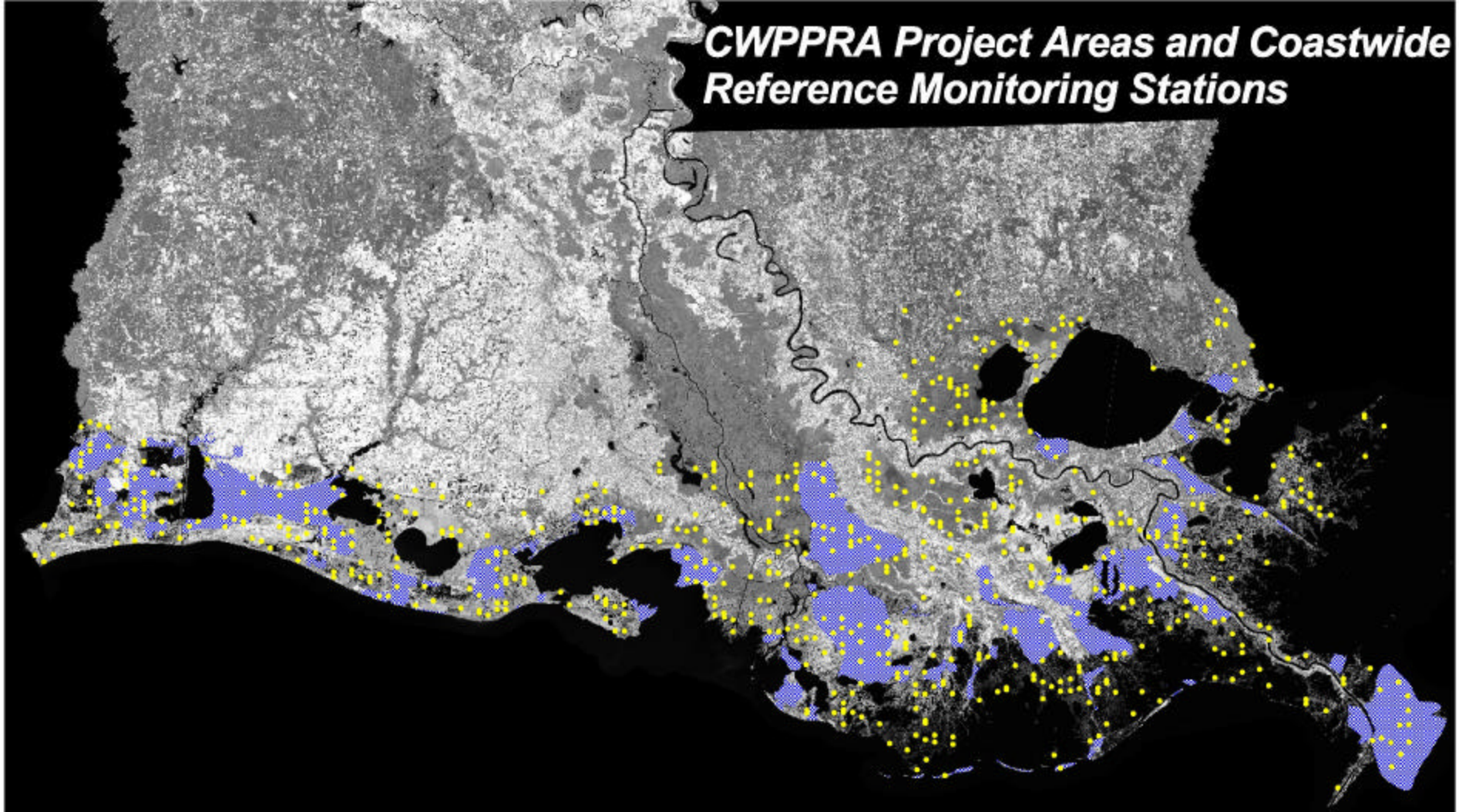
- 72 projects have completed monitoring plans
  - Data collected on project-specific variables
  - Comparison of project vs reference sites
  - Hypothesis testing of specific project goals
  - Very effective for small-scale program

CWPPRA Project Areas and Monitoring Stations

Project-Specific Monitoring Limitations

- Difficulty finding adequate reference areas
- Monitoring variables are different across projects
- Cannot make large-scale inferences or assess cumulative effects
- Large data gaps in areas of the coastal zone





Legend

Coastwide Reference Monitoring Stations

CWPPRA Project Areas

0 20 Miles

N W E S

USGS

science for a changing world

The Distribution of Stations and Environmental Variables Measured will allow us to more effectively evaluate:

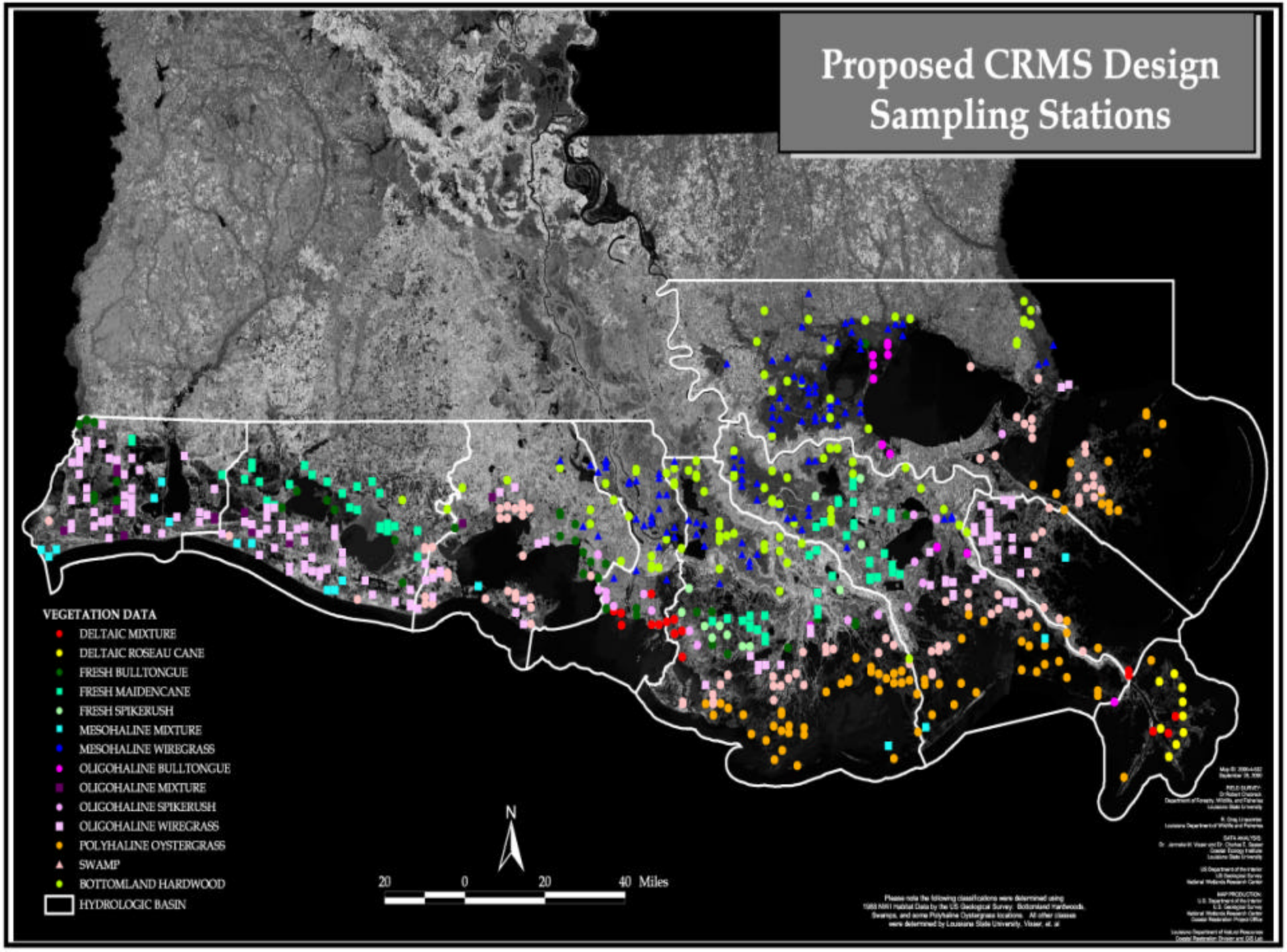
The effectiveness of individual projects, and

The effectiveness of the restoration program

Data Source:
U.S.G.S. National Wetlands Research Center
Coastal Restoration Field Station
Louisiana Department of Natural Resources
Coastal Restoration Division

2000 TM Satellite Imagery

Map ID: 20014440
Date: January 19, 2001


Proposed CRMS Design
Sampling Stations
VEGETATION DATA
DELTAIC MIXTURE
DELTAIC ROSEAU CANE
FRESH BULLTONGUE
FRESH MAIDENCANE
FRESH SPIKERUSH
MESOHALINE MIXTURE
MESOHALINE WIREGRASS
OLIGOHALINE BULLTONGUE
OLIGOHALINE MIXTURE
OLIGOHALINE SPIKERUSH
OLIGOHALINE WIREGRASS
POLYHALINE OYSTERGRASS
SWAMP
BOTTOMLAND HARDWOOD
HYDROLOGIC BASIN
N
20 0 20 40 Miles

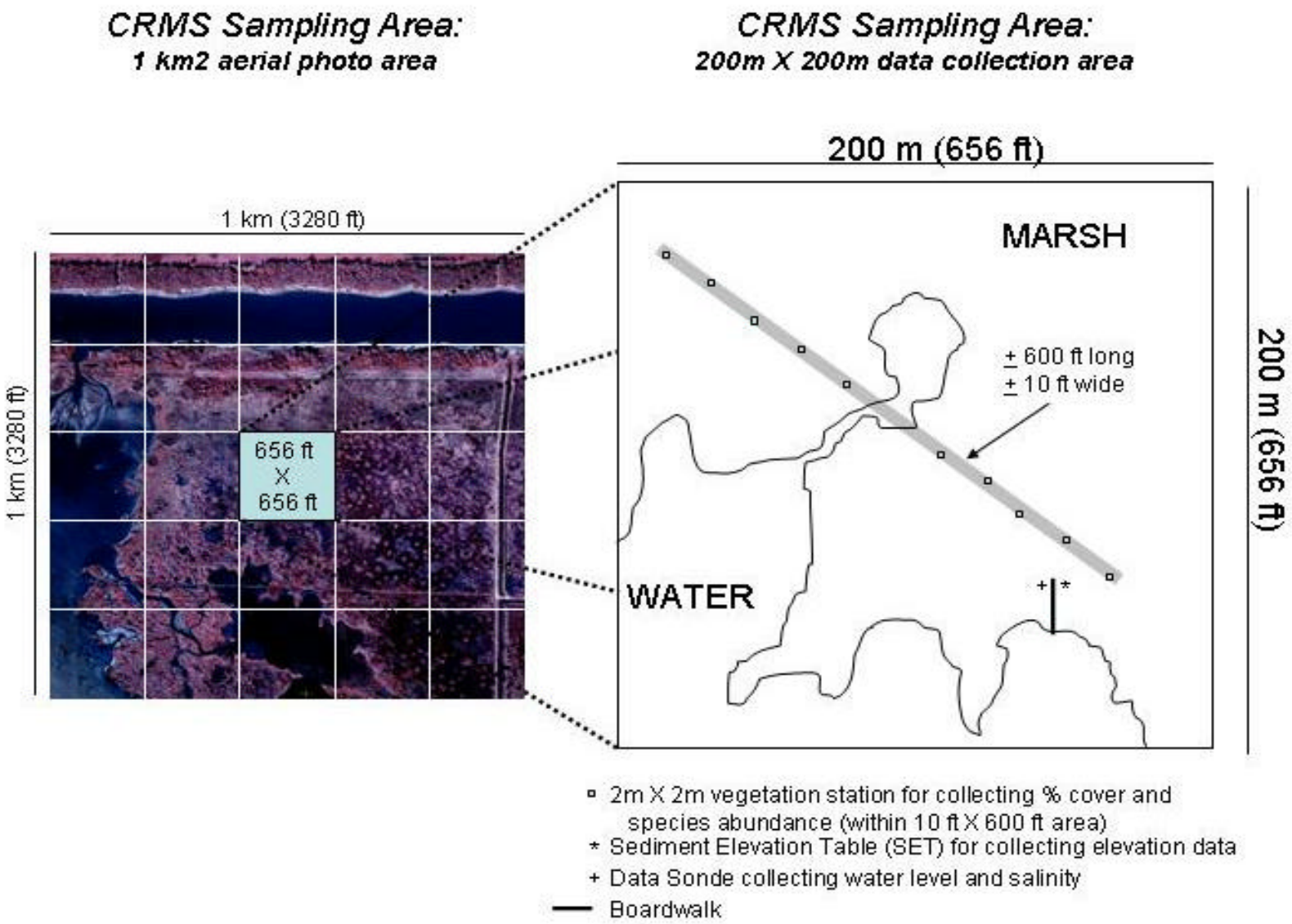
Improvements with CRMS-Wetlands

- Data from the same comprehensive suite of variables will be collected at every station

- Stations will be located in every basin and major plant community type across the coast

- Allows for integration among programs
  - CWPPRA
  - WRDA (Davis Pond & Caernarvon)
  - LCA

TYPICAL CRMS-*Wetlands* SITE SAMPLING & DATA COLLECTION AREAS



WATER-LEVEL and SALINITY RECORDER

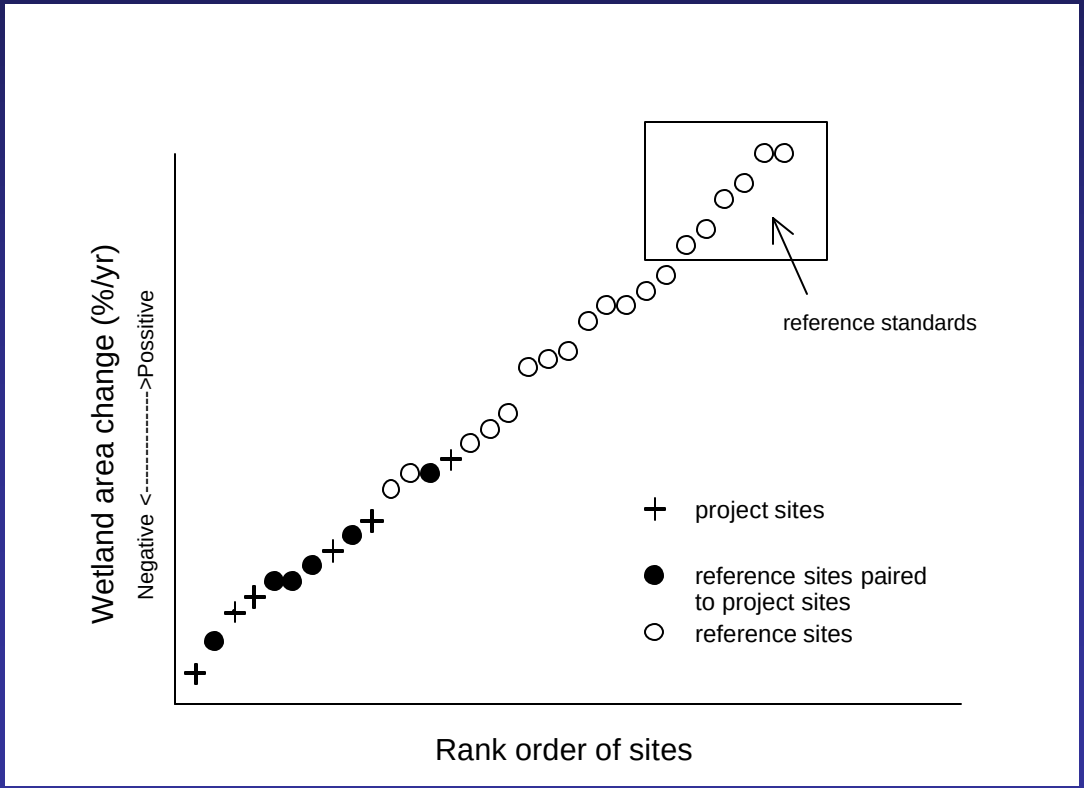
R-SET Measurements of marsh surface elevation

FELDSPAR PLOT FOR MEASURING ACCRETION RATES

VEGETATION PLOT (2m x 2m)

CRMS-*Wetlands* Approach

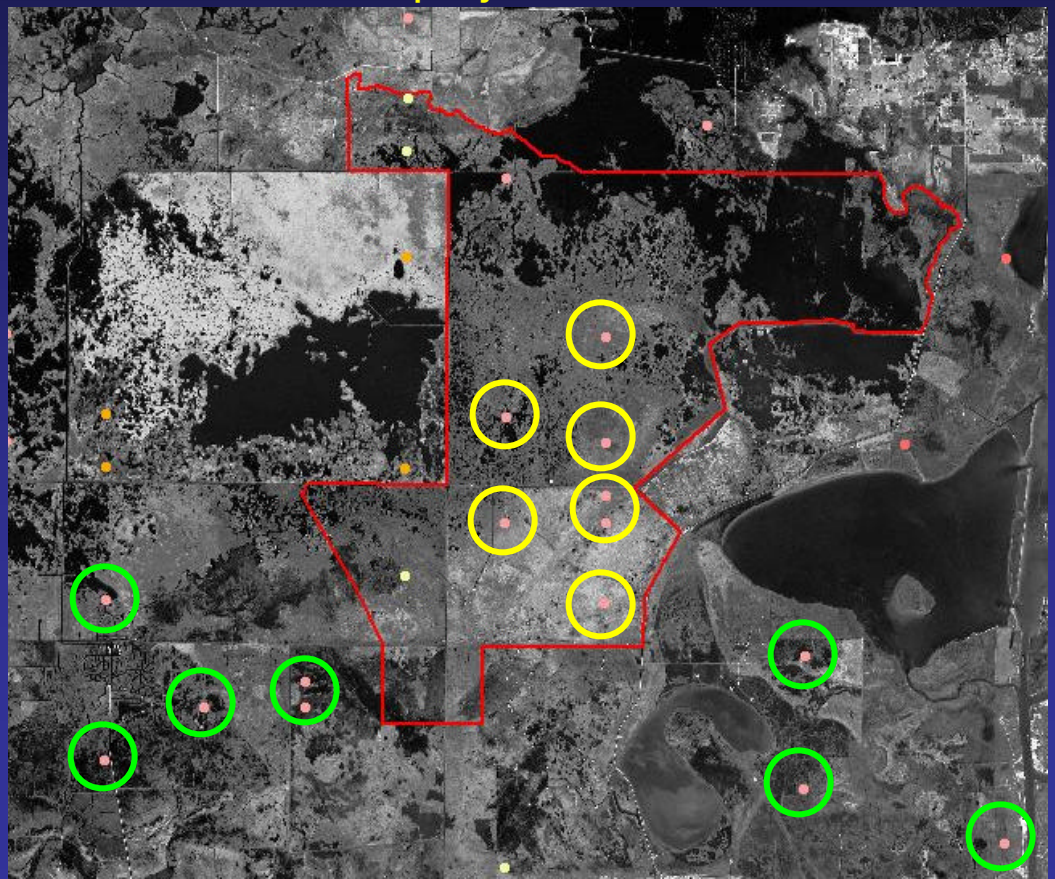
- Classify coastal wetlands into discrete basins, and into vegetation types within each basin.
- Reference sites will represent the range of functional variation for ecological, biological, and water quality variables of interest

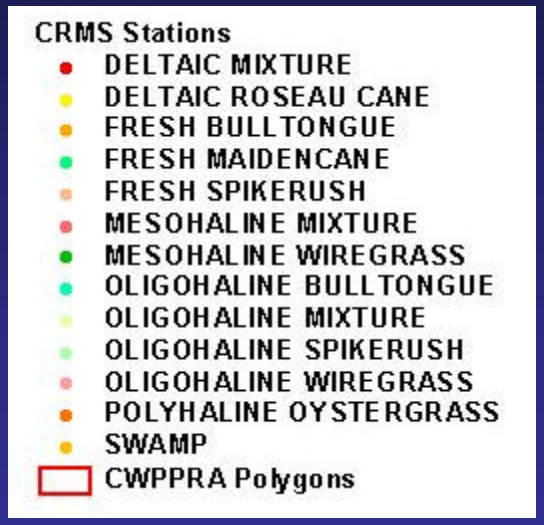


CRMS-*Wetlands* Data Analyses

CRMS-Wetlands will facilitate the investigation of:

- Individual project effects





Project Oligohaline Wiregrass

Reference Oligohaline Wiregrass

CRMS-*Wetlands*
Data Analyses

CRMS-Wetlands will facilitate the investigation of:

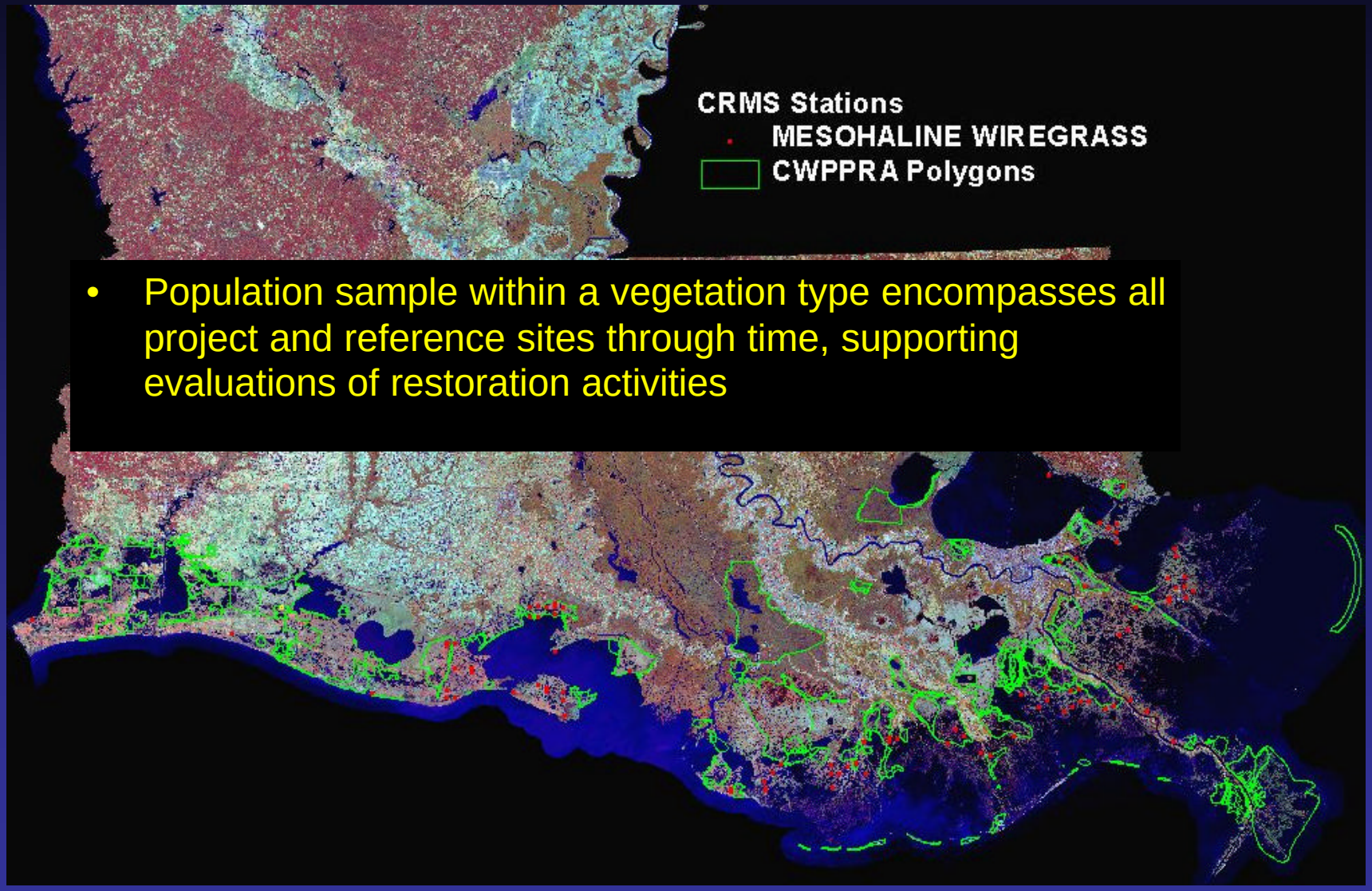
- Comparison of all projects within a basin vs non-project stations within a basin

CRMS Stations
- DELTAIC MIXTURE
- DELTAIC ROSEAU CANE
- FRESH BULLTONGUE
- FRESH MAIDENCANE
- FRESH SPIKERUSH
- MESOHALINE MIXTURE
- MESOHALINE WIREGRASS
- OLIGOHALINE BULLTONGUE
- OLIGOHALINE MIXTURE
- OLIGOHALINE SPIKERUSH
- OLIGOHALINE WIREGRASS
- POLYHALINE OYSTERGRASS
- SWAMP
- CWPPRA Polygons

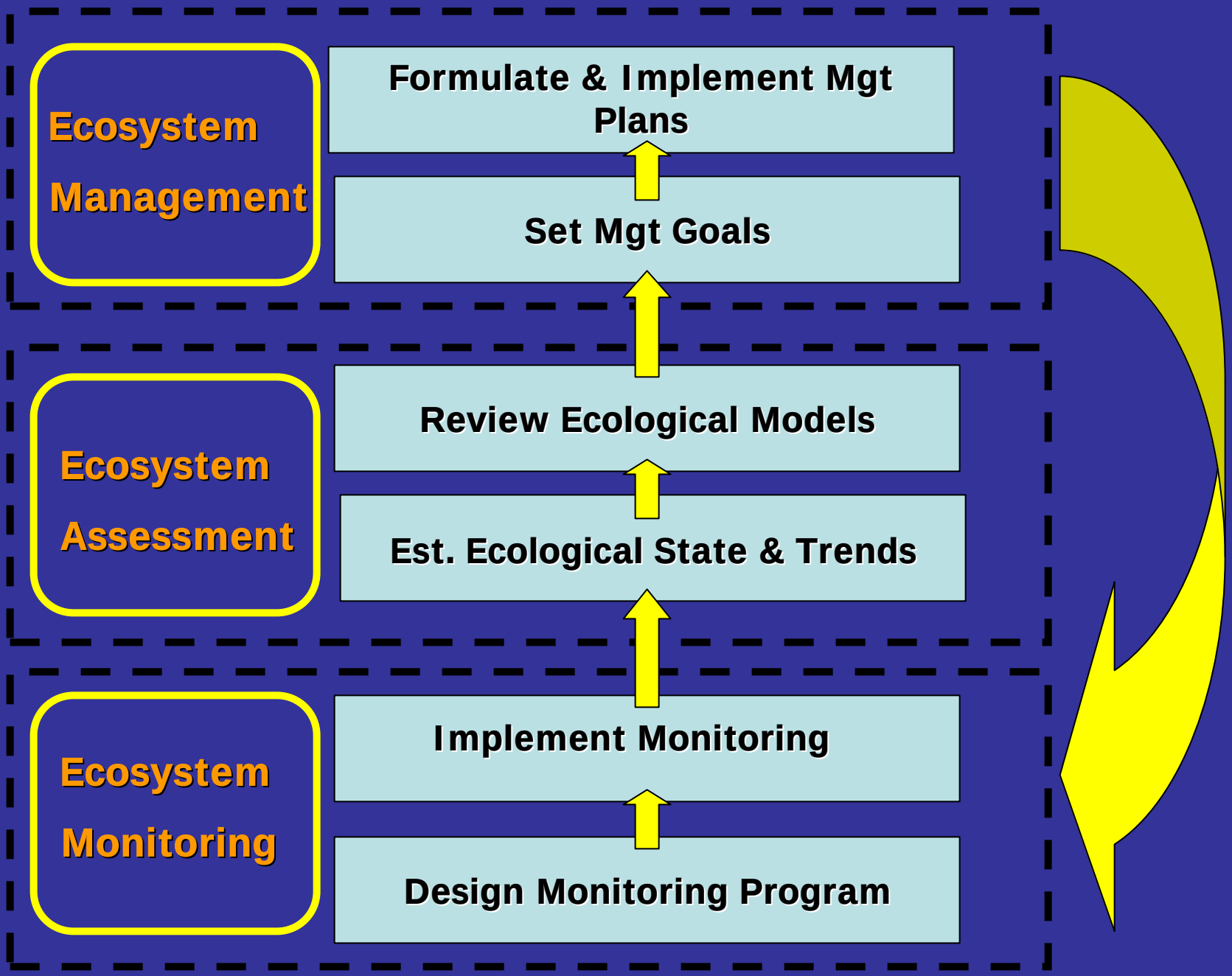
Project Oligohaline Wiregrass

Reference Oligohaline Wiregrass

Value-Added :
Project Planning and Operations

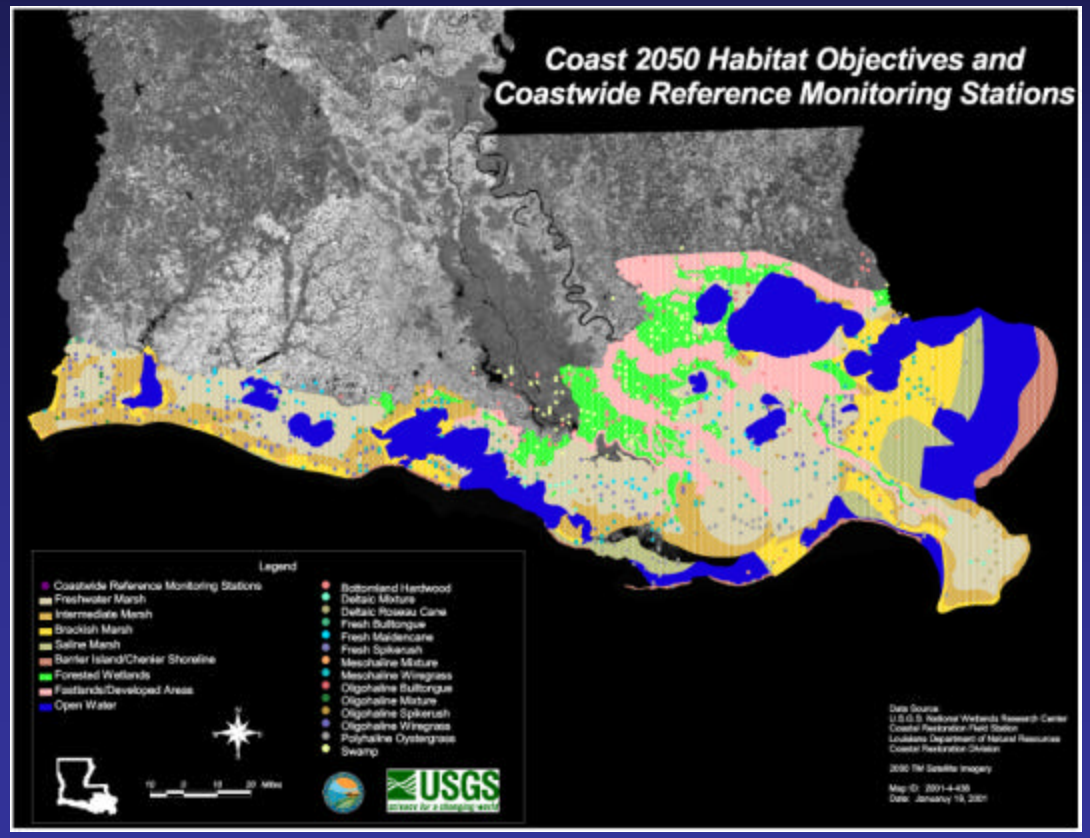


- Population sample within a vegetation type encompasses all project and reference sites through time, supporting evaluations of restoration activities


Ecosystem Management
Formulate & Implement Mgt Plans
Set Mgt Goals
Ecosystem Assessment
Review Ecological Models
Est. Ecological State & Trends
Ecosystem Monitoring
Implement Monitoring
Design Monitoring Program

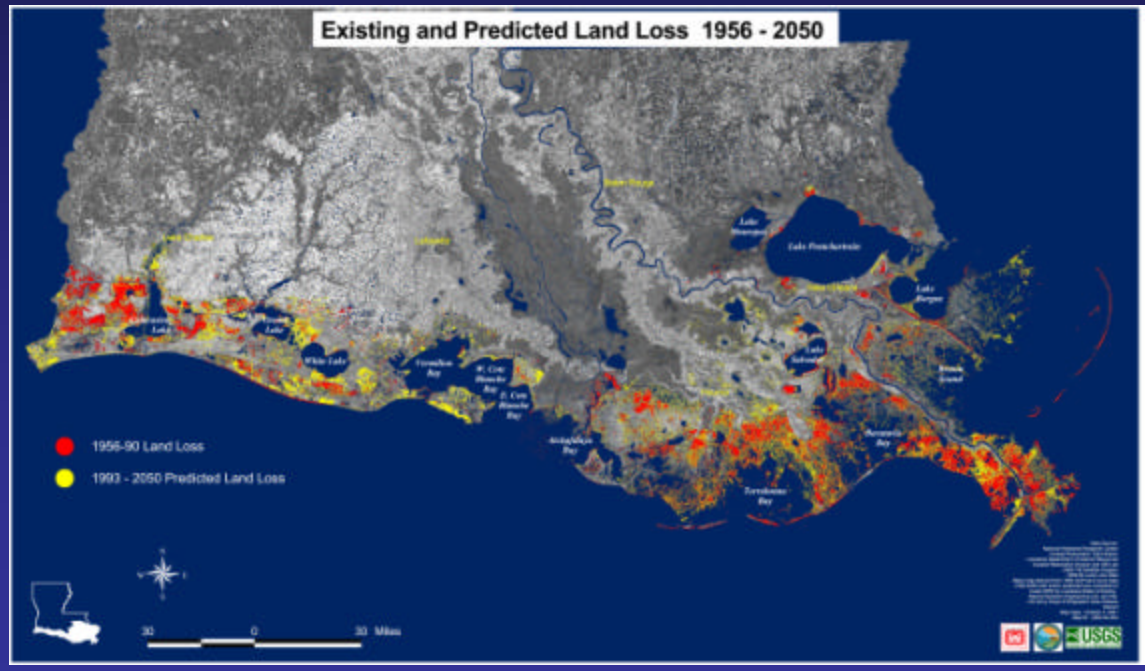
Value Added: Multiple Applications

- Improved capability to evaluate Coast 2050 Habitat Objectives



LCA System-wide Assessment and Monitoring Plan (SWAMP)

- A component of the LCA Science Plan
  - Includes:
    - CRMS-*Wetlands*
    - CRMS-*Waters*
    - Near Coastal Waters (hypoxia)
    - Barrier Islands



Value Added: Unexpected Events

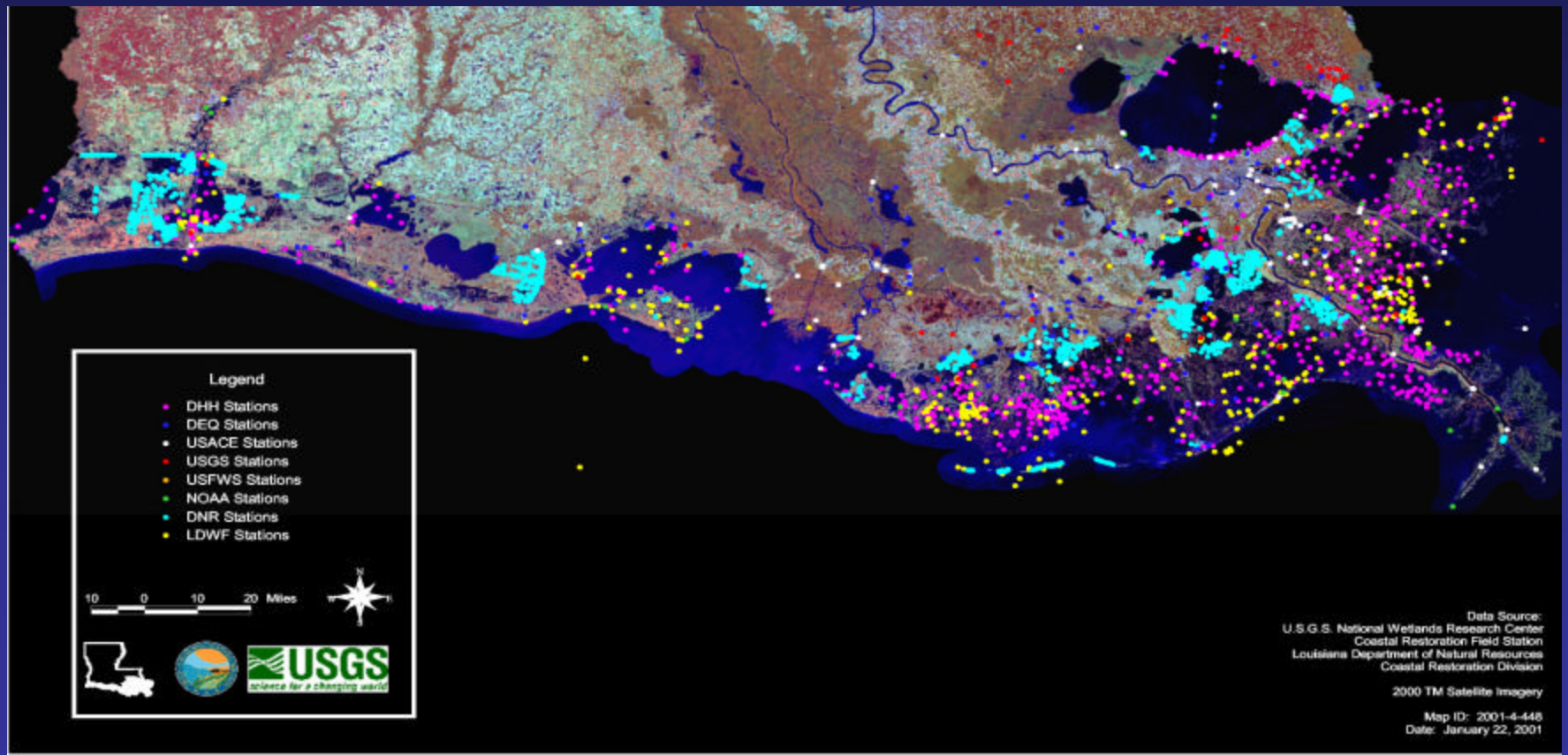
- Provide more useful information to evaluate impacts and mitigation for adverse climatic conditions, such as the Brown Marsh phenomenon, severe drought and tropical storms and hurricanes.

Drought effects at Mud Lake

Brown Marsh in coastal Louisiana

Value Added: Design Infrastructure

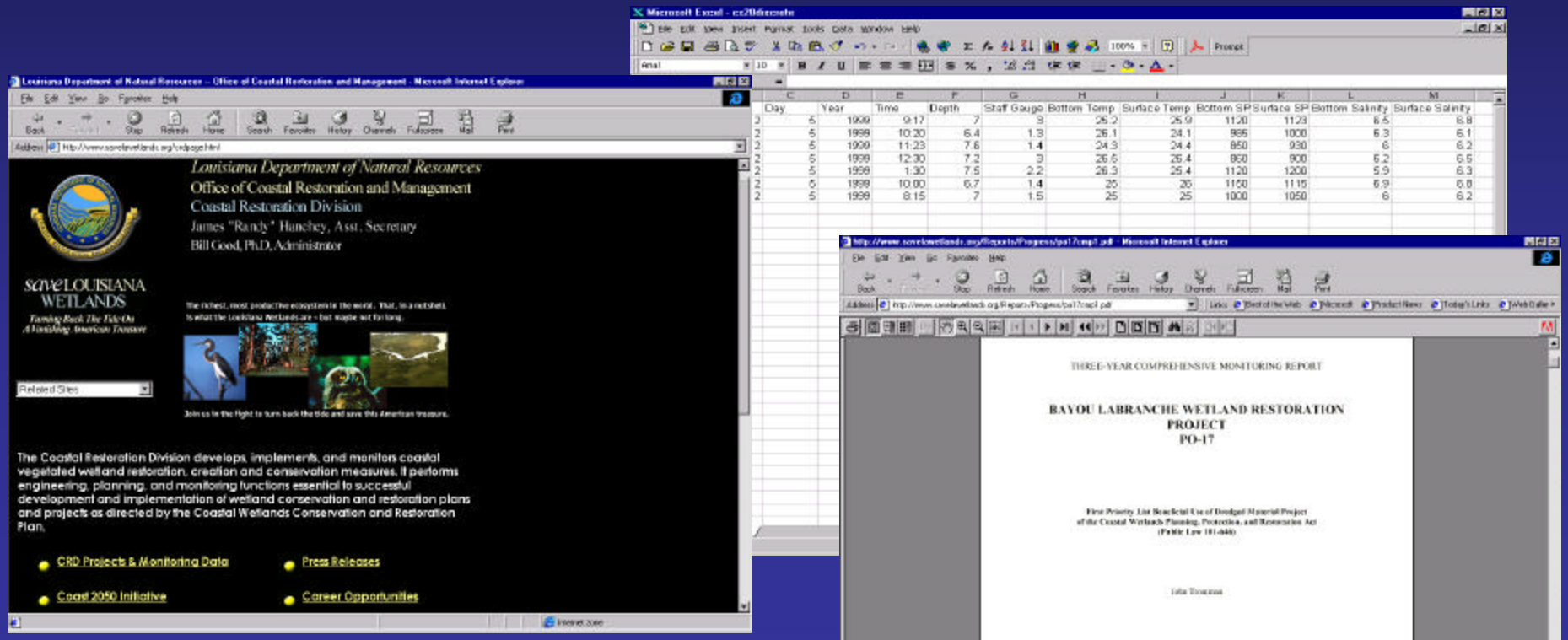
- Classify coastal wetlands into discrete basins, and into vegetation types within each basin.
- Provides a framework for state-wide Comprehensive Coast-wide Monitoring System to unify monitoring of state agencies in Louisiana.



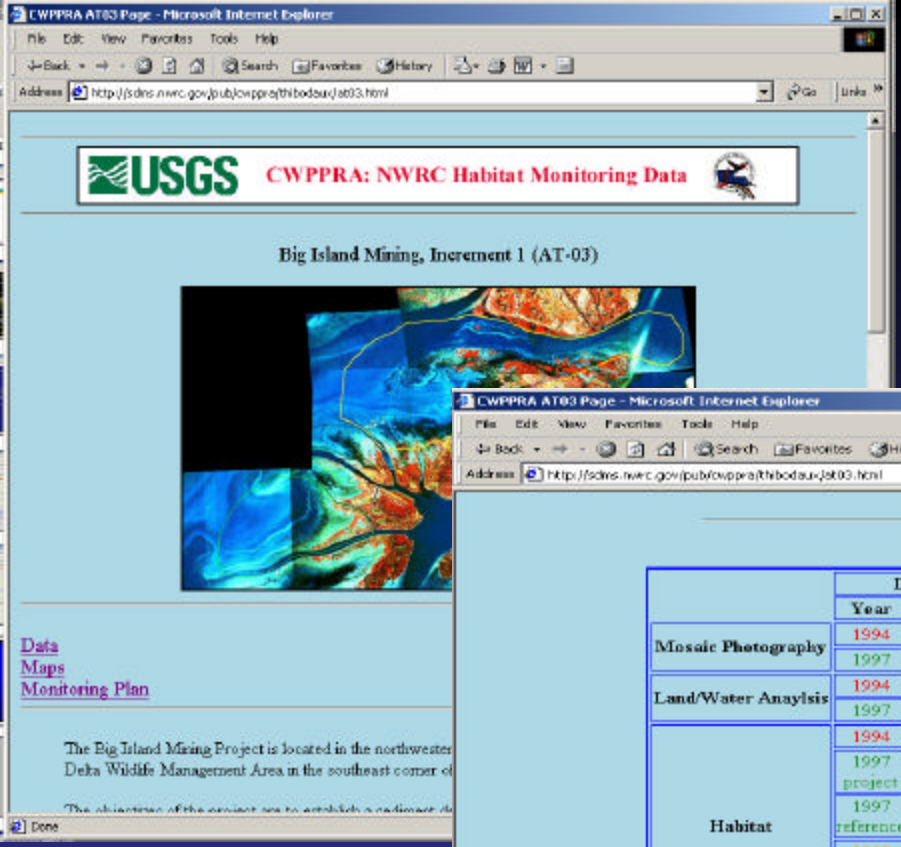
Value Added:
Information exchange

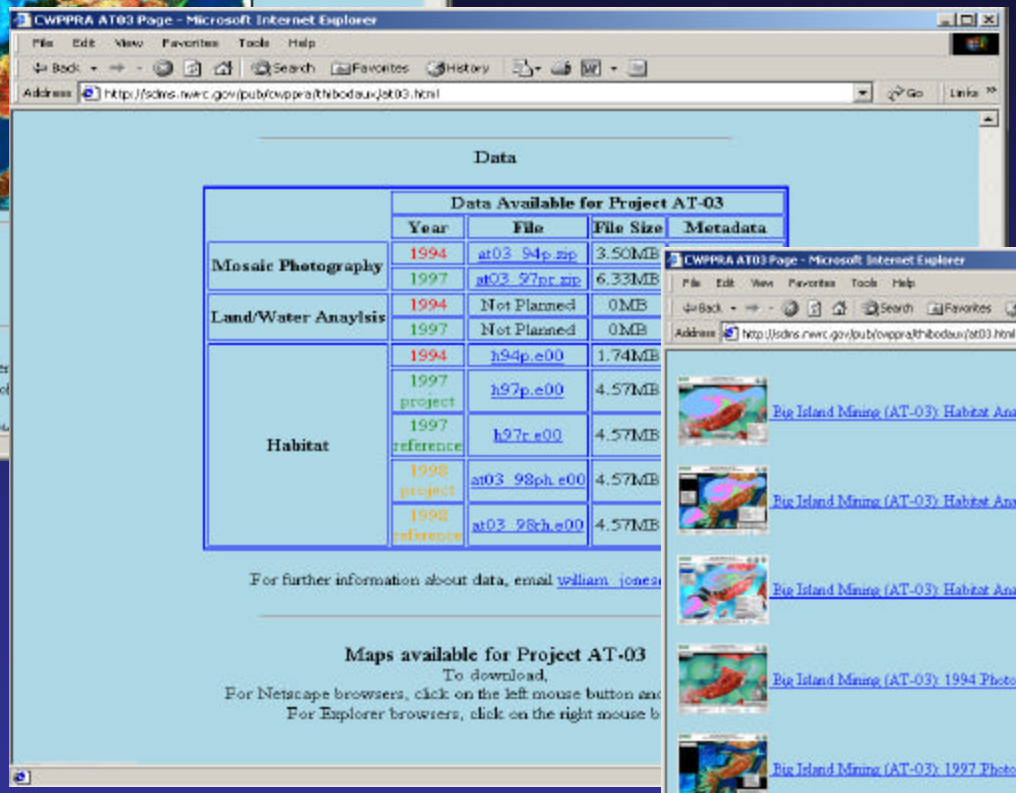
CRMS-*Wetlands* will provide:

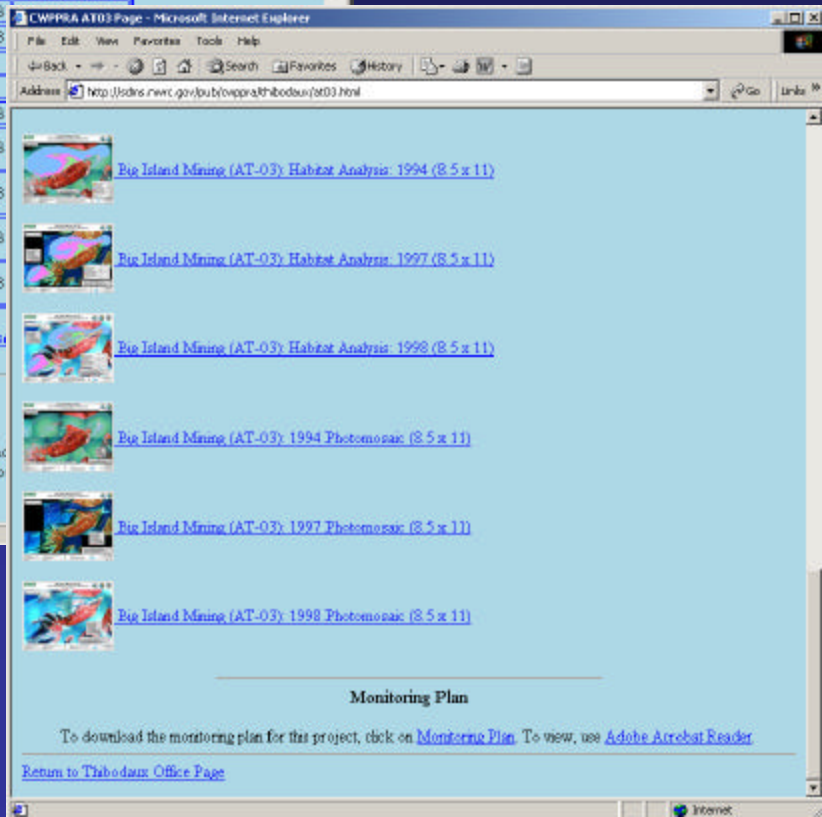
- CRMS-*Wetlands* data from each site will be available to project managers, landowners, academia, planners, LCA modelers, etc. on the internet at **www.saveLAwetlands.org**.



Value Added: Information exchange







sdms.nwrc.gov/pub/cwppra/cwppra2.html

Reporting Changes for 2004 Operation, Maintenance, and Monitoring Reports

Monitoring/
Project Evaluation
Reports

Operation,
Maintenance,
and
Monitoring
Reports

O&M Annual
Inspection Reports

Value-Added Monitoring

- **Project Planning**
- **Engineering and Design**
- **Operations and Maintenance**
- **Adaptive Management**
- **Hydrologic and ecosystem modeling**
- **LCA Science and Technology Plan (SWAMP)**
- **Design structure for adding cost-sharing partners and collaborative wetland studies and research**
- **Anomalous events**
- **Make data and information available**

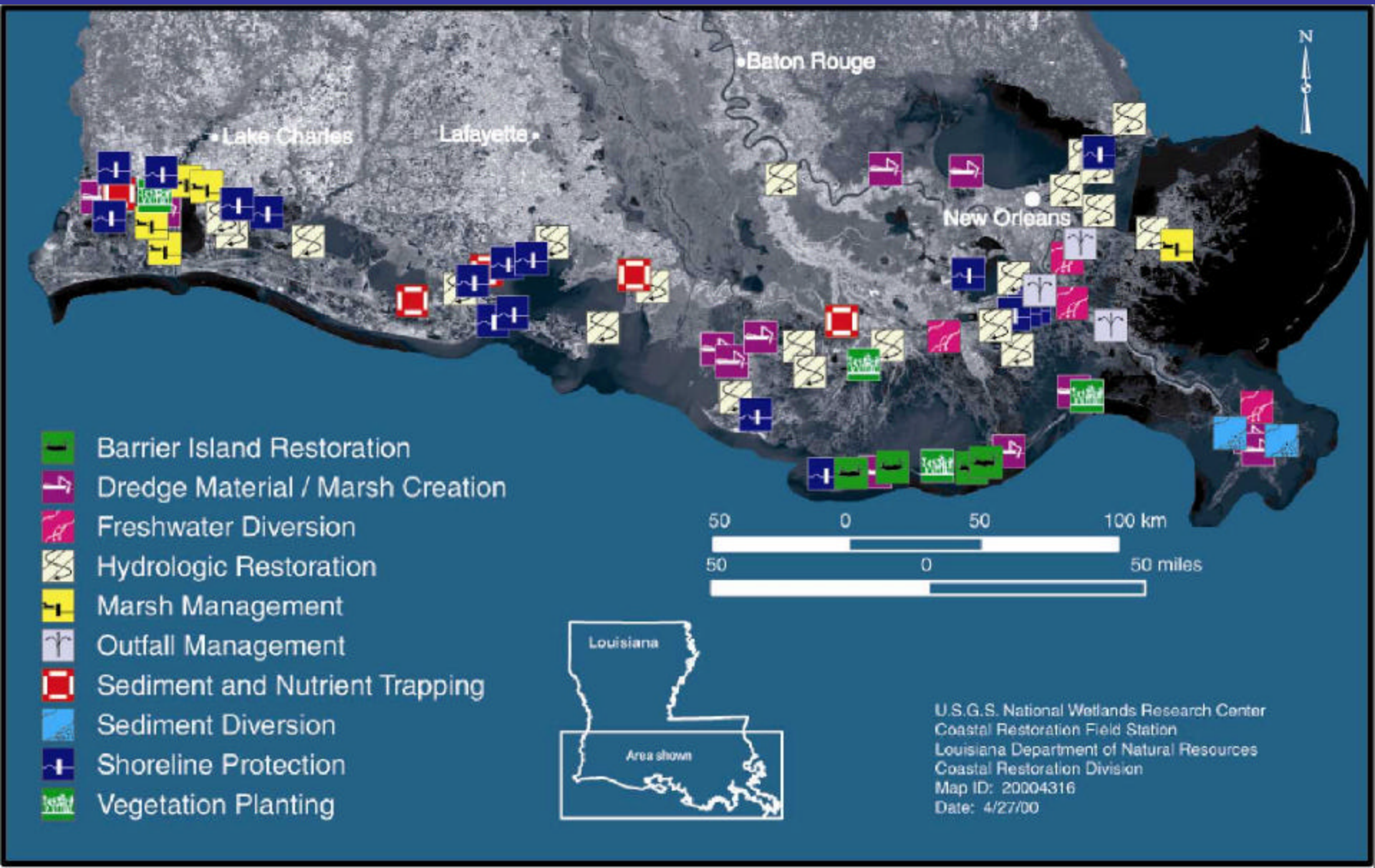
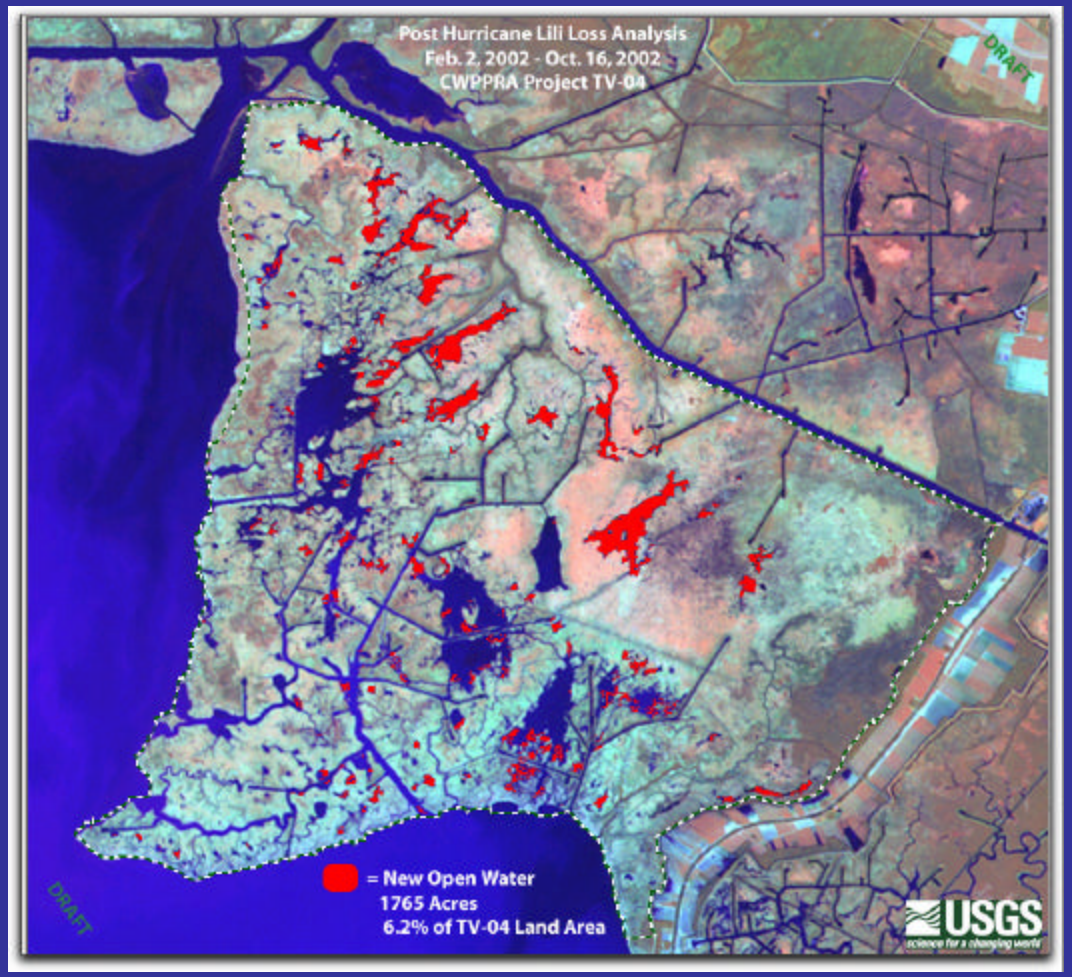
“Transfer of the technology or lack of technology to users is a major problem. Instead, the knowledge and experience gained are buried in countless monitoring reports or kept as private knowledge as a business. Restoration failures should lead to better projects and should be part of an iterative process. Unfortunately, the construction of many restoration projects concludes the work and no lessons are learned to improve the practice.”

Hackney, C.T. 2000. Restoration of coastal habitats: expectation and reality *Ecological Engineering* 15:165-170

FOR MORE INFORMATION:

www.saveLAwetlands.org	LDNR Coastal Restoration Division
www.LACoast.gov	CWPPRA
www.AmericasWetland.com	America's Wetland campaign

Restoration Project Types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