Coastwide Reference Monitoring System - *Wetlands*

Status Report for the CWPPRA Technical Committee
March 15, 2005
CRMS- *Wetlands* Status Report

Outline

- **BACKGROUND and APPLICATIONS**
- **TRACKING PROCEDURES**
  - Budget and Workflow
- **MILESTONES**
  - Landrights, CSA, Contracting, Implementation
- **PRODUCTS AND DELIVERABLES**
  - Data and Reports
- **INFORMATION MANAGEMENT**
  - Data Analysis Products and Information Distribution
CWPPRA Project Areas and Coastwide Reference Monitoring Stations

Legend
- Coastwide Reference Monitoring Stations
- CWPPRA Project Areas

Date 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: 20014449
Date: January 18, 2001
CRMS-Wetlands was developed to address Breaux Act Monitoring Program needs:

1) To improve the efficiency in determining the effectiveness of individual projects.

2) Provide information at multiple scales to evaluate coastal wetlands at the ecosystem scale, basin scale, and also restoration project scale.

3) To determine the ecological condition of the coastal wetlands based on the variables measured to ensure that the strategic coastal plan for Louisiana (Coast 2050 and LCA) is effective in recreating a sustainable coastal ecosystem.
CRMS-Wetlands Variables

- Basin-scale satellite imagery classified into Land and Water (3-year frequency)
- Aerial photography of 1km² surrounding each CRMS station, classified into Land and Water (3-year frequency)
- Hourly salinity and water level
- Marsh surface elevation - Surface Elevation Table (SET)
- Accretion – Feldspar
- Vegetation – percent cover, species abundance
CRMS-Wetlands Value added

- 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
CRMS-Wetlands Value added

- Expedite the planning and implementation of new projects
- Better integration with various Hydrologic Modeling efforts (improved data distribution for model calibration and testing)

Base Condition

Future Condition

(From FTN's Bayou Lacache Model)
Conceptual Models

LCA conceptual models

- Initial determination of the important structural and functional attributes to serve as performance measures – CRMS variables are consistent

- CRMS data input into conceptual models will refine and improve predictive capabilities and identify research needed to test underlying hypotheses, verify assumptions, and guide management actions
Draft Habitat Switching Conceptual Model
Linkage to Coastal Waters Program

- CRMS stations will provide wetting and drying of marsh surface for hydrodynamic, water quality and landscape modeling
- CRMS stations will help refine land building models by assessing how sediments introduced into the system are getting on marsh surface
- CRMS stations will provide calibration of storm surge models
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CRMS- *Wetlands* Funding

- **August 14, 2003:**
  - (2003-2006) \( \text{\$12,397,506} \)
  - (PPL 1-8 and new funding)

- **January 28, 2004:**
  - (2007) \( \text{\$3,101,357} \)

- **October 13, 2004:**
  - (2008) \( \text{\$532,000} \)

- **Total Auth. To Date:** \( \text{\$16,030,863} \)

- **Expenses through 2004:** \( \text{\$750,950} \)
  - (Landrights and Administration)

- **Balance:** \( \text{\$15,279,913} \)
Welcome

PRD

Sonris

Louisiana Department of Natural Resources
Strategic Online Information Systems

Sonris/2000

Username:  RICKR
Password:  ********

Login  Change Password  Exit

If you have any questions, please e-mail the IS Help Desk at HELPDESK@dnr.state.la.us
## PTS Time Sheet

**Name:**
- Last Name: Raynie
- First Name: Rick

**Pay Period:**
- Begin Date: 02/14/2005
- End Date: 02/27/2005

### Project Activity Hours

<table>
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<th>Project Name</th>
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CWPPRA - CRMS Monitoring Database

Financial

CWPPRA Monitoring

CWPPRA Contingency Monitoring

CRMS Monitoring

Workflow

Site Establishment

Administration

CRMS Property Update
CRMS Site Update
IO Tables
Support Data
Reports
CRMS- *Wetlands* Status Report

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CRMS-Wetlands Landrights Status as of March 1, 2005

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<td>Year 3 Stations</td>
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<tr>
<td>Total</td>
<td>339</td>
<td>273</td>
<td>612</td>
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The Cost Share Agreement (CSA) was finalized on June 8, 2004.

USGS is the Federal Sponsor.

CRMS- Wetlands project costs were included for 2003 – 2007. The CSA budget will be amended upon each new funding approval from the Task Force.
CRMS- *Wetlands* : SOP

- A Standard Operating Procedures (SOP) manual (Folse and West 2004) was developed by LDNR with input from NWRC and Academia.
- 185-pages, expands on the CWPPRA Quality Management Plan (Steyer et al. 2000)
- Outlines activities and procedures for CRMS- *Wetlands* site construction, data collection, QA/QC, data processing, and deliverables requirements.
- Describes project-specific monitoring not covered by CRMS (such as shoreline surveys and SAV).
- Will be used by all contractors supporting CRMS- *Wetlands* implementation and provides the guidelines and requirements to ensure standardized implementation and consistency.
CRMS- *Wetlands*: Contractor

- RFP prepared and processed through OSP to construct and service the CRMS- *Wetlands* stations for the first 3-years of implementation.
- RFP was released on June 22, 2004
- Pre-bid conference was held on July 7, 2004
- Bid-opening was August 17, 2004
- Recommendation to State Purchasing in November 2004
- Contract negotiations were completed on January 31, 2005
- Contract was initiated on February 1, 2005
CRMS- *Wetlands*: **Contractor**

Coastal Estuary Services, LLC (CES; a partnership between Shaw and CH2MHI LL) was selected. The contract covers a three year period at a cost of $13,264,314.*

*also includes project-specific monitoring*
CRMS- *Wetlands* : Data Collection Equipment

► Specifications for the electronic equipment that will be necessary for CRMS- *Wetlands* were prepared and submitted to the Office of State Purchasing in January 2005. This is currently out for bid and it is anticipated that a vendor will be selected by the end of March 2005. Equipment should be ready for installation in the field in April 2005.
High quality data is imperative

In-house training of the trainers to support Quality Assurance
  - Training Dates: October 19-21, 2004

Contractor will be properly trained on procedures for site visit and characterization, site construction, data collection and QA/QC methods.
  - Training dates: March 8 and April 4-6, 2005

CES will also initiate its own internal training and continued on-the-job QA/QC and review of procedures.

DNR and USGS will QA/QC all phases of CRMS implementation.
Construction of CRMS- *Wetlands* sites is anticipated to begin in April 2005.

Equipment will be installed as sites are constructed.

Data collection will begin immediately.
CRMS- *Wetlands* Status Report

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  Data Analysis Products and Information Distribution
Biological Monitoring Data

Hydrographic, surface elevation, and vegetation data collected by the LDNR / CRD Biological Monitoring Section are now available online. All downloaded files will be in zipped, comma-delimited format with headers that describe the data. For a detailed explanation of all data types, please review the Data Descriptions document.

Hydrographic Data

Hydrographic data are now available in two general formats: data collected monthly and data collected hourly. Parameters sampled generally include water level, water temperature, specific conductance, and salinity. In some rare instances water velocity and wind speed/direction are sampled at stations where hourly data are collected.

Monthly Data
Link: Retrieve Monthly Data (via SONRIS Lite)

Monthly hydrographic data can be downloaded by either project or station number for any range of dates that data are available. These files will be relatively small as there are only approximately 12 records per station per year. In general, there is a much larger spatial distribution of stations where monthly data are collected than where hourly data are collected. The LDNR currently monitors over 400 stations throughout the coastal zone for monthly hydrographic data.

Hourly Data
Link: Retrieve Hourly Data (via SONRIS Lite)

Hourly hydrographic data may also be downloaded by project or by station number; however these files are much larger than the monthly files. For example, since one year of hourly sampling will yield approximately 8,760 records, a file for a project collecting data at 3 stations for a period of 5 years will contain approximately 131,400 records. Many typical spreadsheet programs will not be able to completely open a file of this size. For this reason, we recommend that hourly data be downloaded by station and not by project. The LDNR currently monitors over 125 stations throughout the coastal zone for hourly.
Atchafalaya Sediment Delivery (AT-02) Overview

Priority Project List: 2

Sponsors: NMFS, LDNR

Parishes: St. Mary

Reports:
- AT-02 General Project Fact Sheet (HTML, figures updated in real time)
- AT-02 General Project Fact Sheet (PDF 325 KB)
- AT-02 Monitoring Plan (PDF 165 KB)
- AT-02 Progress Report 1 - Part 1 (PDF 3.07 MB)
- AT-02 Progress Report 1 - Part 2 (PDF 1.96 MB)
- AT-02 AMR Workshop Presentation (PDF 5.37 KB)

Maps:
- Spot Imagery 1993
Mean Sediment Elevation by year for the Bayou La Branche Wetland Creation Project Area from 1994 - 2002

1997 and 2000 Mean % Cover of Selected Species

- Spartina patens
- Schoenoplectus pungens
- Vigna luteola
- Symphyotrichum subulatum
- Juncus roemerianus
- Distichlis spicata
- Lythrum lineare
- Symphyotrichum tenuifolium
- Eleocharis cellulosa
- Cyperus odoratus
- Ipomoea sagittata
- Cyperus filicinus
- Amaranthus australis
- Pluchea camphorata
- Ammannia coccinea
- Phragmites australis
- Sagittaria lancifolia

temporary Staff Gauges Year 1994-1995 N=6
permanent Staff Gauges Year 1996-2002 N=19

Figure 9. Mean % cover of selected species across all 4-m² plots within the PO-06 project area during September 1997 (N=25 plots) and August 2000 (N=29 plots). Vegetation was sampled using the Braun-Blanquet method.
Operations, Maintenance, and Monitoring Reports

Summary Data and Graphics

Operations, Maintenance, and Monitoring Reports

O&M Annual Inspection Reports
Adaptive Management

Monitoring

- Information Dissemination
- Project Reporting
- Data Analysis
- Plan Development
- Quality Assurance
- Data Collection

CWPPRA

- Planning
- Land rights
- Engineering and Design
- Construction
- Operations & Maintenance
- Construction
CRMS-Wetlands Data Analyses

CRMS-Wetlands will facilitate the investigation of:

- Individual project effects
CRMS-Wetlands
Data Analyses

CRMS-Wetlands will facilitate the investigation of:

- Comparison of one project vs another project

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

- CS-23 Oligohaline Wiregrass
- CS-32 Oligohaline Wiregrass
- CS-27 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-Wetlands
Data Analyses

CRMS-Wetlands will facilitate the investigation of:

- Comparison of all projects across the coast vs non-project stations across the coast
Basin-scale Reporting

► Will occur on a 3-year cycle.
► Collective project effects, habitat characterization, episodic events, etc.
► Basin-level teams will be assembled and include representatives of DNR, USGS, academia, and federal partners.
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CRMS-Wetlands
Data Analyses Products

CRMS-Wetlands will facilitate the development of products that:

• Compare actual changes at individual stations against predicted changes from ecosystem forecasting models
Site 20
1990 – 2001
Land – Water Change

<table>
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<th>Type</th>
<th>Area</th>
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<tr>
<td>Water</td>
<td>116.74</td>
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<tr>
<td>Land</td>
<td>328.04</td>
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<tr>
<td>Loss</td>
<td>26.22</td>
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<tr>
<td>Gain</td>
<td>79.42</td>
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Figures are in acres
Site 37
1990 – 2001
Land – Water Change

- Water: 202.76 acres
- Land: 289.91 acres
- Loss: 39.98 acres
- Gain: 22.27 acres

Figures are in acres
Pre and Post Construction Weekly Average Water Level

Construction period week 52 to week 80

Number of Weeks

Water Depth (ft)

Avg. flood depth
Avg. drain depth
Caernarvon Land: Water Analysis

Percent Change in Land Area (1990 vs 2001) from TM Imagery

Difference in Land Area (%) vs Distance from Diversion (km)

- Numbers in the plot indicate project sites
- Project sites above the red reference line show land gain

Int = 4.79  Slope = -0.35  (p < 0.001)
Coastwide Reference Monitoring System (CRMS) Overview

Priority Project List: NA

Sponsors: LDNR, USGS

Parishes: Acadia, Assumption, Cameron, Calcasieu, Caddo, East Baton Rouge, Iberia, Iberville, Jefferson, Jefferson Davis, Lafayette, Lafourche, Livingston, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Martin, St. Mary, St. Tammany, Tangipahoa, Terrebonne, Vermilion, West Baton Rouge

Reports:
- Office of Coastal Restoration and Management Quality Management Plan 2003 (PDF 582 KB)
- Biological Monitoring Section Standard Operating Procedures (PDF 2.83 MB)
- A contractor's guide to minimum standards required by the Louisiana Department of Natural Resources, Coastal Restoration Division (PDF 2.45 MB)
- Quality management plan for Coastal Wetlands Planning, Protection, and Restoration Act monitoring program (PDF 1.004 KB)
- A proposed coast-wide reference monitoring system for evaluating wetland restoration trajectories in Louisiana (PDF 4.38 MB)
- Task 3 from Request For Proposal - Project Specific Station Location Maps (PDF 4.02 MB)
- SOTERIS Database User Manual (PDF 174 KB)
- CRMS Project Managers' Technical Fact Sheet (HTML)

Maps:
No maps available
Analytical Opportunities

1. RSET and accretion
   a. Are elevation and accretion rates greater in proximity to sediment source/river influence?
   b. Are elevation and accretion rates different in areas near river diversion vs areas with “natural” river influence vs. areas isolates from river influence?
   c. Do elevation and accretion rates differ by habitat type?
   d. What are elevation and accretion rates inside project boundaries vs outside?
   e. What are elevation and accretion rates within each Basin?
   f. What are elevation and accretion rates across the coast?
   g. What are the shallow subsidence rates across the coast, basins, habitat types, etc. How do they differ with proximity to river influence?
Analytical Opportunities

1. RSET and accretion
2. Water Level (marsh flooding frequency and duration)
   a. Are marshes flooded more frequently and longer within and between basins, habitat types, and project vs reference areas?
   b. Are marshes flooded more often and longer in areas isolated from riverine influence?
   c. Does marsh flooding frequency and duration change over time with increasing river influence? (i.e., does the marsh become more “stable”?)
   d. How do storm events and wind events influence water levels on all scales?
3. Salinity (surface and pore water)
4. Soil Properties (bulk density and percent organic content)
5. Vegetation (species composition, biomass, productivity)