Monitoring Networks in Coastal Louisiana
Data Delivery and Optimization Tools

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USGS Monitoring Networks

- Coastal and Marine Geology Program
  - LASED-LA Geology and Geophysics
  - usSEABED-US Surface Samples
  - XSTORMS-Extreme Storms Data
  - InfoBank-CMGP Field Activity Data

- Louisiana Water Science Center
  - NWISWeb
  - NAWQA

- National Wetlands Research Center
  - CWPPRA
  - CRMS - Wetlands
What’s in LASED?

- Contains data from 25 research cruises including
  ~3,600 cores or samples
  ~220,000 measurements
  ~8,000 km of seismic reflection data
- 43 feature classes (bathymetry, shorelines, geology)
- 39 raster datasets (side-scan mosaics, satellite images, georectified maps)
- 12 related tables (cruise, equipment, measurements etc.)
- Access to 80 basemap datasets like aerial photos, tide gauges, roads, etc.
- Links to formal and informal metadata
USSEABED & LASED Cores & Samples
USGS Louisiana Water Science Center Monitoring Stations
Coastwide Reference Monitoring System - Wetlands
## Data collection at each site

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Method</th>
<th>Scale</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land to Water Ratio</td>
<td>Satellite Imagery</td>
<td>Hydrologic Basin</td>
<td>3 years</td>
</tr>
<tr>
<td>Land to Water Ratio</td>
<td>Digital Aerial Photography</td>
<td>CRMS Site (1 Km²)</td>
<td>3 years</td>
</tr>
<tr>
<td>Emergent Vegetation</td>
<td>Braun Blanquet: % Cover, Species Richness, Height of Dominant Species</td>
<td>(10) 2m x 2m plots/CRMS Site</td>
<td>Annually during peak biomass</td>
</tr>
<tr>
<td>Forested Vegetation</td>
<td>DBH and Canopy Cover</td>
<td>(3) 20m x 20m plots/CRMS Site</td>
<td>Annually during peak biomass</td>
</tr>
<tr>
<td>Vertical Accretion</td>
<td>Feldspar Plots/Cryogenic Cores</td>
<td>3 plots/CRMS Site</td>
<td>Bi-annually</td>
</tr>
<tr>
<td>Marsh Elevation Change</td>
<td>Rod Surface Elevation Table (RSET)</td>
<td>4 directions/CRMS Site</td>
<td>Bi-annually</td>
</tr>
<tr>
<td>Porewater Salinity</td>
<td>10 and 30 cm deep wells Syringe/Sipper</td>
<td>3 wells per depth/CRMS Site and at Vegetation Plots</td>
<td>Monthly Annually</td>
</tr>
<tr>
<td>Surface Water Salinity, Temp and Water Level</td>
<td>Submersible Data Logger</td>
<td>in available water within 200 m of CRMS Site or in a well</td>
<td>Hourly</td>
</tr>
<tr>
<td>Soil Characteristics</td>
<td>Core samples profiled into 4 cm increments to 24 cm. Bulk Density, OM%, Soil Salinity, pH, and Moisture.</td>
<td>3 cores, 18 archived samples/CRMS Site</td>
<td>Decade</td>
</tr>
</tbody>
</table>
Ecological Index Development

**METRICS**

- **Vegetation**
  1. Cover
  2. Species composition
  3. Relative abundance
  4. Dominance/calculated
  5. Richness/calculated
  6. Height
  7. NDVI

- **Hydrology**
  8. Water depth
  9. Water duration/calculated
  10. Flooding frequency/calculated
  11. Salinity
  12. Temperature

**Soils**

  13. Bulk density
  14. % organic matter
  15. Water content
  16. Sediment elevation
  17. Sediment accretion
  18. Shallow subsidence
  19. Salinity
  20. Temperature
  21. pH
  22. Soil type
  23. Relative sea level rise
  24. Deep subsidence

- **Landscape**
  25. Land:water ratio
  26. NDVI
  27. Fragmentation

**INDEX DEVELOPMENT**

- Hydrologic Index
- Floristic Quality Index
- Sediment Elevation Compensation Index
- Spatial Integrity Index
Coastwide Reference Monitoring System (CRMS - Wetlands)

Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting the coastal landscape. The effectiveness of the traditional paired-reference monitoring approach in Louisiana has been limited because of difficulty in finding comparable test sites. CRMS is a multiple reference approach that uses aspects of hydrogeomorphic functional assessments and probabilistic sampling.

This approach includes a suite of sites that encompass the range of ecological conditions for each stratum, with projects placed on a continuum of conditions found for that stratum. Trajectories in reference sites are then compared with project trajectories through time. The approach could serve as a model for evaluating wetland ecosystems.

Highlight: Online Mapping
http://www.lacoast.gov/crms
Hydrologic Index for 2005 Intermediate Marsh, Site: CRMS

% Time Flooded: 25.6
Weighted Average Annual Salinity: 6.1 (ppt)
Index Value: 0.2

Floristic Quality Index for Intermediate Marsh, Site CRMS0416

Cover (%)

Year

2005 2006 2007

Floristic Quality

Plant Name (CC Score)
- Spatina pallescens (Ait.) Muhl(9)
- Iva frutescens L.(4)
- Distichlis spicata (L.) Greene(2)
- Cyperus strigosus L.(3)
- Cyperus esculentus Muhl(3)
- Schoenoplectus americanus (Pers.) Volk. ex Schinz & P. Kollar(9)
- Spatina alterniflora Loisel.(10)
- Cephalanthus occidentalis L.(6)
- Other
- FQI
SWAMP data will inform coast-wide modeling and programmatic assessment efforts.

Project Design & Construction

Planning

Programmatic Assessment

Coast-wide Modeling

SYSTEM-WIDE ASSESSMENT & MONITORING PLAN (SWAMP)

BARRIER ISLAND COMPREHENSIVE MONITORING (BICM)

Coast-wide Reference Monitoring System (CRMS)-Wetlands

Coast-wide Reference Monitoring System (CRMS)-Waters
SWAMP Integration (DGIT)
Data Gap Information Tool

Coastwide Reference Monitoring System

Layers:
- Existing CMS
- Modified existing CMS
- User-added

Instructions:
Choose a new or existing station to view/modify/delete collection information.
To add a new station, zoom in to at least level 12, and click the point on the map where you would like the station to be placed.

Zoom
Current zoom level: 10

Admin Tools
Reports:
1) Active users
2) Backbone stations
3) Modified existing stations

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For more information
www. nwrc.gov
www.lacoast.gov
la.water.usgs.gov
coastal.er.usgs.gov/lased/