

Monitoring Networks in Coastal Louisiana Data Delivery and Optimization Tools

Greg Steyer LEAG Annual Planning Meeting April 22 - 23, 2009

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



30°N

284

LASED Seismic Tracklines



30°N

28°N

USGS Louisiana Water Science Center Monitoring Stations



USGS Louisiana Water Science Center Coastal Monitoring Stations



Coastwide Reference Monitoring System - Wetlands



Data collection at each site

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

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.





<u>Highlight</u>

Online Mapping

ttp://www.lacoast.gov/crms







































Monitoring-Modeling Integration Barataria Basin Pilot



Steyer, G.D., A.B. Owens, and B.R. Couvillion. 2006. Data Collection Network to Support Ecosystem Forecasting for the Barataria Basin – Mississippi River Domain. Coastal Environment and Water Quality (ed. By Y.J. Xu & V.P. Singh), 431-442. Water Resources Publications, LLC, Highlands Ranch, CO 80163-0026, USA.

SWAMP data will inform coast-wide modeling and programmatic assessment efforts



SWAMP Integration (DGIT) Data Gap Information Tool



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

Steyer, G. D. and others 2003. A Proposed Coast-wide Reference Monitoring System for Evaluating Wetland Restoration Trajectories in Louisiana. *Environmental Monitoring and Assessment*. 81:107-117.