Data Collection

Team Leaders: Mead Allison, the Water Institute of the Gulf (CPRA), Thad Pratt Engineer Research and Development Center (USACE)

Team Participants: Coastal Protection and Restoration Authority of Louisiana, US Geologic Survey, USACE Engineer Research and Development Center, USACE Mississippi Valley District

Purpose: Data management and collection will compile and analyze existing data and conduct field observational studies of water and sediment dynamics to supplement existing data sets as needed. This effort will enable researchers to characterize existing conditions and processes. Observational data will also support the development of numerical models that are capable of simulating the complex behavior of water, sediment, nutrients, and salinity. These models will be used to project future trends with and without proposed restoration actions.

Objectives: Data Collection will use a combination of boat-based and stationary data collection to gather data on:

- Real-time and synoptic cross-sectional water velocities and discharge
- Suspended load concentration and grain size distribution
- Bed load and flux of sediment occurring through bed form migration
- Sand sheet thickness
- Water column turbidity
- Data for characterizing sediment erodibility, entrainment, flocculation and settling, and deposition
- Data to characterize bed morphology changes
- Salinity and temperature
- Other water quality parameters
- All collected data sets will be archived, managed for quality control and made available for use by the modeling teams, the state and federal partners, and the general public.

Challenges:

- Dependent on field conditions
- Capturing complex spatial and temporal variability

Study Status:

- Collecting estuarine data (salt wedge) during low-water months of Sept-Oct 2013
- Plan to finish collecting data during high water conditions in spring 2014
- The Data Management Team is collecting and processing historic data sets.
- Data analysis and quality control review will continue through FY14.

Anyone seeking additional information on the MRHDM Study can visit the LCA program website at ***www.lca.gov***, the New Orleans District LCA website at ***www.mvn.usace.army.mil/Missions/Environmental/LouisianaCoastalArea.aspx***, or the CPRA website at ***http://coastal.louisiana.gov/***.

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LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
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http://coastal.louisiana.gov

Mississippi River Hydrodynamic and Delta Management Study

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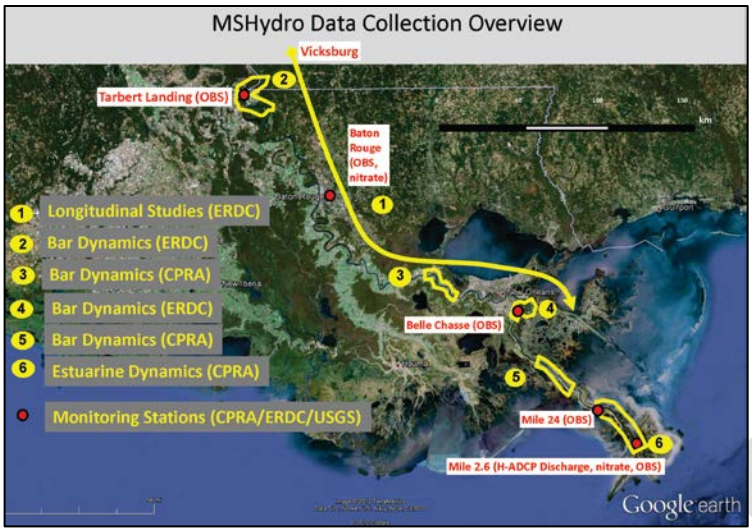

(1) LONGITUDINAL SURVEYS

One dimensional models need to be able to account for the processes that add/subtract from the water discharge, concentration and grain size composition of the suspended sediment. The surveys will begin above Old River Control (to examine the potential impact of the loss of water at the control structures) and extend to Head of Passes. The priority will be to examine progressive settling of suspended fines associated with low discharge (August-November, <500,000 cfs), during a period when there is little bed material load (sand) suspension. The following boat measurements will be made longitudinally and at cross-sections:

1. **Water discharge and velocity** by acoustic doppler current profiler (ADCP)
2. **Suspended sediment load** by point-integrative isokinetic sampler
3. **Bedload transport** by repeat multibeam bathymetric profiling
4. **Bed grain size** by bottom grab
5. **Bed erodibility** on cores using a mobile sediment flume laboratory
6. **Other water quality** parameters (salinity, flocculation, nutrients, etc.).

(2) to (5) BAR DYNAMICS SURVEYS

Multi-dimensional models need to be able to simulate (a) downstream transport of sand on lateral and point-bars in the lower river by dune migration, and (b) the complex exchange of sand grains between the bed and lower water column over dune fields. The following boat measurements will be made at each of the four bar sites:

1. **Base map of the entire reach** by multibeam bathymetry for model grid setup
2. **Water discharge and velocity** by ADCP
3. **Suspended sediment load** by point-integrative isokinetic sampler
4. **Bedload transport** by repeat multibeam bathymetric profiling
5. **Bed grain size** by bottom grab
6. **Other water quality** parameters (salinity, flocculation, nutrients, etc.)

(6) ESTUARINE DYNAMICS SURVEYS

1D and multi-dimensional models need to be able to simulate the complex behavior of water, sediment and nutrients in the Ostrica (mile 24) to deepwater pass mouth(s) “estuarine” reach. Each of the field studies will have distinct goals, and in some cases, will be timed at different river discharge phase. This is because the salt wedge is known to emerge from the Southwest Pass channel only when water discharges at Tarbert Landing are below 300,000 cfs. The field studies are:

1. A single, bank-to-bank, multibeam bathymetry survey of the river reach for model grid setup between Ostrica and Head of Passes, and extending as far as navigable into the SW Pass, South Pass, and Pass a Loutre channels. It will also extend as far as navigable into the trunk channel of major river exits in this reach.
2. Two detailed (orthogonal and longitudinal) surveys will be carried out at low discharge (<300,000 cfs) of the Ostrica-to-HOP reach designed to measure the salt wedge distribution, motion with tide and with change in discharge.
3. One detailed (orthogonal and longitudinal) survey will be conducted at moderate to high discharge (400,000-800,000 cfs) concentrated within the Southwest Pass channel. This discharge range assures that the salt wedge will be confined to the Southwest Pass channel.

(red dots) MONITORING PLATFORMS

Data will be collected at hourly frequencies over the 24 month initial study period at several fixed sites on the river, taking advantage of existing USACE/USGS study sites.

A. **Turbidity (OBS)** – Optical backscatterance sensors (OBS) will be emplaced at Tarbert Landing, Baton Rouge, Belle Chasse, Mile 24 and Mile 2.6 to record pulses in sediment load and how these pulses are modulated through the tidal and estuarine reach.

B. **Nitrate** – Solid-state, optical nitrate sensors will be emplaced at Baton Rouge, Belle Chasse and Mile 2.6 to examine whether nitrate levels change downstream through the tidal and estuarine reach at any phase of the discharge cycle.

C. **Discharge** –A new discharge station will be established in the tidal-estuarine reach at Mile 2.6. Because water velocities (and hence calculated water discharge) are strongly modulated by tides and salt wedge processes, data will be collected with a 300 kHz horizontal ADCP at high frequencies (minutes).

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