Discharge and Suspended Sediment Distribution In the Lower Atchafalaya River Delta During High Water Events

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Project Overview

- Data collected from June 2002 to October 2003 for Louisiana Department of Natural Resources.
- As part of the Castille Pass Channel Sediment Delivery Project.
- Six synoptic studies: 3 Event and 3 Base
- Real Time Continuous Stage and Discharge in Castille Pass.
- 15 locations in the Lower Atchafalaya River Delta.
- Discharge measurement, suspended sediment, bed material, and in situ water quality reading taken at each location.
- Determined flow distribution, sediment concentrations, and grain size distribution for each location .

Lower Atchafalaya River Delta

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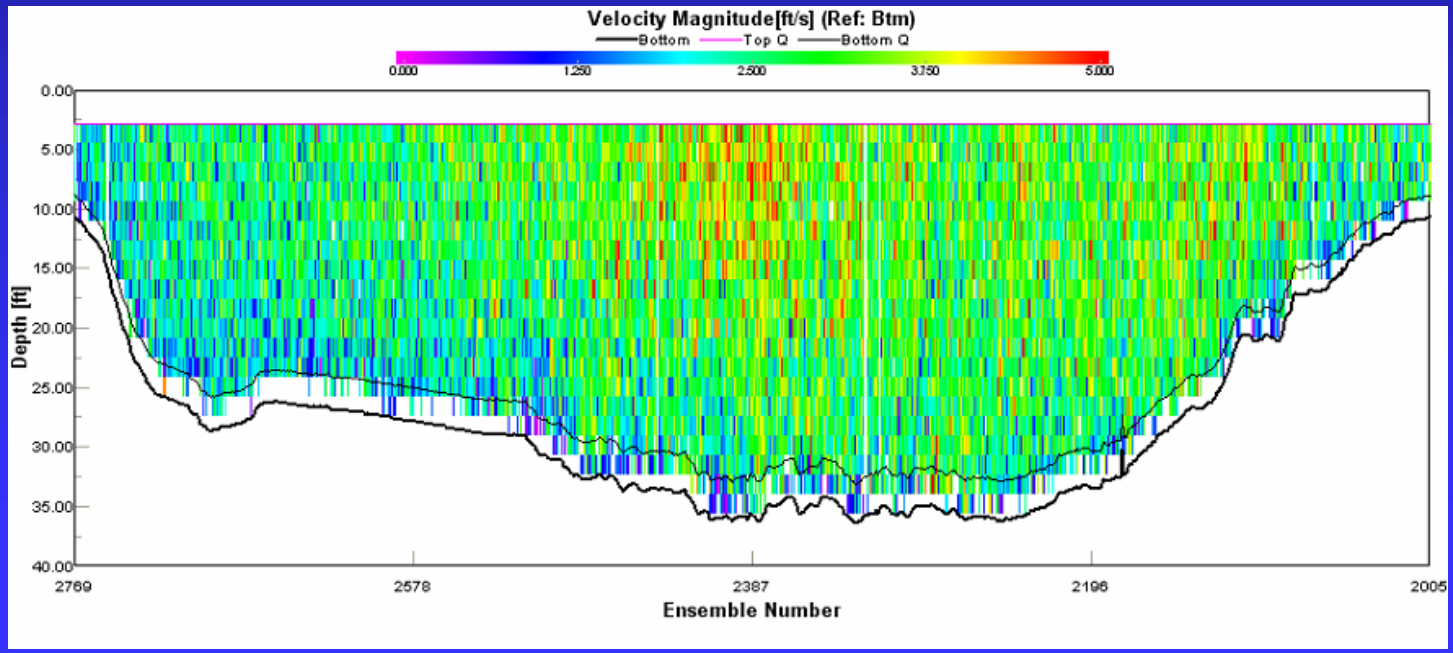
Discharge Measurements

- Moving Boat Measurements made using a RDI Rio Grande 600 kHz.

Discharge Measurements

- Calculate Q using Win River software.
- Average of 4 transects, all transects must be within 5% of mean.
- Software estimates Q for top, bottom, and left and right banks.
- Software calculates Q, X-sectional Area, Mean Velocity, and Width.



Flow Distribution – Upper

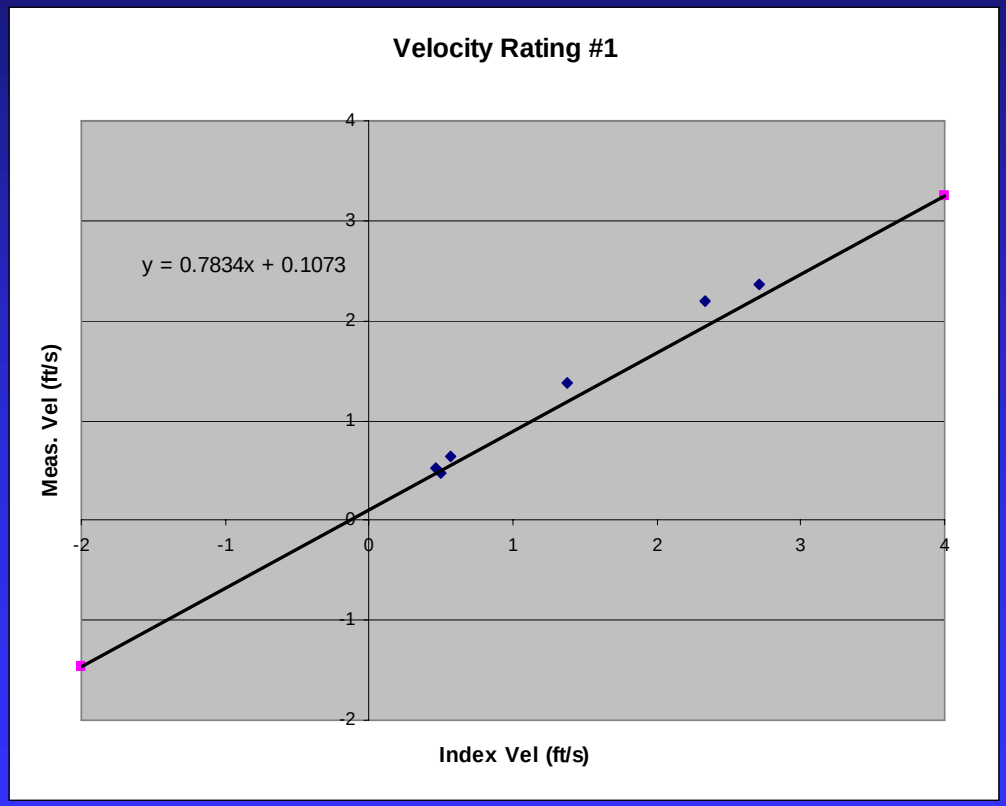
- Approx. 14% of flow down Shell Island Pass (2)
- Dear Island Bayou (4) and Big Island Pass (5) are very shallow and have very low velocities.
- Some loss of water does occur during synoptic do to time lag and tide.

Flow Distribution -- Lower

- Locations tidally effected even at high stages.
- East Pass (7) and Castille Pass (9) are key locations for the project.
- Real Time Stage and Discharge Collected in Castille Pass for duration of project.

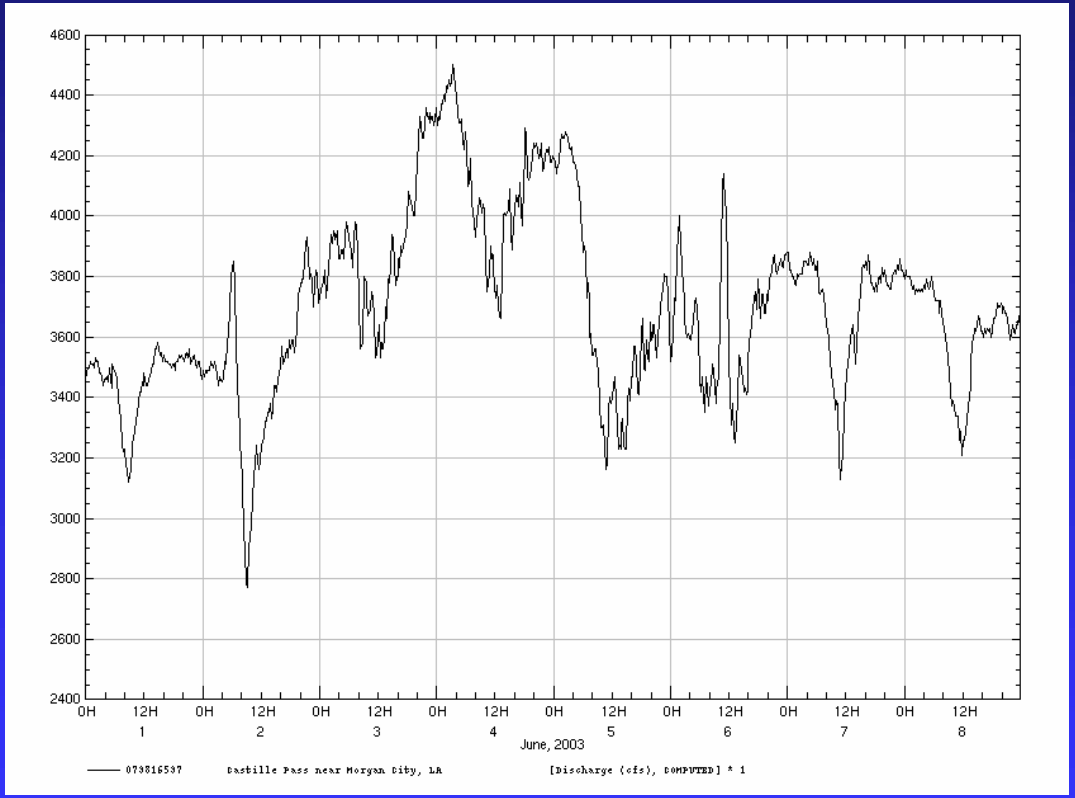
Real Time Gage – Castille Pass

- Index Velocity Rating developed to calculate real time Q.
- Plot Mean Channel Velocity(from measurement) vs. Index Velocity (from velocity meter).



Real Time Gage – Castille Pass

- Discharge ranged from 6340cfs at high flow to –4380cfs during Hurricane Lilli.
- Gage tidally influenced at all stages and discharges.



Suspended Sediment

- Depth Integrated Samples with DH59 or P63.
- Three Verticals per cross section.
- Sand/Slit Split Analysis

Suspended Sediment

- Sediment dominated by silt-clay fraction.
- Concentrations increase with discharge.
- Suspended sand is minimal relative to silt.
- Suspended sediment data from USGS gage at Lower Atchafalaya River at Morgan City, LA was also collected during project.

Castille Pass – Land Development

- Dredged both Natal Pass and Castille Pass, which had silted in over the years.
- Over 10,000 linear feet, or 700,925 cubic yards, of material were dredged and utilized at the site to create 278 acres of marshlands.
- An additional 2,200 acres of wetlands are expected to accrete over the 20 year monitoring life of this project.

Castille Pass – Land Development

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Summary/Conclusion

- Flow Distribution extremely dynamic changing based on river stage and tide.
- Little sand transport mostly silt/clay.
- All data collected by USGS was provided to LA DNR and LSU to confirm/assist project modeling.
- Increasing land development in Atchafalaya Delta.

Questions???