Geomorphic Assessment

- Document the historic trends of the channel system
- Establish the current stability of the channel system and identify the dominant processes and features within the system

Acknowledgement: Little & Biedenharn
1970s to 1990s
1990s to 2000s

Aggradation
Tending Aggradation
Dynamic Equilibrium
Tending Degradation
Degradation
Future Without Project

Acknowledgement: Brown (ERDC)

Much larger flow fraction diverted at Ft St Philip / Bohemia
FWP Run #2

- Diversions open when Tarbert Landing $Q \geq 600,000$ cfs
  - West Maurepas Swamp, RM 144.3 5,000 cfs
  - White Ditch, RM 68.6 35,000 cfs
  - Myrtle Grove, RM 60.7 75,000 cfs
  - Lower Breton Sound, RM 41.8 50,000 cfs
  - Lower Barataria, RM 29.5 50,000 cfs
  - Total additional flow diversion: 215,000 cfs

- White Ditch Sediment Diversion operates only during March and April
- Sediment Diversion Coefficients = 1.0 for all grain sizes
- Intermediate Sea Level Rise (NRC Curve I)

Acknowledgement: Heath & Thomas
Bathymetric change (FLOOD 2011)
observation polygon A to I
Bathymetric change (June 2011-June 2012)
Volume of Erosion and Accretion

Bonnet Carre Spillway: MAY-JUNE 2011
- Observed
- Model

Bonnet Carre Spillway Closed: June 11-JUNE 2012
- Observed
- Model
2011 Flood Event-Fine Sediment (Mud) Budget

Legend
- Deposition in the River
- Deposition in Forebay
- Deposition between BC Structure and Airline Hwy
- Deposition between Airline Hwy and I-10

Lake Ponchartrain
I-10
Airline Hwy
US of BC
DS

Legend:
- 100% Deposition in the River
- 12% Deposition in Forebay
- 0% Deposition between BC Structure and Airline Hwy
- 4% Deposition between Airline Hwy and I-10
- 87% Deposition in the River
- 22% Deposition in Forebay
MODEL DOMAIN
UPPER BRETON SOUND
Production run: 2

- Simulation period: January 2008 – December 2010
- Diversion Capacity 250k cfs
- Diversion is open for three years

Simulated Flow through the Diversion
Production run: 2

- Simulation period: January 2008 – December 2010
- Sediment Water Ratio
Production run: 2

- Simulation period: January 2008 – December 2010
- Sediment Water Ratio
Production run: 2

- Simulation period: January 2008 – December 2010
- Erosion and Deposition volume in the river bed for operating the diversion continuously
Myrtle grove and White Ditch Diversions

Model Domain: RM 76 – RM 56

Design Capacity for MG: 75,000 CFS

Design Capacity for WD: 35,000 CFS
MG+WD Model:

- Erosion and Deposition volume in the river bed for operating both the diversions continuously between 2008-2010

![Map of UBS Diversion Operation Between 2008-2010](image-url)
WEST BAY DIVERSION

Acknowledgement: Meselhe, Allison, Khadka & Deltares
2009-2011 volumes

Observed volume changes 2009-2011 (*1000 m³)

Computed volume changes 2009-2011 (*1000 m³)
2009-2011 Land Building
(~3 km² /750 acres)

EFFECT OF SREDS

Volume change (m³)

Area 1  Area 3  Area 4  Area 5  Area 6  Area 7

Observed
with waves, with SREDS
without wave, with SREDS
with waves, without SREDS
without waves, without SREDS
Basin-side Analysis
Objectives of Basin Wide Analysis

- Produce a validated model to simulate:
  - Morphological evolution processes during the creation of a new delta and wetland areas
  - Nutrient effects to the wetland vegetation, soil, and the estuarine primary producers of Breton Sound and Barataria Basin
  - Determine how diversions affect the distribution and biomass of fish and shellfish using a community modeling approach (Ecosim/TroSim)
Estuarine Open Water transects

Legend
- ▲ Hydrodynamics, Sediment, and Ecological Stations
- △ Hydrological and Water Quality Stations

0 2.5 5 10 15 20 Miles

Bathymetry Transect
Estuarine Transect
CLOSING REMARKS

- The synergy between Diversions and Dredging offers:
  - **Diversions:** Sustainable solution
  - **Diversions:** Significant new land building and preserve existing wetlands [fine material]
  - **Dredging:** Near term land building
  - **Dredging:** Reduced erosion
  - **Dredging:** Enhanced sediment retention
  - **Combined:** May reduce shoaling near the HOP
- Impacts on Fisheries and Nutrients are being analyzed