Diversions Update

Bren Haase, CPRA

Presentation to Expert Panel on Diversion Planning and Implementation Meeting #5

August 4, 2015
Feasibility & Preliminary Engineering

Lower Barataria, Lower Breton, Mid Breton, and Mid Barataria

• Where we’ve been
  Selected location, size, alignment, conceptual level engineering and designs, value engineering

• Where we are
  Basin-wide, ecological modeling and socioeconomic evaluation

• Where we’re going
  Fall 2015 decision on whether to advance to full engineering and design
Basin-Wide Model Development (Delft 3D)
Model Domain of Integrated Hydrodynamic, Morphological, and Nutrient Dynamics

• **Where we’ve been**
  Set up and development, integration of components, validation and calibration

• **Where we are**
  FWOP and production runs underway

• **Where we’re going**
  Complete runs, evaluate outputs
Mississippi River Hydrodynamic and Delta Management Study

• **Where we’ve been**
  Initial array of alternatives screened to final array using decision criteria based on the study’s goals, objectives, and constraints

• **Where we are**
  Production runs, team evaluating final array of alternatives based on model results

• **Where we’re going**
  Choose Tentatively Selected Plan
Ecological Modeling

• **Where we’ve been**
  Development and calibration of EwE and CASM models

• **Where we are**
  Preparation for production runs using Delft 3D outputs

• **Where we’re going**
  Complete runs, evaluate alternatives
Basin-wide Socio-economic Analysis

- **Where we’ve been**
  Literature review, ID of data gaps, initial data collection complete, draft model output reviewed

- **Where we are**
  Framework and scope that outlines methodology for assessing socio-economic effects of diversion activities

- **Where we’re going**
  Application of methodology, and evaluation of results
Four Recommendations from Panel Report #4

• #1: Expand current conceptual model of sediment diversion planning process, greater detail on modeling and socioeconomic studies and respective linkages.

• #2: Use refined conceptual model and detailed description of the socio-economic valuation approach to communicate with stakeholders over the next 6 months and solicit their feedback.
Four Recommendations from Panel Report #4

• #3: Provide for review of monitoring and modeling efforts by independent subject matter experts and make results of the reviews available.

• #4: Design Basin-Wide Socioeconomic study so operational decisions can be compared in terms of socioeconomic outcomes, and apportion available resources to support this work over other more descriptive studies.
Recommendation #1

• #1: Expand current conceptual model of sediment diversion planning process, greater detail on modeling and socioeconomic studies and respective linkages.
WINTER 2014
CPRA DECISION TO ADVANCE PARTICULAR ALTERNATIVES VIA VERIFICATION OF MASTER PLAN BENEFITS AND COSTS
(Land/Site/Size/Cost/Constructability)

MR HYDRODYNAMIC & DELTA MANAGEMENT
(River and basin side modeling)

ECOLOGICAL MODELING
(CASM and EwE coupling with Basin Wide Model)

BASIN-WIDE INTEGRATED HYDRODYNAMIC, MORPHOLOGICAL & NUTRIENTS MODELING
(Analyze Sequencing and Operation of recommended suite of diversions)

SOCIOECONOMIC EVALUATION
(Social, economic, and fisheries impacts – past/present/future)

DECISION DRIVERS

**River Model Outputs**
- Sediment deposition patterns
- River stage
- Current and future navigation practices
- Freshwater supply

**Ecological Model Outputs**
- Fish habitat quality
- Species biomass
- Species distribution

**Basin Wide Model Outputs**
- Wetland acreage
- Wetland types and abundance
- Water levels
- Water quality

**Socioeconomic Outputs**
- Community cohesion
- Employment
- Water supply
- Navigation
- Recreation
- Storm protection
- Ecosystem services

**Other Considerations**
- Cost
- Ability to fund
- Overall public acceptability
- Long term vs. short term effects

DECEMBER 2016
CPRA/FED DECISION TO IMPLEMENT
(Federal Interest Determination – Chief’s Report and Recommended Plan)

FALL 2015
CPRA DECISION TO ADVANCE TO FULL ENGINEERING AND DESIGN
Decision Drivers

River Model Outputs
- Sediment deposition patterns
- River stage
- Current and future navigation practices
- Freshwater supply

Ecological Model Outputs
- Fish habitat quality
- Species biomass
- Species distribution
Decision Drivers

Basin Wide Model Outputs
- Wetland acreage
- Wetland types and abundance
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- Water quality

Socioeconomic Outputs
- Community cohesion  Recreation
- Employment  Storm protection
- Water supply  Ecosystem services
- Navigation
Decision Drivers

Other Considerations
- Cost
- Ability to fund
- Overall public acceptability
- Long term vs. short term effects
WHAT WILL WE DO?

DESIGN CONSIDERATIONS

- Detailed Hydraulics Analysis
- Detailed Geotechnical Investigation, Analysis, and Design
- Analyze Impacts to Utilities and Oil/Gas Facilities
- Analyze Impacts to Transportation and Drainage Infrastructure
- Determine Construction Methodology (e.g., Construction in wet vs. dry, etc.)
- Develop Structure and Channel Geometry
- Develop Construction Sequencing and Project Implementation Plan
- Determine Real Estate Requirements
- Contractual Approach (e.g., Early contractor involvement, design/build, design/bid/build, etc.)
- Refine Opinion of Probable Construction Cost Estimate
PERMISSION TO DO IT

PERMIT CONSIDERATIONS

- Environmental Impact Statement
  - Purpose and Need
  - Alternatives Analysis
  - Affected Environment
  - Environmental Consequences
  - Permits, Mitigation, and Commitments
  - Public Involvement and Stakeholder Coordination
    - Coordination Letters
    - Public Comments
- 408 Permit Requirements
  - Section 214 Agreement
- 404 Permit Requirements
  - Public Interest Review
HOW WILL IT BE DONE?

POLICY, MANAGEMENT & OTHER CONSIDERATIONS

- Monitoring (SWAMP)
- Adaptive Management (also a design consideration)
- Operations and Maintenance (also a design consideration)
- Emergency Management
- Flexibility of Construction Methodology
- Procurement Alternatives
- River Sediment Dynamics (e.g., sediment retention/deposition and dredging requirements.)
Coastal Protection and Restoration Authority of Louisiana
**Recommendation #2**

- #2: Use refined conceptual model and detailed description of the socio-economic valuation approach to communicate with stakeholders over the next 6 months and solicit their feedback.
  - St. Bernard Public Meeting
  - Coastal Conservation Association
  - Coastal Communities Consulting
  - CPRA Board Meetings
  - Governor’s Advisory Commission Meetings
  - Boil for the Bayou
  - Mississippi Flyway Council
Marsh Productivity

#1 Producer:
shrimp, oysters, crawfish, blue crabs

20% of the continental water bird population overwinters in Louisiana every year

40% of the coastal wetlands located in Louisiana in the continental US

97% (by weight) of the commercial fish harvested in the Gulf of Mexico are species that depend on coastal wetlands for reproduction, hatching, growth, or development

26% (by weight) of the commercial fish and shellfish in the continental US are harvested in Louisiana’s waters.
Oil and Gas Infrastructure

#1 Producer of oil in the U. S.

#2 Producer of natural gas in the U. S.

Nearly 1/3 of the U. S. oil and gas supply is produced or transported in and around Louisiana’s Gulf Coast.

125,000 miles of oil and natural gas pipelines pass through the marshes of coastal Louisiana.

90% of the offshore drilling operations in the Gulf of Mexico are supported by Port Fourchon, in coastal Louisiana.

9 interstate pipelines have their nexus at Henry Hub in Erath, Louisiana on the coast.
Commercial Infrastructure

5 of the 15 largest ports in the U.S. are in Louisiana.

20% of the U.S. waterborne commerce (by tonnage) was accounted for by the Louisiana’s ports in 2009.
Recommendation #3

• #3: Provide for review of monitoring and modeling efforts by independent subject matter experts and make results of the reviews available.

• SWAMP subject matter experts
• LCA Mississippi River Hydrodynamic Study: Independent External Peer Review
• LCA Mississippi River Delta Management Study: Independent External Peer Review
• LCA Mississippi River Delta Management Study: EwE and CASM input by subject matter experts
Recommendation #4

#4: Design Basin-Wide Socioeconomic study so operational decisions can be compared in terms of socioeconomic outcomes, and apportion available resources to support this work over other more descriptive studies.
Thank You!

Bren.Haase@la.gov
Extra slides
MBSD Project Design

- River Structure
- Rail
- Bridge
- Utilities
- Pipeline
- Back Structure
- MR&T
- NOV
- Pump Station
- Conveyance Channel
- River and Basin Modeling
Mid-Barataria Sediment Diversion

Next Steps

• Winter 2014/Spring 2015
  – Conduct refined Master Plan runs on E&D Value Engineering alternatives (runs complete, report being generated and results analyzed)

• Spring/Summer 2015
  – Tools available to compare benefits/effects of alternatives using basin-wide Delft models and tools for assessing fish, nutrient, and socio-economic effects

• Summer 2015
  – Prioritize next steps based on available information
Preliminary Engineering

Lower Barataria, Lower Breton, Mid Breton, and Mid Barataria

Lower Breton & Lower Barataria
- 10% conceptual design ongoing
- Investigation of optimum siting with relation to costing
- 50,000 cfs structure
- Verification of Master Plan cost assumptions
- Constructability determination

Mid Breton
- Feasibility level design completed (LCA White Ditch)
- Entered into a Design Agreement
  - Preliminary effort resulted in identification of optimal siting for sediment capture
- 35,000 cfs structure at a total cost of $387.6M
- Feasibility modeling to determine size and operation

Mid Barataria
- 10+ years of planning
- 30% design and Value Engineering completed
- Preferred site of intake structure identified
- Structure ranging in size from 35,000-75,000 cfs
- Verification of Master Plan cost assumptions
- Determine ability to construct, operate and maintain
Basin-Wide Model Development (Delft 3D)
Model Domain of Integrated Hydrodynamic, Morphological, and Nutrient Dynamics

Outcome Indicators: Water level, velocity, salinity, water temperature, suspended sediment, sediment deposition, sediment erosion, bed-level changes, aboveground and belowground biomass, wetland vegetation type (7 species), nitrogen, phosphorus, silicate, chlorophyll-a, dissolved oxygen
Fishing Data Analysis

NOAA ramps
NOAA marinas
Department of Ag water-based fuel pumps
Department of Ag identified water access points

2000-2014 Average Oyster Landings and Value of Commercial Fishing License Holders in Plaquemines Parish

- Fisher Landings (weight in lbs)
- Value of Fisher Catch

MILLIONS

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Mississippi River Hydrodynamic and Delta Management Study

Tools Being Developed:

River Models:
- One-Dimensional Models
  - HEC-6T (Ronnie Heath-USACE/ERDC, Tony Thomas, Ike Mayer and Mike Trawle-BCG)
- Multi-Dimensional Models
  - ADH-SedLib Multi-D Model (Gary Brown-USACE/ERDC)
  - Delft 3D Multi-D Model (Alex McCorquodale-UNO, Steve Ayres-USACE/MVN, and Ehab Meselhe-Water Institute of the Gulf)
  - FVCOM Multi-D Model (Ioannis Georgiou-UNO)
  - Flow3D Multi-D Model (Ehab Meselhe-Water Institute of the Gulf)
- Small Scale Physical Model (BCG, Cecil Soileau-BCG/Dewberry Joint Venture and Alden Research Laboratory)

Geomorphic Assessment (David Biedenharn-Biedenharn Group and Charlie Little-USACE/ERDC)

Data Collection (Mead Allison-Water Institute of the Gulf and Thad Pratt-USACE/ERDC)

Data Management (Christina Hunnicutt and Craig Conzelmann-USGS; Melany Larenas and Beth Forrest-CB&I)

What we will evaluate:
- Water and sediment resources available for restoration
- Effects on navigation
- Sedimentation and effects on river maintenance
- Reduced transport in the river
- Effects on river flood control
- Nutrients and harmful pollutants in the river
Fisheries Modeling/Studies

Following recommended dual model approach (Sable and Rose, 2013)

1. Improved Habitat Suitability Indices (HSIs)
   • Develop polynomial regressions that relate fish and shellfish abundance to key environmental variables

2. Development of a community-level food web model
   • Evaluate how food web dynamics affect species response to change in environmental conditions, and show changes in species biomass over time
     – EcoPath and EcoSim and EcoSpace (EwE)
     – Trophic Simulation Model (TroSim) to capture lower tropic levels / oysters
     – Comprehensive Aquatic Systems Model (CASM)

**Outcome Indicators:** Fish and shellfish habitat quality, food web responses over time, changes in species biomass over time, changes in species distribution over time
BASINWIDE SOCIO-ECONOMIC ANALYSIS

[Past - Present - Future]

GOALS: Further analyze the potential effects to communities, fisheries, and the economy from continued land loss and the implementation of sediment diversion projects recommended in the 2012 Coastal Master Plan.

SCALE: Regional

TIMEFRAME:

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Coastal Communities

GOALS:  Further analyze the potential effects to communities, fisheries, and the economy from continued land loss and the implementation of sediment diversion projects recommended in the 2012 Coastal Master Plan.

SCALE:  Regional

TIMEFRAME:

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*Historic Coastal Atlas*

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