

FY21 RSM IPR



MVN & ERDC, Evaluation of Structural and Operational Alternatives to Optimize the Distribution of Water and Sediment in the Passes of the Mississippi River, Ron Copeland, Jeff Corbino, Michael Hartman

BLUF: Significant maintenance dredging is required each spring at the entrance of the Mississippi River navigation channel, where an average of 25 Million Cubic Yards of dredged material is removed each year from its first 30 miles.

Challenge/Objectives

Evaluate modifications near the river's Head of Passes to optimize the distribution of water and sediment towards the reduction of shoaling in the navigation channel.

Approach

Using HEC-6T one-dimensional numerical model that was calibrated using historical dredging records and daily hydrographic surveys.



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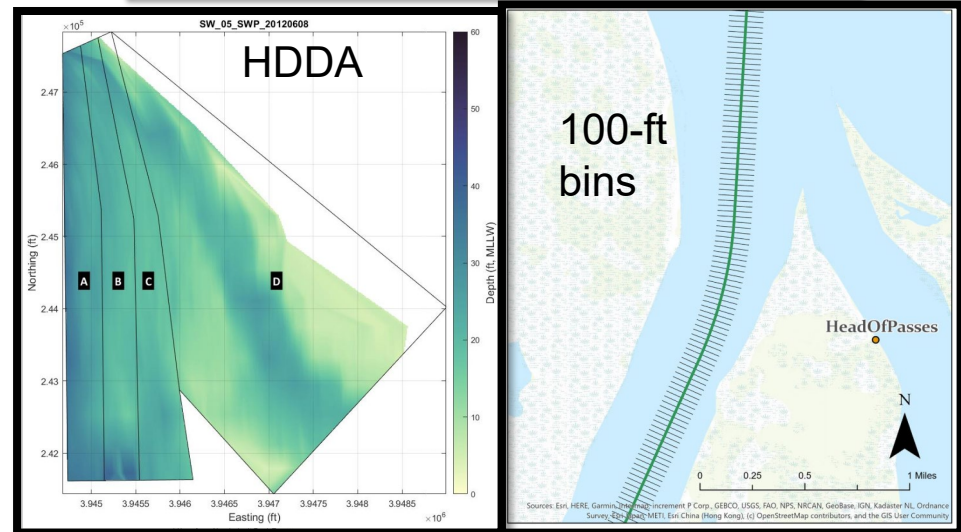
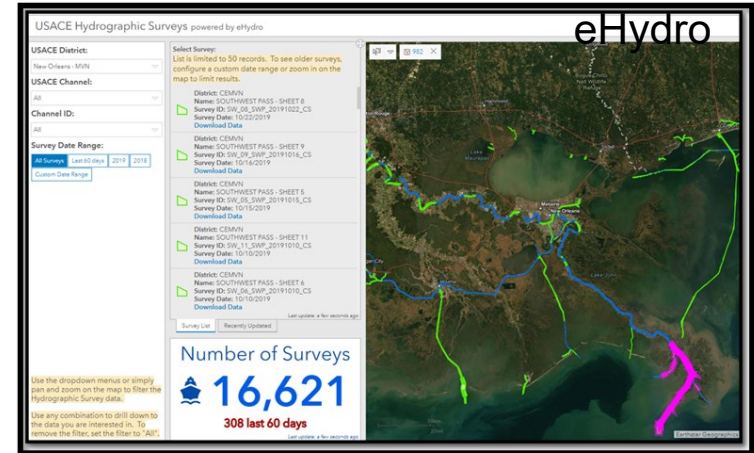
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Stakeholders/Partners

Results from this effort can be shared with local, Federal and State agencies to assist in overall planning of restoration projects in the lower Mississippi River Delta.

Leveraging/Collaborative Opportunities

Leveraging data (hydrographic surveys) and models (Flowline Model) already developed for the Mississippi River Hydrodynamic Study and the Mississippi River Delta Management Study. Coordination with the MVD's "Phase 2 – Southwest Pass Investigation".



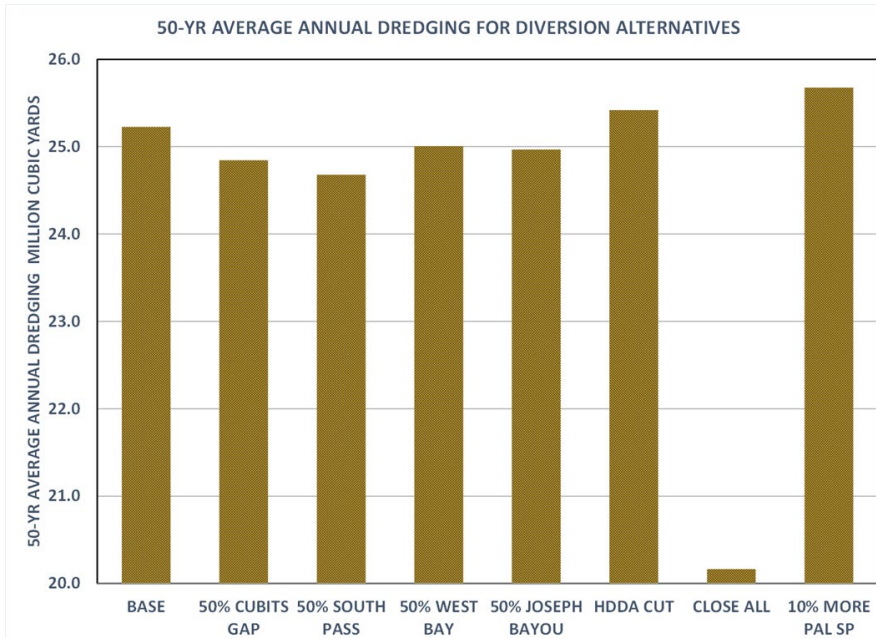
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Accomplishments/Deliverables

Model used to evaluate dredging alternatives at deep water crossings downstream from Baton Rouge, and with prior versions used to inform dredging alternatives in the Cubit's Gap and Head of Passes reaches under varying annual hydrographs. The results of these evaluations were used by the CEMVN to inform channel deepening studies and other proposed operational changes at Head of Passes.



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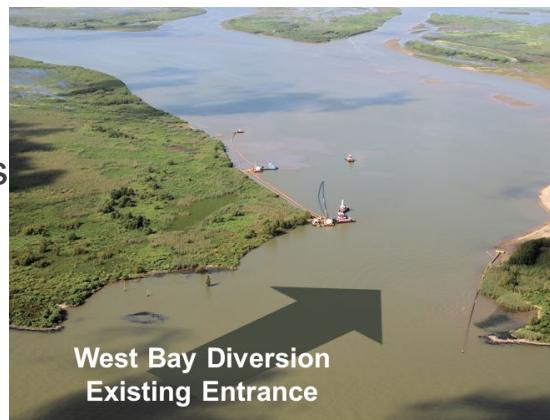


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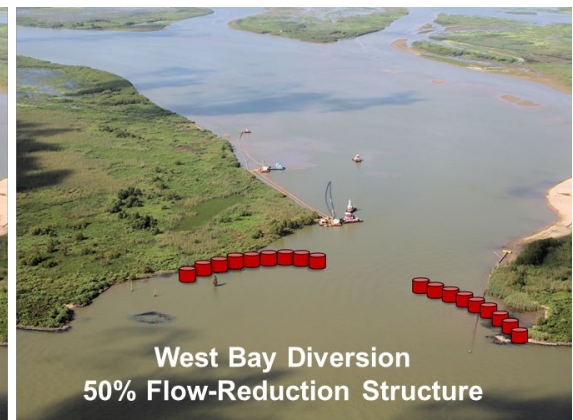
Lessons Learned

The reliability and usefulness of a numerical model study is dependent on accuracy of available data and the proper modeling of operation protocols. MVN provided essential hydraulic, survey and dredging data. In addition, the District provided historic and planned dredging procedures and insight into appropriate options to address dredging issues. Cooperation between researchers at CHL made it possible to incorporate the results of detailed daily dredging (DIS & DQM) and channel response records using daily hydrographic surveys (eHydro) into numerical model simulations.

This project demonstrates the benefits of close cooperation and data sharing among team members in addition to the advantages of having team members with diverse experiences and responsibilities.



West Bay Diversion
Existing Entrance



West Bay Diversion
50% Flow-Reduction Structure

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**How is this project benefiting the USACE and Nation?
(efficiency, monetary, technical, relationship building, outreach, etc.)
(Volume of sediment to be managed, Acres created, etc)**

HDDA Enlargement: Negligible shoaling (<150 KCY) predicted from site enlargement strongly supports construction during next maintenance event. Enlargement provides additional 3 MCY of placement area capacity for large hopper dredges during annual SW Pass O&M while decreasing frequency of HDDA maintenance events by at least 25%.

Closure Structures: Decreased shoaling from plausible closures predicted to be less than 2%. Results suggest negligible net savings (i.e., closure construction and maintenance costs relative to reduced O&M dredging costs) to be explored with Rough Order of Magnitude cost estimates.

Example – 50% closure of Cubit's Gap results in \$1M dredge savings each year; cost to construct / maintain structure could exceed \$10M over 5-10 year period.