



Introduction to, and Overview of, the RESTORE-funded Lowermost Mississippi River Management Program

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Planning and Research Division**

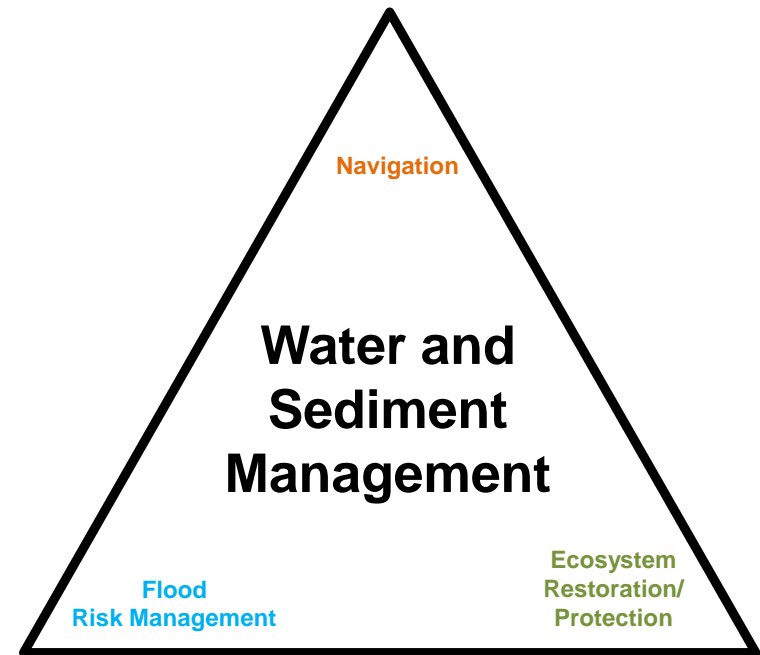
**2 June 2023 Presentation at the
2023 State of the Coast Conference
New Orleans, Louisiana**



committed to our coast

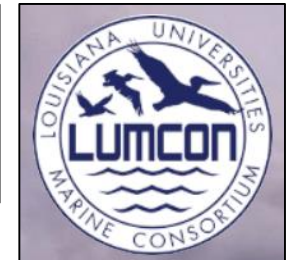
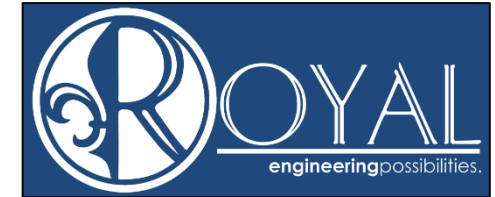
River Management and the Lowermost Mississippi River Management Program

- Flood Risk Management, Navigation, and Ecosystem Restoration and Protection all require effective management of *water and sediment*.
- The objective of the Program is to strengthen partnerships, develop tools, and help advance holistic water and sediment management of the Lowermost Mississippi River.




Lowermost Mississippi River Management Program

- Technical partners



Program Website

<https://cims.coastal.la.gov/outreach/Projects/LMRMP>

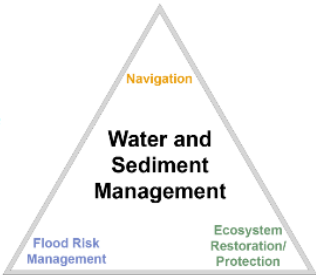


Coastal Protection and Restoration Authority

Lowermost Mississippi River Management Program

[Program Objectives](#) | [Program Overview](#) | [Program Tasks/Deliverables](#) | [Resources](#)

Ecosystem restoration and protection, flood risk management, and navigation associated with the Lowermost Mississippi River (LMR) share common, unifying motivations: community, economic, and ecosystem sustainability. Each of these focus areas require effective management of the same two parameters: water and sediment. The Lowermost Mississippi River Management Program (LMRMP) is a \$9.3 million effort that aims to move toward a more holistic approach for water and sediment management that supports the long-term sustainability of the LMR. Flood risk reduction, navigation, and coastal protection and restoration missions share a common, unifying motivation: economic security and sustainability.



The diagram is a triangle with 'Water and Sediment Management' in the center. The top vertex is labeled 'Navigation', the bottom-left vertex is 'Flood Risk Management', and the bottom-right vertex is 'Ecosystem Restoration/Protection'.



The LMRMP will strengthen partnerships, improve/develop science and technical tools, and help advance holistic water and sediment management. The goal of the LMRMP is to evaluate approaches to water and sediment management that yield practical benefits across all interests.

Louisiana Coastal Protection and Restoration Authority (CPRA) objectives for managing the LMR include:

- Support the long-term sustainability of the coast and reduce land loss to the extent possible,
- Maintain and enhance channels that support use of the LMR for navigation,
- Enhance the health of ecosystems associated with the LMR,
- Mitigate threats to communities and infrastructure posed by river flooding, and
- Support holistic management of LMR water and sediment resources to maximize benefits across all missions.

The LMRMP is funded by the [Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act \(RESTORE Act\)](#), was launched in 2018 and will conclude into fall 2023. It builds upon the [Louisiana Coastal Area Mississippi River Hydrodynamic and Delta Management Study](#) previously conducted by the U.S. Army Corps of Engineers and CPRA. It serves to further develop the science needed to adequately inform decision makers on future LMR management. The program is organized into five Technical Elements: Subsidence, Storm Surge Modeling, Geomorphology, Dredge Material Management, and In-river Modeling. Specific tasks include collecting data, synthesizing existing and newly collected data, conducting numerical and physical modeling, performing economic analyses, investigating existing river management, identifying and evaluating high-level "what if" river management strategies and future environmental scenarios, and coordinating with other programs and initiatives such as the [Mississippi River Mid-Basin Sediment Diversion Program](#).

For a pdf version of this tab, [click here](#).



Project Information

Project Type(s):
Other

Project ID:
MR-0168


Basin(s):
Barataria, Breton Sound, Mississippi River Delta, Pontchartrain

CPRA Program:
Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE)

CPRA Project Phase:
Planning

Parish(es):
Ascension, East Baton Rouge, Iberville, Jefferson, Orleans, Plaquemines, St Bernard, St Charles, St James, St John the Baptist, West Baton Rouge

Estimated Cost:
\$ 9.3 million



Program Website

<https://cims.coastal.la.gov/outreach/Projects/LMRMP>

Coastal Protection and Restoration Authority

Lowermost Mississippi River Management Program

Program Objectives | Program Overview | Program Tasks/Deliverables | Resources

Managing the Lowermost Mississippi River (LMR) for ecosystem restoration and protection, flood risk management, and navigation is a complex, long-term endeavor, and stewardship of water and sediment resources requires holistic river management. The LMR's response to previous and ongoing management, sea-level rise, subsidence, and watershed-scale precipitation trends related to climate change will continue to test our knowledge and management capabilities. Data and decision support tools are needed to evaluate existing river conditions and approaches for future management strategies.

General

Efforts associated with the Lower Mississippi River Management Program (LMRMP) will result in greater understanding of River Hydrodynamics and Flow, Sediment Transport and Dredging, and Landscape Condition and Change and will support progression toward holistic management of Mississippi River sediment and water resources. Information gained through Modeling and Geomorphology Technical Coordination will crosscut and inform nearly all aspects of the LMRMP and will include development of a [Modeling Work Plan](#) that identifies and provides a robust approach for evaluating these alternative "what-if" river management strategies across a range of realistic future environmental scenarios. [Economic Analysis of Current and Alternative Management Strategies](#) will inform viability of these alternative river management strategies. When used in concert, this knowledge will be applied to frame current and future river conditions and support adaptive management, including management and operations of sediment diversions.

River Hydrodynamics and Flow

[Mississippi River Hydrograph Projections](#) will be generated under the [Intergovernmental Panel on Climate Change's Representative Concentration Pathways 4.5 and 8.5](#) conditions to better understand potential future river hydrodynamics and flow and can serve as inputs for evaluating alternative management strategies. [Changes in Storm Surge and Wave Height](#) will be quantified to understand the interaction of storm surge and Mississippi River water levels. [Cross Calibration of Numerical Models and the LSU/CPRA Physical Model](#) will be undertaken to improve hydrodynamic and flow outputs of numerical models.

Sediment Transport and Dredging

[LMR Historic Deep Draft Navigation Dredging Activities](#) have been synthesized and analyzed to produce a record of historical dredging activity in the LMR below Baton Rouge. This analysis will serve as input to the dredging operations and sediment budget for evaluating existing river management strategies and to an economic analysis for regional sediment management and evaluation of alternative river management strategies. Collection of suspended sediment and bed material as well as continuous velocity and turbidity at the U.S. Geological Survey's [Belle Chasse Gage \(Station 07374525\)](#) will provide sediment and flow data for the evaluation of the current conditions.

Project Information

Project Type(s): **Other**

Project ID: **MR-0168**

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CPRA Program: **Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE)**

CPRA Project Phase: **Planning**

Parish(es): **Ascension, East Baton Rouge, Iberville, Jefferson, Orleans, Plaquemines, St Bernard, St Charles, St James, St John the Baptist, West Baton Rouge**

Estimated Cost: **\$ 9.3 million**

CPRA Decision Context & Objectives

Coastal Protection and Restoration Authority of Louisiana

Program Website

<https://cims.coastal.la.gov/outreach/Projects/LMRMP>

Coastal Protection and Restoration Authority

Lowermost Mississippi River Management Program

Program Objectives | Program Overview | Program Tasks/Deliverables | Resources

Below is a list of Lowermost Mississippi River Management Program tasks and deliverables that are currently available. Each task is linked to a brief task overview, schedule, and key team members. Tasks are subject to change as the program moves forward, and links to deliverables will be added upon their availability.

General

- Alternative River Management Strategies and Environmental Scenarios
 - Fact Sheet
 - Deliverable: Strategy and Scenario Development Overview
 - Deliverable: Strategies and Scenarios Work Plan
- Economic Analysis of Current and Alternative Management Strategies
 - Fact Sheet
- Mississippi River Data Portal
- Real Time Forecasting Work Plan
 - Fact Sheet

River Hydrodynamics and Flow

- Cross Calibration between Numerical Models and Small Scale Physical Model
 - Fact Sheet
- Mississippi River Hydrograph Projections
 - Fact Sheet
- Storm Suite Analysis and Quantifying Changes in Storm Surge and Wave Height in the Mississippi River under Various River Conditions
 - Fact Sheet

Sediment Transport and Dredging

- Below Venice Regional Sediment Management Strategy
 - Fact Sheet
- Data Collection at the Bonnet Carré Spillway
 - Fact Sheet
 - Deliverable: Bonnet Carré 2018 Flood Response Report and Associated Data from March 19 – 23 and April 9 – 13, 2018 (ADCP, Bedload, LISST, Grain Size, Suspended Sediment, Raw Multibeam)
 - Deliverable: Bonnet Carré Spillway LiDAR Collection Using a Small Unmanned Aerial System Survey Report and Associated Data from August 14 – 21, 2019
- Data Collection at the Belle Chasse Gage Fact Sheet
 - Fact Sheet
- Project Data: USGS Station 07374525
- Synthesis and Analysis of LMR Historic Deep Draft Navigation Dredging Activities
 - Fact Sheet
 - Deliverable: Synthesis and Analysis of LMR Deep Draft Navigation Dredging Activities

Landscape Condition and Change

- Analytical Techniques to Utilize InSAR Data from Sentinel 1 Satellite
 - Fact Sheet
 - Deliverable: Phase 1 Report
- Episodic Land Loss in Coastal Louisiana
 - Fact Sheet
- Geomorphology Work Plan
 - Fact Sheet
 - Deliverable: Lowermost Mississippi River Management Program: Work Plan for Incorporating Historical Geomorphology Data into the System Dynamics Model Framework, and Timeline of Anthropogenic Activity.
- Neotectonics Expert Panel
 - Fact Sheet
 - Deliverable: Subsidence Risk in Coastal Louisiana – Challenges and Opportunities in Constraining Subsidence Risk to Coastal Protection and Restoration Program Planning
- NGOM2: Coast-wide Integrated Topography and Bathymetry Digital Elevation Model (TBDEM)
 - Fact Sheet
 - Deliverable: Topobathymetric Model of the Northern Gulf of Mexico, 1885 to 2021
- Optimization of Navigation Dredging Operations (BA-0203 Borrow Pit Modeling)
 - Fact Sheet
- Seismic Survey at Myrtle Grove Lateral Bars
 - Fact Sheet
 - Deliverable: Myrtle Grove Seismic Survey Data from June 12-14, 2018
- Subsidence Observation Network Work Plan Proximal to the Lowermost Mississippi River
 - Fact Sheet
 - Deliverable: Subsidence Observation Network Work Plan, Lowermost Mississippi River, Louisiana

For a pdf version of this tab, click here.

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CPRA Program: Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE)
CPRA Project Phase: Planning
Parishes: Ascension, East Baton Rouge, Iberville, Jefferson, Orleans, Plaquemines, St Bernard, St Charles, St James, St John the Baptist, West Baton Rouge
Estimated Cost: \$ 9.3 million

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Mississippi River Data Portal

<https://cims.coastal.la.gov/river/>

River Portal Map Data Resources

Louisiana Mississippi River Data And Information

CPRA RESTORE GULF COAST ECOSYSTEM RESTORATION COUNCIL

Map Data Resources

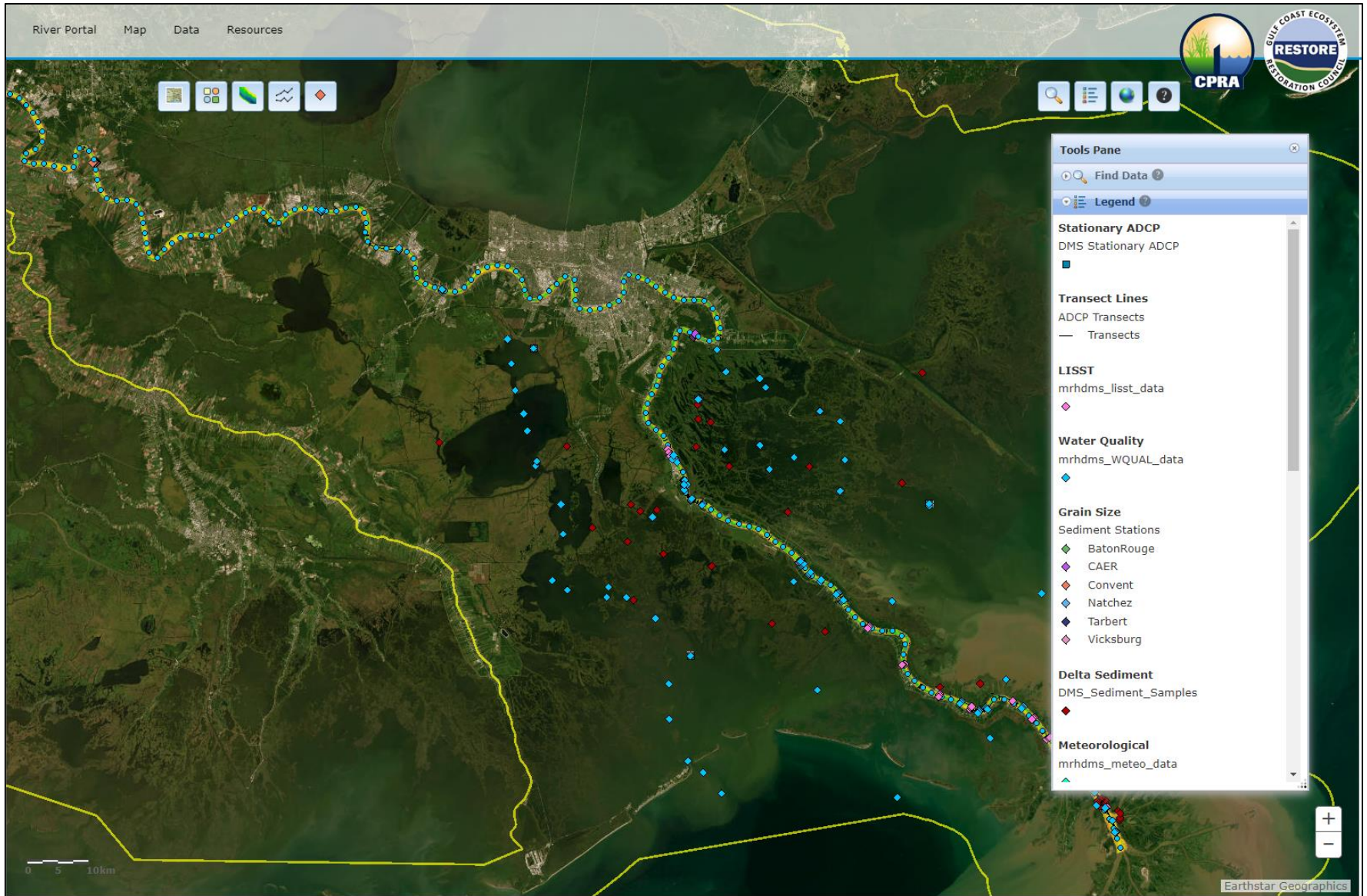
The Mississippi River forms part of the eastern border of Louisiana and enters the state near Simmesport. It then meanders over 300 river miles to the Gulf of Mexico. The economic significance of the Mississippi River cannot be overstated. Just as the river is essential for waterborne commerce, industry, and coastal restoration in Louisiana, it is also vital for nationwide commerce. Collection of various types of data in the Mississippi River are used to inform decision making at all levels of government. A myriad of data collection efforts occur in the River including those led by the USACE, USGS, other federal agencies and state agencies as well as by academia and other technical experts. Together, these data can help aid research and ultimately enhance our understanding of the River's dynamics.

The vision for Louisiana's Mississippi River Data and Information Portal is to aid accessibility of data, reports, and information relevant to the Lower Mississippi River in Louisiana for multiple audiences, including researchers, modelers, other technical practitioners, and the public. This page is intended to link, manage, disseminate and visualize applicable tabular and spatial ecological, geophysical, and engineering data collected in the lowermost reaches of the Mississippi River can be visualized and downloaded.

Data housed on this page are primarily from the [Louisiana Coastal Area Mississippi River Hydrodynamic and Delta Management Study](#) and the [Lowermost Mississippi River Management Program \(LMRMP\)](#). As funding allows, the portal may be expanded to incorporate additional sources of data.

Mississippi River Data Portal

<https://cims.coastal.la.gov/river/>



Lowermost Mississippi River Management Program

Program Areas

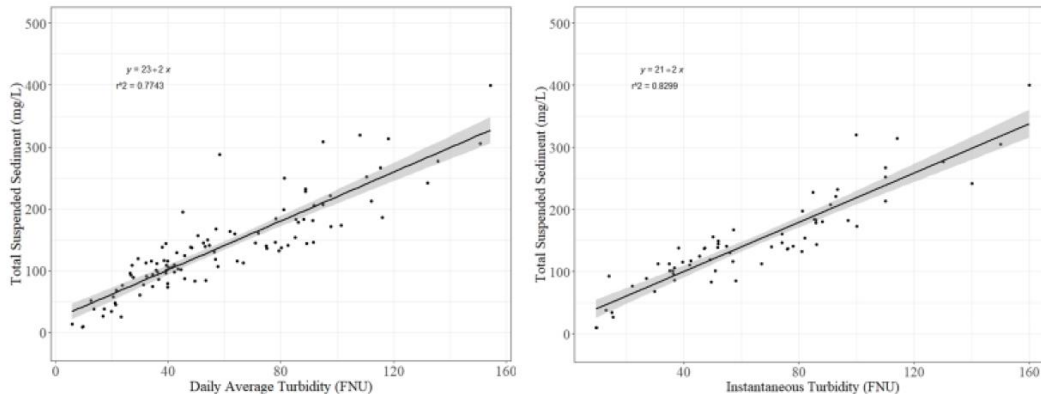
- **Sediment Transport and Dredging**
- **Landscape Condition and Change**
- **River Hydrodynamics and Flow**

Lowermost Mississippi River Management Program

- **Sediment Transport and Dredging**
 - **Data Collection and Analysis at the USGS Belle Chasse Gauge (USGS)**

Relationships between Turbidity and Total Suspended Sediment samples from Belle Chasse
Mississippi River at Belle Chasse, LA USGS 07374525

- Relationship better with instantaneous vs daily average turbidity

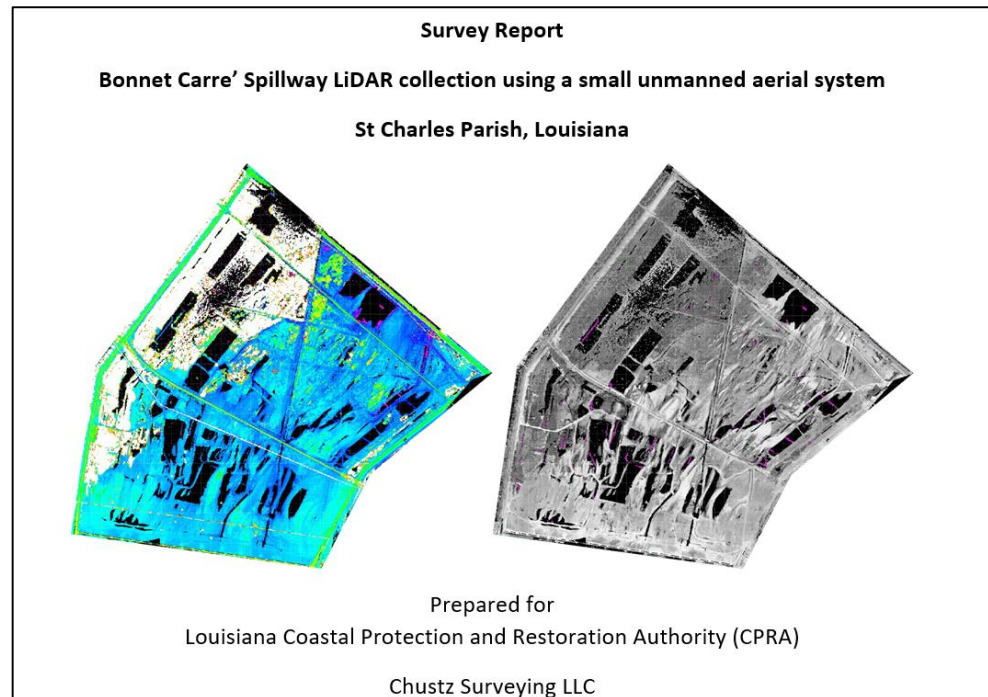


Preliminary data
Subject to revision



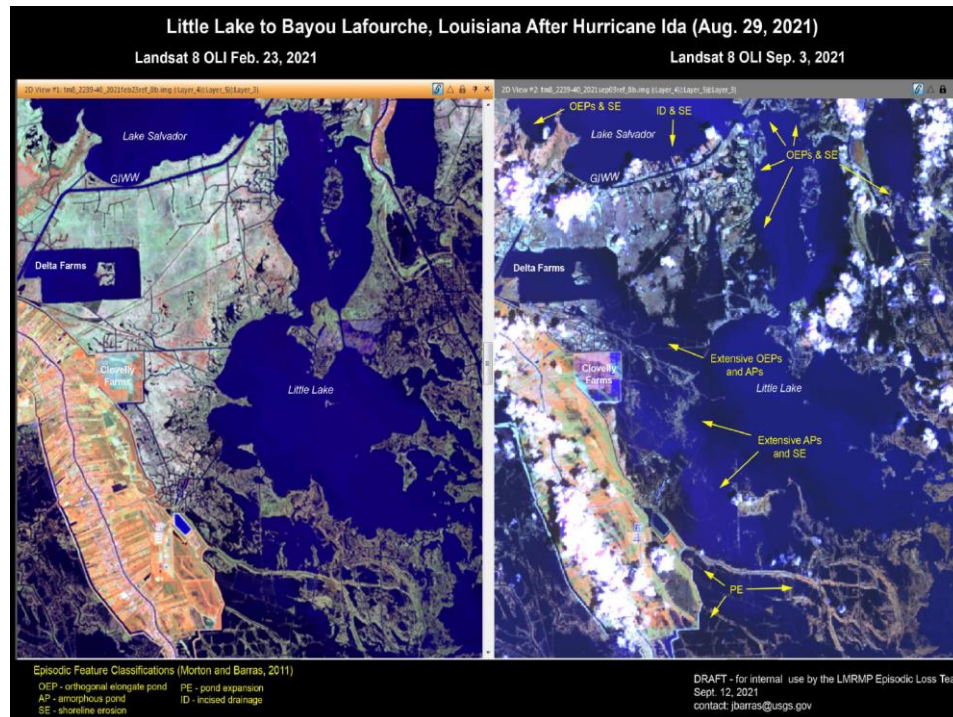
Lowermost Mississippi River Management Program

- **Sediment Transport and Dredging**
 - **Data Collection and Analysis at the USGS Belle Chasse Gauge (USGS)**
 - **Synthesis and Analysis of Lower Mississippi River Deep Draft Navigation Dredging Activities (Water Institute)**
 - **Below Venice Regional Sediment Management Strategy (Water Institute)**
 - **Data Collection at the Bonnet Carré Spillway (CPRA, Water Institute, Chustz Engineering)**



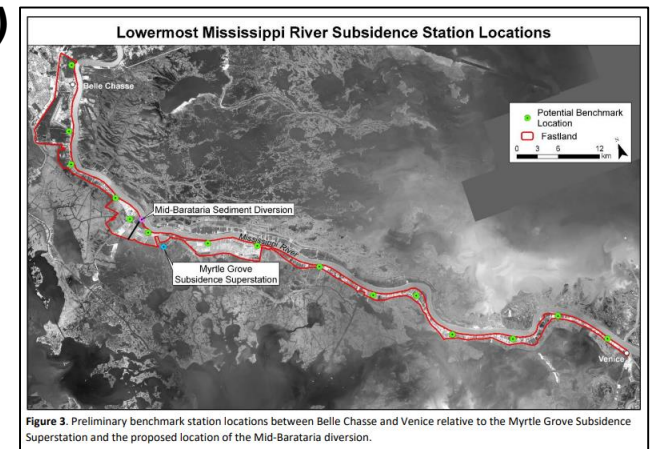
Lowermost Mississippi River Management Program

- **Landscape Condition and Change**
 - **Coast-wide Integrated Topography and Bathymetry Digital Elevation Model (USGS)**
 - **Analytical Techniques to Utilize InSAR from the Sentinel 1 Satellite (Tulane)**
 - **Neotectonics Expert Panel Recommendations to CPRA (Water Institute)**
 - **Episodic Land Loss in Coastal Louisiana (USGS)**



Lowermost Mississippi River Management Program

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 - **Episodic Land Loss in Coastal Louisiana (USGS)**
 - **Modeling to Optimize Navigation Dredging Operations for BA-0203 Spanish Pass Ridge Restoration (ERDC)**
 - **Seismic Surveys of the Myrtle Grove Lateral Bars (CPRA)**
 - **Neptune Pass/Quarantine Bay Sediment Mass Balance Study (LUMCON)**
 - ***Geomorphology Work Plan (Water Institute)***
 - ***Subsidence Observation Network Work Plan Proximal to the Lowermost Mississippi River (CDM Smith, Applied Coastal Research & Engineering)***



Lowermost Mississippi River Management Program

- **River Hydrodynamics and Flow**
 - **Cross-Calibration Between Numerical Models and the LSU Small-scale Physical Model (Water Institute/LSU)**
 - **Cross-Calibration Between Numerical Models and the Alden Mid-Breton Sediment Diversion Physical Model (CPRA)**

LSU

Center for River Studies



<https://lsu.edu/river/>

Lowermost Mississippi River Management Program

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 - Cross-Calibration Between Numerical Models and the Alden Mid-Breton Sediment Diversion Physical Model (CPRA)
 - Mississippi River Hydrograph Projections (ERDC)

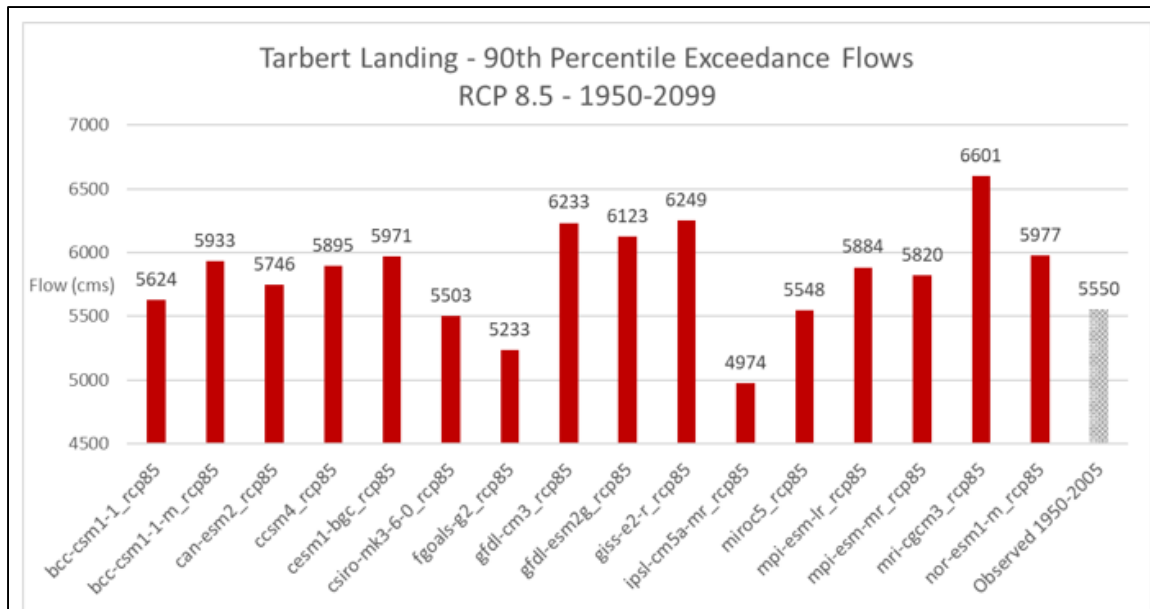




Figure 15. 90th percentile exceedance flow values for RCP 8.5 based on data spanning 1950-2099.

Coastal and Hydraulics Laboratory



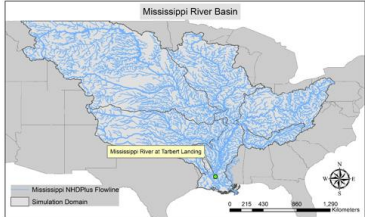
US Army Corps of Engineers
Engineer Research and Development Center



Lowermost Mississippi River Management Program (LMRMP)

Mississippi River Climate Model-Based Hydrograph Projections at the Tarbert Landing Location

W. Clay LaHatte, Ahmad A. Tavakoly, Sara E. Lytle, James W. Lewis March-April 2022

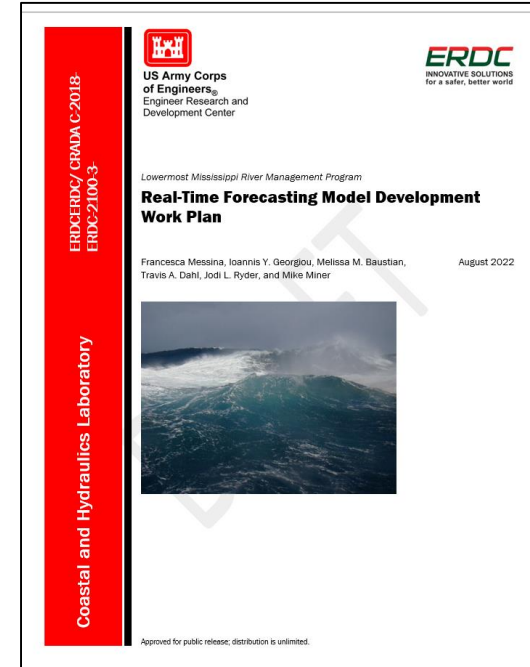


Mississippi River Basin
Mississippi River at Tarbert Landing
Mississippi NHDPlus Flowline
Simulation Domain

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Lowermost Mississippi River Management Program

- **River Hydrodynamics and Flow**
 - **Cross-Calibration Between Numerical Models and the LSU Small-scale Physical Model (Water Institute)**
 - **Cross-Calibration Between Numerical Models and the Alden Mid-Breton Sediment Diversion Physical Model (CPRA)**
 - **Mississippi River Hydrograph Projections (ERDC)**
 - *Storm Suite Analysis and Quantifying Changes in Storm Surge and Wave Height in the Mississippi River under Various River Conditions (ERDC)*
- **Lower Mississippi River Model Inventory (Water Institute)**
- **Modeling of Alternative River Management Strategies and Environmental Scenarios (Water Institute/ERDC)**
- **Mississippi River Real-time Forecasting Model Work Plan (Water Institute/ERDC)**



River Science/Management Application Next Steps

- **National Academies of Science Gulf Research Program's Mississippi River Delta Initiative**
- **RESTORE-funded Louisiana Center of Excellence**
- **US Army Corps of Engineers' Lower Mississippi River Comprehensive Study**
- **Lowermost Mississippi River Management Program Phase 2?**

THANK YOU

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