



THE WATER INSTITUTE
OF THE GULF*

Lowermost Mississippi River Management Program

STRATEGY AND SCENARIO DEVELOPMENT OVERVIEW

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Introduction

The scope of the Lowermost Mississippi River Management Program (LMRMP) includes the identification of management strategies for the Lowermost Mississippi River (LMR) and the development of an evaluation framework for evaluating the likely outcomes of those strategies in the long-term (decadal time scales). Using this framework, the potential implications of various sediment and water management strategies for the range of federal/state decision-maker and stakeholder interests (ecosystem restoration, flood risk reduction, maintaining navigation channels, etc.) will be investigated. Multiple environmental scenarios will be considered across a range of variability in factors that cannot be controlled, such as relative sea level rise (RSLR), with predictions developed for the next 50 years. The outputs of the evaluation framework will be used to illustrate the outcomes of holistic LMR management to decision-makers and stakeholders, including the U.S. Army Corps of Engineers (USACE), with the goal of precipitating changes in how the LMR is managed.

This technical memorandum first describes the collaborative process used by the Louisiana Coastal Protection and Restoration Authority (CPRA), the Water Institute of the Gulf (Water Institute), Royal Engineers & Consultants (Royal Engineering), and other external stakeholders to identify draft management strategies and environmental scenarios (see *Approach for Identifying Management Strategies and Environmental Scenarios*). The outcomes of that process, including the selected suite of strategies and scenarios, is then described (see *Lowermost River Objectives, Strategies, and Scenarios*). Please note: Because the evaluation framework that will be used to investigate these strategies and scenarios is still in development, the final list of strategies and scenarios may be refined based on the availability of relevant input data.

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Approach for Identifying Management Strategies and Environmental Scenarios

The process used in the development of the LMRMP evaluation framework, including identification of management strategies and environmental scenarios, was patterned after the “PrOACT” process used in Structured Decision Making (SDM; Figure 1). SDM is a formal technique used in decision framing and analysis that consists of a sequence of steps including:

1. Identifying the **P**roblem: Articulating the scope of the decision context, i.e., the central issue or challenge that will be resolved and the potential decision-makers that would make those decisions.
2. Articulating the **O**bjectives: Describing a set of objectives outlining the desired positive outcomes.
3. Describing the **A**lternatives: Developing a list of potential options or choices for the decisions that could be made to achieve the objectives (in LMRMP, the term “strategies” is used).
4. Evaluating **C**onsequences: Using a tool or model to systematically predict what the outcomes would be for the identified decision alternatives (herein “strategies”).
5. Considering **T**radeoffs: Identifying and/or quantifying what the positive and negative outcomes would be across all objectives for each alternative (herein “strategies”).

SDM can help ensure that decision-making is transparent and objectives-orientated¹, and can therefore be particularly beneficial when the decisions being made are complex or there are multiple stakeholders with potentially competing interests. The process used here was modeled after the overarching approach of PrOACT for the same reasons.

¹Gregory, R., Failing, L., Long, G., Ohlson, D. 2012. *Structured Decision Making: A Practical Guide to Environmental Choices*. New York, New York: Wiley-Blackwell, 312p.

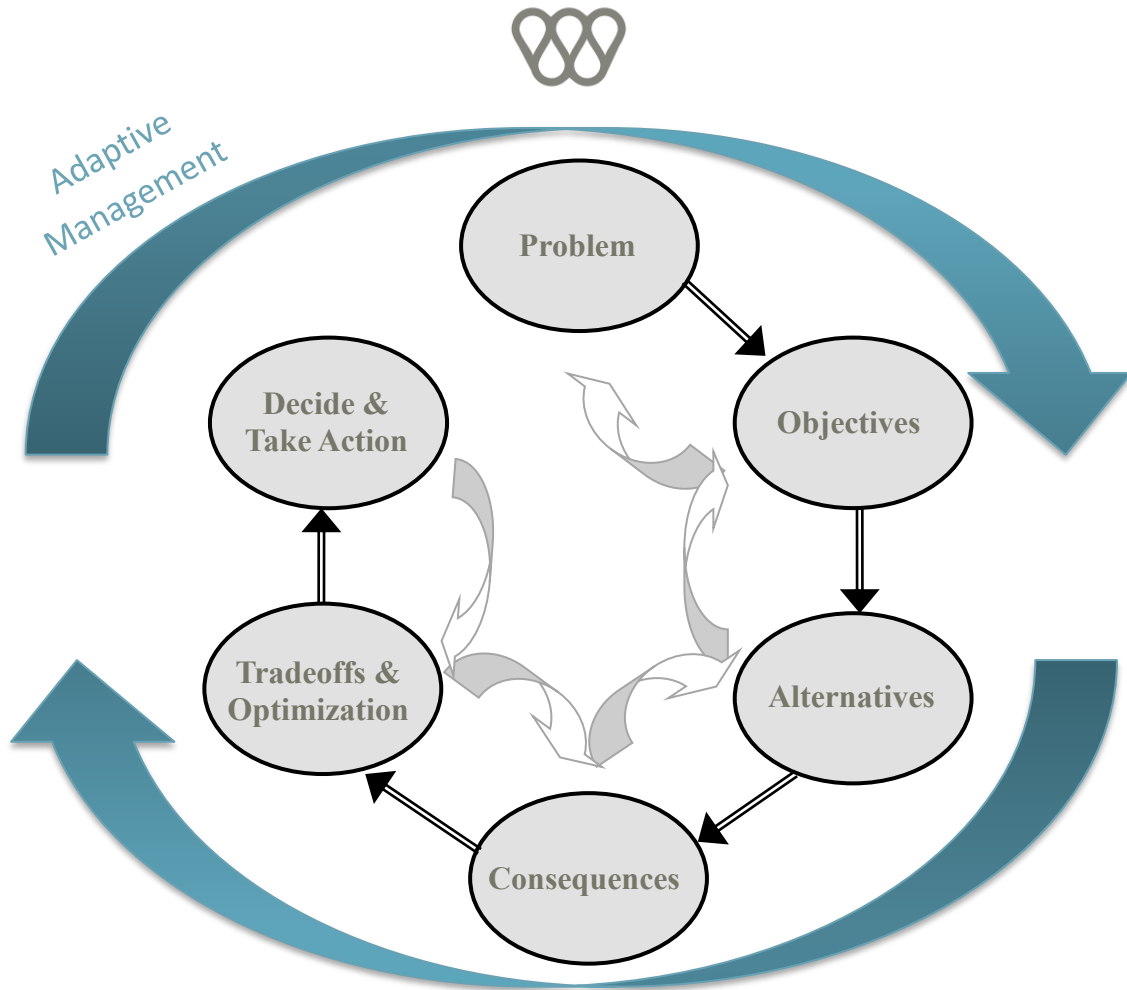


Figure 1. “PrOACT” process used in Structured Decision Making (SDM)¹. The process starts with a focus on the “problem”, or decision context, and the desired objectives. Alternatives (herein “strategies”) are then identified before evaluating the consequences and tradeoffs of those strategies and, ultimately, making a decision and taking action.

The initial phase was to refine the SDM-based approach into a workflow that would ultimately lead to the identification and evaluation of potential management strategies, which—where possible—leverage other prior and ongoing tasks under LMRMP (Figure 2). The team, consisting of representatives from CPRA, the Water Institute, and Royal Engineering (Table 1), then began execution of that workflow.

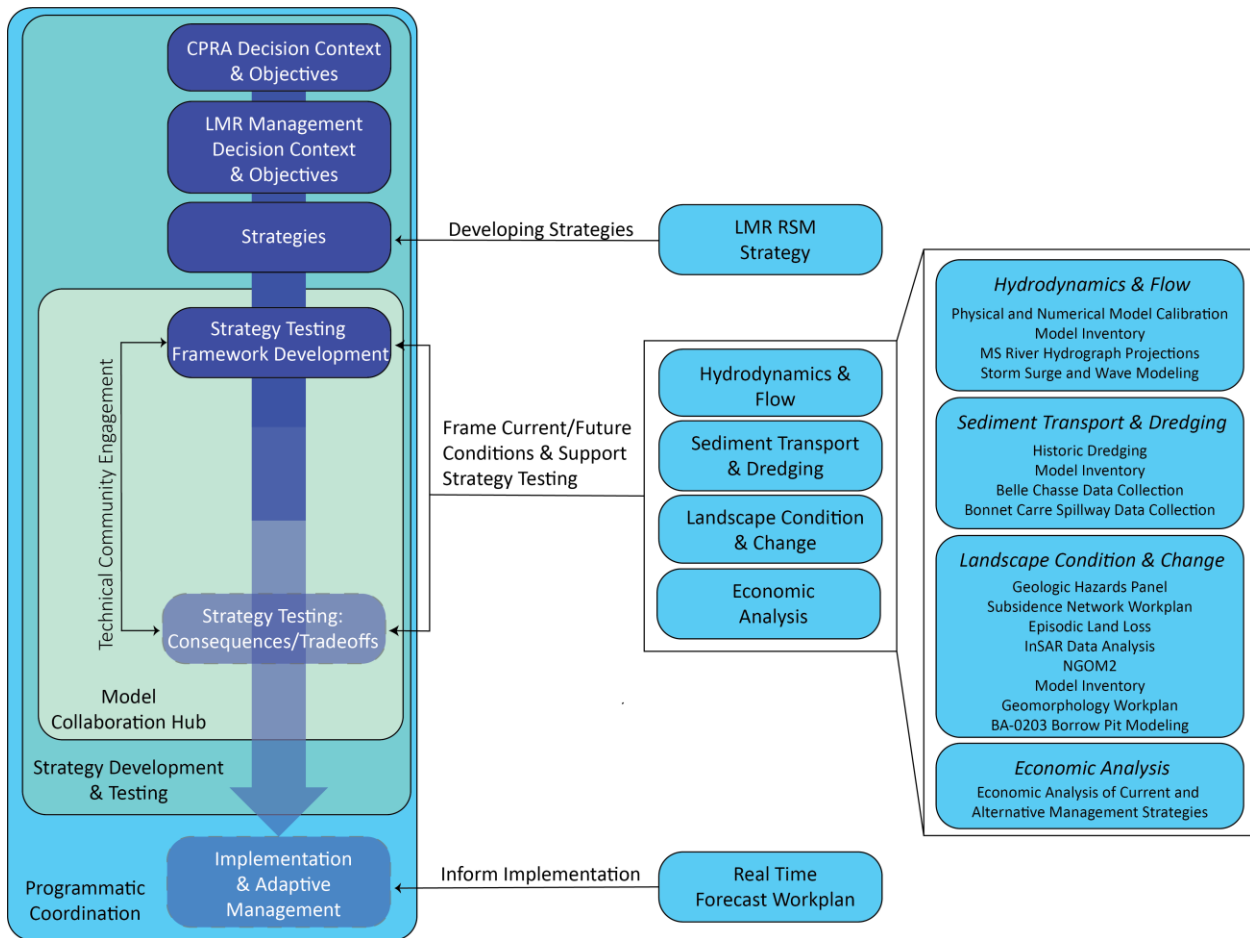


Figure 2. Flow diagram indicating the development of the evaluation framework (dark blue boxes), as well as the interaction with other tasks within the LMRMP program.

The first step in the workflow was to identify the decision context for CPRA, along with their goal and objectives for LMR management. The decision that CPRA is making for LMRMP is to identify what management strategies are sustainable based on the long-term (25-50 year or more) outcomes for the LMR and surrounding areas.

Because CPRA is not the only stakeholder or decision-maker regarding management of the LMR or its resources, the next step in the workflow was to engage external entities as part of outreach and buy-in, and to elicit their input on objectives and desired outcomes for management of the LMR. These stakeholders and decision-makers included representatives from:

1. Federal Regulatory Entities
 - U.S. Army Corps of Engineers (USACE)
 - New Orleans District (MVN)
 - Mississippi Valley Division (MVD)
2. State Regulatory Entities
 - Louisiana Department of Transportation and Development (DOTD)



- Louisiana Department of Natural Resources (LDNR) Office of Coastal Management
- 3. Land Management Entities
 - Louisiana Department of Wildlife and Fisheries (LDWF), Pass á Loutre Wildlife Management Area
 - U.S. Fish and Wildlife Service (USFWS), Delta National Wildlife Refuge
- 4. Ports
 - Ports Association of Louisiana (primary coordination as needed)
 - Secondary coordination may include outreach to individual ports, as needed
- 5. Navigation Community
 - Big River Coalition
 - Associated Branch Pilots
- 6. Environmental Groups (Non-Governmental Organizations, NGOs)
 - Environmental Defense Fund (EDF)
 - National Wildlife Federation (NWF)
 - Coalition to Restore Coastal Louisiana (CRCL)
 - Pontchartrain Conservancy (PC)
 - Secondary coordination may include additional entities if requested
- 7. Public and Other Stakeholders
 - A public webinar will be held later in the project timeline
 - Secondary coordination and direct outreach may include natural resource users, parishes, other landowners, and levee districts as needed

Engagement with external stakeholders was conducted through email, personal outreach, and meetings (primarily held virtually; Table 2). This elicitation focused on objectives and interests for the LMR for refinement of: 1) the selection of management strategies and 2) the types of output the evaluation framework could produce to be relevant to the needs of decision-makers and stakeholders. Questions asked included:

- What opportunities and/or concerns do you see relative to your entity’s roles and responsibilities?
- Do you have guiding principles (e.g., long-term plans, etc.) for managing lands, flood control, ports, navigation and commerce, etc. that would be impacted or relate to the strategy? What can/should LMRMP consider?
- What parameters or information would be helpful for LMRMP to provide to inform your decision-making or investigate the impact of the strategy on your areas of interest?
- Are there specific strategies that would be beneficial for you to see investigated?

The LMRMP goal and objectives, management strategies, and environmental scenarios were identified based on the outcomes of the internal team meetings and decision-maker/stakeholder outreach conducted to date and are described in the next section.

Lowermost River Objectives, Strategies, and Scenarios

The initial focus of the effort was to articulate a goal and objectives for the LMR and ensure that they were broadly consistent with (i.e., not anathema to) the interests of other stakeholders in the region.



GOAL AND OBJECTIVES

The following goal and objectives were identified for the management of the LMR:

Goal of Lowermost River Management: Holistic approach to water and sediment management that supports the long-term sustainability and benefits of the LMR.

CPRA and State of Louisiana Objectives for Lowermost River Management:

1. Support the long-term sustainability of the coast, reducing land loss and collapse to the greatest degree possible.
2. Enhance the health of ecosystems associated with the LMR.
3. Mitigate threats to communities and infrastructure posed by flooding.
4. Maintain and enhance channels that support use of the LMR for navigation.
5. Manage the LMR holistically, maximizing the benefits across all objectives.

LMRMP MANAGEMENT STRATEGIES

The suite of specific management strategies was chosen based on their potential to demonstrate the benefit of holistic LMR management to decision-makers and stakeholders and to advance the objectives provided in *Goal and Objectives*. In addition, these strategies were selected based on their potential to provide immediate benefit in advancing the objective of sustainably managing the LMR (for example, management of the Hopper Dredge Disposal Area [HDDA]).

The strategies for consideration have been grouped into six high-level categories, with several variants identified for each.

- 1) **Future Without Action (FWOA):** Sediment/flow management based on current guidance and construction of projects identified in the 2023 Coastal Master Plan² (Master Plan) and funded as of 2022. Includes:
 - a) **Current landscape:** All flow/sediment operations as conducted under present conditions, as well as the funded River Reintroduction into Maurepas Swamp.
 - b) **Reasonable foreseeable future:** Adds Mid-Barataria and Mid-Breton Sediment Diversions to the current landscape variant.
- 2) **Integration of Flow Considerations into Diversion Management or Diversions into Flood Fight:** Variation of the siting and operation of diversions to preserve ecological benefits while minimizing freshwater releases needed for flood control, specifically through the Bonnet Carré spillway. Includes:
 - a) **Diversion operations:** Varying operations of the Ama, Union, and Lake Maurepas (and possibly others). Diversions based on seasonally variant flow triggers to evaluate the cumulative impact,

² Information about the 2023 Louisiana Coastal Master Plan may be found here: <https://coastal.la.gov/our-plan/2023-coastal-master-plan/>



including operation of the Union Diversion per alternatives under consideration for CPRA planning.

- b) **Diversion siting:** Varying the location of planned diversions within a range that still allows for sediment delivery and benefits to the intended marsh and basin locations.
- 3) **Sediment Management Strategies for Southwest (SW) Pass and the HDDA:** Alternate placement areas for sediment in the coastal system. Includes:
 - a) **Cut across:** Transport of material from the HDDA via cutterhead dredge to spider barge/scow network through channel running directly west from Head of Passes. Sediment is then used for the Barrier Island System Management program along the Barataria Bight.
 - b) **Relocation of the HDDA:** Moving the location of the HDDA to the present location of the Pilottown anchorage.
 - 4) **Alternate Navigation Channel Alignment (abandon SW Pass for Deep Draft Navigation):** Establish different course for the southernmost reach of the Mississippi River, with sediment within the bird's foot delta used for restoration. The variants will be based on the three design concepts proposed during Changing Course³, which may be combined or modified based on available data, model output, and stakeholder input:
 - a) **“Giving Delta”** (Moffatt and Nichol Team): Combined use of controlled flood-pulse structures, utilization of the Gulf Intracoastal Waterway (GIWW), spillways, sediment traps and dredging, settling basins, river realignment, river mouth realignment into Barataria Basin, and sand engines for regional sediment supply.
 - b) **“A Delta for All”** (Baird Team): Development of a network of river distributaries that can be used to create a sequence of sub-deltas, in addition to rerouting of the main channel into Barataria Basin.
 - c) **“Living Delta”** (Team “MISI-ZIIBI”): Use of a combination of dredging and placement, siphoning, and diversions along with relocation of the main navigation channel to a distributary node near Pointe à la Hache to expand the delta to the southwest.
 - 5) **Adjust Flow Ratio at Old River Control Structure (ORCS):** Remove constraint for diversion of 30 percent of flow to go down the Atchafalaya River and consider seasonal and dynamic flow split thresholds. The variants of this strategy will be refined based on available data and model output, as well as on external constraints (for example, flow needs associated with hydroelectric power generation). These variants may be based in part on:
 - a) **USACE Old, Mississippi, Atchafalaya, and Red River (OMAR) Assessment:** Flow distribution changes considered by USACE in the OMAR technical assessment under the authority of the Mississippi River and Tributaries program.

³ Changing Course information may be found here: <http://changingcourse.us/>



The assumptions and a more complete description of the management strategies are provided below.

1. Future Without Action

The FWOA strategy consists of two variants. The first variant, “current landscape”, captures the river under current management practice (e.g., dredging operations and flood control). Existing diversions, canals, siphons, spillways, and other controlled features are operated under their current protocol and assumptions, consistent with the modeling approach used in the Master Plan. The River Reintroduction into Maurepas Swamp project, which is funded for construction, is also included, and assumed to operate under the protocols used within the Master Plan. The second variant, “reasonable foreseeable future”, adds the Mid-Barataria and Mid-Breton Sediment Diversions. These diversions operate under the conditions used within the Master Plan, and all other aspects of the river follow the “current landscape” variant.

Additional assumptions used in modeling both variants of the FWOA strategy include:

- **Dredging**
 - Dredging strategy of clearing the Crossings and SW Pass to maintain a 50’ deep navigation channel does not change over the time period of evaluation.
 - Material dredged from the Crossings is dumped to the side or placed downstream in the thalweg (not removed from the LMR).
 - Sediment dredged from SW Pass is placed in HDDA or offshore disposal area.
 - Sediment in the HDDA is removed and placed in wetlands in the bird’s foot delta or used for channel stabilization.
 - No sediment from the river is used in Master Plan projects except those projects already identified in the Master Plan (i.e., diversions, limited dedicated dredging projects).
- **Flow control**
 - Flood fight plan does not change. Existing triggers at the Carrollton gauge are used to control opening of the Bonnet Carré Spillway and Morganza Floodway.
 - Process of evaluating floodlines and managing the levee heights remains the same.
 - Flow at ORCS is maintained at 70/30 in the main channel vs. the Atchafalaya River.

2. Integration of Flow Considerations into Diversion Management or Diversions into Flood Fight

The focus of this strategy is evaluating if and how holistic management of multiple Mississippi River diversions can reduce the negative impacts of flood risk management by reducing the volume of water released through the Bonnet Carré Spillway into Lake Pontchartrain. There are two variants associated with this strategy that include modifications to diversion operations (i.e., the amount of water released during different seasons and flow conditions) and the siting of diversions that have yet to enter the engineering and design phase. In all cases, the intended environmental and land-building benefits of the diversions must be preserved, with the intent being identification of opportunities to achieve those benefits while also diverting water that might have otherwise been released through the Bonnet Carré Spillway. These variants will leverage and build upon ongoing planning efforts for the Union Diversion, which consider how operations might vary seasonally and with flow conditions to maximize co-benefits to land-building and flood risk management.

Additional assumptions used in modeling variants under this strategy include:



- **Dredging**
 - Because this strategy would have a significant impact on flow and sediment movement, there may be an impact to dredging operations (e.g., maintenance of diversions). This impact will be evaluated to the degree possible with the evaluation framework.
 - Potential dredging scenarios for the maintained channel will be considered in conjunction with evaluating the outcomes of this scenario if possible (i.e., if outputs can be parameterized with available input data).
- **Flow Control**
 - Triggers for operations of the spillways for flood control purposes will be assumed to follow the current protocols.

3. Sediment Management Strategies for SW Pass and HDDA

Sediment dredged by USACE from the navigation channel of the main stem of the LMR and portions of SW Pass is placed in the HDDA at Head of Passes. The action of disposing large volumes of sand at the heads of Pass á Loutre and South Pass reduces flow and sediment transport capacity in those passes. Removal of sediment from the HDDA by natural processes is minimal, leading to infilling and the need to frequently dredge the HDDA so that it retains capacity for subsequent hopper dredge disposal events and draft clearance for loaded hopper dredges. Sediment dredged from the HDDA is currently placed in various disposal areas within the bird's foot delta. The strategy evaluated here will consider alternate methods of managing the HDDA and/or the sediment that is disposed there. The first variant will evaluate a beneficial use of dredge material approach wherein the sediment dredged from the existing HDDA would be used to nourish and restore barrier islands within Barataria Basin under the Barrier Island System Management Program or for other projects in coastal Louisiana. The second variant will consider an alternate location of the HDDA itself, namely relocating it across the channel to the Pilottown Anchorage. This location will minimize the impact of disposed sediment on the flow and sediment transport within Pass á Loutre and South Pass, and pipelines used to convey sediment from this location to restoration projects will not interfere with navigation activities on the LMR. This regional sediment management (RSM) approach is being refined in a separate task within LMRMP, with the results from that task being incorporated in this strategy evaluation.

Additional assumptions used in modeling variants under this strategy include:

- **Dredging**
 - Sediment/sand from the HDDA that is currently being placed in the bird's foot delta would instead be used to construct Master Plan restoration projects at barrier islands, marsh, ridges, etc. outside of the bird's foot.
 - Sediment would be used for nourishing the coastal system east from Caminada Headland to the bird's foot delta.
- **Flow control**
 - HDDA is maintained at clearance to allow flow down bird's foot delta distributaries.

4. Alternate Navigation Channel Alignment (abandon SW Pass for Deep Draft Navigation)

This management strategy encompasses rerouting the main (deep draft) navigation channel of the Mississippi River so that it follows a more direct route to the 60' contour. Some flow to the existing



bird's foot may be retained. Some sediment available within the bird's foot (and channel) can be mined to nourish the coast in other locations. The variants of this strategy will be based on the three "Changing Course" design team concepts, all of which follow the same overarching approach of channel rerouting. These concepts may be refined or combined based on model output availability and preliminary evaluation framework results, and/or the original design teams may be consulted.

Additional assumptions used in modeling variants under this strategy include:

- **Dredging**
 - Establish alternate course for deep draft navigation to the Gulf that terminates above the bird's foot delta.
 - Mine the sediment supply south of the new location of the deep draft navigation channel.
 - Because this strategy would have a significant impact on flow and sediment movement, assumptions may need to be made on dredging operations.
- **Water management**
 - Maintain freshwater flow at major intake locations (e.g., Alliance).

5. Adjust Flow Ratio at Old River Control Structure (ORCS)

Under this management strategy, the current constraint of 30 percent flow down the Atchafalaya River at the ORCS will be removed. USACE is the decision-making authority for the ORCS and is currently conducting the Old, Mississippi, Atchafalaya, and Red River (OMAR) assessment under the authorization of the Mississippi River and Tributaries program to evaluate potential alternatives for ORCS management that would still meet other constraints (such as flow through the Sidney Murray Hydroelectric Station). The evaluation framework will consider the broader impacts of the alternatives considered under OMAR if available, and/or will conduct a sensitivity analysis to determine how a seasonally variable ORCS operational strategy might impact the Mississippi River. Although evaluating specific impacts of ORCS operating protocols to the Atchafalaya River, Basin, and Delta are beyond the scope of LMRMP, changes in flow down the Atchafalaya will be noted and, if possible, the potential implications noted.

Additional assumptions used in modeling variants under this strategy include:

- **Dredging**
 - Mining of available sediment supply in any potential sediment source areas downstream of the ORCS.
 - Because this strategy would have a significant impact on flow and sediment movement, assumptions may need to be made on dredging operations.
- **Water management**
 - Achieve USACE benchmarks for flood control.
 - Maintain flow and river head at Sidney Murray Hydroelectric Station as necessary for operations.
 - Optimize flow within the Mississippi and Atchafalaya rivers (from an environmental sustainability perspective) during low-flow conditions.

ENVIRONMENTAL SCENARIOS

The environmental scenarios vary across factors that have significant potential influence on achieving the objectives of LMR management, such as variability in the river hydrograph and RSLR. The



environmental scenarios will be selected, in part, based on the range of parameters used in the Master Plan and by USACE in project design⁴. This approach creates synergy with existing planning tools and increases the likelihood the evaluation framework output will catalyze changes in management approaches. Each of the management strategies will be evaluated for each environmental scenario for which input data and model output are available to parameterize the evaluation framework.

The parameters that will be considered in the evaluation framework include:

- Eustatic (global) sea level rise (SLR)
 - Select scenarios used by the Master Plan.
 - Select scenarios used by USACE in accounting for the impacts of SLR in project planning.
- Subsidence
 - “Deep subsidence” rates used to inform the Master Plan (https://coastal.la.gov/wp-content/uploads/2021/03/Subsidence-Rates_Mar2021.pdf).
- Storminess
 - Scenarios developed from outputs of the LMRMP Storm Surge Task.
 - Storm scenarios from the Master Plan (https://coastal.la.gov/wp-content/uploads/2021/03/Storm_Selection_for_ICM_Oct2020-1.pdf).
- River hydrograph: values based on predictions made for future greenhouse gas concentration trajectories used by the Intergovernmental Panel on Climate Change (IPCC), including:
 - Representative Concentration Pathway (RCP) 4.5.
 - Representative Concentration Pathway (RCP) 8.5.

These parameters and their variants will be analyzed alone and in concert depending on the available model and data output that can be used to parameterize the evaluation framework. In addition, uncertainties associated with environmental variability not conducive to developing discrete environmental scenarios will be considered. For example, the impacts of variability in suspended and bedload sediment into the area of interest, which could result from changes in land management in the upstream watershed, may be considered through uncertainty or sensitivity analysis. As these inputs are finalized, other environmental scenarios and associated uncertainties may be identified and included in testing with the evaluation framework.

⁴ USACE SLR Guidance may be found here:
https://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1100-2-8162.pdf?ver=2014-02-12-131510-113



Summary

An SDM-based workflow was developed by a team consisting of personal from CPRA, the Water Institute, and Royal Engineering as an objectives-oriented way to build a management strategy and environmental scenarios evaluation framework for use by the LMRMP. This workflow, which included internal CPRA working sessions and outreach to external decision-makers and stakeholders, was used to: articulate a goal and objectives for management of the LMR; identify a suite of management strategies with potential benefit to improve holistic management of the LMR; and identify the parameters that should be varied across environmental scenarios when predicting the response of the LMR to those strategies in an uncertain future. The next steps of the workflow are to: design the evaluation framework; identify available sources of data and model output to parameterize, construct, and implement the evaluation framework; and investigate the likely outcomes of the strategies identified here to interests in the LMR.



Tables

Table 1. Internal team working sessions used in developing the high-level LMRMP evaluation framework (Figure 2), as well as identifying management strategies and environmental scenarios for testing with the framework. Meetings are ongoing and shown as of October 31, 2021.

Dates	Attendees	Description
Recurrent	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green, Jordan Earls ⁵ , Jason Curole	Weekly to biweekly project team meetings; working sessions focused on advancing framework development and/or preparing materials for the meetings below
11/5/2020	Carol Parsons Richards, Brian Lezina, Mike Miner, Soupy Dalyander	Development of overall approach for strategy and scenario development
12/2/2020	Carol Parsons Richards, Brian Lezina, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green	Development of draft objectives for CPRA for LMRMP and LMR Management
2/3/2021	Carol Parsons Richards, Brian Lezina, Greg Grandy, Bren Haase	Presentation of LMRMP objectives (WI slide development)
2/22/2021	Carol Parsons Richards, Brian Lezina, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green	Identification of stakeholders in LMRMP management and drafting of workplan for engagement
3/15/2021	Carol Parsons Richards, Brian Lezina, Mike Miner, Soupy Dalyander, Jason Curole, Alaina Grace, Mandy Green	Development of LMRMP decision-maker and stakeholder engagement strategy; refinement of strategies for framework evaluation
4/7/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Rex Caffey, Hua Wang	Discussion of linkages of the strategies and scenarios task to the economic analysis task
4/13/2021	Carol Parsons Richards, Brian Lezina, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green, Jordan Earls, Jason Curole	Updates on engagement of USACE leadership; walkthrough of pilot model and first draft concept of evaluation framework design
5/5/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Rex Caffey, Hua Wang	Discussion of indices, potential quantification of outcomes in the evaluation framework
5/17/2021	Carol Parsons Richards, Brian Lezina, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green, Jordan Earls, Jason Curole	Continued refinement of stakeholder engagement plan; finish assessing the strategy categories and framing of assumptions

⁵ Jordan Earls left CPRA in the summer of 2021 and did not participate in calls after that time.



Dates	Attendees	Description
5/20/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Rex Caffey, Hua Wang	Discussion of indices, potential quantification of outcomes in the evaluation framework
5/26/2021	Carol Parsons Richards, Jordan Earls, Ahmad Tavakoly, Sara Lytle, Mike Miner, Soupy Dalyander, Ioannis Georgiou, Alaina Grace, Mandy Green	Update on the LMRMP Mississippi River hydrograph tasks to inform environmental scenario development
5/27/2021	Carol Parsons Richards, Ronald Heath, Travis Dahl, Gary Brown, Mike Miner, Soupy Dalyander, Ioannis Georgiou, Mandy Green, Alaina Grace	Discussion of USACE Engineering Research and Development Center (ERDC) engagement in strategy and scenario development
6/7/2021	Carol Parsons Richards, Brian Lezina, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green, Jordan Earls, Jason Curole	Refinement of desired level of input from stakeholders on outcomes analysis; refinement of preferred strategies and scenarios
6/28/2021	Carol Parsons Richards, Brian Lezina, Mike Miner, Alaina Grace, Mandy Green, Jordan Earls, Jason Curole	Discussion of stakeholder input plans; assessment and refinement of FWOA strategy set; discussion of workplan and deliverables
7/8/2021	Carol Parsons Richards, Soupy Dalyander, Hua Wang	Continued discussion of cost/benefit components of model framework
8/4/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green, Jason Curole	Planning and preparation for engagement of USACE MVN leadership
8/6/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Alaina Grace, Mandy Green, Jason Curole, Ioannis Georgiou, Chris Massey, Margaret Owensby	Discussion of output from LMRMP storm surge modeling and leveraging within the strategy and scenario framework
8/25/2021	Carol Parsons Richards, Rudy Simoneaux, Russ Joffrion, Dain Gillen, Mike Miner, Soupy Dalyander, Francesca Messina, Brett McMann, Brendan Yuill, John Swartz, Chris Esposito, Ioannis Georgiou, Alaina Grace, Mandy Green	Update and discussion with the CPRA Engineering team
8/26/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Ioannis Georgiou, Chris Esposito, Francesca Messina, Alaina Grace, Mandy Green, Travis Dahl	Check-in and discussion with USACE ERDC



Dates	Attendees	Description
9/20/2021	Carol Parsons Richards, Brian Lezina, Mike Miner, Alaina Grace, Mandy Green, Jason Curole	Finalization of the management strategies and environmental scenarios
9/30/2021	Soupy Dalyander, Francesca Messina, Christopher Esposito, Ioannis Georgiou, Travel Dahl, Alaina Grace, Mandy Green	Check-in and discussion with USACE ERDC
10/4/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Ioannis Georgiou, Chris Esposito, John Swartz, Mandy Green, Alaina Grace, Rob Nairn, Qimiao Lu	Discussion of the Baird Box model and potential for input to the stock/flow model
10/21/2021	Carol Parsons Richards, Chris Massey, Margaret Owensby, Mike Miner, Soupy Dalyander, Jason Curole, Alaina Grace, Mandy Green	Check-in and discussion with USACE ERDC on storm surge modeling
10/25/2021	Carol Parsons Richards, Mike Miner, Soupy Dalyander, Jason Curole, Alaina Grace, Mandy Green, and the CPRA Planning and Research Division (open invitation to webinar)	Update to, and engagement of, the CPRA Planning and Research Division on the LMRMP strategies and scenarios task

Table 2. Webinars conducted as part of engagement of external decision-makers and stakeholders for eliciting input on management strategies and environmental scenarios for testing with the LMRMP evaluation framework as of October 31, 2021. Additional engagement of the navigation community, ports, and the general public – along with follow-up with the entities in the table – will be conducted as LMRMP continues.

Agency/Entity	Date	Attendees
U.S. Fish and Wildlife Service (USFWS)	June 11, 2021	Barret Fortier (USFWS); Carol Parsons Richards, Brian Lezina, Jordan Earls (CPRA); Mike Miner, Soupy Dalyander, Jason Curole (the Institute); Alaina Grace, Mandy Green (Royal Engineering)
Louisiana Department of Natural Resources (LDNR)	June 3, 2021	Feedback elicited via email from Charles Reulet (LDNR, Office of Coastal Management)
Non-Governmental Organizations	July 21, 2021	Steve Cochran, Natalie Snider (EDF); David Muth, Alisha Renfro (NWF); Michael Hopkins (PC); Emily Vuxton (CRCL); Carol Parsons Richards (CPRA); Mike Miner, Soupy Dalyander (WI); Alaina Grace, Mandy Green (Royal Engineering)



U.S. Army Corps of Engineers, MVN	August 9, 2021	Brad Inman, Jeff Varisco (USACE MVN); Brian Lezina, Carol Parsons Richards (CPRA); Soupy Dalyander (WI); Alaina Grace, Mandy Green (Royal Engineering)
Louisiana Department of Transportation and Development	August 17, 2021	Molly Bourgoyne, Randall Withers (DOTD); Carol Parsons Richards (CPRA); Soupy Dalyander, Jason Curole (WI); Alaina Grace, Mandy Green (Royal Engineering)
Louisiana Department of Wildlife and Fisheries	September 9, 2021	Vaughan McDonald (LDWF); Carol Parsons Richards, Todd Baker (CPRA); Soupy Dalyander, Jason Curole (WI); Alaina Grace, Mandy Green (Royal Engineering)
National Academy of Science (NAS) Gulf Research Program (GRP)	September 15, 2021	Presentations by Carol Parsons Richards (CPRA) and Soupy Dalyander (WI). Webinar was publicly available and attended predominantly by members of the academic community.
Navigation Community	September 30, 2021	Sean Duffy (Big River Coalition); Michael T.D. Miller (Associated Branch Pilots); Carol Parsons Richards, Brian Lezina (CPRA)
U.S. Army Corps of Engineers, MVN	October 6, 2021	Brad Inman, Jeff Varisco, David Ramirez, Ann Hijuelos, Travis Creel (USACE); Carol Parsons Richards, Brian Lezina (CPRA); Mike Miner, Soupy Dalyander, Jason Curole (WI); Alaina Grace (Royal Engineering)
Non-Governmental Organizations	October 22, 2021	Devyani Kar (EDF); David Muth, Alisha Renfro (NWF); Michael Hopkins (PC); Emily Vuxton (CRCL); Carol Parsons Richards, Erin Vidrine (CPRA); Mike Miner, Soupy Dalyander, Jason Curole, Donna Averion (WI); Alaina Grace (Royal Engineering)