



Preface

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PREFACE

Louisiana's coast and coastal communities have experienced numerous natural and human-induced disasters over the past decade as environmental, social, and economic vulnerability have increased with continued land loss, increased hurricanes, and the effects of climate change. In response to the hurricanes of 2005, the Louisiana Legislature passed Act 8 of the First Extraordinary Session of 2005, which formed the Coastal Protection and Restoration Authority (CPRA) and tasked it with the development and five-year updates of a comprehensive protection and restoration master plan, commonly referred to as Louisiana's Coastal Master Plan.

CPRA produced the first coastal master plan, which was a ground-breaking effort to integrate coastal protection and coastal restoration, in 2007. This 18-month planning process produced an award-winning report that established goals and objectives and synthesized decades of coastal thinking about projects and solutions. The *2007 Coastal Master Plan* became the starting point for the *2012 Coastal Master Plan* effort.

With unlimited funding, sediment, and freshwater, we could successfully implement the *2007 Coastal Master Plan*. However, relying on this unlikely assumption does not provide a realistic future for our coastal residents. Thus, the key question for the 2012 planning effort became: "Which projects are predicted to meet our objectives considering these important resource constraints and what does the future look like with and without action?" CPRA relied on a team of over 60 scientists and engineers to develop a series of integrated, coastwide predictive models and a computer-based decision support tool, called the CPRA Planning Tool, to provide objective project evaluation. This systems-based modeling approach was coupled with an extensive outreach and engagement effort that integrated the public and stakeholders into the process and focused on transparency of the modeling results and the decision-making process. Through this process, the *2012 Coastal Master Plan* identified a specific list of projects that effectively invests limited financial resources to make the greatest progress toward achieving a sustainable coast. The *2012 Coastal Master Plan* was unanimously approved by the Louisiana Legislature in May 2012 without modification.

As directed by Statute, the master plan is a living document to be updated at least every 5 years. CPRA continues to advance modeling and research efforts for inclusion in the next master plan update. Since the completion of the 2012 Coastal Master Plan, the team has performed additional modeling to capture the interactive effects of all projects modeled simultaneously and to continue to learn and improve our modeling capabilities. The systems modeling approach provided the opportunity to test the effects of protection projects on the ecosystem and the effects of restoration projects on reducing risk. It is important to understand a few key variations in this

subsequent modeling effort compared to the modeling effort that was used as the basis for the *2012 Coastal Master Plan*. These variations provide an understanding for why results described in this special issue may vary from what was reported in the master plan.

- (1) For the new simultaneous modeling effort, the modeling assumed projects were implemented either at Year 0 or Year 25. Due to time and resource constraints, we were not able to implement projects incrementally over time to provide a more realistic timeline for project funding and construction. This assumption results in some graphics depicting an abrupt shift at Year 25 when new projects are added to the modeled landscape instead of a more realistic gradual change over time. Since no projects were implemented in the later years (from year 26 through year 50), land area is decreasing at the end of the 50-year period in most regions. This indicates that there is not a restoration strategy that we can implement and then walk away from the coast. The Louisiana coast will require continuing investments in restoration projects throughout the 50-year plan period. The *2012 Coastal Master Plan* considered a more realistic implementation strategy than that depicted in this special issue. The *2017 Coastal Master Plan* will further improve our understanding of implementation strategies by testing variations in project sequencing and improving time steps to every 5 years.
- (2) When all projects are operated simultaneously, sediment diversions have to share the sediment and freshwater resources of the river. The modeling maintained the threshold-based diversion operations as presented in the *2012 Coastal Master Plan*, and simplified the operations with a "first-come, first-served" approach. Therefore, sediment diversions lower on the river were less effective when operated simultaneously than when modeled individually due to the removal of sediment and freshwater higher in the system. This simplified operation strategy produces different results for land-building and other variables as presented in this special issue. The *2017 Coastal Master Plan* will test variations in operations to optimize the use of the river's sediment delivery potential and provide a more realistic outlook on how a system of sediment diversions may function into the future.
- (3) Science is constantly evolving and it is important that CPRA incorporate the latest research into our efforts. Since Louisiana is so vulnerable to sea level rise, specific modeling was conducted to identify how sea level rise alone would affect our results. An additional scenario, termed Moderate with High Sea Level Rise, was introduced that increased eustatic sea level rise to 0.78 meters over 50 years while maintaining the Moderate Scenario level for all other uncertainties. This scenario is

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reported in this issue but was not discussed in the 2012 Coastal Master Plan. In most cases, as documented throughout this special issue, the results of the Moderate with High Sea Level Rise Scenario were very similar to the results of the Less Optimistic Scenario. The *2017 Coastal Master Plan* will test the sensitivity of our coastal landscape, as well as project outcomes, to all of the future uncertainties identified in the *2012 Coastal Master Plan* and incorporate the latest science and technical information to develop more refined future scenarios.

This special issue highlights the work of the *2012 Coastal Master Plan* modeling and Planning Tool teams. An overview manuscript is included to provide the reader with some background on the decision-making process and specific aspects, such as the future uncertainty scenarios, that are relevant to each of the subsequent manuscripts. The subse-

quent manuscripts each highlight one specific model, support tool, or model-related effort, in the case of the uncertainty analysis. The manuscripts will provide the reader with an understanding of the model or support tool's platform and mechanics, assumptions, limitations, and results. Additional information on all aspects of the *2012 Coastal Master Plan* modeling and decision-making process can be found at www.coastal.la.gov.

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