



## ASSESSMENT OF MISSISSIPPI RIVER FRESHWATER RE-INTRODUCTION INTO BAYOU LAFOURCHE

**Project No. 2014-16**

**Location:**

Barataria & Terrebonne Basins, LA

**Contract Value:** \$208,611

**Completion Date:** Oct. 2015

**Owner/POC:**

Bayou Lafourche Fresh Water District  
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**Project Specific Disciplines**

- Sustainability and Asset Management Program Initiatives & Planning
- Water Quality, Water Supply, Water Reuse, & Compliance Plans
- Planning Studies & Evaluations
- Information Technology Tool Refinements
- NEPA

Royal has been contracted by the Bayou Lafourche Fresh Water District (BLFWD) to assess the environmental benefits of increased freshwater input from the Mississippi River into Bayou Lafourche at Donaldsonville, Louisiana. A historical distributary of the Lower Mississippi River, Bayou Lafourche was dammed at Donaldsonville in 1903 in the interest of flood protection, which in turn deprived the adjacent marshes of their seasonal source of freshwater, sediment, and nutrients. At a magnitude of 1,000 cfs, the objectives of the increased freshwater input are to improve water quality and ecology within the bayou and receiving basins and to furnish municipal/industrial users along the bayou with a larger supply of freshwater. To provide adequate capacity for the proposed discharge, the project will entail additional dredging of Bayou Lafourche and potentially the removal of the existing concrete weir in Thibodaux.

The long-term improvement, sustainability, and management of Bayou Lafourche's freshwater resources are the key aspects of this freshwater diversion project. To appropriately assess the diversion's potential for providing sustainable benefits to the region, the Royal Team is applying the metrics and tools of Louisiana's Comprehensive Master Plan for a Sustainable Coast

to predict long-term landscape changes in vegetation and wetland morphology due to the proposed freshwater re-introduction. The assessment of these benefits is being made over a projected timeframe of 50 years, using a suite of numerical models to simulate the governing physical processes and environmental responses associated with the project. Team member FTN Associates, Ltd. is utilizing the RMA modeling suite (RMA2, RMA11) to calculate 1D/2D hydrodynamics, including salinity and temperature transport. The hydrodynamics, solved over highly refined spatial and temporal scales, are then used to drive the offline Vegetation Change and Wetland Morphology models being implemented by team members at the University of Louisiana at Lafayette and the U.S. Geological Survey, respectively. The Vegetation Change model calculates the response of 19 emergent plant species, as well as one type of submerged aquatic vegetation (SAV), to changes in water depth, temperature, and salinity. The Wetland Morphology model calculates accretion due to deposition of waterborne sediments, as well as organic matter accumulation from vegetation. Results of this effort will be used to identify the locations and magnitudes of environmental benefits due to the diversion project, and to inform the BLFWD of the associated freshwater/salinity distributions anticipated within its service area.