**EM-3 Freshwater Reintroduction into Bayou Lafourche**

1. OBJECTIVE

To support and encourage reintroduction of Mississippi River flows into Bayou Lafourche in order to bring freshwater and sediments to Barataria and Terrebonne basin marshes to help address coastal land loss and to ensure adequate consumptive freshwater supplies by combating saltwater intrusion.

1. DESCRIPTION

This action plan will aid in addressing the major priority problem for the BTES which is habitat loss and modification and, as a side benefit, help ensure adequate freshwater drinking supplies for nearly 300,000 Louisiana residents. Currently, the uppermost 16 miles of the channel has been cleared and dredged, and construction is underway for the replacement of the Union Pacific Railroad Bridge in Donalsonville and will be complete before the end of 2016. Additionally, the construction of a water control structure in Lockport is nearing completion that will prevent saltwater migration further north into Bayou Lafourche while also having the ability to function as a weir in the event it is necessary. The analysis and design of pumping capacity improvements have been initiated for the Pump Station site in Donaldsonville. This project is aimed at increasing the pumping capacity from the Mississippi River into Bayou Lafourche nearly threefold by either expanding the existing pump station or construction of a new pump station. Other currently ongoing projects that have begun are the Thibodaux Weir Removal Preliminary Analysis and the Permitting of Channel Dredging from Napoleonville to Thibodaux.

Since formulation and acceptance of BTNEP’s original CCMP, alternatives to accomplish the desired outcomes were evaluated and the plan currently being implemented was selected. Successful and timely execution of this plan is critically important to the residents of Barataria-Terrebonne because of the consumptive water supply benefits and the benefits afforded the receiving marshes on the lower end of Bayou Lafourche. BTNEP will continue to support the Bayou Lafourche Freshwater District and Louisiana Coastal Protection and Restoration Authority throughout the execution phase and during long-term operations and maintenance.

1. BACKGROUND

Bayou Lafourche, originally called La Fourche des Chetimaches (the fork of the Chitimacha), is an historic distributary of the Mississippi River that extends 106 miles from its origin in Donaldsonville to the Gulf of Mexico. The bayou is bounded on the west by Louisiana Highway 1 and on the east by Louisiana Highway 308 and is known as “the longest Main Street in the world”. It flows through Ascension, Assumption and Lafourche parishes and serves as a major freshwater source for their residents. Original inhabitants of the area were various Indian Tribes including the Chitimacha, Chawasha and Washa. In the late 1700’s small European settlements were built, followed shortly by the first Acadians in 1764. In addition, the area was settled by a small group of Canary Islanders called “Isleños” imported by the Spanish government to help settle the Louisiana territory.

The French explorers Iberville and Bienville considered Bayou Lafourche the west fork of the Mississippi River-thus “Lafourche”-the fork. In the mid-1800’s Bayou Lafourche carried roughly 12 percent (over 40,000 cubic feet per second) of Mississippi River flow. To address local flooding concerns, in 1904 a closure was constructed at Bayou Lafourche and it ceased to function as a distributary of the Mississippi River. This major hydrologic modification resulted in devastating impacts to the Barataria and Terrebonne basins. To provide some freshwater flows, a pump station was built on the Mississippi River at Donaldsonville in 1955 to allow water from the Mississippi River to enter Bayou Lafourche. Currently, about a quarter of one percent (200 cubic feet per second) of the Mississippi River flow is allowed down the Bayou. This flow is closed if heavy rains have caused high water in the Bayou or if monitoring stations on the Mississippi River indicate a chemical spill has occurred upriver of Donalsonville.

The closing of Bayou Lafourche prevented freshwater from reaching the marshes in the southern Barataria and Terrebonne basins. Navigation through to the Mississippi River from Bayou Lafourche was eliminated. However, the closing allowed for increased development of the natural and man-made levees, intensified agricultural activities, and also enhanced economic opportunity-especially with the petroleum industry boom increasing the job base. Seasonal flooding of Bayou Lafourche was controlled and farming, residential and business development could proceed predictably. Now, the Barataria and Terrebonne basins are experiencing the most severe coastal land loss rates in the world. Concerns about adequate long-term consumptive water supplies continue as do concerns about possible contamination from agricultural chemicals usage. Increasing Mississippi River flows into Bayou Lafourche is a reliable way to satisfy consumptive freshwater supply demands now and into the future and is a major way to benefit coastal landscapes by supplying freshwater and sediments to areas that were historically connected to freshwater flows from the river.

The benefits of increasing diversion flows down Bayou Lafourche are mainly the nourishing of coastal marshes both on the east and west sides of the Bayou near Lockport, the combating of salt water intrusion from the Gulf of Mexico, and the provision of more reliable freshwater consumptive supplies for use by residents and industry. Reintroduction of Mississippi River flows to Bayou Lafourche is a sustainable restoration technique, using the established natural process that nourished and created marshes prior to the closure of the Bayou. Freshwater, nutrients, and sediment should help revitalize marsh vegetation that is stressed by saltwater increases or by sediment deprivation.

1. LOCATION

This action will occur entirely along Bayou Lafourche. Actions at the headwaters in Donaldsonville include dredging and renovation or redesign and construction of the pump station drawing from the Mississippi River. Additional dredging will occur from Donalsonville to Thibodaux to increase channel capacity, and the Thibodaux weir will be redesigned or removed. A water control structure is under construction at Lockport. Outfall management actions are possible at various locations along the entire channel.

1. LEAD AGENCY RESPONSIBLE FOR IMPLEMENTATION

Local: Bayou Lafourche Freshwater District

State: Coastal Protection and Restoration Authority

Federal: USACE, EPA, USFWS, NRCS

1. TIMELINES AND/OR MILESTONES

The remaining components of the overall project, namely the new pump station at Donaldsonville, removal of the weir at Thibodaux and channel dredging are expected to be complete by 2020.

1. POSSIBLE RANGE OF COSTS AND SOURCES OF FUNDING

As defined above, Lead Agencies/Entities are legislatively mandated to manage issues related to EM-3. Furthermore, each agency/entity develops annual budgets and programmatic budgets internally to address those legislatively mandated requirements. These budgets or discussion thereof are not presented here.

BTNEP as a co-lead implementer works with other lead agencies/entities on an annual basis to define data gaps and develop partnerships with these organizations to address those data gaps. This includes an annual tiered process, first convening meetings of various action plan teams to discuss needs for a particular action plan. Projects are defined during this phase along with appropriate costs/budgets. These costs vary according to the size and scope of the individual projects. As the process moves further, these project concepts and associated budgets are presented to the Management Conference where they are discussed and approved and included as part of individual BTNEP work plans. Funding sources vary, including CWA Section 320 funding. Since the process of selecting projects to address data gaps is used annually, no reasonable expectation of costs can be presented beforehand.

1. PERFORMANCE MEASURES, MONITORING STRATEGIES and EVALUATION METHODS

The following monitoring strategies are intended to serve as a process for assessing the performance of this particular Action Plan. These strategies should only be used as a guide, not as a requirement. Recognizing that the monitoring strategies outlined here will be expensive to implement and that, because all levels of government and much of the private sector currently have severe funding restraints, they should be considered the minimum necessary and are not intended to suggest that regulatory agencies require a higher level of monitoring by permit applicants than is currently required.

**Methods**

Steyer and Stewart (1992) list variables which may be measured to monitor freshwater and sediment diversions implemented under CWPPRA. It is recommended that this model be followed, regardless of the particular funding source for any component of the overall project. Measurable parameters identified by Steyer and Stewart (1992) have been prioritized by Steyer et al. (1995) into Essential Variables or Additional Variables or Substitutions. For this Action Plan, only the Essential Variables are recommended for immediate and on-going monitoring. Those include: Habitat Mapping, Salinity, Water Level and Vegetation.

Data collection methods

This section provides guidance on the types of data collection methods which are currently available and appropriate for monitoring this project types.

*Habitat Mapping* - The procedures and methods outlined by Handley (1992) and Steyer et al. (1995) should be followed.

*Salinity* - The procedures and methods outlined by Powell (1992) and Steyer et al. (1995) should be followed. At least one continuous recording salinity gauge should be installed at each reference site.

*Water Level -* The basic procedures and methods outlined by Powell (1992) and Steyer et al. (1995) should be followed with the following detailed recommendations. At least one continuous water level gauge should be installed at each reference site. These gauges should be sufficiently accurate to record changes in water level of 1 cm and pressure transducers should be vented to allow for automatic correction of changes due to atmospheric pressure. If unvented transducers are used, data must be corrected for changes in barometric pressure.

*Vegetation* - As the monitoring criterion addresses coastal marsh productivity, rather than the abundance of species or communities, the recommendations of Steyer (1992) concerning aboveground biomass and of Steyer et al. (1995) concerning biomass measurements should be followed.

Given concerns related to sediment deposition in the channel, monitoring of changes in the bathymetry of the channel should also be considered.

*Bathymetry/Topography* - Bathymetry and topography should be measured using the techniques outlined by Steyer and Stewart (1992) and Steyer et al. (1995) noting that recording fathometers, measuring in m, should be used for bathymetric and topographic surveying with either GPS or conventional rod-and-level techniques recommended. The choice of survey techniques should be determined by the acceptable level of error and the sophistication of the available technology and equipment.