Restoring the Lower Fish River and Magnolia River Watersheds

Project Background

Over the last decade the Mobile Bay National Estuary Program and our partners have committed to developing management plans for all tidally influenced watersheds in Mobile and Baldwin counties. Watershed planning is a citizen driven effort steeped in science. Plans characterize watershed health and condition while also identifying specific and tangible management measures to protect, conserve, and restore (when necessary) unique characteristics that sustain our coastal quality of life.

Published in 2017, the Weeks Bay Watershed Management Plan (WMP) includes the Fish and Magnolia River drainage basins in the southwestern corner of Baldwin County, Alabama. Baldwin County has been one of the fastest growing counties in Alabama for nearly two decades. Rapid development has led to land use changes resulting in expansion in impervious surface area/cover, (decreases in wetlands and riparian buffer acreage) increasing the volume and velocity of stormwater and associated stormwater-borne pollutant loading. Reducing sediment and nutrient loading in the watershed was a recommendation of the WMP, specifically, identifying instream erosional “hot spots” and prioritization and implementation of stream restoration and bank stabilization projects.

In 2020, the Mobile Bay National Estuary Program was awarded funding from the National Fish and Wildlife Foundation (NFWF) Gulf Environmental Benefit Fund for restoration of degraded streams within the Lower Fish River Watershed (LFRW). Modeled after the successful D’Olive Watershed Restoration Program, the LFRW Restoration Program incorporates natural channel design to emulate natural systems. There are advantages to designing with nature rather than against it, including reduced maintenance and cost, aesthetic improvements, enhanced environmental conditions, and habitat preservation. LFRW Phase I included design and construction of a stream project near County Road 9 & 32 in the Marlow community as well as comprehensive assessments to identify additional sites, and funding for engineering and design of identified sites. The Marlow project was completed in August 2022 and is performing well. Following discussions with willing landowners, project partners, the State, and NFWF, two additional sites were selected for engineering and design – Schoolhouse Branch and four degraded bluffs on the Magnolia River.

The second phase of the LFRW Restoration Program was approved by NFWF in November 2022, with field assessments and engineering and design completed in Phase I providing the foundation for the restoration practices to be implemented. Phase II work includes the restoration and rehabilitation of approximately 3,131 linear feet of perennial stream on Schoolhouse Branch south of U.S. Highway 98 and four non-contiguous bluffs on the Magnolia River east of the town totaling over 900 linear feet (Figure 1).

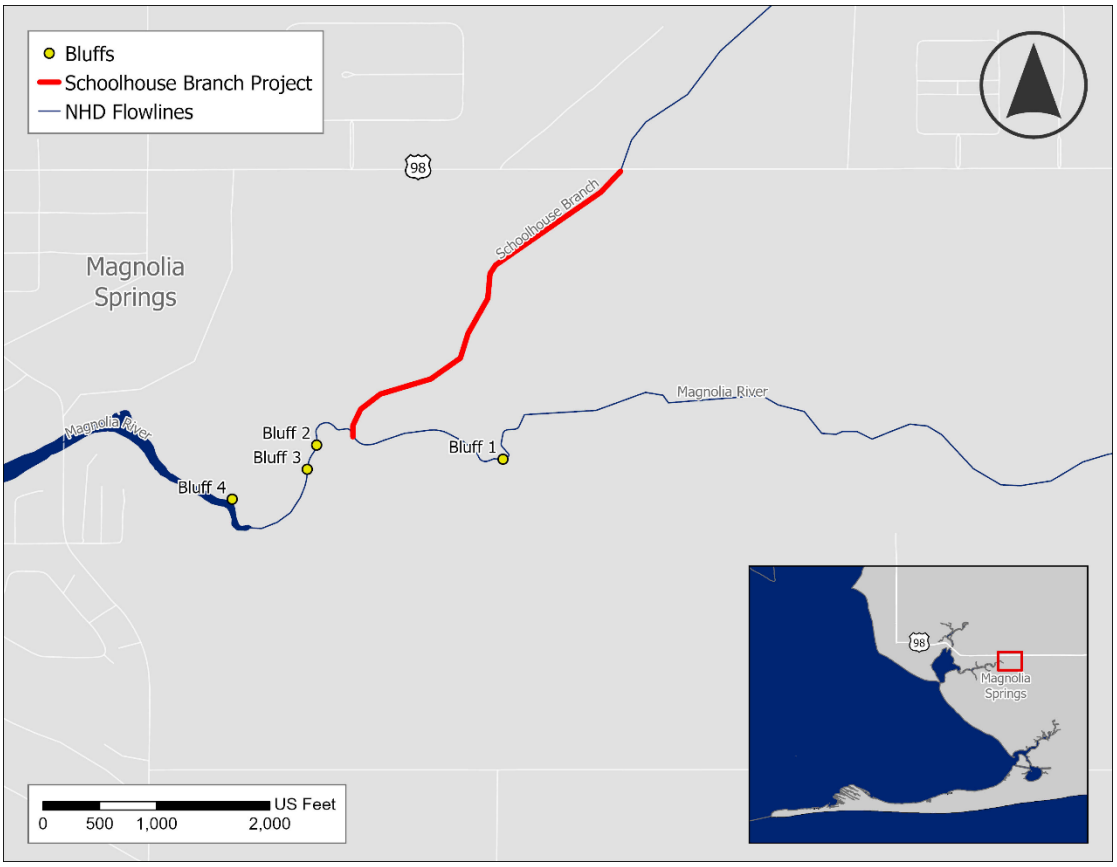

Figure 1: LFRW Phase II Project Map

Procurement for LFRW Phase II has been completed and construction will begin November 2024. Goodwyn Mills Cawood (Magnolia Bluffs) and Volkert Inc. (Schoolhouse) are the principal engineers. Construction contractor procurement followed state Public Works bid laws and bidders are required to demonstrate previous stream restoration experience. Construction is anticipated to last one year with an estimated completion date of November 2025, followed by a two-year maintenance and monitoring period. This project is expected to reduce sediment loading in the watershed by almost 7,000 tons per year, Phosphorus by 13 tons per year, and Nitrogen by 22 tons per year (Table 1).

Project	Stream Length (ft)	Erosion Reduction (tons/year)	Watershed Total Sediment Loading Reduction (%)	Nitrogen Reduction (tons/year)	Phosphorus Reduction (tons/year)
Schoolhouse Branch	3131	4940	18	13.2	11.9
Magnolia River	900	1893	7	9.1	1.3
Total	**4031**	**6833**	**25**	**22.3**	**13.2**

Table 1:Phase II LFRW Load Reduction Estimates

Natural Channel Design Strategy

The restoration of incised and failing stream banks using natural channel design will bolster natural function and environmental condition while combating the effects of erosion, habitat loss, and downstream sediment and nutrient impacts. The most critical aspect of stabilizing incised channels, such as Schoolhouse Branch, is re-establishment of floodplain connectivity. A well-connected floodplain is the first line of defense for a river and its ecosystem during a significant flood event. Floodplains function to dissipate energy during high flows, allowing water to spread out and decreasing velocity and shear stress. This process minimizes scour and bank erosion.

To improve the resilience of a riverbed ecosystem, the floodplain should be reconnected to the river, and native vegetation should be reestablished throughout the riparian buffer. Vegetation acts as a barrier to sediment and anchors the riverbed to the shoreline, slowing the flow of water, filtering pollutants, and reducing downstream erosion. It also provides refuge for wildlife. Additional instream structures are used to provide grade control, bank stability, and enhanced habitat, including toe wood revetments, root wads, log j-hook and sills, riprap, and boulder riffles – reminiscent of mountain streams. These structures support stream stability and reduce stress while planted buffers becomes established. Erosion controls will be put in place with mulch, coconut coir fiber matting, temporary seeding, and bypass pumping during active construction.