

**RESTORE Act Ecosystem Restoration Project Proposals
for consideration in the Gulf Coast Ecosystem Restoration Council's Comprehensive Plan
2012**

Contact Information: Roland Ottolini	Date of Submittal: 1/7/2013
Name of Project: Ten Mile Canal Filter Marsh Phase II	Org and Rank:
Background: The Estero Bay watershed includes all of Estero Bay, most of which lies within the Estero Bay Aquatic Preserve, and the adjacent barrier islands. Hendry Creek, Mullock Creek, Ten Mile Canal, the Estero River, areas of Corkscrew Swamp, Flint Pen Strand, Spring Creek, and the Imperial River are major surface water features in the watershed. Hendry Creek, Mullock Creek, Estero River, Spring Creek, and the Imperial River experience some degree of tidal influenced. The portion of the Estero River east of U.S. 41 is a slow conveyance system and is considered a recharge area along with the Imperial River east of I-75 (SWFRPC, 1995). Local drainage canals tend to provide some regional flood protection during wet periods, but also lead to over-drainage during dry periods. Estero Bay has long been recognized as one of Florida's significant natural resources. The Bay was designated as the State's first Aquatic Preserve. The area in and around the Estero Bay watershed has undergone dramatic increases in the rate of residential and commercial development as well as population growth during the past 30 years. There are several documented, predicted, and perceived problems in the Estero Bay watershed. The problems are primarily related to: 1.) conversion of natural habitats to agricultural, commercial, and residential land uses; 2.) the construction of canals, ditches, and road beds; and 3.) filling, dredging, and draining of wetlands waterbodies that occur in association with the previous two factors. The watershed problems include: increased watershed size, increased freshwater inflows, increased nutrient and total suspended solids loading, lowered water tables, altered wetland and aquatic hydroperiods, loss of wetland, upland, and aquatic habitats, downstream flooding. Ten Mile Canal, part of the Mullock Creek watershed, was constructed in the 1920s to control flooding in South Fort Myers. In the 1970s the Canal was deepened and widened, and control structures for water table maintenance and protection from saltwater intrusion were constructed. Those include the Daniels Parkway Weir, the Page Field Weir and the Tamiami Weir. Culverts, bridges, and weirs along Ten Mile Canal are shown on a watershed map (Attachment 2). Since its original construction and 1970s enhancements, the area surrounding the Ten Mile Canal has developed rapidly, as the area population has nearly quadrupled– from 150,000 to 625,000 – since the 1970s. This has greatly impacted the pollution level of water running into the Ten Mile Canal and subsequently into Mullock Creek and Estero Bay. In 2005, Lee County constructed Phase 1 of the Ten Mile Canal Filter Marsh on an approximately 10-acre land tract owned by the County. The filter marsh is located between Daniels Parkway and Six Mile Cypress Parkway east of Ten Mile Canal. The project included excavation, littoral planting for filtration and absorption of pollutants. Vegetation and plant growth are harvested periodically during the maintenance events. A water control structure is located in Ten Mile Canal just upstream of Daniels Parkway. Water from the canal, upstream of	

the water control structure is diverted into the filter marsh using two (2) 30 inch diameter pipes with gates. Flow through these pipes is controlled by the gates. The existing filter marsh consists of four (4) cells. Cell 1 is a deep cell intended to trap sediments before entering the other cells. Cells 2 and 4 are shallow cells that include emergent vegetation. Cell 3 is a deeper cell that includes floating vegetation. Flashboard riser structures with wood boards are used to control water levels within each cell. Lee County's monitoring data shows an annual average TN removal of 64% and TP removal of 81% for the period of record 2007 to 2010. Lee County will continue to monitor these parameters to develop a clear before-, during- and after-comparison to determine how well the project contributes to lowering the pollutant levels.

Project Description: Lee County built 10 acres of treatment area in the first phase and phase two will double the size of the filter marsh to 20 acres of treatment area.

In August 2009, Lee County entered into an agreement with Seminole Gulf Railway LP to construct an expansion of the filter marsh on lands owned by Seminole Gulf Railway LP. A copy of this agreement is attached (Attachment 4).

Lee County is proposing to widen the Ten Mile Canal Filter Marsh into the Seminole Gulf Railway right-of-way to allow more water to be treated and improve overall treatment efficiency. Along with the expansion, several design changes are proposed including:

- Replacement of riser control structures with top opening gates to better control water levels
- Installation of connection (control structure and pipe) between Cell 1 and Cell 3 to allow flows to discharge directly to Cell 3 without first passing through Cell 2.
- Addition of control structure between Cell 1 and Cell 2 to control water entering the filter marsh in Cell 2. This will allow the gate valves in the inflow pipes to remain open during normal operation.
- Install a control structure on the existing pipes between Cell 2 and Cell 3. This structure will remain closed during normal operation. It will only be opened during some maintenance operations.
- Change of bottom elevations within Cell 2, 3 and 4 to maintain approximately 1.5 ft of water at the control elevation and 2 ft of water during normal operation.

Lee County and other partner agencies have developed watershed management plans over the years that have cited the Ten Mile Canal and provided recommendations for water quality improvement best management practices. The following is a brief summary of those plans from which we developed the Ten Mile Canal Filter Marsh Phase I and Phase II concept:

Charlotte Harbor National Estuary Program Comprehensive Conservation Management Plan explains the need for water quality improvement projects utilizing passive wetland treatment in the Estero Bay Watershed which receives flow from the Ten Mile Canal.

Estero Bay Agency on Bay Management has labeled Ten Mile Canal an "issue of special concern."

The South Florida Water Management District in 1999 completed an assessment study of the Estero Bay Watershed. In the report, SFWMD identified the Ten Mile Canal as a major source of pollutants flowing into Estero Bay. Specifically, the report noted pollution emptying into Ten Mile Canal includes urban runoff, suspended solids loading, nitrogen and phosphorous loading and industrial discharge. Further, the report recommended a project be developed to improve water quality within the Estero Bay Watershed and identified opportunities to reduce pollutant loading from older developments along the Canal. The report suggested the project's effectiveness also should be regularly monitored through ongoing data analysis through a private grant to Florida Gulf Coast University. Phase I of the Ten Mile Canal Filter Marsh project included two additional funding partners; the South Florida Water Management District contributing \$400,000 and the Florida Department of Environmental Protection contributing \$507,000. These funds were applied to the project construction and management.

Lee County Stormwater Master Plan discusses, at length, pollutant problems with the Ten Mile Canal.

Lee County recently made a significant investment in trying to identify the relationship between land use and water quality in the Estero Bay Basin by retaining a consultant, DHI, Inc., to:

- (1) Establish a dynamic water quality model for the Estero Bay Basin, which will simulate the impacts from changes of pollution loading caused by changes in land use or river network alterations.
- (2) Provide Lee County with a watershed planning and management tool.

Project Location: Mullock Creek Basin

Responsible Party: Lee County

Partners: FDEP

NEP: CHNEP

Project Cost: \$2,316,000

Dollars Needed: \$

Start: November 2012

Completion: 2013

Status of Project Design and Permitting: Project is permitted and commenced.

What Date or Year could Construction Feasibly Begin: 2012

Your Proposed Timing of Funding (given permits, phasing, staging, etc.)

FY	12/13	13/14	14/15	15/16	16/17	17/18	Total

Quantify Environmental Results and How to Measure Them: Improve water quality and support the restoration efforts within the Estero Bay basin for Impaired Waters Rule planning list pollution reduction goals, the Southwest Florida Comprehensive Watershed Plan (formerly Southwest Florida Feasibility Study) and provide habitat improvement concurrent with Lee County's comprehensive conservation master planning efforts.

Economic Benefits (including ecosystem services): Improved water quality, improved fisheries and rookery habitats.

Estimated number of Jobs Created or Preserved: 25

How much Habitat will be restored and conserved?: 10 acres onsite, 7 sq mi downstream

Quantify pollutant reductions: 1,103 kg/yr TP, 5,816 kg/yr TN

What living coastal/marine resources will be improved and by how much?: Mullock Creek, Estero Bay.

How will community resilience be enhanced? Improved freshwater wetland habitat in the current landscape will prolong the period of habitability in the tributaries of the Estero Bay as climate change and sea level rise occur. Habitat improvements due to restored historical flows will also mitigate the current effects of degradation on fisheries and improve the period of time these fisheries can be sustained during the onset of sea level rise.

Additional Justification: Lee County has entered into a Basin Management Action Plan (BMAP) with the Florida Department of Environmental Protection in 2012 in the basin adjacent to the Mullock Creek/Ten Mile Canal basin. The BMAP was promulgated due to TMDLs for total nitrogen in the Hendry Creek Basin, a tributary to the Estero Bay. The basin land use in the Mullock Creek basin is similar to that of Hendry Creek and is on FDEP's Impaired Waters Rule (IWR) Planning List for future TMDLs. The County is required to restore and protect water quality under the BMAP watershed restoration plan as well as mitigate impacts in IWR prioritized basins. In addition, the Estero Watershed is part of a system that has been designated Outstanding Florida Waters as well as discharging into State Aquatic Preserve and National Wildlife Refuges. The Estero Bay Watershed has been identified by numerous local, state and federal studies as an area of critical concern due to hydrologic disconnection resulting from development pressure in the region.

Add any photos or maps that explain project:

