NONPOINT SOURCE SUCCESS STORY

Florida

Ecosystem Restoration Project Improves Clam Bayou Drain

Waterbody Improved

Water quality impacts from nutrient loading and polluted runoff from nonpoint sources led the Florida Department of Environmental Protection (DEP) to add Clam Bayou Drain to Florida's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for annual average exceedances of the historical maximum nutrient impairment threshold. In response, project partners implemented numerous nonpoint source pollution management strategies including constructing the Clam Bayou Ecosystem Restoration Project, which provides habitat for a variety of wildlife and increases water quality, storm water treatment, flood control and channel stabilization. Improvement in chlorophyll *a* (chl *a*) measurements demonstrates that the project has had a positive impact on water quality for Clam Bayou Drain. DEP recently acquired updated seagrass coverage information and is scheduled to propose removal of this waterbody from the 303(d) list of impaired waters in 2021.

Problem

The 44-acre Clam Bayou Drain watershed is in the Group 5 Springs Coast Watershed in central Pinellas County between Gulfport and St. Petersburg, Florida (Figure 1). Clam Bayou Drain is a Class III estuary designated for recreation and the propagation and maintenance of healthy, well-balanced fish and wildlife populations. The predominant land uses in the Clam Bayou Drain watershed are 56% urban and 24% wetlands. Clam Bayou Drain flows into the Boca Ciega Bay Aquatic Preserve and then into Tampa Bay.

In 1998, DEP placed Clam Bayou on the state's CWA section 303(d) list for nutrients, bacteria and dissolved oxygen impairment. There are no point sources within the Clam Bayou watershed; nonpoint sources include septic systems and surface water runoff.

Since 1998, DEP adopted the Identification of Impaired Surface Waters Rule (IWR) Chapter 62-303, Florida Administrative Code, applying the numeric interpretation of the narrative nutrient criteria of 11 micrograms per liter (µg/L) chl *a* expressed as an annual average not to be exceeded in any year.

The Clam Bayou Drain watershed is mostly urbanized and built-out, which has led to portions of the bayou to be highly modified and engineered. The hydrologic modifications altered the natural flow of water within the bayou, causing the nutrient concentrations to increase and eventually exceed the state's applicable water quality standard for Class III waterbodies.

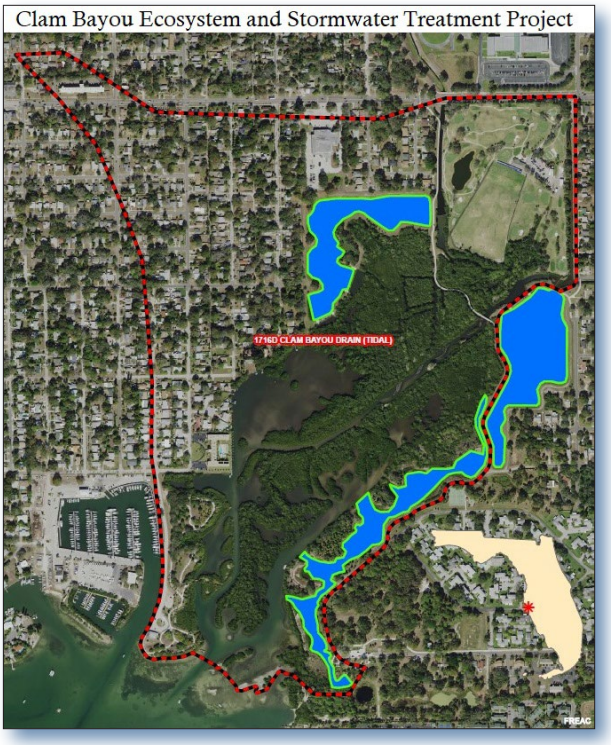

Figure 1. The Clam Bayou Drain watershed is on Florida's Gulf Coast (project area highlighted in blue).

Story Highlights

In 2005, the ecosystem restoration and stormwater treatment project with the cities of St. Petersburg and Gulfport were selected for Florida's CWA section 319(h) funding. The Clam Bayou ecosystem restoration project was designed and implemented to address nonpoint source pollution impacting the Clam Bayou watershed and provide benefits such as wetland restoration, flood control, water quality improvement and recreational opportunities. The project restored/enhanced 24.14 acres of various estuarine and coastal habitats for the bayou and created 20 acres of ponds that now provide stormwater treatment for an estimated 2,558 acres of urbanized watershed (Figure 2). The 319 funding supported construction of a new wet detention pond which, in combination with other stormwater treatment practices funded by project partners, results in an estimated load reduction of 1,236.79 pounds per year (lbs/year) total nitrogen and 68,510.85 lbs/year total suspended solids.

These best management practices enhance water quality by reducing loads of nutrients and other pollutants delivered to Boca Ciega and Tampa Bay. The restored wetland areas also provide essential habitat for wildlife. Facilities built for recreational use include boardwalks and a canoe/kayak launch facility. Additionally, educational signage depicts the processes used by the project to treat stormwater runoff. The project work was initiated in 2005 and completed in 2013.

Results

Data have been collected for the time periods before/during the construction of the ecosystem restoration and stormwater treatment project, as well as after the completion of the project in 2013. The period of record consists of 6 years of data, collected at multiple monitoring stations by various agencies, including Pinellas County, the City of St. Petersburg and DEP. There has been a decrease in the chl *a* concentrations from before the ecosystem restoration and stormwater treatment project was initiated in 2005 and when it was completed in 2013. These decreasing concentrations can be attributed to the addition of several immediately adjacent stormwater treatment areas with connected control structures, as well as the restoration of a natural wetland area, which created a more natural flow regime.

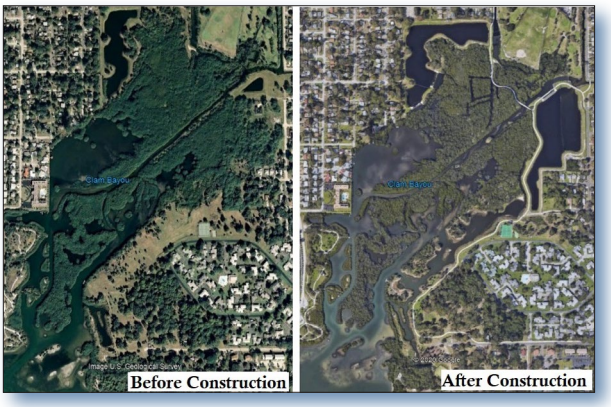

Figure 2. Clam Bayou project area, before and after restoration project construction.

In 2013 the threshold expression was updated from an annual arithmetic mean to an annual geometric mean. For comparison, data are presented using both methodologies; both calculations show an improvement in chl *a* concentrations. In the post-project time period (2016–2019), the annual arithmetic mean (AAM) concentrations have decreased below the state's impairment threshold of 11 µg/L, with a maximum concentration of 11 µg/L in 2019—down from a maximum value of 18 µg/L in 2004 (pre/during project). The same improvement is seen in the annual geometric mean (AGM) chl *a* concentrations, with a maximum pre-project value of 14 µg/L and a maximum post-project value of 7 µg/L. These reductions demonstrate that the project has had a positive impact on water quality for Clam Bayou. As a result, DEP is scheduled to propose removal of this waterbody from the 303(d) list of impaired waters in 2021.

Partners and Funding

The project was funded through the City of St. Petersburg Land Acquisition ($1,920,050), Southwest Florida Water Management District (Pinellas-Anclote Basin Board, Water Management Lands Trust Fund, State Appropriation) ($6,926,200), and CWA section 319 grant funding ($898,800 total [$600,000 in 2005 and $298,800 in 2004]). The 319 funds were allocated to the construction of the Boca Ciega Clam Bayou Stormwater Treatment Project – Central Pond. Pinellas County has also implemented multiple environmental education campaigns, including Be Floridian, and has partnered with the University of Florida's Institute of Food and Agricultural Sciences Extension offices.

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For additional information contact:

Amanda Peck
Florida Department of Environmental Protection
850-245-2952 • Amanda.Peck@floridadep.gov