

Lake Gwyn East Surface Water Restoration

**Hans Zarbock, P.E. – Principal Investigator
Polk County Parks & Natural Resources Division
4177 Ben Durrance Road
Bartow, FL 33830
hanszarbock@polk-county.net**

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1.0 ABSTRACT

The restoration of Lake Gwyn is an important part of conserving the Peace River basin. As part of the headwaters to the Peace River and a significantly degraded system, restoration of Lake Gwyn not only provides an increase to water quality in the system, but also much needed wetland habitat for fish and wildlife. Previous partnerships between Polk County, the Southwest Florida Water Management District, and the Florida Fish and Wildlife Conservation Commission have completed the restoration of the western portion of the lake. This restoration saw dramatic increases in fish and wildlife use. This project seeks to restore the eastern half of the lake, to increase water quality in the system and provide more suitable habitat for fish and wildlife.

2.0 INTRODUCTION

Florida's Wildlife Legacy Initiative (FLWI) has identified the Peace River as a priority enhancement basin in the State Wildlife Action Plan (SWAP) (Florida Fish and Wildlife Conservation Commission [FWC], 2012). Enhancement basins were defined as having "poor and declining conditions but high value for fish and wildlife." The Peace River begins in Polk County in south-central Florida and flows southwest through Hardee and DeSoto counties before discharging into the Charlotte Harbor estuary in Charlotte County. The river is one of the largest rivers in southwest Florida and is about 105 miles in length with a watershed of approximately 2,350 square miles. The Peace River is the dominant fresh water system discharging to the Charlotte Harbor estuary. Flows from the river, especially high flows during the summer months, are essential to the overall health and productivity of the estuary (PBSJ, 2009). Additionally, the river serves as the primary water source for the Peace River Manasota Regional Water Supply Authority which supplies potable water to Charlotte, DeSoto, Manatee, and Sarasota Counties. The SWAP identifies high ranking Sources of Stress for rivers and streams as "Surface Water Withdrawal", "Conversion to Agriculture", "Nutrient Loads – Agriculture", and "Conversion to Housing and Urban Development." All of these Sources of Stress are applicable

to the Peace River system and affect habitat, water quality, and hydrology of the river and estuary.

Located within the headwaters of the Peace River, Lake Gwyn (Figure 1) is a 120-acre surface water body located east of County Road 655 in the community of Wahneta in Polk County. The lake is at the center of the Wahneta Farms Canal (canal) watershed (Waterbody Identification Number [WBID] 1580) which flows into Peace Creek (WBID 1539) and subsequently the Peace River. A fecal coliform Total Maximum Daily Load (TMDL) was adopted by the Florida Department of Environmental Protection (FDEP) for both Peace Creek and the Wahneta Farms Canal. These water bodies receive large nutrient loads as well.

The Wahneta Farms Canal receives runoff from a watershed that consists of rural-residential, agricultural, industrial, and commercial land uses. Urban areas comprise about 40% of the watershed, the vast majority of which was developed prior to the regulation of stormwater quality by the state. Stormwater runoff from Winter Haven is transported by the canal from a direct contributing drainage area of 3,637 acres. During periods of high water, flows are diverted from Lake Lulu into the canal through a connector canal and control structure operated by the Lake Region Lake Management District. Thus significant flows from the Winter Haven Chain of Lakes can also contribute to inflows to Lake Gwyn.

The canal was constructed in the 1920's as a deep cut ditch with high spoil berms on each side, and bisects Lake Gwyn diagonally from north to south. The lower elevation of the canal drained the lake and has severely lowered historical surface and ground water elevations. This has resulted in a degraded wetland system which was dry most of the time.

The Wahnetta Canal Watershed Management Plan (PBS&J, 2005) recommends three projects for restoring floodplain storage and wetland functions within the watershed. The restoration of Lake Gwyn was identified as one of the most feasible options to achieve these objectives in large part because the land needed for the project is owned by the State of Florida, and the old lake bottom provides an excellent area for a constructed marsh. Geographically this area is a vital link between the Winter Haven Chain of Lakes and the Peace River providing a significant opportunity for habitat creation and treatment of stormwater in the watershed.

In 2005 Polk County entered into a 50-year lease agreement with the State of Florida's Board of Trustees of the Internal Improvement Trust Fund for 67.9 acres of the lake west of the canal. In 2008 the lease was amended to include the remaining 80 acres of land under State ownership making it feasible to restore both sides of the lake. A study was conducted by Quest Ecology and Moduss Engineering in 2009 on the feasibility of restoring the wetland functions of Lake Gwyn. Based on the results of this study, Polk County obtained a Southwest Florida Water Management District (SWFWMD) Environmental Resource Permit (ERP) for restoration of the western half of the lake. Cooperative funding for the engineering design and permitting was provided to Polk County by the SWFWMD and the FWC Aquatic Habitat Conservation and Restoration Section. Funding for construction was also jointly provided by Polk County, SWFWMD and a State Wildlife Grant from FWC. That part of the project has been successfully completed.

Similarly, engineering design and permitting are now being completed for the east side of the lake (Figure 2). Note that some of the east half of the historical lake area is not included. Privately-held parcels have not been incorporated in the design. Cooperative funding from SWFWMD for construction has been approved, and obtaining a State Wildlife Grant is critical to successfully implement construction. Draft (60%) construction plans have been submitted to

FWC, and the ERP permit (43035044.004) and the U.S. Army Corps of Engineers (ACOE) permit (SAJ-02463 NW27) are available upon request.

A major benefit of this work is increased wetland and aquatic habitat for birds and other wildlife. The new constructed wetland treatment system will further reduce fecal coliform pollutant loads while also reducing the nitrogen (TN), phosphorus (TP), total suspended solids (TSS) loads that are impairing the canal and downstream receiving waters. The pollutant load reductions expected from this project were calculated. The pollutant load reduction from the east and west sides of the lake combined were estimated to be 2,259 lb/year for total phosphorus (TP), 9,387 lb/year total nitrogen (TN), 46,596 lb/year of biochemical oxygen demand (BOD), 350,653 lb/year of total suspended solids (TSS), and a 60% reduction in fecal coliform. This exceeds the 38.9% fecal coliform reduction specified in the TMDL for the Wahneta Farms Canal (WBID No.1580). Treatment in the east side of the lake is estimated to contribute 9%, 22%, 19% and 11%, respectively, to the total load reduction. In addition to the habitat and water quality improvements, this project provides additional storage volume to help attenuate flooding of the Peace Creek Canal and to assist in maintaining minimum flows in the Peace River. The project will also provide public education on the use of wetlands for stormwater treatment, and provide areas for passive recreational activities such as hiking, bird watching, and fishing.

Many Species of Greatest Conservation Need will benefit from this project. Additional wetland habitat will be created for wading birds such as the Great Blue Heron (*Ardea Herodias*), Great Egret (*Ardea alba*), Little Blue Heron (*Egretta caerulea*), and Limpkin (*Aramus guarauna*), and mammals such as the river otter (*Lontra canadensis*). Since construction of the west side of Lake Gwyn was completed, Snail Kites (*Rostrhamus sociabilis plumbeus*) have been observed loafing and foraging onsite. Construction of wetland habitat on the east side will increase

suitable habitat for this species. The newly created marsh will also create expanded foraging habitat for many species of bats. The resultant increased level of water quality treatment will benefit many of the freshwater invertebrates and fish inhabiting the canal and river.

Upon project completion, the site will open to the public for passive recreation. Kiosks will be installed with signage on the natural communities present, and on the effects of pollutants in stormwater runoff for public education of both the neighboring community and the students of the adjacent elementary school. Brochures will be developed for the project and distributed to the local community to educate the citizens on what can be done to further reduce these pollutants at their source. County staff will conduct tours and classes at the site to improve the public's understanding of stormwater, wetlands treatment, and lake biology. The educational component of this project will not be funded by State Wildlife Grants.

A site-specific resource management plan for west Lake Gwyn (Polk County Parks & Natural Resources Division, 2017) was approved by FDEP to maintain the wetland function for stormwater treatment while controlling the invasive vegetation on the area under lease from the State. Polk County will monitor the site in accordance with the management plan and ERP and will apply the same management principals to the east side.

3.0 METHODS

To accomplish re-establishing favorable surface water elevations in the eastern portion of the lake, a portion of the canal water that now passes through only the western portion of the lake will need to be diverted. This will be accomplished by the use of heavy machinery to remove sections of berm currently restricting the flow of water into the eastern portion of Lake Gwyn. Heavy earth work will be used to clear the project area, grade the site to the designed

specifications and create berms around the project area to ensure neighboring properties are not flooded during high water conditions. Success will be determined by the completion of construction as designed and permitted.

Rehydration of the 50 acres of dried lake bottom will occur as a portion of the Wahneta Farms canal is diverted after earth work is completed. Wetland function is designed to occur at all flow regimes as a series of deep pools will be dug to maintain water at low flow regimes, and during high flow regimes, water will sheet flow from north to south across the project area. Success will be determined by the completion of construction as designed and permitted.

Planting of the site with upland and aquatic native vegetation following completion of the earthwork will provide enhanced habitat, erosion control, and stormwater treatment. The site will be stabilized with an initial planting during the final stages of construction. Wetland planting for stormwater treatment will occur after a period of natural recruitment of native vegetation to allow for control of emergent exotic invasive species. Desirable aquatic vegetation will be planted in five zones based on water depth, including an herbaceous marsh, deep zones, emergent side slopes along the deep zone, shrubby upper side slopes, and a forested wetland island, as shown on the attached planting plan graphic. The deep zone will provide important fish and wildlife refuge and food source during low water periods and an existing forested island will provide bird roosting habitat. Over one million native plant species common to Polk County wetlands will be installed at the site, with species selected based on the proposed water depths. Representative species include maidencane (*Panicum hemitomon*), blue flag iris (*Iris hexagona*), smartweed (*Persicaria* spp.), lizard tail (*Saururus cernuus*), button bush (*Cephalanthus occidentalis*), alligator flag (*Thalia geniculata*), swamp dogwood (*Cornus foemina*), red maple (*Acer rubrum*), dahoon holly (*Ilex cassine*), and sweetbay (*Magnolia virginiana*). To support

development of the planted desirable species, an initial maintenance event will be conducted upon completion of the grading activities to remove nuisance and exotic vegetative species. As with the Lake Gwyn West project, vegetation maintenance will be conducted regularly throughout the operation phase of the project to ensure the nuisance and exotic species remain at low levels.

4.0 Progress

Selected contractor (RAM) was selected and has begun initial grub and clear on the project site. Due to unexpected rains and discovering more muck/clay soils than anticipated originally, the projects has slowed to address these issues. Below is a detailed summary of the Lake Gwyn Efforts for July 1, 2018 to Jan 31, 2019.

Prior to July 1, 2018, RAM Excavating selected as construction contractor for the project.

October 8, 2018 – Notice to Proceed was issued to RAM Excavating. Completion date is July 21, 2020 (580 calendar days)

October 23, 2018 – Discovered large force main under area where construction equipment would access. Need solution.

November 29, 2018 – CSA with Wood (formerly known as Amec Foster Wheeler) signed for construction administration and archaeology survey as requested by FWC.

December 4, 2018 – Mobilization initiated

December 11, 2018 – Kickoff meeting held and dewatering began

December 12, 2018 – FWC agreement executed

December 18, 2018 – Concrete pad construction over large force main began & completed

January 10, 2019 – SWFWMD co-funding representative visited site with County staff and contractor

January 16, 2019 – On-site progress meeting

January 28 & 30, 2019 – 22 additional geotech (muck borings) conducted throughout site

5.0 Future Plans

Please see below project schedule and progress:

Construction

1.1 Mobilization and Dewatering

December 11 and is expected to continue until February 2019.

1.2 Clearing and Grubbing

Site clearing began on December 11 and is expected to continue through April 2019

1.3 Earthwork

Excavation is scheduled to begin in April 2019 and continue for 9 – 10 months.

Construction Engineering Services

2.1 Construction Engineering Services

This activity began December 11 and will continue through project completion.

2.2 Site Inspections

This activity began December 11 and will continue through project completion.

2.3 As-built Drawings

This activity will begin after final site grading.

2.4 Aquatic Vegetation Planting

This activity will begin upon approval of as-builts.

In addition, details of the required future work is to address the discovery of more clay/muck in the soil that originally calculated. So the first step is to conduct LiDar of the recently grubbed project site, which will be completed on the project site in March. Using the LiDar the plans will be reviewed and an assessment of the existing native vegetation and plans will be made. Contractors will continue to remove soil from the site, working towards the end desired contouring of the project. Continued inspection will occur to maintain BMP for sediment control and water quality.