

STREAM ECOSUMMARY

Lake Marion Creek, Polk County
WBID 1472A
STORET 280358858128462
October 20, 2010



Figure 1. Stream Condition Index site for Lake Marion Creek on October 20, 2010.

The Department of Environmental Protection (DEP) conducted water quality and biological sampling at Lake Marion Creek in Polk County on October 20, 2010, in order to assess attainment of designated uses.

❖ Background

The biological assessment method consisted of the Stream Condition Index (SCI, an assessment tool developed by the Florida Department of Environmental Protection (FDEP) to determine ecological integrity of aquatic macroinvertebrate communities. The SCI assesses how closely the macroinvertebrate community of a stream resembles that of an undisturbed or “reference” condition. The SCI is based on ten measurements of the aquatic macroinvertebrate community, eight of which decrease in response to human disturbance and two metrics (% very tolerant and % dominant) that increase with greater human disturbance. As described in DEP SOP LT 7000, the SCI score ranges and categories are: (68-100) Exceptional; (35-67) Healthy; and (0-34) Impaired. As part of numeric nutrient

criteria development, an SCI score of 40 or higher, based on the two most recent samples, was determined to fully meet the expectation of a healthy, well- balanced community, with no single value below 35. Each SCI includes assessment of stream habitat, conducted per DEP SOP FT 3100. The stream and river Habitat Assessment (HA) evaluates the availability and quality of habitat for macroinvertebrates, and can help diagnose the cause of a low SCI score.

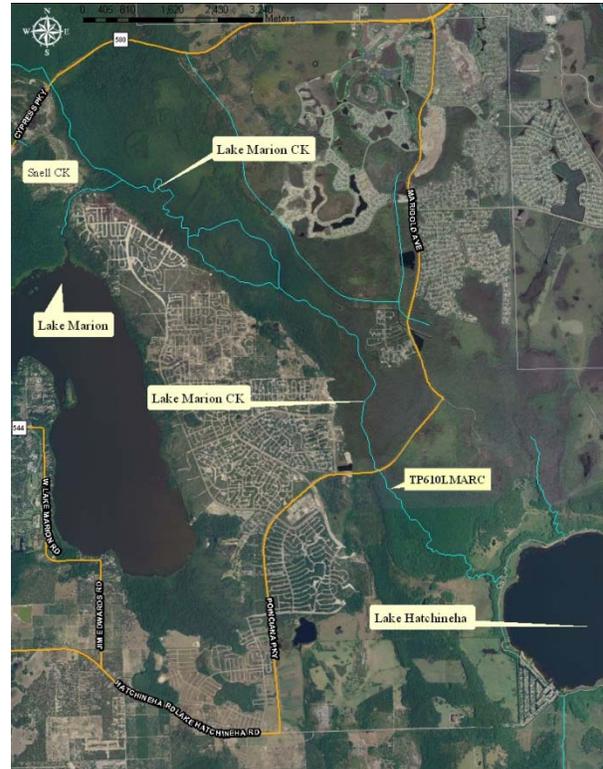


Figure 2. Lake Marion Creek Watershed geographic location and sampling site TP610LMARC location.

❖ Watershed Characteristics

The headwaters of Lake Marion Creek is Lake Marion in Polk County. The Creek runs for 11 miles and flows into Lake Hatchineha (Figure 2). Most of the watershed is hardwood swamp.

❖ Methods

The site (TP610LMARC) was located south and east of Haines City, and about 400 meters south of Poinciana Parkway (Figure 2). The SCI was collected on October 20, 2010, by

DEP Southwest (SW) District Office staff per DEP SOP FS7420 and calculated per DEP SOP LT7200. (<http://www.dep.state.fl.us/water/sas/qa/sops.htm>). The SCI consists of collecting 20 D-frame dipnet sweeps (0.5 m in length) of the most productive habitats in a 100 m reach of stream. The organisms are sub-sampled, sorted, and identified to the lowest practical taxonomic level. The SCI included habitat assessments per DEP SOP FT 3100.

Periphyton (attached algae) was collected using DEP's Qualitative Periphyton Method (DEP SOP FS 7220). A total of 10 sample aliquots are apportioned across available habitats (snags, roots, leaf packs, vegetation and rock, excluding sediments) in a 100 m stream reach. To perform the method, a seasoned substrate is chosen, and algae is removed from a 9 cm diameter area and placed into a wide-mouth jar that was been filled with 100 ml of site water. Water and algae are mixed and a 4 ml aliquot is removed and placed into a centrifuge tube. Nine additional aliquots are sampled in this manner for a final volume of 40 ml. The sample is analyzed for algal taxonomic composition in the lab.

❖ Results

Habitat: The riparian zone was mostly natural and quite extensive; about 200 meters on the west side and about 190 meters on the east side. The in-stream habitat in this section of Lake Marion Creek was predominantly sandy bottom. About 6% of the available habitat was considered productive (snags, roots and aquatic vegetation) and available for invertebrate and fish use. Over 25% of the habitat was smothered by either sand or silt accumulation. Water velocity was 0.25 m/sec.

The Habitat Assessment score was 126 which places it in the "Optimal" category, indicating that the watershed has been minimally disturbed by human influences.

Invertebrates: The SCI score was 61, meeting the requirements for the FDEP's healthy

Category 2 status. The invertebrate community was diverse, with several sensitive species and few tolerant species. However, the grazing amphipod, *Hyalella azteca*, dominated the community, comprising about 35% of organisms collected.

Water chemistry: Table 1 summarizes the water quality measurements for October 20, 2010. All parameters with the exception of total nitrogen fell within natural unimpaired levels. Total nitrogen exceeded the proposed Class III water quality criterion due to high concentrations of total Kjeldahl nitrogen (TKN) and nitrate+nitrite. High TKN and low pH are typical for highly colored streams that drain hardwood swamps.

Table 1. Water quality data results for Lake Marion Creek on 10/20/10.

Analyte	Result	Applicable Class III Water Quality Criteria (freshwater)
Field Temperature (°C)	23.9	
Field pH (SU)	5.55	≥6 and ≤8.5 or within 1 SU of natural condition
Field Dissolved Oxygen (mg/L)	7.9	≥ 5.0
Field Specific Conductance (µmhos/cm)	161	Not > 50% of natural conditions but never > 1275
Alkalinity (mg CaCO ₃ /L)	41	≥20
Color (PCU)	100	
Chlorophyll a (µg/L)	42	
Total Phosphorus (mg/L)	0.084	*0.12 mg/L
Nitrate+Nitrite (mg/L)	0.42	
Ammonia (mg/L)	0.036	
Total Kjeldahl Nitrogen (mg/L)	1.9	
Total Nitrogen (mg/L)	2.356	*1.54 mg/L

* Federally promulgated numeric nutrient criteria for peninsular nutrient region

The algal community in the stream consisted of 50.67% blue-green algae, 32% diatoms and

17.33% green algae. The most common taxon was the cyanobacteria, *Synechocystis*, a fairly common species found in both fresh water and marine waters. *Synechocystis* is one of the most highly studied blue-green algae because, like many cyanobacteria, it can grow both by photosynthesis in sunlight and by heterotrophic growth in the absence of light (Vermaas 2001). The dominant diatom collected was *Achnanthydium microcephalum*, a very widespread and abundant diatom around the world.

❖ Significance

The current biological sampling shows that Lake Marion Creek supported a healthy, well balanced macroinvertebrate community at this location on October 20, 2010, despite excessive total nitrogen. The freshwater macroinvertebrate community was diverse and well-balanced, indicating a healthy stream.

❖ References

All of the Florida Department of Environmental Protection (FDEP) Standard Operation Procedures (SOP) can be found on the Departments website: <http://www.dep.state.fl.us/labs/cgi-bin/sop/biosop.asp>

Development and Testing of Biomonitoring Tools for Macroinvertebrates in Florida Streams Fore, L. 2004_ Final Report
http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/sci_old.pdf

Diatom identification guide & ecological resource.
<http://westerndiatoms.colorado.edu/taxa/genus/achnanthydium>

Lake Marion Creek & Reedy Creek Management Areas; Five-Year General Management Plan (2005 – 2010). Land Stewardship Division South Florida Water Management District, April 2005.
https://my.sfwmd.gov/portal/page/portal/pg_grp_sfwmd_landresources/portlet_mgmtplans/lake_mar_upper_reedy_plan_1105.pdf

Stream Condition Index (SCI) Report - Fore, L. et al. 2007. Development and Testing of Biomonitoring Tools for Macroinvertebrates in Florida Streams.
http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/sci_final.pdf

**For more information, please contact Gitta Schmitt, Southwest District Office, 13051 N. Telecom Pkwy, Tampa, FL 33637. (813) 632-7600 x 490.
E-mail: Gitta.Schmitt@dep.state.fl.us**