LAKE ECOSUMMARY

Swift Creek Pond

September 7, 2012

DEP conducted water quality and biological sampling at Swift Creek Pond in Bradford County on September 7, 2012 to assess attainment of designated uses. Swift Creek Pond was part of the Integrated Watershed Resource Monitoring (IWRM) Status Network probabilistic sampling program. The water quality sampling was done by IWRM staff from the St. Johns River Water Management District (SJRWMD) and the Lake Vegetation Index (LVI) was completed by DEP Northeast District. Overall, the water quality and plant community data indicated that the lake met expectations for a healthy, well-balanced lake.

Background

Although healthy, well-balanced lake communities may be maintained with some level of human activities, such activities may result in lake degradation. Human stressors include increased inputs of nutrients, sediments and/or pesticides from watershed runoff, undesirable removal of native shoreline and/or upland buffer vegetation, and introduction of nuisance (generally exotic) plants and animals. DEP has methods to evaluate if human activities have resulted in the condition where a particular waterbody has exceeded water quality criteria (Chapter 62-302, Florida Administrative Code), including whether adverse impacts to biological communities have occurred. DEP water quality standards are designed to protect designated uses of the waters of the state (*e.g.,* recreation, aquatic life support), and exceedances of these standards are associated with interference with the designated use. Chlorophyll *a* is a measure of algal biomass in the water column. In clear, low alkalinity lakes (lakes where color is < 40 PCU and alkalinity is < 20 mg/L $CaCO_2$), a healthy system is expected to have $\leq$ 6 µg/L of chlorophyll *a*. In colored ($\geq$ 40 PCU) lakes or clear, high alkalinity ($\geq$20 mg/L $CaCO_2$) lakes, healthy systems are expected to have $\leq$ 20 µg/L of chlorophyll *a*. Chlorophyll *a* values greater than those shown above may result in unwanted shading of aquatic plants and/or greater potential for harmful algal blooms. The Lake Vegetation Index (LVI) assesses how closely the plant community of a lake resembles a native undisturbed community. These tools are often used in conjunction with one another because it is possible to detect imbalance in the plant community while the algal community appears healthy (and vice versa).

Methods

Swift Creek Pond was sampled on April 11, 2012 by the IWRM staff; DEP Northeast District Office performed LVI on September 7, 2012. Surface water samples were collected for analysis of nutrients, chlorophyll *a*, color, and alkalinity, following DEP Standard Operating Procedures (SOPs; see http://www.dep.state.fl.us/water/sas/qa/sops.htm). Sampling and analyses met DEP quality assurance/quality control standards (see http://www.dep.state.fl.us/water /sas/qa/index.htm). For the LVI, species lists were developed for four of twelve sections of the lake (Figure 1), and the following information was derived from those lists: percent native species, percent invasive exotic species, percent sensitive species, and the coefficient of conservatism (C of C; a measure of how tolerant a species is to disturbance) of the dominant species. According to DEP SOP LT 7000, the LVI score ranges and categories are: (78-100) Exceptional; (38-77) Healthy; and (0-37) Impaired. DEP has proposed a revised impairment threshold, in which scores of 43 and higher fully meet the expectation of a healthy, well balanced community, and scores below 43 are considered impaired. The LVI was sampled per DEP SOP FS7310 and calculated per DEP SOP LT7000.

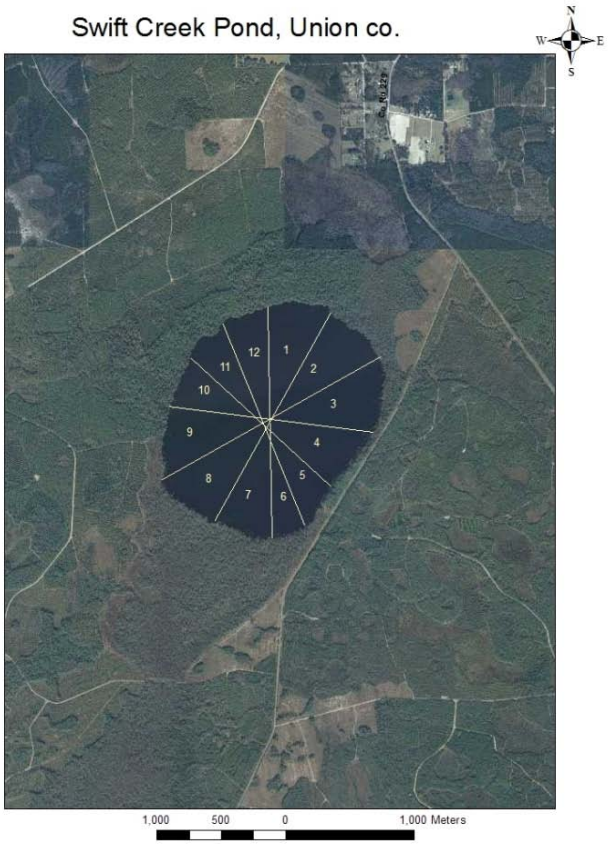


Figure 1. Sampling map of Swift Creek Pond. Sections 1,4,7,10 were sampled for the Lake Vegetation Index. Water quality sample was collected from the lake center.

Site Information

Swift Creek Pond, located in northern Union County, is surrounded by Swift Creek Swamp and natural forest. Swift Creek Pond has a Landscape Development Intensity Index (LDI) of 1.0. This low LDI value indicates completely natural land uses. Also important to note is that Swift Creek Pond has never had a documented fish kill. See the link for fish consumption advisories: (http://www.doh.state.fl.us/environment/medicine/fishconsumptionadvisories/2012-75Brochure.pdf). Swift Creek Pond is a high color, low alkaline lake. Swift Creek Pond is not listed as impaired for any water quality parameter.

Results

Water Quality

The water quality samples complied with water quality standards (Table 1). The concentrations of total nitrogen and total phosphorus in the sample collected April 11, 2012, did not exceed the proposed state water quality criteria (Table 1, note that compliance with lake numeric nutrient criteria involves an annual geometric mean, and is not based on single samples). The water quality sample had a chlorophyll value of 18 µg/L, which although elevated, met the proposed standard. The high color (220 PCU), low alkalinity (0.65 mg/L), and low pH (5.1 SU) are characteristic of dystrophic lakes.

Table 1. Water quality results from April 11, 2012 at Swift Creek Pond.

Analyte	Result	Remark	Applicable Class III Water Quality Criteria
Field Temperature (°C)	22.1		
Field pH (SU)	5.1		
Field Dissolved Oxygen (mg/L)	8.29		≥ 5
Field Specific Conductance (µmhos/cm)	102		
Alkalinity (mg $CaCO_3$/L)	0.65		
Color (PCU)	220		
Chlorophyll a (µg/L)	18		*≤20
Total Phosphorus (mg/L)	0.049		*≤0.16
Nitrate+Nitrite (mg/L)	0.004	U	
Ammonia (mg/L)	0.010	U	
Total Kejldahl Nitrogen (mg/L)	1.1		
Total Nitrogen (mg/L)	1.1		*≤2.23

U – Result was less than the method detection limit

*Federally promulgated numeric nutrient criteria for Florida lakes

Lake Vegetation Index

The LVI score for this lake was 73 out of a possible 100 points, corresponding with a healthy designation. Table 2 contains the species list and occurrence information for this sampling event. The dominant plant C of C score in the four sections observed was 5.82 (*Panicum hemitomon*). *Panicum hemitomon* (Maidencane) is a native grass species that is very common grass in Northeast Florida. A total of four invasive exotic plants were observed in the lake (*Alternanthera philoxeroides, Ludwigia peruviana, Panicum repens, Salvinia minima*).

Table 2. Species list for the September 7, 2012 LVI at Swift Creek Pond. An asterisk (*) indicates an invasive exotic plant species. P = present, D = dominant, C = codominant

Swift Creek Pond, 9/7/2012		Sections			
Scientific Name	**Common Name**	**1**	**4**	**7**	**10**
Acer rubrum	RED MAPLE	P	P	P	P
Alternanthera philoxeroides *	ALLIGATOR WEED*	P	P	P	P
Andropogon virginicus	BROOMSEDGE BLUESTEM	P	P		
Baccharis glomeruliflora	SILVERLING			P	
Cephalanthus occidentalis	COMMON BUTTONBUSH	P	P	P	P
Cladium jamaicense	JAMAICA SWAMP SAWGRASS		P		
Cyperus polystachyos	MANYSPIKE FLATSSEDGE		P		
Cyrilla racemiflora	TITI	P	P	P	P
Eleocharis baldwinii	BALDWIN'S SPIKERUSH; ROADGRASS	P	P	P	P
Gordonia lasianthus	LOBLOLLY BAY	P	P		P
Hydrocotyle	MARSHPENNYWORT		P		
Juncus effusus	SOFT RUSH			P	
Juncus marginatus	SHORE RUSH;GRASSLEAF RUSH		P		
Lachnanthes caroliniana	CAROLINA REDROOT		P		
Leersia hexandra	SOUTHERN CUTGRASS			P	
Lemna minor	COMMON DUCKWEED	P	P	P	P
Limnobium spongia	AMERICAN SPONGEPLANT; FROG'S-BIT		P	P	
Ludwigia arcuata	PIEDMONT PRIMROSEWILLOW			P	
Ludwigia leptocarpa	ANGLESTEM PRINROSEWILLOW		P	P	
*Ludwigia peruviana**	PERUVIAN PRIMROSEWILLOW*	P	P	P	
Lycopus amplectens	CLASPING WATERHOREHOUND		P	P	P
Lyonia lucida	FETTERBUSH	P		P	P
Magnolia virginiana	SWEETBAY	P	P	P	P
Mikania scandens	CLIMBING HEMPVINE			P	
Myrica cerifera	SOUTHERN BAYBERRY; WAX MYRTLE	P	P	P	P
Nuphar	POND LILY	P	P	P	
Nyssa sylvatica biflora	SWAMP TUPELO	P	P	P	
Osmunda cinnamomea	CINNAMON FERN	P	P		P
Osmunda regalis	ROYAL FERN	P	P		
Panicum hemitomon	MAIDENCANE	D	D	D	D
*Panicum repens**	TORPEDO GRASS*		P		P
Panicum virgatum	SWITCHGRASS		P		
Pinus elliottii	SLASH PINE	P	P		P
Pluchea foetida	STICKING CAMPHORWEED				
Polygonum hydropiperoides	MILD WATERPEPPER		P		
Polygonum pensylvanicum	PENNSYLVANIA SMARTWEED			P	
Sacciolepis striata	AMERICAN CUPSCALE	P	P	P	P
Salix caroliniana	CAROLINA WILLOW		P	P	
*Salvinia minima**	WATER SPANGLES*			P	
Scirpus cyperinus	WOOLGRASS		P	P	
Sesbania herbacea	BIGPOD SESBANIA		P		
Setaria geniculata	MARSH BRISTLEGRASS		P		
Smilax	GREENBRIAR			P	
Solidago fistulosa	PINE BARREN GOLDENROD			P	
Taxodium	CYPRESS	P	P	P	P
Typha	CATTAIL		P	P	P
Vitis rotundifolia	MUSCADINE	P	P		P
Xyris	YELLOWEYED GRASS		P		

Thank you for your interest in maintaining the water quality of Florida's lakes. Please feel free to contact us if you have any questions.

Contact and resources for more information

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DEP publications on Best Management Practices and Environmental Stewardship and Education:
http://www.dep.state.fl.us/water/nonpoint/pubs.htm
DEP biological assessment resources:
http://www.dep.state.fl.us/water/bioassess/index.htm
FWCC Aquatic Plant Management:
http://myfwc.com/wildlifehabitats/habitat/invasive-plants/aquatic-plant/
Freshwater Algal Bloom information:
http://www.dep.state.fl.us/labs/biology/hab/index.htm