LAKE ECOSUMMARY

Wildcat Lake

WBID 2905C, Lake County

July 20, 2016



Figure 1. Wildcat Lake in Lake County.

DEP conducted water quality and biological sampling at Wildcat Lake (STORET 20020504, SBIO VOLUS46) in Lake County on July 20, 2016, to assess attainment of designated uses. This lake was sampled as part of a reference lake sampling project. Overall, the water quality and plant community data indicated that the lake met expectations for a healthy, well-balanced lake.

Background

Healthy, well-balanced lake communities may be maintained with some level of human activity, but excessive human disturbance 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 a specific waterbody exceeding water quality criteria (Chapter 62-302, Florida Administrative Code [F.A.C.]), 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. DEP assesses the health of plant communities in Florida lakes, as one indication of whether adverse impacts to biological communities have occurred.

Site Description

Wildcat Lake (Figure 1), located in Lake County in the Ocala National Forest, is part of the Juniper Creek watershed in the Middle St. Johns River Basin (Figure 2). It is in the Ocala Scrub Lake Region, which is comprised of ancient dunes with excessively drained deep sandy soils and sand pine scrub forests. Wildcat Lake has a surface area of approximately 335 acres, a maximum depth of 18 feet and a mean depth of 10 feet.

The predominant land use surrounding Wildcat Lake is natural forest, though its northernmost shore is directly adjacent to Highway 40, and its western shore is close to Highway 19. This lake is not currently listed on the Impaired Waters Verified List (4/27/16).

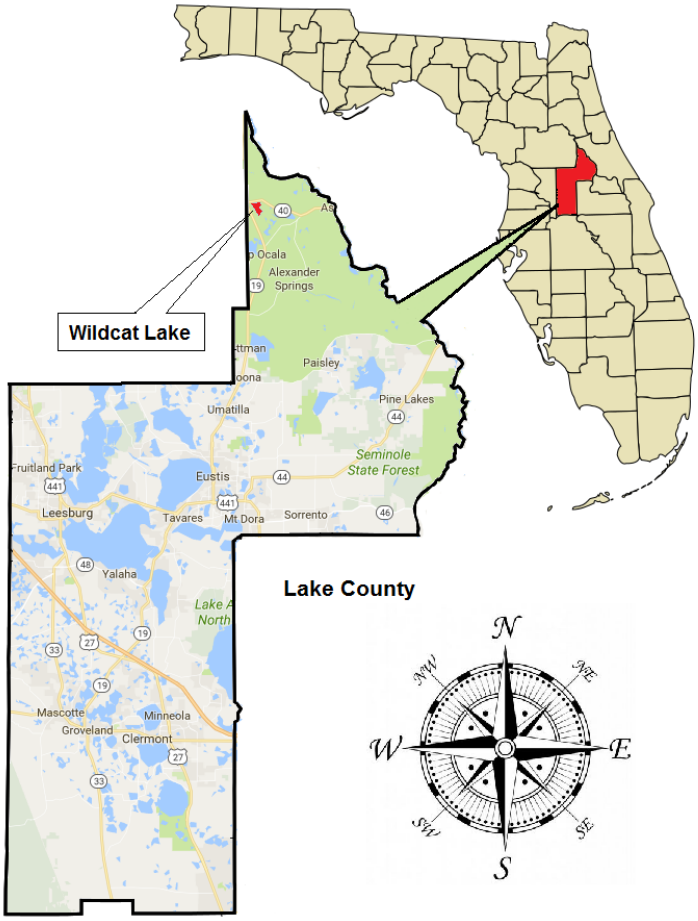


Figure 2. Location of Wildcat Lake in Lake County, Florida.

Methods

Water Quality

Wildcat Lake was sampled on July 20, 2016, by the DEP Central Regional Operations Center. Surface water samples were collected from the center of the lake for analysis of nutrients, metals, chlorophyll *a*, color, alkalinity, fluoride, ammonia, nitrogen, phosphate, bromide, chloride, and sulfate following DEP Standard Operating Procedures (SOPs; see http://dep.state.fl.us/water/sas/sop/sops.htm). Sampling and analyses met DEP quality assurance/quality control standards. Results were compared with applicable Class III water quality criteria contained in 62-302, F.A.C., including nutrients, dissolved oxygen, and other indicators.

Chlorophyll *a* is a measure of algal biomass in the water column. Chapter 62-302.531, F.A.C., provides numeric criteria for chlorophyll *a*, total nitrogen (TN), and total phosphorus (TP) in lakes, and is dependent upon the long term mean color and alkalinity of the lake (Table 1). If the annual geometric mean chlorophyll *a* (calculated with at least four samples, representing seasonal variability) does not exceed the chlorophyll *a* value for the lake type in Table 1, then the TN and TP criteria for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in Table 1. If there are insufficient data to calculate the annual geometric mean chlorophyll *a* for a given year or the annual geometric mean chlorophyll *a* exceeds the values in Table 1 for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1. Based on the color and alkalinity results presented in this report, Wildcat Lake is a low color, low alkalinity lake. These values can most likely be attributed to the lake being surrounded by sandy soil and pine forest, and being fed primarily through rainwater.

Table 1. Numeric nutrient criteria in lakes, 62-302.531 (2)(b)(1), F.A.C. AGM = annual geometric mean

Long Term Geometric Mean Lake Color and Alkalinity	AGM Chlorophyll *a*	AGM TP Range	AGM TN Range
> 40 Platinum Cobalt Units	**20 µg/L**	**0.05 to 0.16[1] mg/L**	**1.27 to 2.23 mg/L**
≤ 40 Platinum Cobalt Units and > 20 mg/L $CaCO_3$	**20 µg/L**	**0.03 to 0.09 mg/L**	**1.05 to 1.91 mg/L**
≤ 40 Platinum Cobalt Units and ≤ 20 mg/L $CaCO_3$	**6 µg/L**	**0.01 to 0.03 mg/L**	**0.51 to 0.93 mg/L**

[1] For lakes with color > 40 PCU in the West Central Region, the maximum TP limit is 0.49 mg/L

Dissolved Oxygen

Rule 62-302.533 (1), F.A.C., states that no more than 10 percent of the daily average percent dissolved oxygen (DO) saturation values shall be below 38 percent in the Peninsula and Everglades bioregions. This site is in the Peninsula region for DO criteria assessment. Percent saturation considers factors such as temperature, atmospheric pressure, and salinity. For lakes, the daily average DO level shall be calculated as the average of measurements collected in the upper two meters of the water column at the same location on the same day.

The daily average freshwater DO criteria is preferentially assessed using daily average values calculated from full days of diel (collected over a 24 hour period) monitoring data. If diel monitoring data are not available, as was the case for this report, instantaneous samples are used to assess the DO criterion by comparing the instantaeous value with a time-of-day-specific translation of the daily average criterion (62-303.420(9), F.A.C.), and a spreadsheet calculator for this purpose is available at: http://www.dep.state.fl.us/water/wqssp/swq-docs.htm.

Lake Vegetation Index

The Lake Vegetation Index (LVI) assesses how closely the plant community of a lake resembles a native undisturbed community. The LVI was sampled and calculated per DEP SOP LVI 1000 and calculated per DEP SOP LVI 2000. Species lists were developed for four of twelve sections of the lake (Figure 3), and the following information was derived from those lists: percent native species, percent Category 1 invasive exotic species as identified by the Florida Exotic Pest Plant Council, percent sensitive species, and the coefficient of conservatism (C of C; a measure of how tolerant a species is of disturbance) of the dominant or co-dominant species. Chapter 62-303.330 and 62-303.430, F.A.C., provide that a LVI score of 43 or greater meets the expectation of a healthy, well balanced community, and scores below 43 are considered impaired.

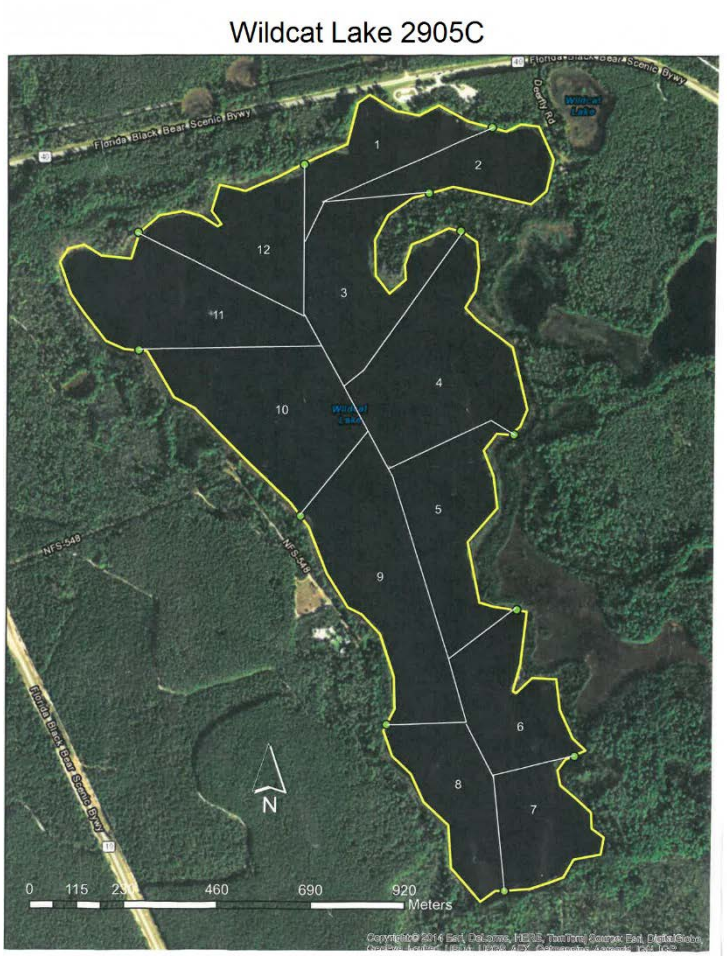


Figure 3. LVI sampling map of Wildcat Lake. Sections 3, 6, 9, 12 were sampled for the Lake Vegetation Index. The water quality sample was collected from the lake center.

Results

Water Quality

The water quality results are shown in Table 2.

Based on this sampling event, the lake met the nutrient thresholds for low color, low alkalinity lakes; however, the thresholds represent annual geometric mean concentrations (minimum of four samples) not to be exceeded more than once in any three-calendar year period. DEP's Watershed Assessment Section will evaluate the complete dataset for this lake to determine compliance with nutrient criteria.

Table 2. Water quality results from July 20, 2016 at Wildcat Lake.

Analyte	Result 7/20/16	Applicable Class III Water Quality Criteria
Field Temperature (°C)	31.6	
Field pH (SU)	5.0	6-8.5, or within 1 SU of natural background
Field Dissolved Oxygen (% saturation)	90	*> 35.62 %
Field Specific Conductance (µmhos/cm)	52	50% above background or 1275 µmhos/cm, whichever is greater
Alkalinity (mg $CaCO_3$/L)	0.65 U	Shall not be depressed below 20
Color (PCU)	2.9 I	N/A
Chlorophyll a (µg/L)	2.9	≤ 6 µg/L for low alkalinity clear lakes
Total Phosphorus (mg/L) as P	0.005	< 0.12 mg/L
Nitrate+Nitrite (mg/L) as N	0.004 U	
Ammonia (mg/L) as N	0.002 U	**< 2.52 mg/L
Total Kjeldahl Nitrogen (mg/L) as N	0.28	N/A
Total Nitrogen (mg/L) as N	0.284	< 1.54 mg/L

* Instantaneous DO criterion calculated per DO Saturation Calculator

** Total ammonia criterion calculated per Total Ammonia Nitrogen Calculator

I = Value is between the laboratory method detection limit and the laboratory practical quantitation limit.

U = Compound was analyzed for but not detected.

Lake Vegetation Index

The LVI score for this lake was 84 out of a possible 100 points, corresponding with an "Exceptional" designation. Table 3 contains the species list and occurrence information for this sampling event. No invasive exotic plants were observed in the lake. The most prevalent plant, indicated by its dominance in sections 3, 9, and 12, and co-dominance (along with *Cladium jamaicense*) in section 6, was *Panicum hemitomon* (Figure 4).

Table 3. Species list for the July 20, 2016 LVI at Wildcat Lake. An asterisk (*) indicates an invasive exotic plant species. P = present, D = dominant, C = codominant.

Wildcat Lake, July 20, 2016		Sections			
Scientific Name	Common Name	1	2	3	4
Acer rubrum	RED MAPLE				P
Bidens mitis	SMALLFRUIT BEGGARTICKS			P	
Blechnum serrulatum	SWAMP FERN	P	P		P
Cephalanthus occidentalis	BUTTONBUSH	P	P	P	P
Cladium jamaicense	SAWGRASS	P	C	P	P
Eichhornia crassipes	WATER HYACINTH	P			
Eleocharis elongata	SLIM SPIKERUSH	P	P		P
Eleocharis submersed viviparous (species unknown)	SPIKERUSH	P	P		
Eriocaulon decangulare	TENANGLE PIPEWORT		P		
Eupatorium	DOGFENNEL		P	P	
Fuirena scirpoidea	SOUTHERN UMBRELLASEDGE	P		P	P
Gordonia lasianthus	LOBLOLLY BAY	P	P	P	P
Hydrocotyle	PENNYWORT	P		P	
Hypericum fasciculatum	PEELBARK ST.JOHN'S-WORT				P
Lachnanthes caroliniana	REDROOT		P		
Leersia hexandra	SOUTHERN CUTGRASS	P	P	P	P
Ludwigia suffruticosa	SHRUBBY PRIMROSEWILLOW	P	P	P	P
Mayaca fluviatilis	STREAM BOGMOSS	P			
Myrica cerifera	WAX MYRTLE	P	P	P	P
Nuphar	SPATTERDOCK	P	P	P	P
Nymphoides aquatica	BIG FLOATINGHEART	P	P	P	P
Nyssa sylvatica biflora	SWAMP TUPELO	P			P
Panicum hemitomon	MAIDENCANE	D	C	D	D
Pinus elliottii	SLASH PINE	P	P	P	P
Pluchea	CAMPHORWEED	P	P		
Pontederia cordata	PICKERELWEED	P	P	P	P
Sagittaria isoetiformis	QUILLWORT ARROWHEAD		P		
Sagittaria lancifolia	DUCK POTATO	P			
Taxodium	CYPRESS			P	
Utricularia gibba	HUMPED BLADDERWORT	P	P		P
Utricularia purpurea	PURPLE BLADDERWORT	P	P		
Vitis	MUSCADINE	P	P	P	P
Websteria confervoides	ALGAL BULRUSH	P			
Woodwardia virginica	VIRGINIA CHAIN FERN		P	P	P
Xyris	YELLOWEYED GRASS		P	P	



Figure 4. Dominant plant community of *Panicum hemitomon* (maidencane).

Conclusions

Sampling at Wildcat Lake indicates that the lake met applicable State Water Quality Criteria.

Water quality results were well within acceptable limits for chlorophyll *a*, total nitrogen and total phosphorus on July 20, 2016. The Lake Vegetation Index indicated plant communities are consistent with expectations for a healthy, well-balanced lake.

Thank you for your interest in maintaining the water quality of Florida's lakes. Please 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/invasive-plants/

Freshwater Algal Bloom information:
http://www.dep.state.fl.us/water/bgalgae/index.htm