LAKE ECOSUMMARY

Porter Pond

WBID 518, Jackson County

August 24, 2016 & October 11, 2017



Figure 1. Porter Pond in Jackson County.

DEP conducted water quality and biological sampling at Porter Pond (WIN ID WAS16POR, Nickname PorterPond) in Jackson County on August 24, 2016, and October 11, 2017, to assess attainment of designated uses. This lake was sampled as part of the DEP 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

Porter Pond (Figures 1 and 2) is in southwestern Jackson County and is part of the Jack Creek watershed in the Apalachicola-Chipola Basin. It is located in the New Hope Ridge/Greenhead Slope Lake Region, which is an upland sand ridge region. Clear, acidic, softwater lakes of extremely low mineral content are characteristic of this region. The lakes are typically very low in nitrogen, phosphorus, and chlorophyll *a*. Porter Pond is a low pH sandhill lake, primarily fed by rainwater but possibly with some groundwater influence. Porter Pond has a surface area of approximately 21 acres (8.4 hectares).

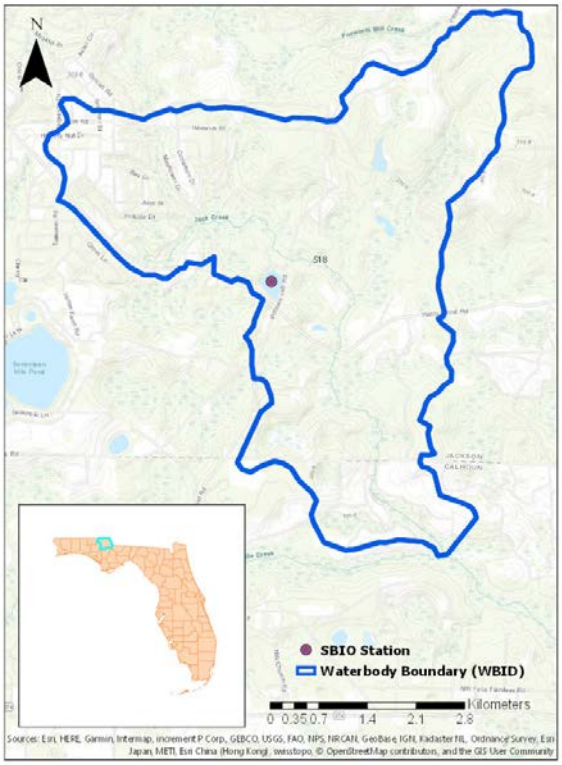


Figure 2. Location of Porter Pond in Jackson County.

The predominant land uses surrounding Porter Pond are Herbaceous-Dry Prairie, Coniferous Plantations, and Wetland Forested Mixed. This lake is not currently listed on the Impaired Waters Verified List (June 2017). Additional information about this WBID is available in the TMDL Tracker application (http://prodenv.dep.state.fl.us/DearTmdl/tmdlReportAction.do?method=report).

Methods

Water Quality

This lake was sampled on August 24, 2016, and October 11, 2017, by the members of the Aquatic Ecology and Quality Assurance Section of the DEP Tallahassee Office. Surface water samples were collected from the center of the lake for analysis of alkalinity, color, chlorophyll *a*, ammonia, nitrate+nitrite, total phosphorus, ortho-phosphate, and total Kjeldahl nitrogen following DEP Standard Operating Procedures (SOPs; see https://floridadep.gov/dear/quality-assurance/content/dep-sops). 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 available color and alkalinity data, Porter Pond is a low color, low alkalinity lake.

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 67 percent in the Panhandle West bioregion, 38 percent in the Peninsula and Everglades bioregions, or 34 percent in the Northeast and Big Bend bioregions. This site is in the Panhandle region for DO criteria assessment. Percent saturation takes into account 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: https://floridadep.gov/dear/water-quality-standards-program/documents/do-saturation-calculator%C2%A0.

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 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.

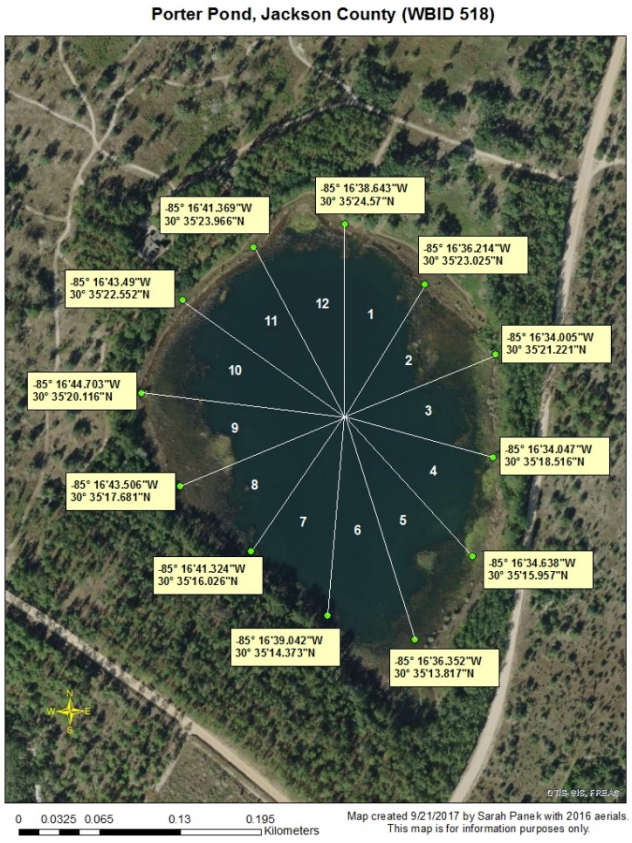


Figure 3. LVI sampling map of Porter Pond. Sections 2, 5, 8, 11 were sampled for the LVI on August 24, 2016, and on October 11, 2017. The water quality samples were collected from the lake center.

Results

Water Quality

The water quality results are shown in Table 2. Porter Pond chlorophyll *a*, TP, and TN concentrations were well below the minimum limits set by the NNC for lakes with low color and low alkalinity (Table 2).

Based on these two sampling events, 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 assess compliance with nutrient criteria.

Table 2. Water quality results from August 24, 2016, and October 11, 2017, at Porter Pond.

Analyte	Result 8-24-16	Result 10-11-17	Applicable Class III Water Quality Criteria
Field Temperature (°C)	32.5	29.6	N/A
Field pH (SU)	4.63	5.19	Within 1 SU of natural background
Field Dissolved Oxygen (% saturation)	76.4	103.3 J	*Panhandle West Criterion: 70%
Field Specific Conductance (µmhos/cm)	12.5	11	50% above background or 1275 µmhos/cm, whichever is greater
Alkalinity (mg $CaCO_3$/L)	0.65 U	0.65 U	Shall not be depressed below 20
Color (PCU)	4.1 I	3.4 I	N/A
Chlorophyll a (µg/L)	1.1 I	0.93 I	≤ 6 µg/L for low color and low alkalinity lakes
Total Phosphorus (mg/L) as P	0.003 I	0.003 I	0.03 mg/L
Nitrate+Nitrite (mg/L) as N	0.004 I	0.004 U	N/A
Ammonia (mg/L) as N	0.008	0.002 U	**2.38 mg/L and 2.87 mg/L
Total Kjeldahl Nitrogen (mg/L) as N	0.23	0.20 I	N/A
Total Nitrogen (mg/L) as N	0.23	0.20	0.93 mg/L

* Instantaneous DO criterion calculated per DO Saturation Calculator and adjusted for time of day.

** Total ammonia criterion calculated per Total Ammonia Nitrogen Calculator, for single sample maximum.

J – Indicates that the reported value was estimated.

U – Indicates that the compound was analyzed for but not detected.

I – The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Lake Vegetation Index

The LVI score for this lake was 89 on August 24, 2016, out of a possible 100 points, and 95 on October 11, 2017, corresponding with an "Exceptional" (≥ 78) designation. The LVI indicated plant communities that are consistent with expectations for a healthy, well-balanced lake. Tables 3 and 4 contain the species lists and occurrence information for these sampling events. A total of two invasive exotic plants (*Sapium sebiferum* and *Panicum repens*) were observed in the lake on August 24, 2016. The plants were not widespread, and were only observed in one of the four lake sections. No invasive exotic plants were observed in the lake on October 11, 2017.

Hypericum fasciculatum was codominant with *Utricularia floridana* in section 2, and *U. floridana* was dominant in the remaining three sections on August 24, 2016 (Figure 4). *Utricularia floridana* was dominant in all sections on October 11, 2017. Several of the same taxa were observed on the sampling dates in 2016 and 2017, including the same dominant taxa, which indicates a stable, healthy plant community in Porter Pond.

Table 3. Species list for the August 24, 2016, LVI at Porter Pond. An asterisk (*) indicates an invasive exotic plant species. P = present, D = dominant, C = codominant.

Porter Pond, August 24, 2016		Sections			
Scientific Name	**Common Name**	**2**	**5**	**8**	**11**
Brasenia schreberi	WATERSHIELD	P	P	P	P
Cyperus haspan	HASPAN FLATSEDGE	P			
Cyrilla racemiflora	TITI	P	P		
Eleocharis robbinsii	ROBBINS' SPIKERUSH	P		P	P
Eriocaulon compressum	FLATTENED PIPEWORT	P		P	P
Hypericum fasciculatum	SANDWEED; PEELBARK ST.JOHN'S-WORT	C	P	P	P
Ilex glabra	INKBERRY; GALLBERRY	P		P	
Ilex cassine myrtifolia	MYRTLE DAHOON	P		P	P
Leersia hexandra	SOUTHERN CUTGRASS	P	P	P	P
Magnolia virginiana	SWEETBAY	P			
Myriophyllum laxum	LOOSE WATERMILFOIL	P	P		
Nymphaea odorata	AMERICAN WHITE WATERLILY	P	P		P
Nymphoides cordata	LITTLE FLOATINGHEART	P			
Panicum hemitomon	MAIDENCANE	P	P	P	P
*Panicum repens**	TORPEDO GRASS			P	
Rhynchospora inundata	NARROWFRUIT HORNED BEAKSEDGE			P	
Rhynchospora tracyi	TRACY'S BEAKSEDGE				P
Sagittaria latifolia	BROADLEAF ARROWHEAD	P			
*Sapium sebiferum**	CHINESE TALLOW		P		
Utricularia floridana	FLORIDA BLADDERWORT	C	D	D	D
Utricularia olivacea	PIEDMONT BLADDERWORT	P	P	P	P
Utricularia purpurea	PURPLE BLADDERWORT	P	P	P	P
Websteria confervoides	ALGAL BULRUSH	P			P
Xyris	YELLOWEYED GRASS	P		P	P

Table 4. Species list for the October 11, 2017, LVI at Porter Pond. An asterisk (*) indicates an invasive exotic plant species. P = present, D = dominant, C = codominant.

Porter Pond, October 11, 2017		Sections			
Scientific Name	**Common Name**	**2**	**5**	**8**	**11**
Brasenia schreberi	WATERSHIELD	P	P	P	P
Cyrilla racemiflora	TITI	P	P		
Eriocaulon decangulare	TENANGLE PIPEWORT			P	P
Hypericum fasciculatum	SANDWEED; PEELBARK ST.JOHN'S-WORT	P	P	P	P
Ilex cassine myrtifolia	MYRTLE DAHOON			P	
Leersia hexandra	SOUTHERN CUTGRASS				P
Nuphar	SPATTERDOCK; YELLOW PONDLILY	P			
Nymphaea odorata	AMERICAN WHITE WATERLILY	P	P		P
Nymphoides cordata	LITTLE FLOATINGHEART	P			
Panicum hemitomon	MAIDENCANE	P	P	P	P
Rhynchospora tracyi	TRACY'S BEAKSEDGE	P			
Sagittaria isoetiformis	QUILLWORT ARROWHEAD	P		P	P
Utricularia floridana	FLORIDA BLADDERWORT	D	D	D	D
Xyris	YELLOWEYED GRASS	P	P	P	P

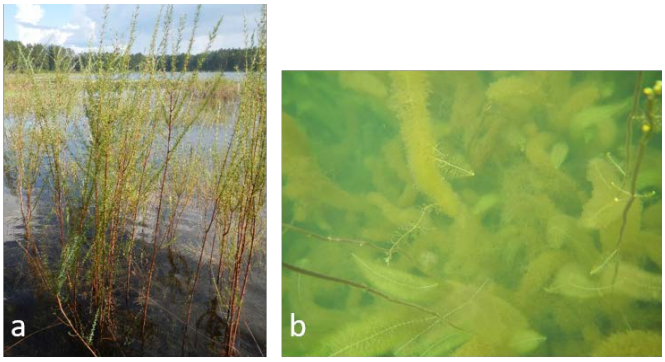


Figure 4. *Hypericum fasciculatum* (a) codominant in section 2 on August 24, 2016. *Utricularia floridana* (b) codominant in section 2 on August 24, 2016 and dominant in sections 5, 8, and 11. *Utricularia floridana* was dominant in all sections on October 11, 2017.

Conclusions

Sampling at Porter Pond 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 August 24, 2016, and October 11, 2017. The Lake Vegetation Index indicated plant communities that 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 Division of Environmental Assessment and Restoration homepage:
https://floridadep.gov/dear
DEP biological assessment resources:
https://floridadep.gov/dear/bioassessment
FWCC Aquatic Plant Management:
http://myfwc.com/wildlifehabitats/invasive-plants/

Freshwater Algal Bloom information:
https://floridadep.gov/dear/algal-bloom