LAKE ECOSUMMARY

Porter Pond

WBID 518, Jackson County

July 27, 2021 and September 8, 2022



Figure 1. Porter Pond in Jackson County.

DEP conducted water quality and biological sampling at Porter Pond **(**WIN ID: WAS16POR, SBIO Nickname: PORTERPOND**)** in Jackson County on July 27, 2021, and September 8, 2022, 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 in the New Hope Ridge/Greenhead Slope Lake Region, which is an upland sand ridge region. Clear, acidic, soft-water 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 (July 2024).

Methods

Water Quality

This lake was sampled on July 27, 2021, and September 8, 2022, by the DEP Aquatic Ecology and Quality Assurance 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 DEP SOPs | Florida Department of Environmental Protection). 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 West 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 ideally assessed using daily average values calculated from full days of diel (collected over a 24 hour period) monitoring data. Diel monitoring data often are not available for routine sampling, [as was the case for this report],so 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: DO Saturation Calculator | Florida Department of Environmental Protection.

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 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.

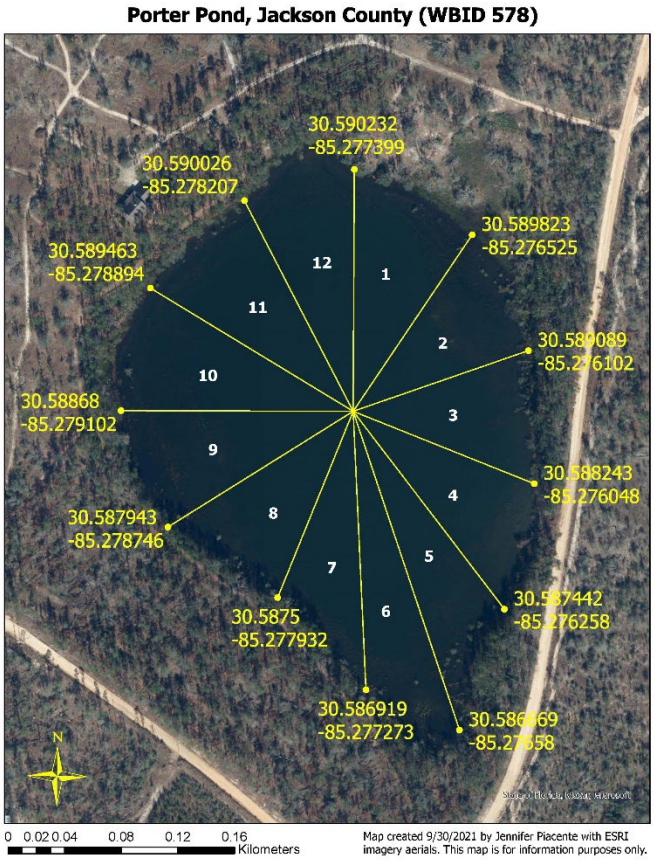


Figure 3. LVI sampling map of Porter Pond. Sections 2, 5, 8, 11 were sampled on July 27, 2021, and on September 8, 2022, for the Lake Vegetation Index. The water quality sample was collected from the lake center.

Results

Water Quality

The water quality results are shown in Table 2. 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 July 27, 2021, and September 8, 2022 at Porter Pond.

Analyte	Result [July 27, 2021]	Result [Sept 8, 2022]	Applicable Class III Water Quality Criteria
Field Temperature (°C)	32.6	30.1	N/A
Field pH (SU)	6.34	5.80	Within 1 SU of natural background
Field Dissolved Oxygen (% saturation)	92.5	75.3	*Panhandle West Criterion: 66.87% and 65.25%, respectively
Field Specific Conductance (µmhos/cm)	11.6	11.5	50% above background or 1275 µmhos/cm, whichever is greater
Alkalinity (mg $CaCO_3$/L)	1.2 I	0.65 U	Shall not be depressed below 20
Color (PCU)	9.1	5.9 I	N/A
Chlorophyll a (µg/L)	1.4 I	4.6 I	≤ 6 µg/L for low color and low alkalinity lakes
Total Phosphorus (mg/L) as P	0.004 I	0.005 I	0.03 mg/L
Nitrate+Nitrite (mg/L) as N	0.004 U	0.004 U	N/A
Ammonia (mg/L) as N	0.003 I	0.002 U	**2.36 mg/L and 2.77 mg/L
Total Kjeldahl Nitrogen (mg/L) as N	0.36	0.43 J	N/A
Total Nitrogen (mg/L) as N	0.004 U	0.038	0.67 mg/L

* Instantaneous DO criterion calculated per DO Saturation Calculator.

** Total ammonia criterion calculated per Total Ammonia Nitrogen Calculator

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 92 on July 27, 2021, out of a possible 100 points, and 95 on September 8, 2022, corresponding with a "Exceptional" 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 this sampling event. No invasive exotic plants were observed in the sampling sections on either date. There was a small amount of *Panicum repens* (FISC Cat. 1) in the lake, but it did not occur in the 4 sampling sections on either date.

Hypericum fasciculatum was co-dominant with *Utricularia floridana* in section 2, 8, and 11, and *U. floridana* was co-dominant with *Panicum hemitomon* in section 5 on July 27, 2021. *Utricularia floridana* was dominant in all sections on September 8, 2022. Several of the same taxa were observed on the sampling dates in 2021 and 2022, including the same dominant taxa, which indicates a stable, healthy plant community in Porter Pond.

Table 3. Species list for the July 27, 2021, LVI at Porter Pond. An asterisk (*) indicates an invasive exotic plant species. P = present, D = dominant, C = codominant.

Porter Pond, June 7, 2023		Sections			
Scientific Name	**Common Name**	**2**	**5**	**8**	**11**
Andropogon	BLUESTEM	P	P	P	P
Brasenia schreberi	WATERSHIELD	P	P	P	
Centella asiatica	INDIAN PENNYWORT	P	P	P	P
Cyrilla racemiflora	TITI	P	P	P	P
Dichanthelium erectifolium	ERECTLEAF WITCHGRASS	P	P	P	P
Eriocaulon compressum	FLATTENED PIPEWORT	P	P	P	P
Hypericum fasciculatum	PEELBARK ST.JOHNSWORT	C	P	C	C
Ilex glabra	APPALACHIAN TEA		P	P	
Ilex myrtifolia	MYRTLE LEAF HOLLY	P	P	P	P
Lycopodiella alopecuroides	FOXTAIL BOG CLUBMOSS			P	P
Myriophyllum laxum	LOOSE WATERMILFOIL	P	P		
Nymphaea odorata	AMERICAN WHITE WATERLILY	P	P	P	P
Nymphoides aquatica	BIG FLOATINGHEART	P	P		P
Nyssa sylvatica var. biflora	BLACKGUM		P		
Panicum hemitomon	MAIDENCANE	P	C	P	P
Sabatia grandiflora	LARGEFLOWER ROSE GENTAIN		P	P	P
Rhexia mariana	PALE MEADOW BEAUTY		P	P	P
Rhynchospora fascicularis	FASCICLED BEAKSEDGE		P	p	
Rhynchospora tracyi	TRACY'S BEAKSEDGE	P	P	P	P
Utriclaria floridana	FLORIDA YELLOW BLADDERWORT	C	C	C	C
Xyris sp.	YELLOWEYED GRASS	P	P		

Table 4. Species list for the September 8, 2022, LVI at Porter Pond. An asterisk (*) indicates an invasive exotic plant species. P = present, D = dominant, C = codominant.

Porter Pond, September 8, 2022,		Sections			
Scientific Name	**Common Name**	**2**	**5**	**8**	**11**
Andropogon	BLUESTEM	P	P		P
Brasenia schreberi	WATERSHIELD		P	P	
Centella aslatica	INDIAN PENNYWORT		P		P
Cyrilla racemiflora	TITI		P	P	P
Eleocharis robbinsii	ROBBINS' SPIKERUSH				P
Eriocaulon sp.	PIPEWORTS		P		
Dichanthelium erectifolium	ERECTLEAF WITCHGRASS	P	P	P	P
Hypericum fasciculatum	PEELBARK ST. JOHNS-WORT	P	P	P	P
Ilex myrtifolia	MYRTLE LEAF HOLLY	P	P	P	P
Lycopodiella alopecuroides	FOXTAIL BOG CLUBMOSS		P		P
Myriophyllum laxum	LOOSE WATERMILFOIL	P	P	P	P
Nymphaea odorata	AMERICAN WHITE WATERLILY	P	P	P	P
Nymphoides aquatica	BIG FLOATINGHEART		P		
Panicum hemitomon	MAIDENCANE	P	P	P	P
Pinus elliottii	SLASH PINE		P	P	P
Rhynchospora fascicularis	FASCICLED BEAKSEDGE		P		P
Rhynchospora tracyi	TRACY'S BEAKSEDGE	P	P		P
Sagittaria isoetiformis	QUILLWORT ARROWHEAD	P	P		P
Utricularia floridana	FLORIDA YELLOW BLADDERWORT	D	D	D	D
Woodwardia virginica	VIRGINIA CHAIN FERN		P		P

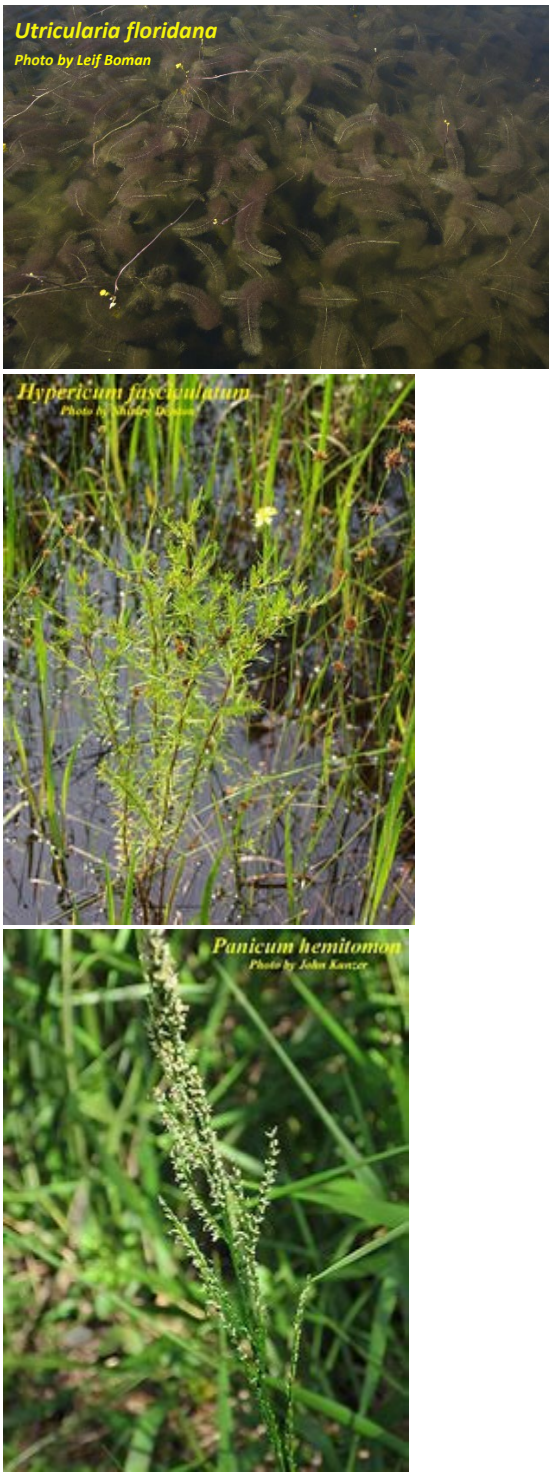


Figure 4. *Utricularia floridana* (top) was codominant in all sections on July 27, 2021, and dominant in all sections on

September 8, 2022. *Hypericum fasciculatum* (middle) was codominant in sections 2, 8, and 11 on July 27, 2021. *Panicum hemitomon* (bottom) was codominant in section 5 on July 27, 2021.

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 July 27, 2021 and September 8, 2022 **.** 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 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