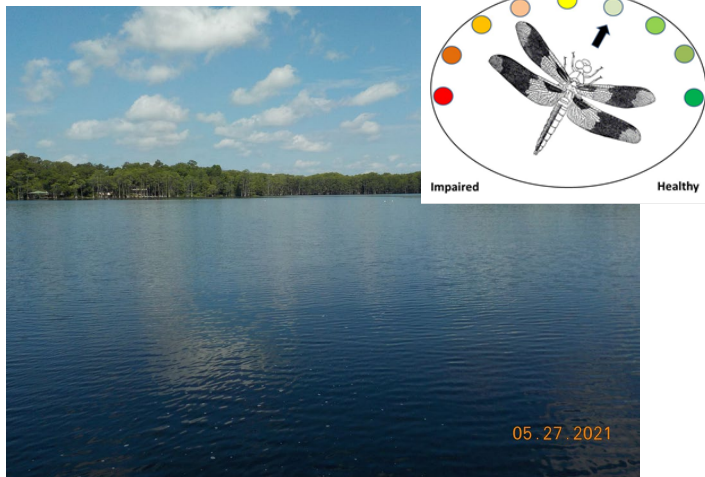


Waterbody: Lake Bradford



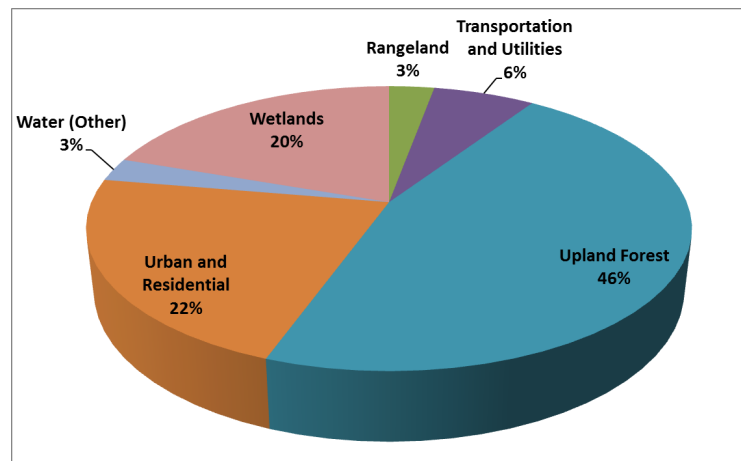
Basin: Lake Munson

The Bradford Brook Chain of Lakes is composed of the cypress rimmed, dark water Lakes Bradford (179 acres), Hiawatha (51 acres) and Cascade (124 acres) and is located in western Leon County. Water typically flows east via Bradford Brook into Lake Cascade. Lake Hiawatha receives flow from Lake Cascade via a culvert beneath Capital Circle Southwest. Much of the water entering Lake Bradford is via Lake Hiawatha, though at times Grassy Lake flows into Lake Bradford. On occasion, flow is reversed and Lake Bradford flows into Lake Hiawatha which then flows into Lake Cascade. In addition, groundwater sources of flow are possible.

As shown in the pie chart, approximately 31% of land uses in the 17,637-acre Bradford Brook watershed are rangeland, transportation, utilities, urban and residential. Increases in stormwater runoff and waterbody nutrient loads can often be attributed to these types of land uses.

Background

Healthy, well-balanced lake communities may be maintained with some level of human activity, but excessive human disturbance may result in waterbody degradation.



Human stressors may include increased inputs of nutrients, sediments, and/or other contaminants from watershed runoff, adverse hydrologic alterations, undesirable removal of habitat or riparian buffer vegetation, and introduction of exotic plants and animals. State water quality standards are designed to protect designated uses of the waters of the state (e.g., recreation, aquatic life, fish consumption), and exceedances of these standards are associated with interference of the designated use. Leon County also conducted a vegetation survey to evaluate the health of floral (plant) communities.

Methods

Surface water and sediment samples were collected to determine the health of Lake Bradford and met the requirements of the Florida Department of Environmental Protection (FDEP).

Results

Nutrients

The nutrient thresholds and results are found in Table 1. According to FDEP requirements, Numeric Nutrient Criteria (NNC and expressed as an annual geometric mean) cannot be exceeded more than once in a three-year period.

Table 1. FDEP's chlorophyll-*a*, total nitrogen and phosphorus criteria for lakes applied to Lake Bradford.

Colored Lake	Chlorophyll- <i>a</i> 20 µg/L	Total Nitrogen Threshold 1.27-2.23 mg/L	Total Phosphorus Threshold 0.05-0.16 mg/L
2004	3.0	0.34	0.01
2005	3.0	0.35	0.02
2006	2.0	0.46	0.02
2007	3.3	0.68	0.03
2008	10.1	0.75	0.03
2009	3.4	0.64	0.03
2010	4.4	0.61	0.03
2011	10.0	0.83	0.05
2012	12.7	0.59	0.03
2013	13.0	0.67	0.02
2014	2.6	0.69	0.02
2015	12.7	0.64	0.03
2016	10.5	0.63	0.02
2017	11.7	0.67	0.02
2018	13.6	0.71	0.03
2019	7.8	0.50	0.02
2020	-	-	-
2021	1.4	0.50	0.01

While state Numeric Nutrient Criteria were not exceeded during the sampling period, chlorophyll-*a* results in the latter half of the sampling period tended to be elevated. Originally it was thought that lake levels were lower at the time and lake water was not as tannic, so nutrients were concentrated and greater light penetration occurred, enhancing algal growth. However, even when the lake color levels increased, the higher algal levels have persisted. An algal bloom during the August 2015 sampling event elevated chlorophyll-*a* levels (82.5 µg/L). The cause of the bloom is unknown. Other chlorophyll-*a* values taken in 2015 were relatively low (6.2, 10.1 and 5 µg/L). The levels in 2018 ranged from 2.8 µg/L to an elevated 35.0 µg/L, while levels in 2019 were the lowest levels since 2015; ranging from 4.6 to 13.4 µg/L. Due to the pandemic, samples

could not be collected in the 2nd quarter of 2020 which prevented the calculation of the NNC. Chlorophyll-*a* levels continue to be elevated in 2020, with a geometric mean (three samples) of 17 µg/L. Both nitrogen and phosphorus geometric means (0.62 mg/L and 0.04 mg/L) were also elevated in 2020. In contrast, the geometric mean chlorophyll-*a* level (1.45 µg/L) for 2021 was the lowest geometric mean recorded since sampling begin. Both nitrogen and phosphorus levels were low in 2021 as well.

Metals

Elevated lead levels during the 1st quarter 2021 in Lake Bradford are thought to be due to both relict and potentially current sources. Relict anthropogenic sources of lead in the area include a former shooting range and the former Dale Mabry airfield, while possible current sources include the Tallahassee Regional Airport (aviation fuel). The acidic nature of these lakes causes increased lead levels in the water due to the enhanced solubility of lead under low pH conditions. Because acidic systems like Lake Bradford Chain of Lakes are more sensitive to metals contamination, exceedance levels tend to be lower and oftentimes more frequent than a similar metal level in a more alkaline system.

[Click here for more information on metal levels in Leon County waterbodies.](#)

Fish Consumption Advisory

The Florida Department of Health has issued consumption limits for certain fish in Lake Bradford due to elevated levels of mercury.

[Click here for more information about fish consumption advisories.](#)

Floral Assessment

The Lake Vegetation Index score for Lake Bradford was 72, placing the lake's vegetative community in the Healthy category.

Twenty-six plant species were found during the survey. The native species, pond cypress (*Taxodium ascendens*), maidencane (*Panicum hemitomon*), and the Invasive Exotic torpedo grass (*Panicum repens*) were the most dominant species. Other species include red maple (*Acer rubrum*) and buttonbush (*Cephalanthus occidentalis*).

The aforementioned torpedo grass (*Panicum repens*) is listed as a Category I Invasive Exotic by the Florida Exotic Pest Control Council and is a concern in Lake Bradford. No other exotic plants were noted in the surveyed area.

For more information concerning Florida Invasive Exotics, please click on the Florida Exotic Pest Control Council website; <http://www.fleppc.org/>.

[Click here for more information on the Lake Bradford LVI.](#)

[Click here for more information on common exotic and invasive plants in Leon County wetlands and waterbodies.](#)

Other Parameters

Other water quality parameters appear to be normal for the area and no other impairments were noted.

Conclusions

Based on ongoing sampling, Lake Bradford met the nutrient thresholds for the East Panhandle Region, though increasing chlorophyll levels continue to be a cause of concern. The Lake Vegetation Index score for Lake Bradford was 72, placing the lake's vegetative community in the Healthy category.

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

Contact and resources for more information

www.LeonCountyWater.org

[Click here to access the results for all water quality stations sampled in 2021.](#)

[Click here for a map of the watershed – Sample Site B0B.](#)

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