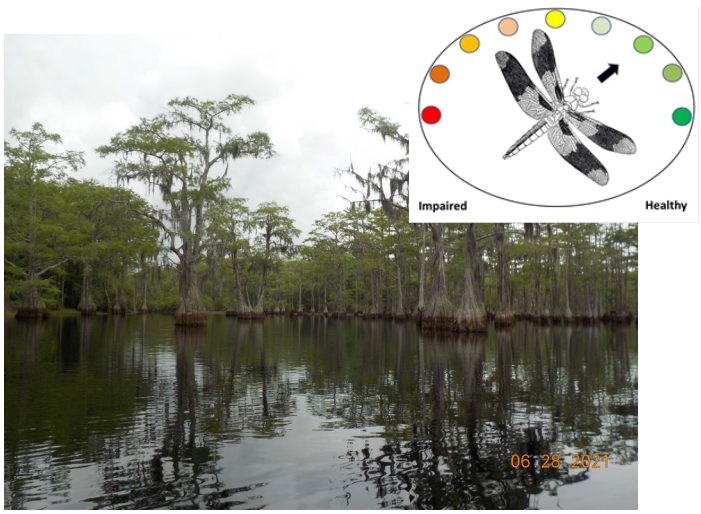
Waterbody: Lake Cascade



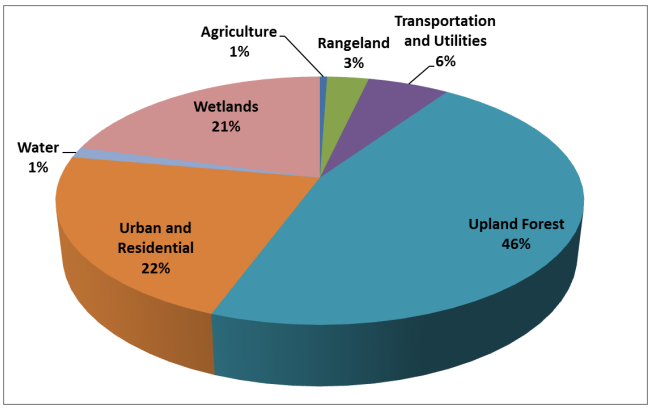
Basin: Lake Munson

The Bradford Brook Chain of Lakes is composed of the cypress rimmed 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 following pie chart, approximately 32% of land uses in the 16,591-acre Lake Cascade watershed are agriculture, 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.

Lake Cascade has an active sinkhole and is affected by drought conditions more than either Bradford or Hiawatha. Due to drought conditions, sampling has been intermittent, and results remain inconclusive.

Methods

Surface water sampling was performed to determine the health of Lake Cascade 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) (expressed as an annual geometric mean) cannot be exceeded more than once in a three-year period. Due to low water conditions, the required number of samples could not always be collected. The lack of data means that FDEP requirements for determining Numeric Nutrient Criteria for some stations for several years could not be

calculated. When the NNC criteria could be met, it was shown that no exceedances for nitrogen or phosphorus have occurred since 2006.

For illustrative purposes, individual data points were plotted to determine any possible trends (Figures 1-3). With few exceptions, individual values did not exceed the in-lake criteria.

While the geometric means for the NNC parameters were never exceeded, individual values occasionally rose above the threshold values. There was a large increase in total nitrogen and phosphorus in 2013 (4^{th} and 1^{st} quarters, respectively) and a smaller increase in phosphorus levels during the 1^{st} quarter of 2018. Increased levels of nutrients could be attributed to the decay of terrestrial plants that grew in the lake bottom during drought conditions or possibly stormwater runoff associated with the southwest Capital Circle widening. Post nutrient levels have decreased. The chlorophyll-a value for the 1^{st} quarter of 2019 (89.3 µg/L) is by far the highest chlorophyll-a value recorded on Lake Cascade. Other water quality parameters taken during that time frame did not suggest an algal bloom or nutrient problem, so it is unknown why the chlorophyll-a value was so elevated.

Metals

Elevated lead levels in Lake Cascade during the third quarter of 2021 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.

Floral Assessment

The Lake Vegetation Index (LVI) score for Lake Cascade was 90, placing the lake's vegetative community in the Exceptional category.

Twenty-five plant species were found during the survey. The native species pond cypress (*Taxodium ascendens*) was the most dominant species on the lake. Other native shoreline vegetation included: red maple (*Acer rubrum*), buttonbush (*Cephalanthus occidentalis*) and swamp tupelo (N*yssa sylvatica var. biflora*).

Unfortunately, Chinese Tallow Tree (*Sapium sebiferum*), a Category I Invasive Exotic by the Florida Exotic Pest Control Council was found at Lake Cascade. Alligator weed (*Alternanthera philoxeroides*), is listed as a Category II Invasive Exotic that was found in the lake.

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 Cascade 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 Cascade continued to meet the nutrient thresholds for the East Panhandle Region and no impairments were noted. The LVI

score for Lake Cascade was 90, placing the lake's vegetative community in the Exceptional 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.

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

Colored Lake	Chlorophyll-a 20 µg/L	Total Nitrogen Threshold 1.27-2.23 mg/L	Total Phosphorus Threshold 0.05-0.16 mg/L
2004	2.8	0.21	0.01
2005	2.4	0.43	0.01
2006	3.6	0.38	0.01
2007-2012	-	-	-
2013	4.7	1.16	0.02
2014	4.5	0.79	0.02
2015	-	-	-
2016	5.7	0.76	0.01
2017	4.8	0.83	0.01
2018-2021	-	-	-

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 B0C.

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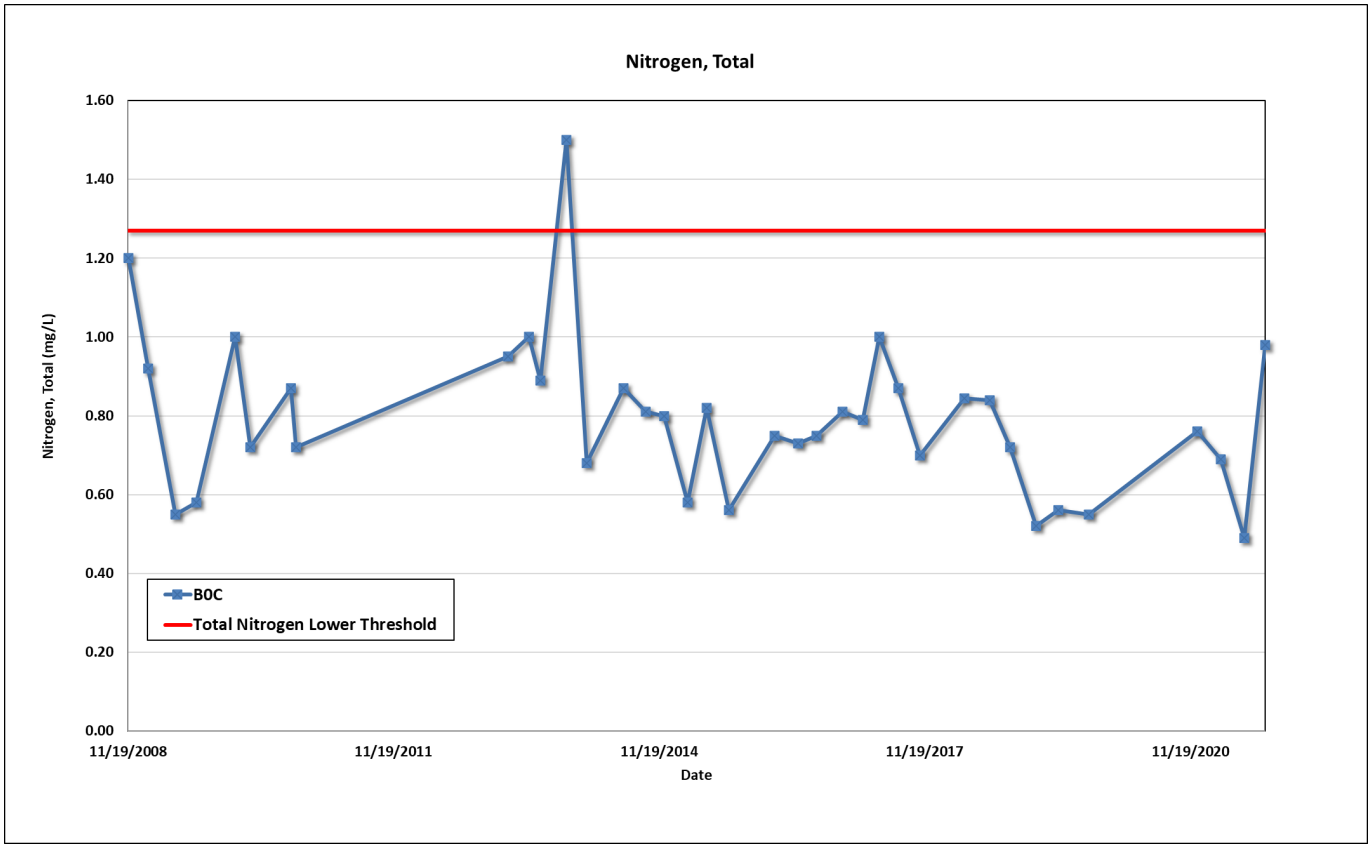

Figure 1. Total Nitrogen results for Lake Cascade.

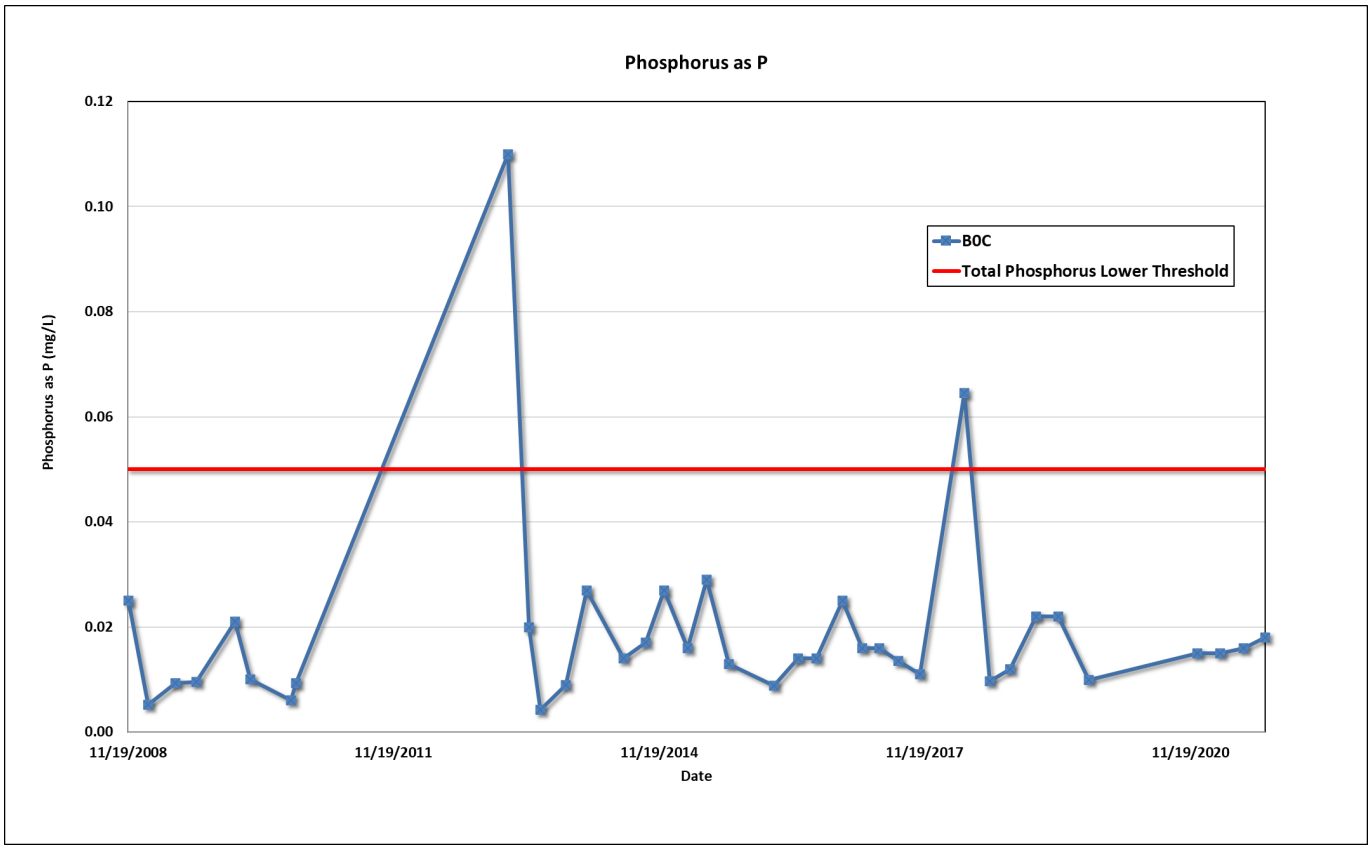

Figure 2. Total Phosphorus results for Lake Cascade.

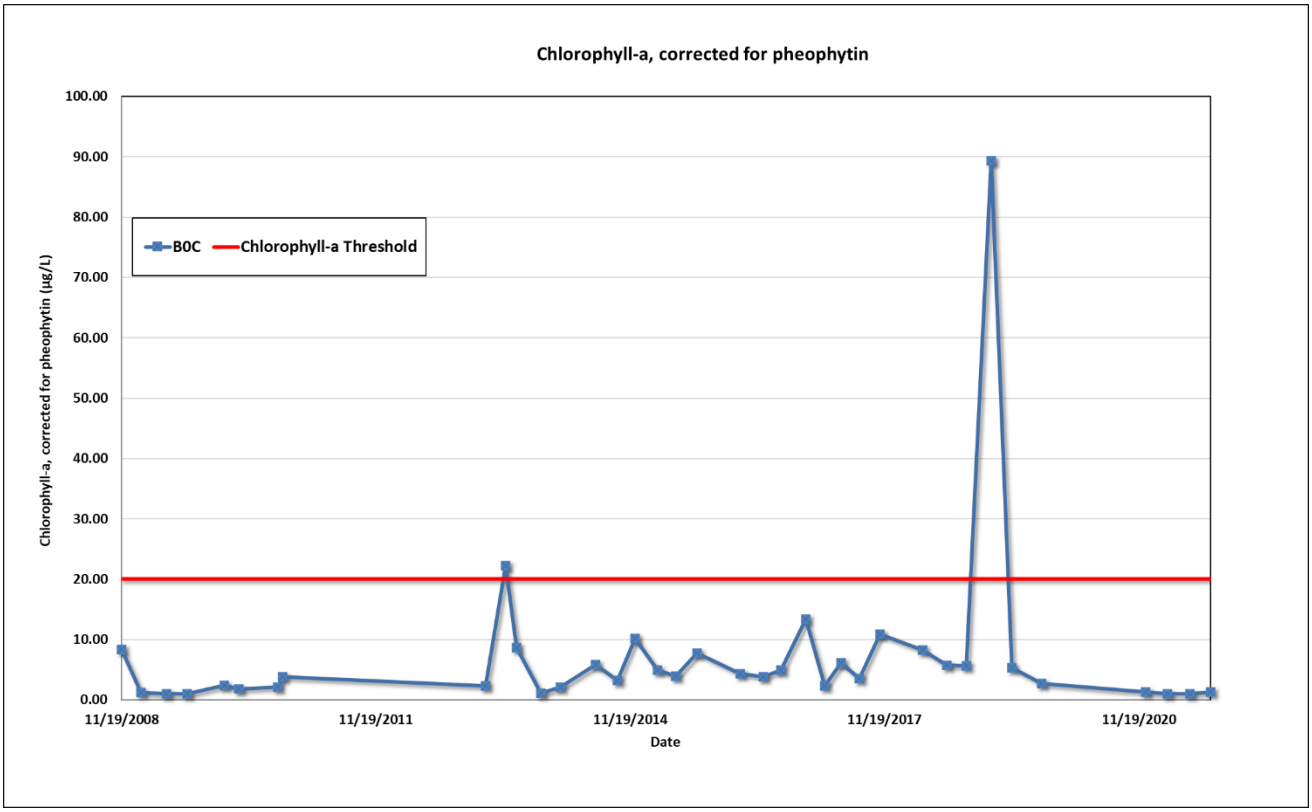

Figure 3. Chlorophyll-*a* results for Lake Cascade.