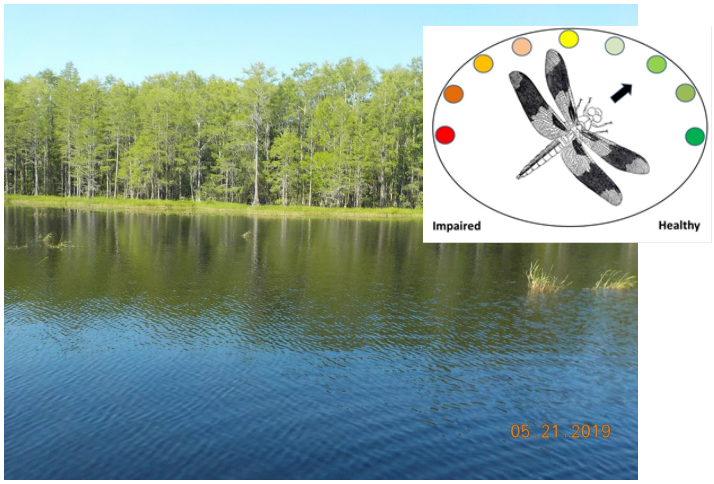
Waterbody: Lake Hiawatha



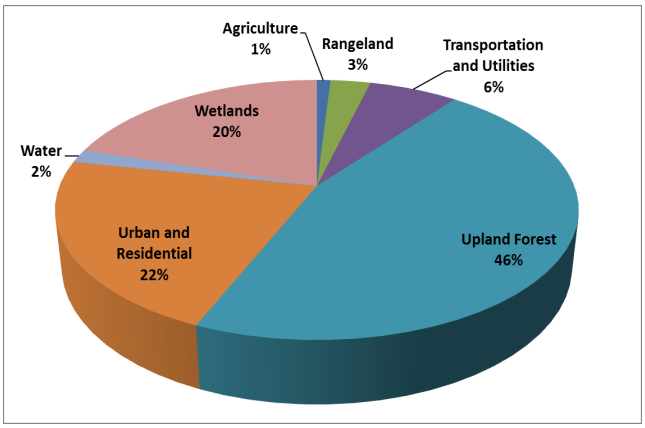
Basin: Lake Munson

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 following pie chart, approximately 32% of land uses in the 17,023-acre Lake Hiawatha 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.

Methods

Surface water, sediment sampling and a Lake Vegetation Index (LVI) were conducted to determine the health of Lake Hiawatha 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 (expressed as an annual geometric mean) cannot be exceeded more than once in a three-year period. Due to low water, the numeric nutrient criteria data requirements could not be calculated for years 2008 and 2011-2013. When data requirements were met, nutrient values did not exceed the state criteria. However, nitrogen values in some years have more than doubled since 2004.

Table 1. FDEP's chlorophyll-*a*, total nitrogen and phosphorus criteria for lakes applied to Lake Hiawatha. Due to low water, the Numeric Nutrient Criteria data requirements could not be calculated for years 2008, 2011 - 2013.

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	1.6	0.33	0.01
2005	3.4	0.37	0.01
2006	1.9	0.47	0.01
2007	2.4	0.63	0.02
2008	-	-	-
2009	1.9	0.76	0.02
2010	3.2	0.60	0.02
2011-2013	-	-	-
2014	2.2	0.67	0.01
2015	6.7	0.68	0.01
2016	7.1	0.74	0.01
2017	8.3	0.72	0.02
2018	5.5	0.70	0.02
2019	7.7	0.52	0.02

While still relatively low, chlorophyll-*a* levels steadily increased in the latter half of the sampling period (2015-2019).

Metals

Copper levels were elevated in Lake Hiawatha during the 1st quarter of 2019. While the source of copper is unknown, it is suspected that the copper exceedances are the result of the application of copper-based algaecides.

The acidic nature of these lakes causes increased lead concentrations due to the enhanced solubility of lead under low pH conditions. Because acidic systems like the Bradford Chain of Lakes are more susceptible to metals contamination, exceedance levels tend to be lower 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 score for Lake Hiawatha was 84, placing the lake's vegetative community in the exceptional category.

Twenty-five species were found during the survey. The native species pond cypress (*Taxodium ascendens*) and maidencane (*Panicum hemitomon*) were the most dominant species in the lake. Other native shoreline vegetation included; red maple (*Acer rubrum*), buttonbush (Cephalanthus occidentalis) and myrtle dahoon (*Ilex myrtifolia*). The exotic floating plant, water spangles (*Salvinia minima*), and spadeleaf (*Centella asiatica*) were also found during the survey.

Click here for more information on the Lake Hiawatha LVI.

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 Hiawatha met the nutrient thresholds for the East Panhandle Region and the floral community is considered "exceptional" by the LVI. The more than doubling of nitrogen values over the sampling period and the elevated chlorophyll-*a* levels in the last several years are a concern. Copper levels were elevated in Lake Hiawatha during the 1st quarter of 2019. While the source of copper is unknown, it is suspected that the copper exceedances are the result of the application of copper-based algaecides.

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.LeonCountyFL.gov/WaterResources

Click here to access the results for all water quality stations sampled in 2019.

Click here for a map of the watershed – Sample Site B0H.

Johnny Richardson, Water Resource Scientist
(850) 606-1500
Richardsonjo@leoncountyfl.gov