2025 Lakes Monitoring Annual Report

Lake Bradford

Lake Bradford is located near the Tallahassee International Airport just off Capital Circle Southwest. Lake Bradford is the last of the Bradford Chain of Lakes, which originally receives Apalachicola National Forest upland drainage via the Bradford Brook stream.

- Lake Bradford Physiographic Province: Munson Sandhills
- Drainage Basin: Lake Munson
- Publicly Accessible: Yes
- Lake Bradford is recreational favorite for skiing, fishing & sailing.
- Surface Area: 178 acres
- Drainage Area: 8,905 acres
- Maximum Depth: 13 feet
- Average Depth: 6 feet
- Trophic Classification: Eutrophic
- Fish Consumption Advisories: Mercury (Largemouth Bass, Bluegill, Redear sunfish)
- Lake Type: Dark-Acidic
- Water Quality Conditions: Healthy
- Water Quality Impairments: Lead
- Biological Health: Healthy

Evaluation of Lake Health

Healthy lake systems often exhibit well-balanced populations of flora and fauna. While some level of disturbance can be tolerated, excessive human activities may result in lake degradation. Human stressors such as increased inputs of nutrients, sediments and pesticides from watershed runoff, undesirable removal of native shoreline and upland buffer vegetation, and introduction of nuisance (generally exotic) plants and animals all contribute to degradation of our water resources. The Florida Department of Environmental Protection (FLDEP) has methods to evaluate if these anthropogenic activities have resulted in conditions where a particular waterbody has exceeded water quality criteria, (Chapter 62-302, Florida Administrative Code), including whether adverse impacts to biological communities have occurred. The most common criteria used by FLDEP to determine lake health is called "Numeric Nutrient Criteria" (NNC). FLDEP water quality standards are designed to protect the designated uses of waters of the state (*e.g.,* recreation, aquatic life support). This criterion will show exceedances of these standards that may impede the designated use of a particular waterbody. The Numeric Nutrient Criterion primarily evaluates Chlorophyll-*a*, Total Nitrogen and Total Phosphorus. Chlorophyll-*a* is a measure of algal biomass in a water column and is generally found in higher concentrations as a response to increased levels of nitrogen and/or phosphorus. In clear, low alkalinity lakes (a lake where color is ≤ 40 PCU and the alkalinity is ≤ 20 mg/L CaCO3), a healthy system is expected to have < 6 µg/L of chlorophyll-a. In colored (> 40 PCU) lakes or clear, high alkalinity (>20 mg/L CaCO3) lakes, healthy systems are expected to have < 20 µg/L of chlorophyll-a. Chlorophyll-a values greater than those referenced may result in unwanted shading of aquatic plants and/or greater potential for harmful algal blooms. **Table 1** below represents the FLDEP Numeric Nutrient Criteria for Florida lakes.

Table 1. Florida Numeric Nutrient Criteria

Long Term Geometric Mean Lake Color and Alkalinity	Annual Geometric Mean Chlorophyll *a*	Minimum calculated numeric interpretation		Maximum calculated numeric interpretation	
		Annual Geometric Mean Total Phosphorus	Annual Geometric Mean Total Nitrogen	Annual Geometric Mean Total Phosphorus	Annual Geometric Mean Total Nitrogen
> 40 Platinum Cobalt Units	**20 µg/L**	**0.05 mg/L**	**1.27 mg/L**	**0.16 mg/L[1]**	**2.23 mg/L**
≤ 40 Platinum Cobalt Units and > 20 mg/L $CaCO_3$	**20 µg/L**	**0.03 mg/L**	**1.05 mg/L**	**0.09 mg/L**	**1.91 mg/L**
≤ 40 Platinum Cobalt Units and ≤ 20 mg/L $CaCO_3$	**6 µg/L**	**0.01 mg/L**	**0.51 mg/L**	**0.03 mg/L**	**0.93 mg/L**

From a biological perspective on lake health, the Lake Vegetation Index (LVI) is utilized as the primary bioassessment tool. This rapid field method was developed by FLDEP to assess the lake's plant community.

For the LVI, the lake is divided into twelve sections, with four of these sections chosen at random to be evaluated. The evaluation is during the summer months of the year when vegetation is actively growing. Criteria documented are "percent native species", "percent invasive exotic species", "percent sensitive species", and the "coefficient of conservatism" (C of C; a measure of how tolerant a species is to disturbance) of the dominant species. According to DEP SOP LT 7000, the LVI score ranges and categories are: (78-100) Exceptional; (43-77) Healthy; and (0-42) Impaired. DEP's revised impairment threshold score of 43 and higher fully meet the expectation of a healthy, well-balanced community, and scores below 42 are considered

impaired. The LVI was sampled per DEP SOP FS7310 and calculated per DEP SOP LT7000.

Lake Bradford maintains a relatively consistent permanent pool of water, which is conducive to water quality and biological monitoring activities. The Bradford Chain of Lakes generally flows from west to east, with Lake Bradford residing furthest east immediately downstream of Lake Hiawatha. Lake Bradford receives its primarily source of water from the upstream lakes (Hiawatha & Cascade), which are dependent on receiving water through the Apalachicola National Forest. Additionally, during times of large storm events, the West Drainage Ditch has the potential to backflow into Grassy Lake and subsequently Lake Bradford. Annual water quality data is available for Lake Bradford dating back to 1993 and biological monitoring has occurred since 2001. The following tables and charts provide water quality (annual geometric means) and biological results covering the time period of 2011-2024. **Figures 1 & 2** display the water quality and biological LVI monitoring locations within Lake Bradford.

Figure 1. Water Quality Monitoring Locations

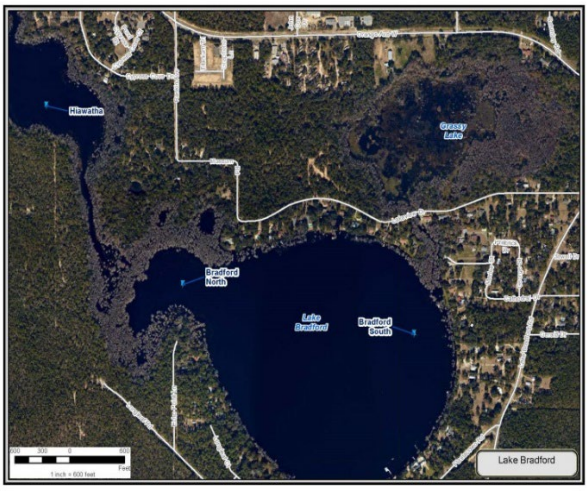


Table 2. Water Quality Annual Geomeans

Yearly Geomeans of FLDEP Nutrient Criterion Parameters & Biological Health Lake Bradford						
Year	Chlorophyll*	Color	Alkalinity	TN*	TP*	LVI
2011	3	85	3	0.77	0.030	
2012	No samples collected due to extreme low water level					
2013	14	160	8	0.59	0.020	75
2014	12	215	2	0.71	0.020	
2015	6	163	2	0.75	0.010	60
2016	7	108	2	0.61	0.020	
2017	12	77	2	0.84	0.030	78
2018	17	86	2	0.40	0.030	
2019	4	151	2	0.50	0.020	75
2020	14	90	2	0.67	0.020	
2021	13	101	4	0.72	0.030	64
2022	11	58	5	0.53	0.020	74
2023	6	32	3	0.58	0.029	73
2024	9	124	3	0.69	0.020	75

Chart 1. Color

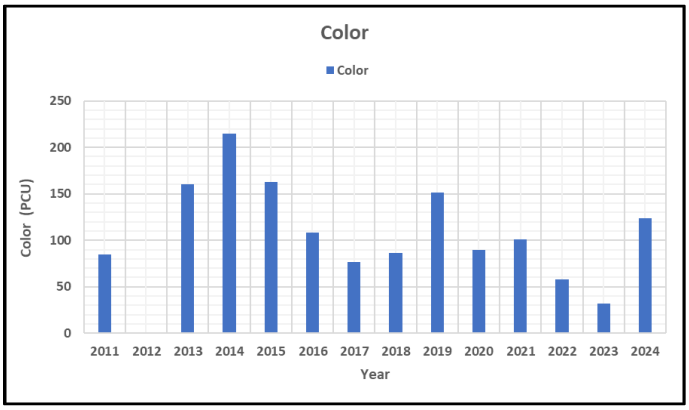


Chart 2. Alkalinity

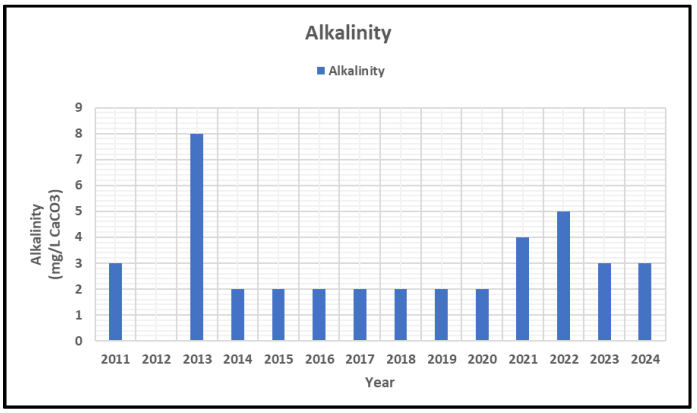


Chart 3. Chlorophyll

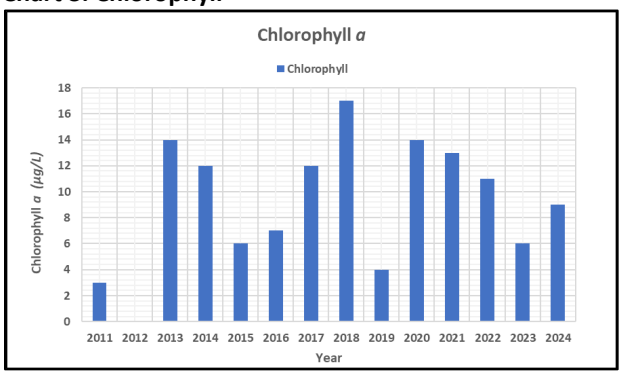


Chart 4. Total Nitrogen

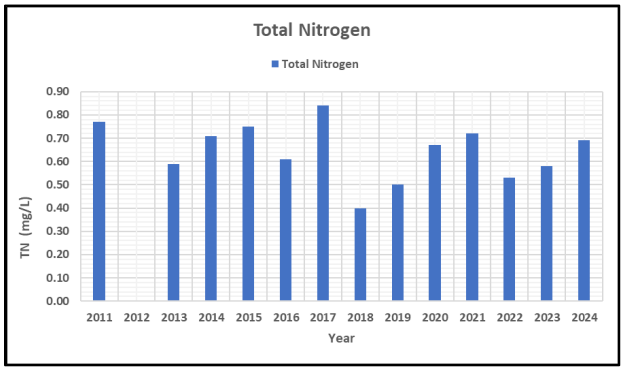


Chart 5. Total Phosphorus

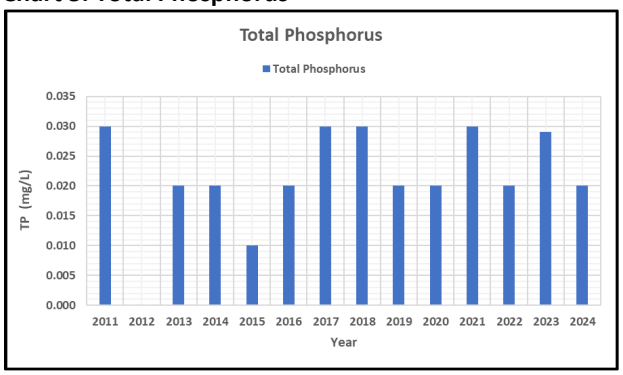


Figure 2. Biological Monitoring

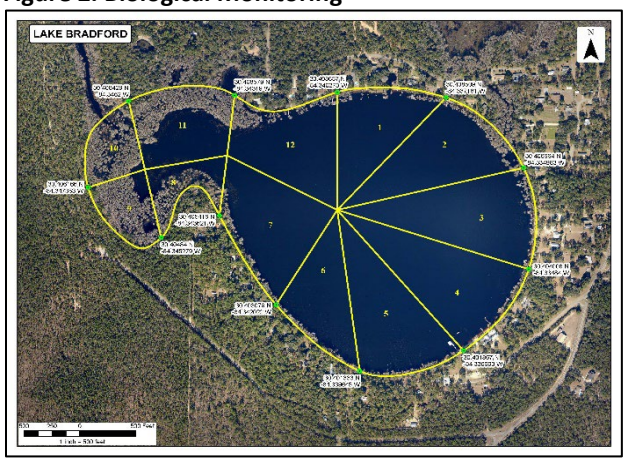


Chart 6. Biological LVI Species List for Year 2024

Lake Bradford Year 2024	LVI Score: 75	Sections			
Scientific Name	Common Name	2	5	8	11
Acer rubrum	RED MAPLE	P		P	P
Cephalanthus occidentalis	COMMON BUTTONBUSH	P	P	P	P
Clethra alnifolia	SWEET PEPPERBUSH	P			
Cyperus lecontei	LECONTE'S FLATSEDGE		P		
Liquidambar styraciflua	SWEETGUM				P
Ludwigia leptocarpa	ANGLESTEM PRIMROSEWILLOW	P	P		P
Lycopus rubellus	TAPERLEAF WATERHOREHOUND		P		
Lycopus virginicus	VIRGINIA WATERHOREHOUND	P			P
Magnolia virginia	SWEETBAY MAGNOLIA			P	
Nymphaea odorata	AMERICAN WHITE WATERLILY		P		
Nyssa sylvatica biflora	SWAMP TUPELO	P	P		
Panicum capillare	WITCH GRASS	P	P		P
Panicum repens	TORPEDO GRASS		P	P	P
Persicaria sp.	SMARTWEED		P		
Pontederia cordata	PICKERELWEED		P	P	
Sabal palmetto	CABBAGE PALM			P	
Sacciolepis striata	AMERICAN CUPSCALE	P	P	P	P
Sagittaria isoetiformis	QUILLWORT ARROWHEAD	P			
Taxodium sp.	BALD CYPRESS	D	D	D	D

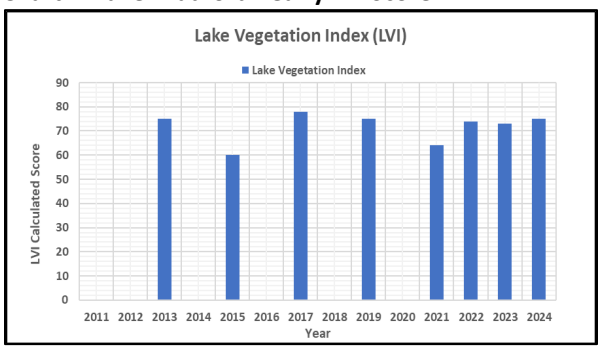
Data Discussion

The data within the above charts and tables is used to determine overall lake health. The Lakes Monitoring Program utilizes the Mann-Kendall Statistical Trend Analysis to determine if there are any statistically significant trends. Per this analysis, there are no significant trends, either increasing or decreasing, for any of the numeric nutrient water quality parameters illustrated in the charts.

The water quality and biological health within Lake Bradford can be characterized as “Healthy”,

evidenced by low levels of nutrients and chlorophyll-*a* in relation to the high color content of the water. This characterization concurs with the FLDEP nutrient assessment of water quality, which notes no existing nutrient impairments within the lake. The high color content in Lake Bradford's water, helps keep Chlorophyll *a* level's from producing problematic algal blooms. There is sufficient organic nitrogen to help "feed" chlorophyll, but the high tannins in the water column filter the sunlight so algae production is at a minimum. However, it should be noted that an impairment for lead exists at Lake Bradford. The source of lead has not been identified, but the impairment is likely related to a combination of factors including the naturally low hardness and acidic nature of Lake Bradford.

Chart 7. Lake Bradford Yearly LVI Score



Lake Bradford's vegetation community has a narrow diversity structure with native plant species. The overall LVI calculated score was "75" for year 2024, which indicates a "Healthy" plant community. The shoreline "Torpedo Grass" and "Witch Grass", both within the *Panicum* sp. genera, are the two exotic invasive species recorded this survey season. The presence of "Witch Grass" is a newly identified species for Lake Bradford. Witch Grass is a species of grass that is found in various habitats across North America. Shady, moist, sandy, upland soils provide the necessary conditions for abundance. The extensive housing development, encompassing around 80% of the lake, leaves little room for littoral zone growth. The dark-colored water shades out submerged plant communities, which prevents their ability to thrive. The LVI scores vary from year to year based on the surveyed sections, which are determined by a random number sequence. The littoral shoreline is dominated with the Bald Cypress tree (*Taxodium* sp.) with a few "Sweetbay" Magnolia (*Magnolia virginiana*), and "Red" Maples (*Acer rubrum*) mixed in.

Thank you for your interest in maintaining the water quality of City of Tallahassee area lakes. Visit the web-links below for more information on the City of Tallahassee, Leon County and Florida natural water resources.

City of Tallahassee Think About Personal Pollution (TAPP) Program
https://tappwater.org/

City of Tallahassee Stormwater Management
https://www.talgov.com/you/stormwater

Leon County Water Resources
https://cms.leoncountyfl.gov/waterresource

Best Management Practices for Protection for Water Resources
https://ffl.ifas.ufl.edu/media/fflifasufledu/docs/GIBMP_Manual_Web_English.pdf

DEP biological assessment resources:
https://floridadep.gov/dear/bioassessment/content bioassessment-training-evaluation-and-quality-assurance#LVI

FWCC Aquatic Plant Management:
http://myfwc.com/wildlifehabitats/habitat/invasive-plants/aquatic-plant/

Freshwater Algal Bloom information:
https://floridadep.gov/AlgalBloom

University of Florida / IFAS Lake Resources:
Florida LAKEWATCH