

2025 Lakes Monitoring Annual Report

Lake Cascade

Lake Cascade is located near the Tallahassee International Airport just off Capital Circle Southwest. Lake Cascade is the first lake of the Bradford Chain of Lakes, which receives water via drainage from the Apalachicola National Forest by way of the Bradford Brook stream.

- Lake Cascade Physiographic Province: Munson Sandhills
- Publicly Accessible: Yes
- Surface Area: 109 acres
- Drainage Basin: 8,260 acres
- Maximum Depth: 8 feet
- Average Depth: 5 feet
- [Trophic Classification: Mesotrophic](#)
- [Fish Consumption Advisories: None](#)
- Lake Type: Dark-Acidic
- Water Quality Conditions: Healthy
- Water Quality Impairments: Lead
- Biological Health: Exceptional



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 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 NNC evaluates Chlorophyll-*a*, Total Nitrogen and Total Phosphorus based on the Color and Alkalinity of the lake. 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 CaCO_3), a healthy system is expected to have < 6 $\mu\text{g/L}$ of chlorophyll-*a*. In colored (> 40 PCU) lakes or clear, high alkalinity (> 20 mg/L CaCO_3) lakes, healthy systems are

expected to have < 20 $\mu\text{g/L}$ 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 <i>a</i> | 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 $\mu\text{g/L}$ | 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 $\mu\text{g/L}$ | 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 $\mu\text{g/L}$ | 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 LVI assessment is performed during the growing season of summer. The assessment score is calculated: the percent native species, the percent invasive exotic species, the percent sensitive species, and the dominant or co-dominant species, including the coefficient of conservatism (C of C; a measure of how tolerant a species is to disturbance) of each plant taxa. 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 meets 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 Cascade maintains a highly variable permanent pool of water, which can be inconducive to water quality and biological monitoring activities. For the years 2011, 2012, 2019 and beginning of 2023 the lake was in a dry condition absent of necessary water to complete monitoring activities. Generally flowing from west to east, Lake Cascade is the western most lake in the Bradford Chain of Lakes residing immediately upstream of Lake Hiawatha and adjacent to the Apalachicola National Forest from which Cascade is dependent on water inflow. Annual water quality data is available for Lake Cascade dating back to 1991 and biological monitoring has occurred since 2001. The following tables and charts provide water quality (annual geometric means) and biological results covering the period of 2011-2024. **Figures 1 & 2** display the water quality and biological monitoring locations within Lake Cascade.

Figure 1. Water Quality Monitoring Locations



Table 2. Water Quality Annual Geomeans

| Yearly Geomeans of FLDEP Nutrient Criterion Parameters & Biological | | | | | | Health |
|---|---|-------|------------|------|-------|--------|
| Lake Cascade | | | | | | |
| Year | Chlorophyll * | Color | Alkalinity | TN * | TP* | LVI |
| 2011 | Lake was dry from internal sinkhole opening and draining lake | | | | | |
| 2012 | | | | | | |
| 2013 | 6 | 376 | 2 | 0.96 | 0.016 | |
| 2014 | 4 | 305 | 2 | 0.74 | 0.013 | |
| 2015 | 4 | 280 | 2 | 0.66 | 0.009 | |
| 2016 | 3 | 226 | 2 | 0.88 | 0.020 | |
| 2017 | 7 | 124 | 2 | 0.70 | 0.020 | |
| 2018* | 4 | 324 | 2 | 0.74 | 0.010 | |
| 2019 | 5 | 124 | 2 | 0.71 | 0.020 | 89 |
| 2020* | 9 | 400 | 2 | 0.97 | 0.010 | |
| 2021 | 7 | 192 | 2 | 0.72 | 0.021 | |
| 2022 | 3 | 214 | 2 | 0.78 | 0.012 | 80 |
| 2023* | Lake was dry from internal sinkhole opening and draining lake | | | | | |
| 2024 | 5 | 240 | 2 | 0.93 | 0.015 | |
| *2018 Year data based on two sampling events. Lake Cascade had drained to very low water levels before refilling in of 2018. | | | | | | |
| *2020 Year data based on one sampling event. Lake Cascade had drained in 2019 to very low water levels before refilling in of during Summer of 2020. | | | | | | |
| *2023 Year data based on three sampling events. Lake Cascade had drained in 2023 to very low water levels before totally refilling in of during Summer of 2024. | | | | | | |

Chart 1. Color

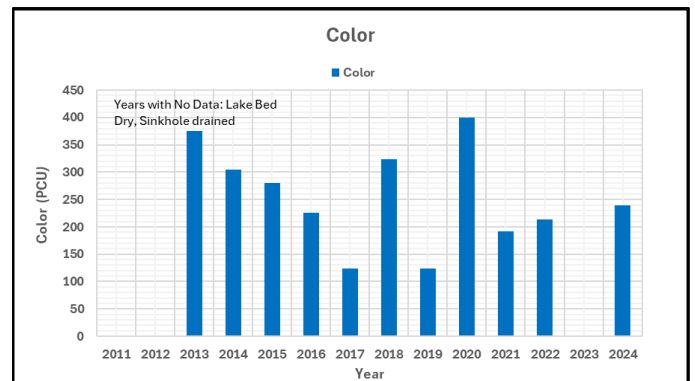


Chart 2. Alkalinity

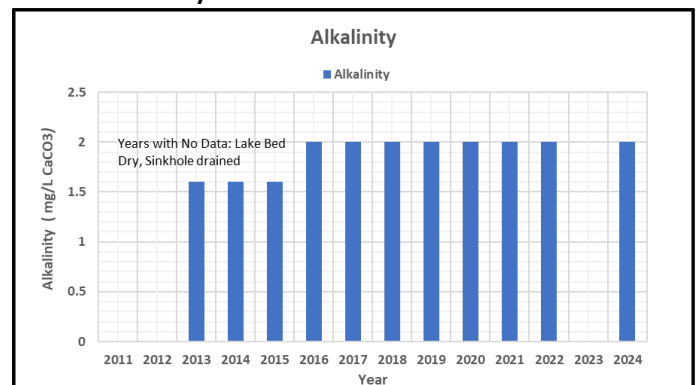


Chart 3. Chlorophyll

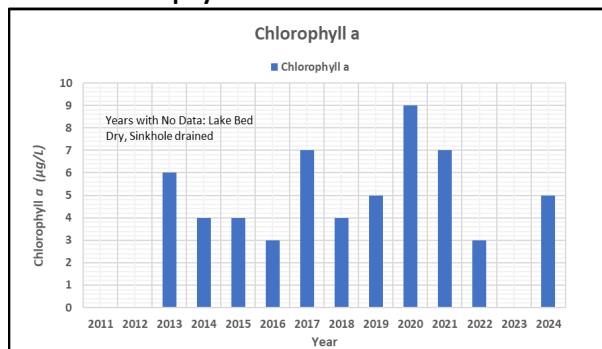


Chart 4. Total Nitrogen

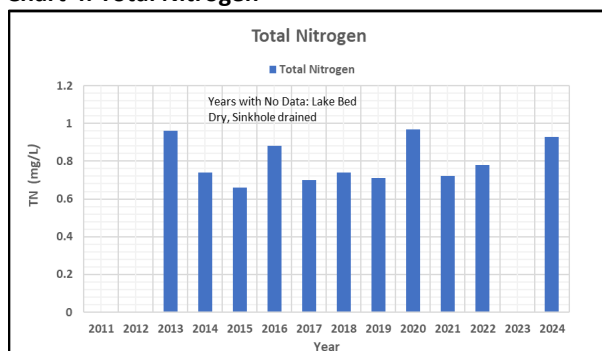


Chart 5. Total Phosphorus

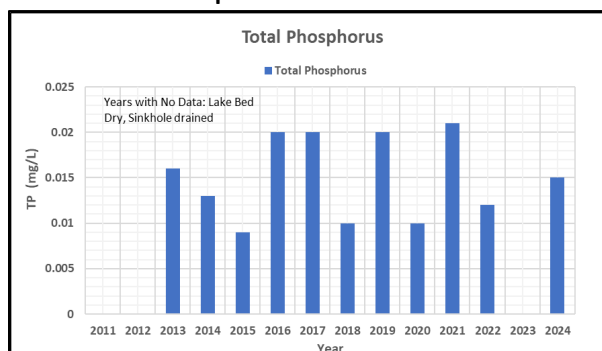


Figure 2. Biological Monitoring

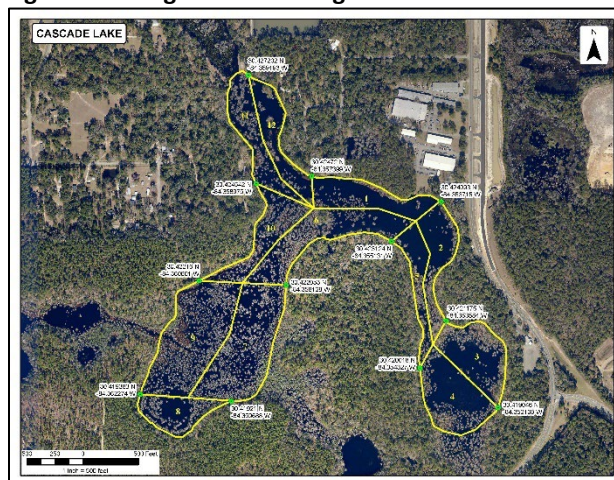


Chart 6. Biological LVI Species List for Year 2022

| Lake Cascade Year 2022 | | LVI SCORE: 80 | | | | Sections | | | |
|----------------------------------|-------------------------------|---------------|---|---|---|----------|---|---|----|
| Scientific Name | Common Name | | | | | 3 | 6 | 9 | 12 |
| <i>Acer rubrum</i> | RED MAPLE | P | P | P | P | | | | |
| <i>Andropogon sp.</i> | BROOMEDGE | P | P | | | | | | |
| <i>Azolla caroliniana</i> | CAROLINA MOSQUITO FERN | | | | | | | P | |
| <i>Bidens mitis</i> | SMALLFRUIT BEGGARTICKS | P | P | P | P | | | | |
| <i>Cephalanthus occidentalis</i> | COMMON BUTTONBUSH | P | P | P | P | | | | |
| <i>Clethra alnifolia</i> | COASTAL SWEETPEPPERBUSH | P | P | P | | | | | |
| <i>Cyrilla racemiflora</i> | TITI | P | P | P | P | | | | |
| <i>Hydrocotyle sp.</i> | MARSHPENNYWORT | | | | | | | | P |
| <i>Ilex cassine myrtifolia</i> | MYRTLE DAHOON | P | | | | | | P | |
| <i>Ilex vomitoria</i> | YAUPON | P | P | | | | | | |
| <i>Leersia hexandra</i> | SOUTHERN CUTGRASS | | | | | | | | P |
| <i>Liquidambar styraciflua</i> | SWEETGUM | | | | | P | | | |
| <i>Luziola fluitans</i> | SOUTHERN WATERGRASS | | | | | | | P | P |
| <i>Lycopus sp.</i> | WATERHOREHOUND | | | | | P | | | |
| <i>Nymphaea odorata</i> | AMERICAN WHITE WATERLILY | | | | | | | | P |
| <i>Nyssa sylvatica biflora</i> | WATER TUPELO | | | | | | | P | P |
| <i>Panicum hemitomon</i> | MAIDENCANE | P | P | P | P | | | | |
| <i>Persicaria sp.</i> | KNOTWEED | | | | | | | | P |
| <i>Sabal palmetto</i> | CABBAGE PALM | | | | | | | P | P |
| <i>Sapium sebiferum</i> | CHINESE TALLOW | | | | | P | | | |
| <i>Sphagnum sp.</i> | BOG MOSS | | | | | | | P | |
| <i>Taxodium c.f. ascendens</i> | BALD-CYPRESS (POND) | D | D | D | D | | | | |
| <i>Triadenum virginicum</i> | VIRGINIA MARSH ST.JOHN'S-WORT | | | | | | | | P |

Data Discussion

The data within the above charts and tables is used to determine overall lake health and to assess whether any data trends are evident. Lake Cascade was dry at the end of year 2022 thru the first half of 2023. Water levels never sufficiently recovered and as such no monitoring activities occurred during the entire 2023 year. The lake received enough rain to fill the lake for the first quarter of 2024 but then receded to

extremely low levels once again, prohibiting sample collection for April 2024. Summer rains refilled Cascade again for samples to be collected for the rest of the 2024 year. Last year data shows that there was a slight increase in all three key nutrient indicators for lake health: chlorophyll, total nitrogen, and total phosphorus. This is due to the high organic material that accumulated during the drought-induced, exposed lake bottom. However, through 2024, there are no significant trends indicated for any of the three parameters mentioned.

The water quality and biological health within Lake Cascade can be characterized as excellent, 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 assessment of water quality, which notes no existing impairments within the lake. However, Lake Cascade does have an impairment for lead, according to FLDEP's Impaired Waters List. 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.

Lake Cascade's vegetation community has a robust diversity structure with predictable native plant species due to the surrounding Apalachicola National Forest. However, due to the lake draining via its sinkhole during December of 2011 and several times there-after, Lake Vegetation Index (LVI) surveys are rarely performed on Lake Cascade. The summer of 2022 is still the most recent LVI survey completed. Low water once again negated a LVI survey being completed last year.

The 2022 LVI calculated score was "80" which indicates it's an "Exceptional" plant community. The scores vary from year to year based on the surveyed sections, which are chosen at random to avoid sampling bias. **Chart 6** lists the identified plant vegetation during the 2022 LVI survey. The littoral shoreline is dominated by the Bald Cypress tree (*Taxodium* sp.) while the grassy vegetation, Maidencane (*Panicum hemitomon*), inhabits a majority of the shoreline within Lake Cascade. The Red Maple (*Acer rubrum*) and the Water Tupelo (*Nyssa s. biflora*) constitute the tree population on the lake banks within the quadrants surveyed. Unfortunately, also present is the tree Chinese Tallow (*Sapium sebiferum*), which is the lone invasive exotic tree that was documented.

Dark, tannic, colored water prevents sunlight penetration thru the water column, thus limiting algal production. The elevated Total Nitrogen values noted in **Table 2** are natural, due to the decomposition of organic matter such as leaves and vegetation. The resulting high organic nitrogen values is the driving factor of the Total Nitrogen concentrations.

Below: Photos 1 & 2. Lake Cascade in a dry condition January 2023.





Photo 3. High watermarks on a Pond Cypress tree, illustrating the extreme water fluctuations within Lake Cascade.



Photo 4. Water levels begin to return April 2024.



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/waterresourceBest>

Management Practices for Protection for Water Resources
https://ffl.ifas.ufl.edu/media/fflifasufledu/docs/GIB_MP_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](https://lakewatch.org/)