

# 2023 Lakes Monitoring Annual Report

## Lake Kinsale

*Lake Kinsale is located within the Killearn Estates Subdivision off Shannon Lakes Road just West of Lake Killarney, and within the City of Tallahassee corporate limits. Lake Kinsale is a private community lake.*

- Lake Tom John Physiographic Province: Red Hills
- Publicly Accessible: No (Private)
- Surface Area: 15 acres
- Drainage Basin: 3,478 acres
- Maximum Depth: 5 feet
- Average Depth: 3 feet
- [Trophic Classification](#): Eutrophic
- [Fish Consumption Advisories \(2022\)](#): None
- Lake Type: Clear-Acidic
- Water Quality Conditions: Marginal
- Water Quality Impairments: 4e Restoration Plan (Chlorophyll, Total Nitrogen, & Total Phosphorus)
- Biological Health: Poor



## 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 Numeric Nutrient Criterion 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  $\leq 40$  PCU and the alkalinity is  $\leq 20$  mg/L CaCO<sub>3</sub>), 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<sub>3</sub>) 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 <sup>1</sup>	2.23 mg/L
$\leq 40$ Platinum Cobalt Units and $> 20$ mg/L CaCO <sub>3</sub>	20 $\mu\text{g/L}$	0.03 mg/L	1.05 mg/L	0.09 mg/L	1.91 mg/L
$\leq 40$ Platinum Cobalt Units and $\leq 20$ mg/L CaCO <sub>3</sub>	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 evaluation typically occurs 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 Kinsale maintains a relatively consistent permanent pool of water, making it conducive to perform water quality monitoring activities. Water quality data collection began in 2017 with an effort to collect additional data to better understand the function of the Killlearn Chain of Lakes (KCOL). The following tables and charts provide water quality (annual geometric means) results covering the time period of 2017-2022. **Figure 1** shows the water quality monitoring location within Lake Kinsale.

**Figure 1. Water Quality Monitoring Locations**

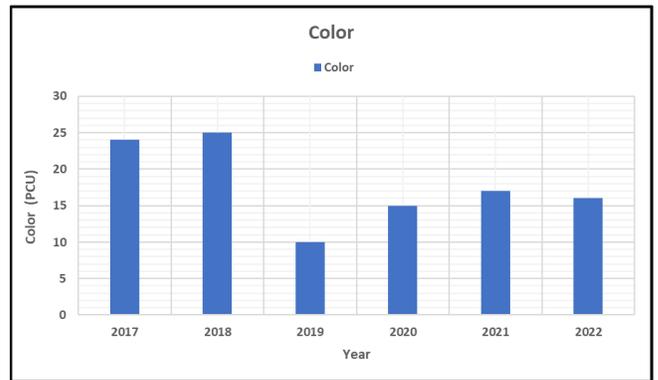


The table (2) below documents the nutrient criterion data for the 2017 - 2022 years.

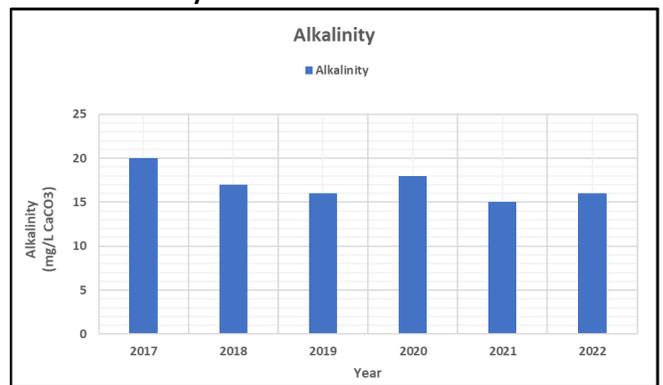
**Table 2. Water Quality Annual Geomeans**

Yearly Geomeans of FLDEP Nutrient Criterion Parameters					
Lake Kinsale					
Year	Chlorophyll*	Color	Alkalinity	TN*	TP*
2017	45	24	20	1.29	0.206
2018	13	25	17	0.67	0.078
2019	13	10	16	0.89	0.086
2020	26	15	18	1.01	0.041
2021	14	17	15	0.55	0.065
2022	6	16	16	0.73	0.065

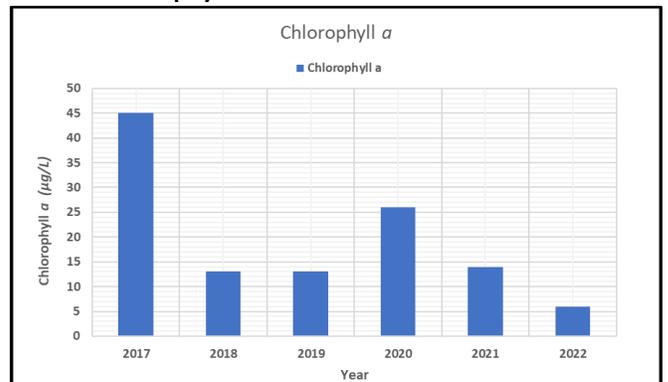
**Chart 1. Color**



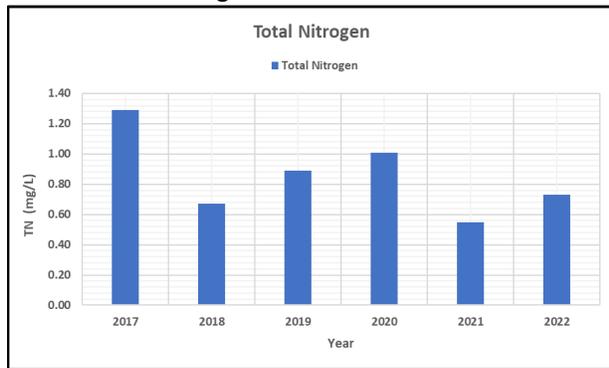
**Chart 2. Alkalinity**



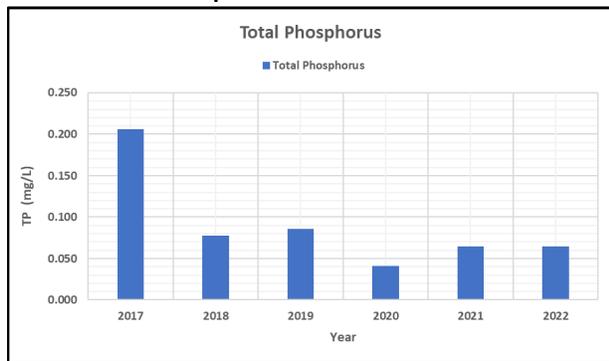
**Chart 3. Chlorophyll**



**Chart 4. Total Nitrogen**



**Chart 5. Total Phosphorus**



### Data Discussion

The data within the above charts and the corresponding **Table 2**, are used to determine overall lake health and to assess whether there are data trends evident. The City’s Lakes Monitoring Program utilizes the Mann-Kendall Statistical Trend Analysis test to determine if there are statistically significant trends.

Water quality conditions are best characterized as marginal, while the biological community is poor. This characterization concurs with the FLDEP assessment of water quality. Impairments for Chlorophyll-*a*, Total Nitrogen and Total Phosphorus are assessed as a “clear acidic” lake. While water quality challenges certainly exist within Lake Kinsale, Chlorophyll-*a*

concentrations seem to be declining as well as the frequency with which algal blooms are occurring.

Lake Kinsale is the most upstream water body within the Killarney Chain of Lakes, (KCOL), discharging downstream to Lake Killarney. While Lake Kinsale maintains a relatively consistent permanent pool of water, it is a very shallow lake (average depth 3 feet) and thus more susceptible to desiccation during periods of drought or lower than average rainfall. When the lake bottom is dry, terrestrial grasses and plants overtake a large portion of the lake bottom. When ample rainfall occurs to refill the lake system, established terrestrial plants die and decompose. This vegetative decomposition releases stored nutrients and can lead to the production of algal blooms. These algal blooms create high Chlorophyll-*a* and total nitrogen concentrations. Additionally, the Red Hill clay soils within the KCOL drainage basin also contribute to elevated phosphorus levels due to the high phosphorus concentrations naturally found within this soil type.

Urban housing developments surround Lake Kinsale and the contributing drainage basin. Residential shore-line vegetation zones are present to help with fertilizer runoff from the homeowner’s property into the lake. Additional efforts could be implemented by property owners to further control nutrient rich runoff to the lake. Additional methods include removing decomposing leaves from the streets to prevent them from entering the storm water inlets, as well as preventing large congregates of geese from gathering and leaving vast amounts of animal waste. The geese fecal waste can filtrate into the lake spiking high organic nitrogen concentrations.

Lake Kinsale's vegetation community is like the Lakes Killarney and Kanturk, with many invasive exotic trees and shoreline plants. Chinese Tallow, Alligator Weed, and Water Hyacinth are just a few of the invasive plants that can be found growing in Lake Kinsale. However, a Lake Vegetation Survey has not been performed because there is no readily available access point to launch a vessel.

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>

**Figure 2. Low water level during periods of below average rainfall.**



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/GIB\\_MP\\_Manual\\_Web\\_English.pdf](https://ffl.ifas.ufl.edu/media/fflifasufledu/docs/GIB_MP_Manual_Web_English.pdf)