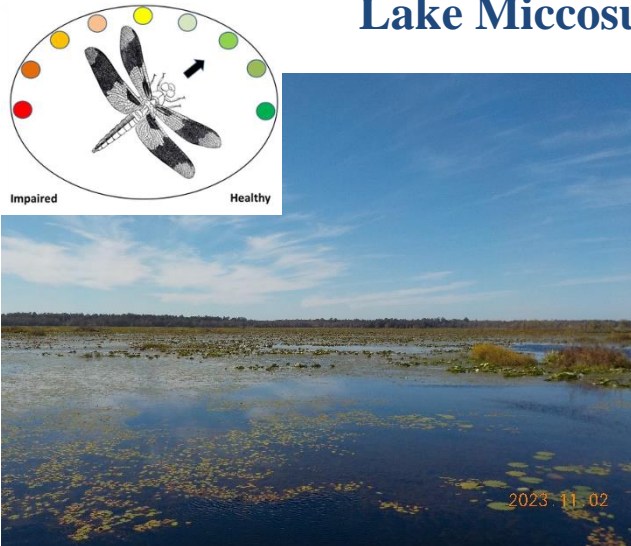


# Lake Miccosukee EcoSummary



Lake Miccosukee is a 6,257-acre, phosphorus-limited lake that forms the northeastern border of Leon County. Lake Miccosukee is considered a shallow, prairie lake which historically drained via sinkholes, becoming nearly dry in the process. The result of the natural drawdowns was a large reduction in the amount of organic matter content found in the bottom sediments.

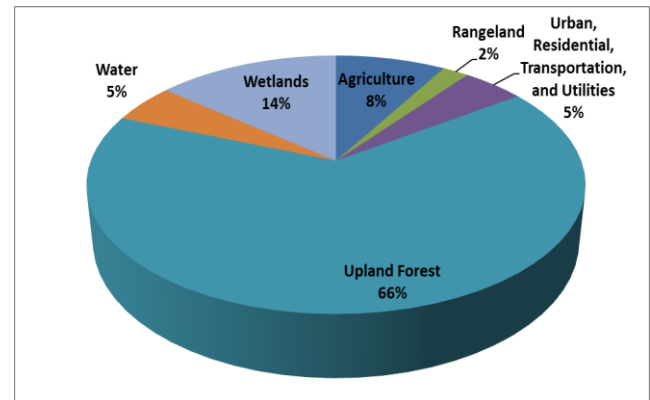
In 1954, a control structure was constructed around the northern sinkhole and a wooden weir constructed at the southern end of the lake to stabilize water levels. Water level stabilization led to increased emergent vegetation in the lake, so that vegetation covered as much as 80% of the lake's surface. By taking up space and decreasing oxygen levels, the increased vegetation also contributed to the diminishment of the fish population and increased the amount of organic material in the sediment.

Because of rising concerns about the health of the lake, the control structure gate was opened during the 1999 drought, allowing part of the lake to drain into the aquifer via the sinkhole. Several areas of the lake were excavated, and part of the lake bottom was burned during the drawdown. The burning and excavation led to increased lake volume and removed a portion of the organic rich sediment. After tropical storms

Allison and Barry passed through the area in 2001, Lake Miccosukee quickly refilled. A second drawdown was done in 2012. At that time, prescribed burning was performed on a portion of the woody tussocks that float on the lake. Plant maintenance continues to this day.

In 2010, an additional sinkhole developed on the southeast side of the lake. While this sinkhole won't completely drain the lake, it may keep the lake levels lower during dry periods.

Approximately 15% of land use in the 147,861-acre Lake Miccosukee basin is agriculture, rangeland, transportation, utilities, urban and residential (as shown in **Figure 1**). These types of land uses are often attributed to increases in stormwater runoff and higher nutrient loads.



**Figure 1.** Lake Miccosukee watershed land use.

## Background

Healthy, well-balanced lake communities may stay that way 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. Stressors can also include 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 samples are collected quarterly (as field conditions allow) and sediment samples are collected annually. This information is used to determine the health of Leon County waterbodies and meets the requirements of the Florida Department of Environmental Protection (FDEP).

## Results

### *Nutrients*

The State of Florida uses Numeric Nutrient Criteria (NNC) to evaluate nutrients in waterbodies. NNC thresholds are set based on waterbody-specific characteristics and are used to determine if a waterbody meets water quality standards. The results of the four quarterly samples from a single year are used to calculate the annual geometric mean. According to FDEP requirements, the NNC threshold cannot be exceeded more than once in a three-year period.

Water quality results and thresholds are found in **Table 1**. When data requirements were met, the NNC were not exceeded.

No exceedances were noted, but nutrient levels have fluctuated over time. Changes in the area around the station may have contributed to changes in nutrient concentrations (**Figure 2**). Previously, the area in the vicinity of station MI2 was dominated by *Nymphaea odorata*, the fragrant water lily. Florida Fish and Wildlife (FWC) contractors enlarged an open water area adjacent to the station that had encompassed the station area. More recently, emergent vegetation has again become more dominant, with the

addition of floating tussock islands that have either formed or floated into the sampling area. Because of the anthropogenic disturbances to the vegetative community, fluctuating water chemistry results continue to occur.

### *Chlorophyll-a*

Water quality samples collected by Leon County are analyzed by Pace Analytical Services – Ormond Beach (Pace), with the analysis results provided back to the County for submission to FDEP. In June 2022, FDEP conducted a routine audit of the chlorophyll-a data. This audit revealed that from October 2014 through December 2020, the chlorophyll-a data was reported as “uncorrected chlorophyll-a” and not “corrected chlorophyll-a”, as it should have been. Pace has since rectified this error and beginning in January 2021, the chlorophyll-a data were properly reported as “corrected chlorophyll-a”. The laboratory also provided Leon County with the “correct chlorophyll-a” data from the affected dates and the information in **Table 1** of this year’s Report has been changed to reflect this. This has resulted in chlorophyll-a numbers that are lower than past Reports, which in turn has led to changes to the current Report’s narrative.

### *Dissolved Oxygen (DO)*

As **Figure 3** shows, the Lake Miccosukee stations exhibited percent DO saturation values that did not meet Class III water quality criteria. Staff considers the low DO normal for this lake because the stations are shallow and normally covered with vegetation, preventing rapid water exchange with the larger area of the lake. Plant respiration (samples were often taken in the morning hours) and organic sediments also contributed to the low DO saturation values. Because station MI2 has become less vegetated, more water circulation is occurring along with

less plant respiration, thus allowing DO saturation values to increase.

### Fish Consumption Advisory

The Florida Department of Health has issued consumption limits for certain fish in Lake Miccosukee due to elevated levels of mercury.

[Click here for more information about fish consumption advisories.](#)

### 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 Miccosukee met the nutrient thresholds for the East Panhandle Region. Changes in the plant community are influencing nutrient and percent DO saturation value levels at station MI2. Other water quality parameters appear to be normal for the area and no other impairments were noted.

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.LeonCountyWater.org](http://www.LeonCountyWater.org)

[Click here to access the results for all water quality stations sampled in 2023.](#)

[Click here for a map of the watershed – Sample Site MI2.](#)

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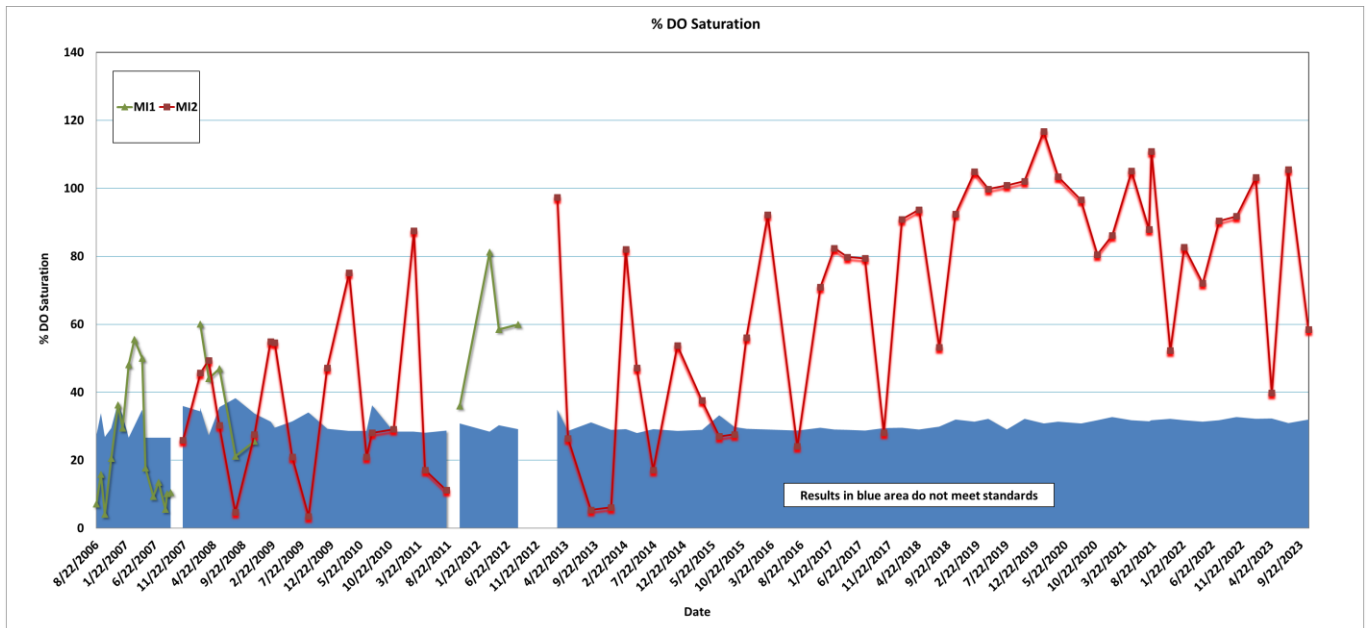
**Table 1.** FDEP’s NNC Thresholds and Sample Results for Lake Miccosukee.

Colored Lake	Chlorophyll-a 20.0 µg/L	TN Threshold 1.27-2.23 mg/L	TP Threshold 0.05-0.16 mg/L
2004	4.6	0.28	0.02
2005	6.1	0.40	0.03
2006	2.9	0.52	0.02
2007	2.3	0.69	0.02
2008	3.3	0.61	0.01
2009	3.5	0.42	0.02
2010	8.8	0.70	0.03
2011	5.8	0.82	0.04
2012*	-	-	-
2013	11.7	1.05	0.04
2014	4.3	0.86	0.03
2015	7.3	0.78	0.06
2016*	-	-	-
2017	4.9	0.83	0.03
2018	2.7	0.68	0.02
2019	4.7	0.63	0.03
2020	4.6	0.67	0.02
2021	1.3	0.63	0.02
2022	2.8	0.81	0.02
2023	2.6	0.64	0.02

\* Due to low water conditions staff could not collect the appropriate number of samples and thus could not determine the NNC for the noted years.



**Figure 2.** Station MI2 showing the variability of the plant community over time. Photos were taken in: 2013, 2017, 2018, and 2020.



**Figure 3.** Dissolved Oxygen Percent Saturation results for Lake Miccosukee. Gaps in the data are due to low water, preventing sampling.