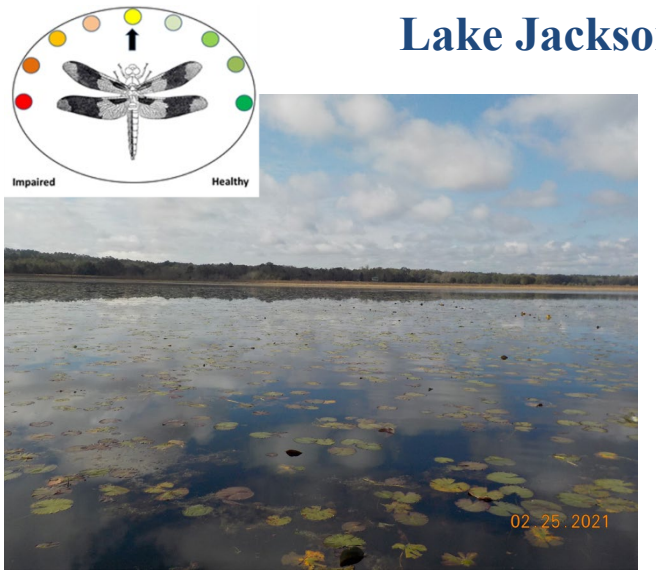
Lake Jackson EcoSummary



Lake Jackson is an approximately 4,254 acre, shallow, flat-bottomed, prairie lake with two major sinkholes and is located north of the City of Tallahassee. Lake Jackson is a valuable biological, aesthetic, and recreational resource of Leon County and was designated (along with the neighboring Lake Carr and Mallard Pond) as an Aquatic Preserve in 1973 for the primary purpose of preserving and maintaining the biological resources in their natural condition.

The aforementioned sinkholes are sources of extreme water loss in the lake over the past several decades. Normally, the sinkholes are plugged with sediments, but will collapse when groundwater levels drop, allowing the lake water to enter the aquifer, often dramatically lowering the lake water level, most recently in 2021 and continuing through 2022.

Approximately 40% of land use in the 27,096-acre Lake Jackson 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.

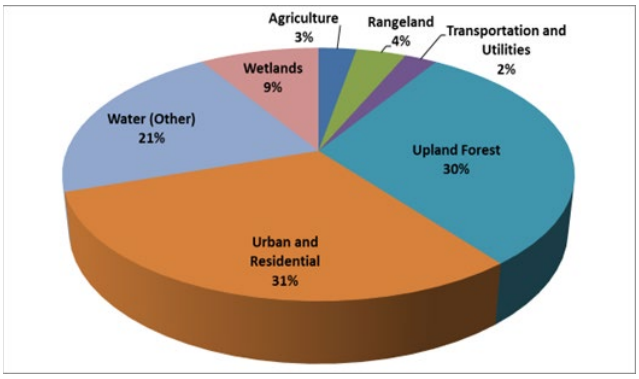


Figure 1. Lake Jackson watershed land use.

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

When field conditions allow, surface water samples are collected quarterly, and sediment samples are collected annually. Leon County also conducts an annual vegetation survey to evaluate the health of floral (plant) communities in the County lakes. 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

Low water levels caused by drought and sinkhole activity meant certain water quality stations could not be sampled during some months. The latest low water level event began in the latter half of 2020 with the lake completely draining through the Porter sinkhole in June 2021. Due to low water levels sampling did not occur for the last three quarters of 2021 and the entire 2022 calendar year. Objective results of nutrient concentration continued to be skewed by water level fluctuations. The effects of water level fluctuation continue to be documented.

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.

The nutrient thresholds and results are found in **Table 1**. Chlorophyll-a, Total Phosphorus and Nitrogen levels were exceeded during some years over the sampling period.

Chlorophyll-a data

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 correctly 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 updated 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.

Table 1. NNC thresholds and sample results for Lake Jackson. Results in bold signify exceedances of the State criteria.

Clear Lake, Low Alkalinity	Chlorophyll-a 6.0 µg/L	TN Threshold 0.51-0.93 mg/L	TP Threshold 0.01-0.03 mg/L
2004	2.2	0.33	0.01
2005	3.2	0.29	0.03
2006	3.0	0.63	0.03
2007	2.1	0.77	0.03
2008	5.7	0.60	**0.04**
2009	**8.4**	0.49	**0.02**
2010	3.2	0.58	0.02
2011	**6.9**	**0.61**	**0.02**
2012-2013*	-	-	-
2014	2.3	0.69	0.02
2015	**6.8**	**0.54**	**0.03**
2016	5.3	0.47	0.02
2017	4.2	0.56	0.02
2018	3.2	0.50	0.02
2019	5.1	0.54	0.03
2020	3.0	0.54	0.03
2021-2022*	-	-	-

* 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.

Dissolved Oxygen

As **Figure 2** shows, several Lake Jackson stations showed dissolved oxygen (DO) percent saturation values that did not meet Class III water quality criteria. This was not unexpected, since the Lake Jackson stations are shallow stations normally covered with vegetation, which prevents rapid water exchange with the larger area of the lake. Plant respiration (samples were often taken in the morning hours), in addition to organic rich sediments, also contributed to the low DO saturation values.

Fish Consumption Advisory

The Florida Department of Health has issued consumption limits for certain fish in Lake Jackson 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 Jackson NNC for chlorophyll-a, Total Phosphorus and Nitrogen levels were exceeded during certain years. Ongoing sampling showed percent dissolved oxygen (DO) saturation values did not always meet Class III water quality criteria. This was not unexpected, since the Lake Jackson stations are shallow stations normally covered with vegetation, preventing rapid water/atmospheric exchange. Plant respiration and organic-rich sediment also contributed to low DO saturation values. As of November 2023, lake levels continue to be very low, preventing water quality sampling.

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

Click here to access the results for all water quality stations sampled in 2022.

Click here for a map of the watershed – Sample Sites J03, J05, J14 and J16.

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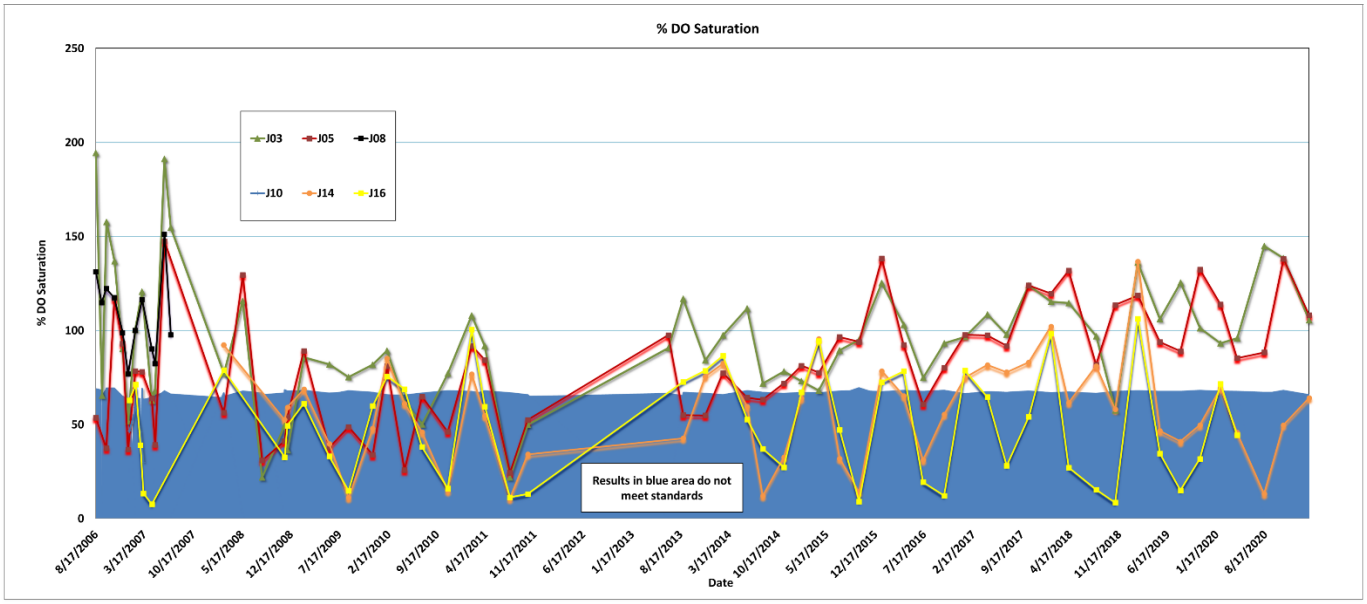

Figure 2. Dissolved Oxygen Percent Saturation results for Lake Jackson.