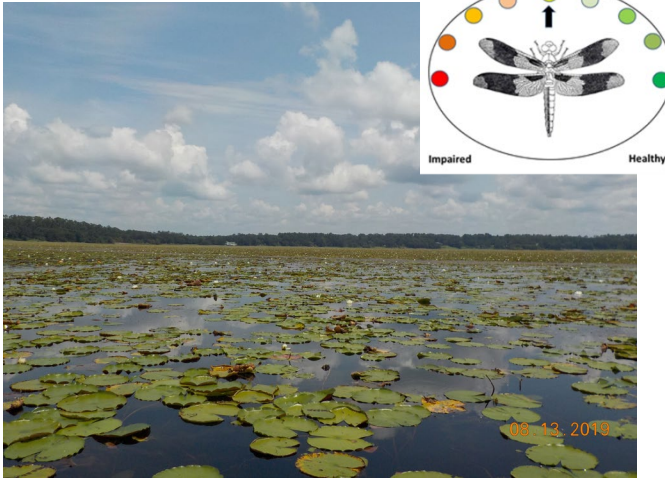


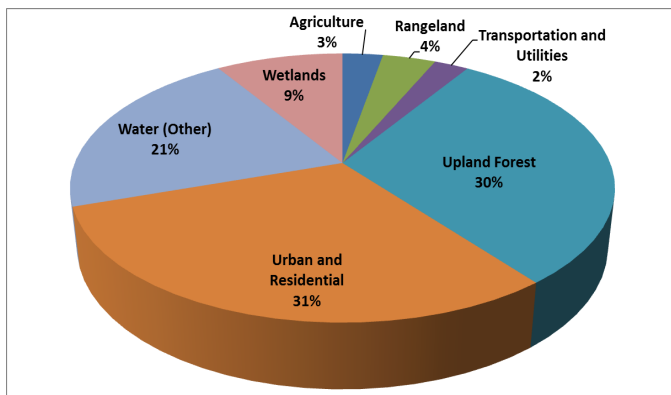
## Waterbody: Lake Jackson



## Basin: Lake Jackson

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.

As shown in the following pie chart, approximately 40% of land use in the 27,096-acre Lake Jackson Basin is agriculture, rangeland, transportation, utilities, urban and residential. Increases in stormwater runoff and waterbody nutrient loads can often be attributed to these types of land uses.



## 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. 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, sediment sampling, and a Lake Vegetation Index (LVI) were conducted to determine the health of Lake Jackson and met the collection and analysis requirements of the Florida Department of Environmental Protection (FDEP).

## Results

### *Nutrients*

Low water levels caused by drought and sinkhole activity meant certain water quality stations could not be sampled during some months. After Tropical Storm Fay (August 2008), Lake Jackson water levels reached full pool conditions; however, subsequent drought conditions lowered lake levels to where staff was unable to collect water chemistry samples in 2012 and the first quarter of 2013. Water levels continued to rise in the latter part of 2013 and reached full pool in 2014. Objective results of nutrient concentration continued to be skewed by water level fluctuations. The effects of water level fluctuation continue to be documented.

The nutrient thresholds and results are found in Table 1. According to FDEP requirements, Numeric Nutrient Criteria (NNC) (expressed as an annual geometric mean) cannot be exceeded more than once in

a three-year period. Chlorophyll-a, total phosphorus, and nitrogen levels were exceeded several times over the sampling period, with the latest occurring in 2019. When comparing 2019 with previous years, total nitrogen and phosphorus levels were not substantially different, but the 2019 geometric mean chlorophyll-a levels are the highest recorded since Leon County sampling began. It is thought that due to the aggressive herbicide spraying on Lake Jackson and the dominance of the invasive exotic hydrilla on the southern side of the lake, native emergent and floating vascular plants are no longer present in the numbers needed to “shade out” phytoplankton, allowing phytoplankton numbers to increase and contributing to the elevated chlorophyll-a numbers.

#### Dissolved Oxygen

As Figure 1 shows, several Lake Jackson stations showed percent dissolved oxygen (DO) 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 in Leon County.](#)

#### Floral Assessment

The Lake Vegetation Index score for Lake Jackson was 52, placing the lake’s vegetative community in the healthy category.

Seventy species were found during the survey. While the score suggests that Lake Jackson has a healthy aquatic plant community, there is some cause for

concern. While the native species fragrant waterlily (*Nymphaea odorata*) and fanwort (*Cabomba caroliniana*) were the most dominant species in sections two and eleven, the Category I Invasive Exotic hydrilla (*Hydrilla verticillata*) was the most dominant in two of the four surveyed sections five and nine.

**Table 1.** FDEP’s chlorophyll-a, total nitrogen and phosphorus criteria for lakes applied to Lake Jackson. Results in bold signify exceedances of the State criteria. Due to low water the numeric nutrient criteria data requirements could not be calculated for years 2012-2013.

Clear Lake, Low Alkalinity	Chlorophyll-a 6.0 µg/L	Total Nitrogen Threshold 0.51-0.93 mg/L	Total Phosphorus 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	<b>0.04</b>
2009	<b>8.4</b>	0.49	<b>0.02</b>
2010	3.2	0.58	0.02
2011	<b>6.9</b>	<b>0.61</b>	<b>0.02</b>
2012-2013	-	-	-
2014	2.6	0.69	0.02
2015	<b>9.2</b>	<b>0.54</b>	<b>0.03</b>
2016	<b>6.4</b>	0.47	<b>0.02</b>
2017	<b>6.5</b>	<b>0.56</b>	<b>0.02</b>
2018	6.0	0.50	0.02
2019	<b>11.4</b>	<b>0.54</b>	<b>0.03</b>

Additionally, Chinese tallow tree (*Sapium sebiferum*), wild taro (*Colocasia esculenta*), torpedo grass (*Panicum repens*) and water hyacinth (*Eichhornia crassipes*), are also listed as Category I Invasive Exotics by the Florida Exotic Pest Control Council <http://www.fleppc.org/> and were found in Lake Jackson. Alligator weed (*Alternanthera philoxeroides*) is a Category II Invasive Exotics that was found in the lake. Other exotics found are parrot feather milfoil (*Myriophyllum aquaticum*), and bur-head sedge (*Oxycaryum cubense*).

[Click here for more information on the Lake Jackson LVI.](#)  
[Click here for more information on common exotic and invasive plants in Leon County wetlands and waterbodies.](#)

### 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 several times over the sampling period. The latest exceedance is thought to be at least partially the result of current plant management practices. 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, prevent-

ing rapid water/atmospheric exchange. Plant respiration and organic-rich sediment also contributed to low DO saturation values. While, the Lake Vegetation Index score places the lake’s vegetative community in the “healthy” category, there is a cause for concern since two of the surveyed sections were dominated by the Category I Invasive Exotic, hydrilla.

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 2019.](#)

[Click here for a map of the watershed – Sample Sites J03, J05, J14 and J16.](#)

Johnny Richardson, Water Resource Scientist  
(850) 606-1500  
[Richardsonjo@leoncountyfl.gov](mailto:Richardsonjo@leoncountyfl.gov)

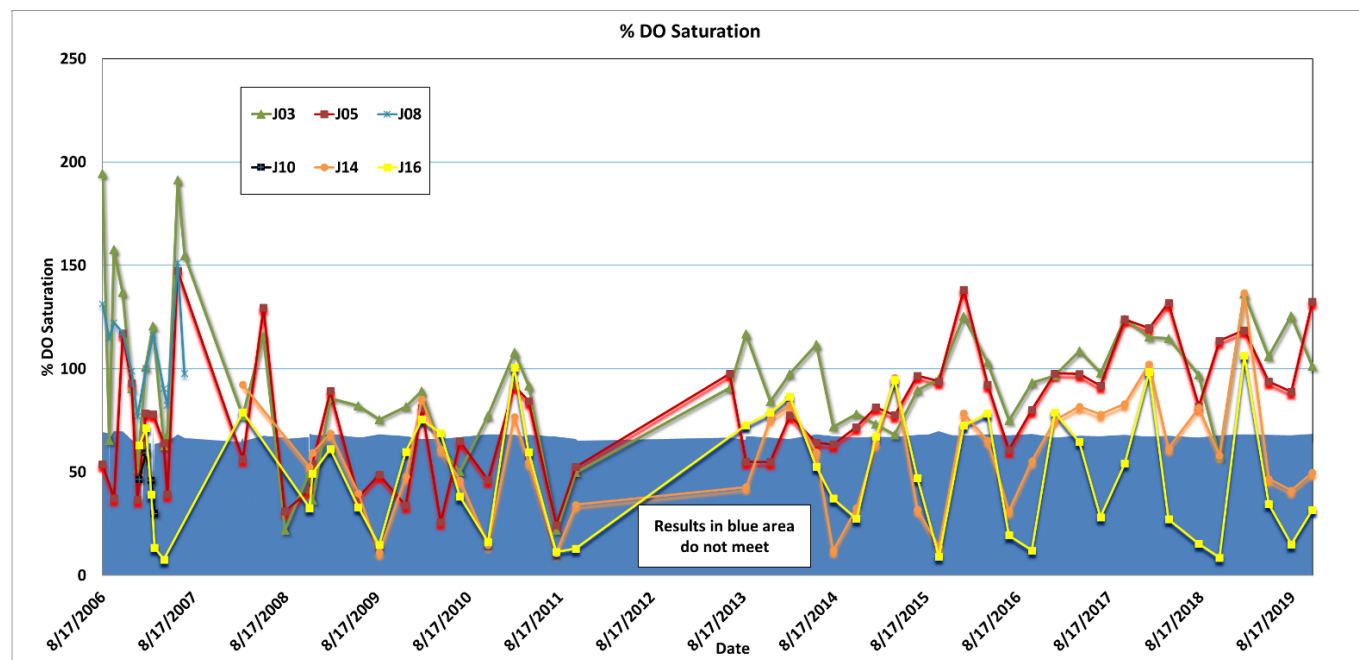


Figure 1. Dissolved Oxygen Percent Saturation results for Lake Jackson.