Harbor Isle
City of St. Petersburg
Water Quality Analysis

Sample date: 8/18/2020
Report date: 8/25/2020

Produced by:
Sam Sardes, Weed Science Director
Matt Kramer, Field Biologist

SOLITUDE
LAKE MANAGEMENT

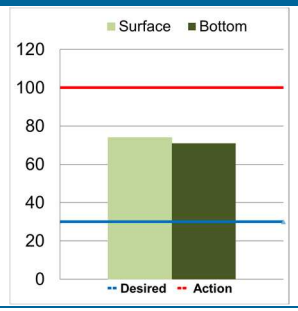
888.480.LAKE (5253)
solitudelakemanagement.com

Water Quality Data: Harbor Isle, Site #3

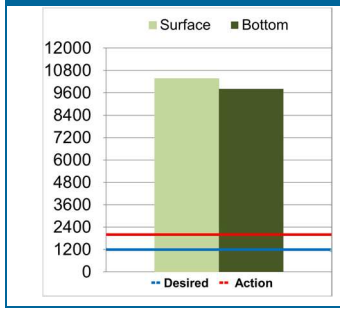
Date: 8/18/2020

Site Readings					
Test	**Desired Range**	**Action Level**	**Surface**	Bottom	**This lake is:**
Nutrients - Total Phosphorus	< 30 ppb	> 100 ppb	74	71	**Normal**
Nutrients - Total Nitrogen	< 1200 ppb	>2000 ppb	10,360	9,818	**Very High***
Nutrients – Ammonia	< 100 ppb	>250 ppb	997	868	**High***
Clarity – Turbidity	< 5 NTU	NA	23.3	24.8	**Very High***
Salinity	< 0.5 ppt	NA	6.4	6.3	**Normal**
Water Clarity - Secchi Depth	≥ 4 Feet	N/A	2		**Low***

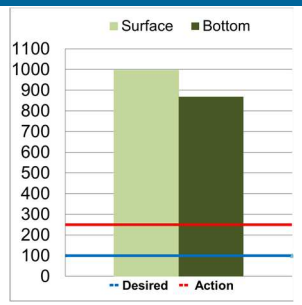
Total Phosphorus (ppb)



Total Nitrogen (ppb)



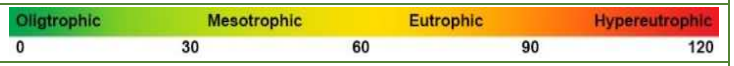
Ammonia (ppb)



The TN/TP Ratio is: 139.16

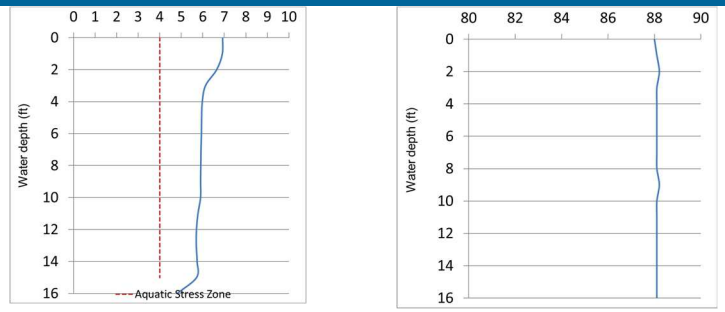
When the TN/TP ratio is > 75, conditions are ideal for supporting healthy phytoplankton communities and aquatic food webs, especially for fisheries management. This ratio level should be maintained for the most balanced aquatic ecosystem.

The trophic lake health index is: 82



Eutrophic lakes have a TSI of 41-100 and usually have intermittent plankton algae blooms, fair water clarity, muck accumulation, occasional odor, moderate dissolved oxygen levels, dense submersed plant growth and algae mats.

Dissolved Oxygen: DO (ppm) + **Temperature (°F)** -



Indicates that this lake is:

Mixed: The dissolved oxygen and temperature profile shows this lake's water column is adequately mixed resulting in acceptable dissolved oxygen levels at lower depths, expanded fisheries habitat, less bottom muck and bad odors. It is recommended to monitor oxygen levels closely, particularly with seasonal changes.
Aquatic Stress Zone= FDEP dissolved oxygen criteria for Class III waters.

Observations

Since last month's sampling event, phosphorus levels have held steady/slightly decreased.

The nitrogen levels have increased, and this is likely due to watershed input with the summer rains. It is important to note that the ammonia levels have come down a little bit. This is likely due to better oxygen saturation in the water column making other forms of nitrogen more favorable.

The water clarity has been reduced. This is expected since the algae bloom has begun to increase again. It was expected that the algae would come back at some point over the summer. It is the normal cycle of the ecosystem for algae blooms to increase in both density and frequency over the course of the summer. Another large-scale algae treatment should hold it at bay. Ideally, the results would last into fall/winter.

Since the aeration system has been running for over a month, the water column is vertically mixed and acceptable oxygen levels are now seen, for the first time, throughout the entire water column.

SOLITUDE LAKE MANAGEMENT

Water Quality Glossary

Trophic State Index (TSI)

A Trophic State Index (TSI) provides a single quantitative result for the purpose of classifying and ranking lakes in terms of water quality.

Nutrients such as phosphorus are usually the limiting resource for algae and plant abundance and therefore are used in creating a TSI reference number. Generally, the higher the lakes TSI the greater the likelihood of elevated nutrient levels, increased algae problems and decreased water clarity.

Due to the dynamic nature of Florida's geology and differing climate zones, regional locations may differ slightly in what is considered a healthy water quality profile.

TSI Values	Trophic Status	Attributes
30-40	Oligotrophic	Clear water, few plants and algae, small bass
40-50	Mesotrophic	Water moderately clear, but increasing probability of anoxia, green algae are likely dominant, balanced fishery with medium sized bass
50-60	Eutrophic	Decreased transparency, occasional light algal blooms, lots of available food making for large bass
60-70	Eutrophic	Dominance of blue-green algae, algal scums possible, extensive macrophyte problems possible, higher probability of anoxia, fishery starting to decline
70-80	Hypereutrophic	Dominance of blue-green algae, frequent algal scums, higher probability of anoxia, stunted fishery
>80	Hypereutrophic	Algal scums, higher probability of anoxia, fish kills, few macrophytes, very poor water clarity

More information on data sources available upon request.

Nutrient Tested	Desired Range	Action Level	Issues with high levels	Likely causes of high levels
Total Phosphorus	< 30 ppb	> 100 ppb	>100 ppb can unbalance the ecosystem	Reclaimed water discharge, landscape fertilizer runoff and agricultural drainage, phosphorus laden bottom sediments
Total Nitrogen	< 1200 ppb	>2000 ppb	>1200 ppb can unbalance the ecosystem	Landscape fertilizer runoff
Ammonia	< 100 ppb	>250 ppb	>500 ppb can be toxic to fish and animals	Organic decomposition, landscape/fertilizer runoff, and anoxic conditions (low oxygen)

Nutrient Thresholds

The desired range is the threshold value recommended for freshwaters in order maintain a balanced ecosystem.

If nutrients are measured above the action level, it is likely that the nutrient levels may have a detrimental effect on aquatic life and long-term lake health. Action needs to be taken at this point to maintain a healthy ecosystem. Nutrients above the action level will require more maintenance.

TN/TP Ratio

The TN/TP ratio can provide a useful clue as to the relative importance of nitrogen or phosphorus toward the abundance of algae in a waterbody.

In general, the lower the TN/TP ratio the more cyanobacteria bacteria will be present (i.e., Microcystis) and the higher the TN/TP ratio the more desirable green algae will be present.

Studies done on TN/TP ratios have found good agreement in predicting the type of algae present (Schindler et al., 2008; Yoshimasa Amano et al., 2008).

Secchi depth

A mechanical test to judge water clarity, accomplished by lowering a black and white disk into the water and recording the point at which it can no longer be seen.

- Higher values indicate greater water clarity.
- Nutrient rich lakes tend to have Secchi depths less than 9 feet and highly enriched sites less than 3 feet.

Dissolved Oxygen

The most critical indicator of a lake's health and water quality.

- Oxygen is added to aquatic ecosystems by aquatic plants and algae through photosynthesis and by diffusion at the water's surface and atmosphere interface.
- Oxygen is required for fast oxidation of organic wastes including bottom muck.
- When the oxygen is used up in the bottom of the lake, anaerobic bacteria continue to breakdown organic materials, creating toxic gasses such as hydrogen sulfide.
- For a healthy game-fish population, oxygen levels should not go below 4.0 ppb