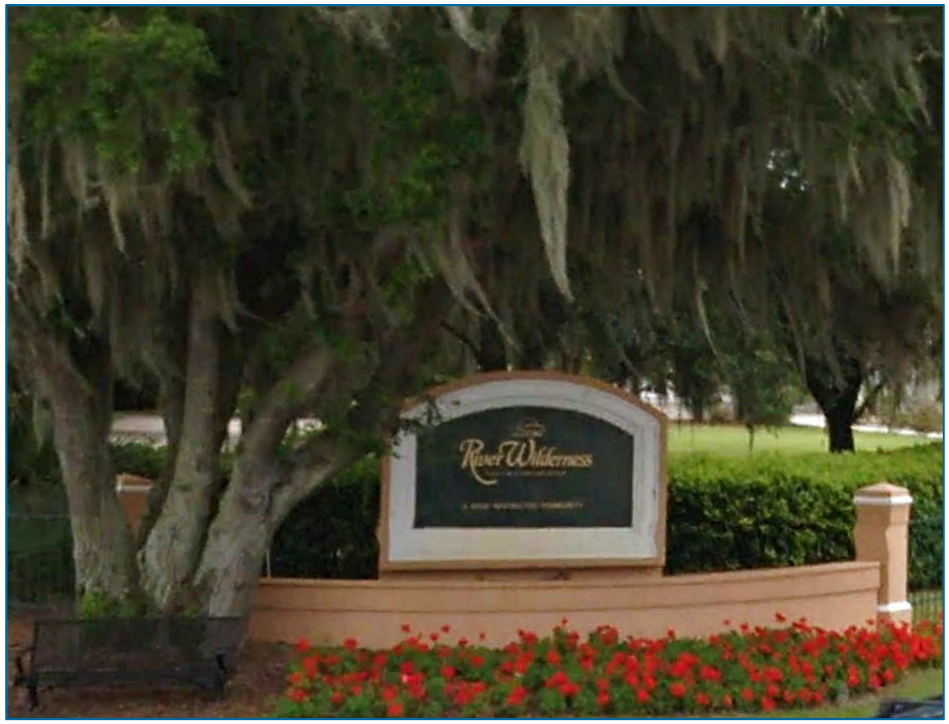
River Wilderness

Total Phosphorus and Turbidity



Sample date: 10/10/2018
Report date: 10/15/2018

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Aquatic Systems
LAKE & WETLAND SERVICES

2100 NW 33rd Street
Pompano Beach, FL 33069
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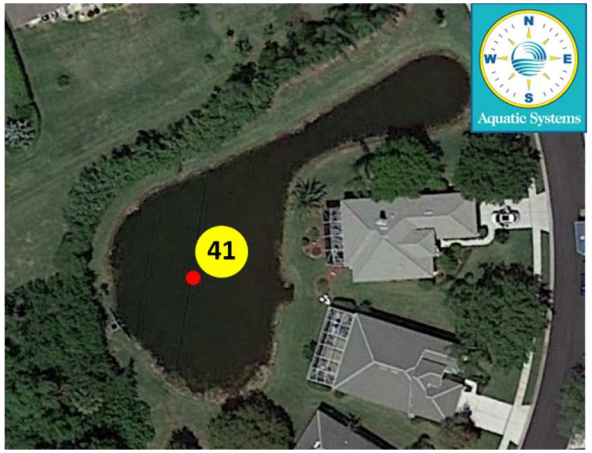
River Wilderness, Site 41

Water Quality Data

Date: 10/10/2018

Measured:	Perimeter Feet: 600	Surface Acres: 0.3	Depth: 8
Calculated Approx.	Volume in Gal.: 250,600	Total Acre Feet: 0.8	



Surface Readings Pre- Alum Reset

Test	Desired Range	Action Level	Sample 41	Your Range
Nutrients - Total Phosphorus	< 30 ppb	> 100 ppb	11,520	Very High
Water Clarity - Turbidity	<5 NTU	N/A	455	Very High

Observations

The trophic lake health index is: 158

Hypereutrophic lakes have a TSI index greater than 100 and usually experience heavy plankton algae blooms, dangerously low dissolved oxygen levels, occasional fish kills, poor water clarity, odor, bottom muck and undesirable blue green algae mats dominate.

Surface Readings Post- Alum Reset

Test	Desired Range	Action Level	Sample 41	Your Range
Nutrients - Total Phosphorus	< 30 ppb	> 100 ppb	43	Normal
Water Clarity - Turbidity	<5 NTU	N/A	3.35	Normal

Observations

The trophic lake health index is: 58

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.

Recommendations

Based on test results, the following is recommended:

☒ On-going water quality monitoring

River Wilderness, Site 48

Water Quality Data

Date: 10/24/2018

Measured:	Perimeter Feet: 789	Surface Acres: 0.98	Depth: 8.1
Calculated Approx.	Volume in Gal.: 1,715,000	Total Acre Feet: 5	

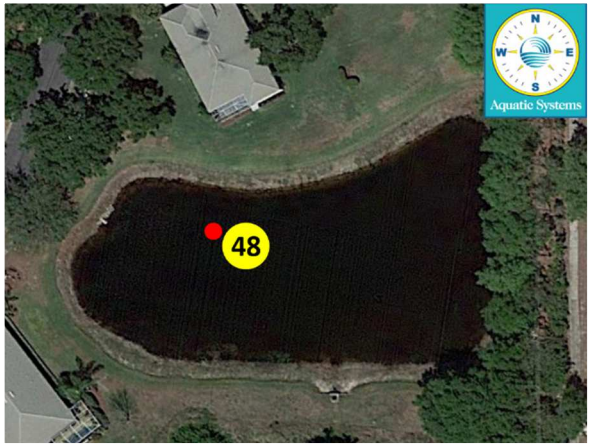
Surface Readings Pre-Alum Reset

Test	Desired Range	Action Level	Sample 48	Your Range
Nutrients - Total Phosphorus	< 30 ppb	> 100 ppb	3,630	Very High
Water Clarity - Turbidity	< 5 NTU	N/A	72.0	Very High

Observations

The trophic lake health index is: 108

Hypereutrophic lakes have a TSI index greater than 100 and usually experience heavy plankton algae blooms, dangerously low dissolved oxygen levels, occasional fish kills, poor water clarity, odor, bottom muck and undesirable blue green algae mats dominate.



Surface Readings Post-Alum Reset

Test	Desired Range	Action Level	Sample 48	Your Range
Nutrients - Total Phosphorus	< 30 ppb	> 100 ppb	81	Normal
Water Clarity - Turbidity	< 5 NTU	N/A	4.47	Normal

Observations

The trophic lake health index is: 68

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.

Recommendations

Based on test results, the following is recommended:

☒ On-going water quality monitoring

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 cause excessive aquatic weeds and algae	Reclaimed water discharge, landscape fertilizer runoff and agricultural drainage, phosphorus laden bottom sediments

Nutrient Thresholds

The desired range is the threshold value recommended for Florida freshwaters in order to limit algae growth and water clarity issues. Keeping nutrients in this range help 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.

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

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.

Benefits of Aeration Systems

- Reduce phosphorus, nitrogen, and ammonia levels
- Increase oxygen uptake and distribution throughout the water column
- Assist in creating an aerobic layer above the sediment and therefore reduce phosphorus leaching back into the lake's water column
- Reduce plankton algae blooms and improve water clarity
- Eliminate foul shoreline odors
- Reduce the possibility of an oxygen related fish kill and allow the fish to utilize the entire water column for habitat.

Alum

A product that binds phosphorus in its various forms, removing it from the water column and binding it within the sediment layer, thus making it unavailable for uptake by organisms. This treatment has been shown in multiple studies to significantly reduce nutrient levels and improve water clarity

