



Placido Bayou

Standard Lake Assessment

Sample date: 10/11/2017

Report date: 11/6/2017

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Lab and Field Biologist

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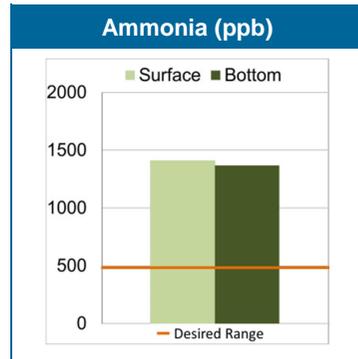
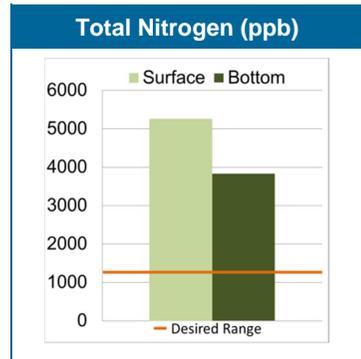
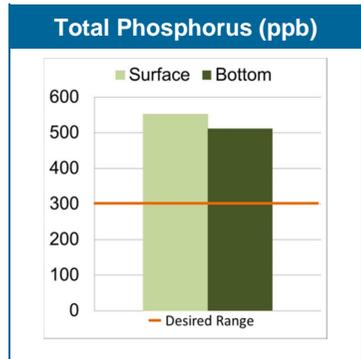


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Water Quality Data: Placido Bayou, Site 1

Test	Desired Range	Site 1		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	552	512	High
Nutrients - Total Nitrogen	400-1200 ppb	5260	3830	High
Nutrients - Ammonia	< 500 ppb	1410	1370	High
Water Clarity - Secchi Depth	≥ 4 Feet	3		Low



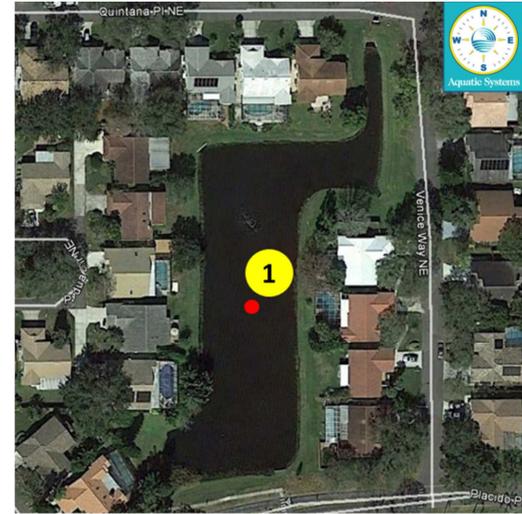
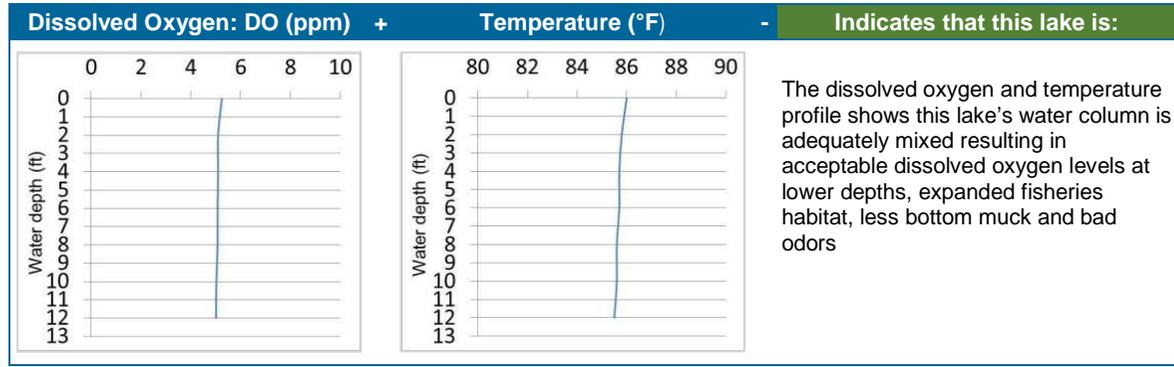
The TN/TP Ratio is: 8.5

When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.

The trophic lake health index is: 95

Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic
0	30	60	90
120			

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.



Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 1300	Volume-Gal.: 2,350,000
Surface Acres: 1.0	Total Acre Ft: 7.2
Depth: 12	

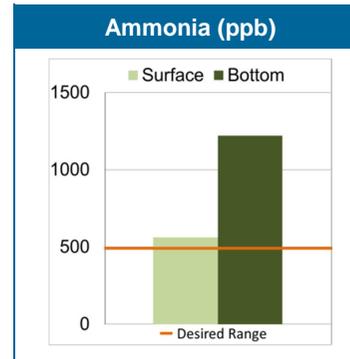
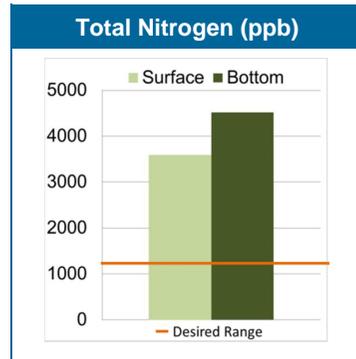
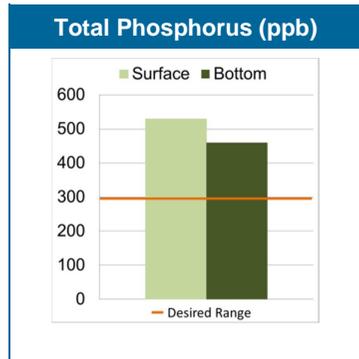
Observations

Water quality analysis suggests that Site 1 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.

- Recommendations for This Lake**
- Alum for Phosphorus Reduction
 - On-going water quality monitoring

Water Quality Data: Placido Bayou, Site 2

Test	Desired Range	Site 2		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	530	460	High
Nutrients - Total Nitrogen	400-1200 ppb	3585	4520	High
Nutrients - Ammonia	< 500 ppb	560	1220	High
Water Clarity - Secchi Depth	≥ 4 Feet	3		Low



The TN/TP Ratio is: 8.3

When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.

The trophic lake health index is: 95

Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic
0	30	60	90
120			

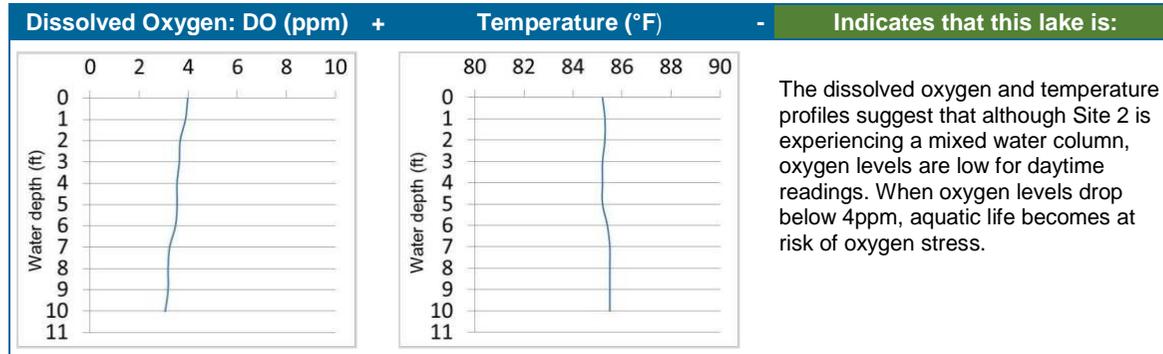
Eutrophic lakes have a TSI of 41-100 and usually have intermittent plankton algae blooms, fair water clarity, muck accumulation, occasional odor, moderate dissolved oxygen levels, dense submersed plant growth and algae mats.

Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 470	Volume-Gal.: 625,900
Surface Acres: 0.3	Total Acre Ft: 1.9
Depth: 10	

Observations

Water quality analysis suggests that Site 2 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.

It is also important to note that Site 2 is at risk of oxygen stress. By installing aeration, oxygen levels could be restored for a healthy ecosystem.

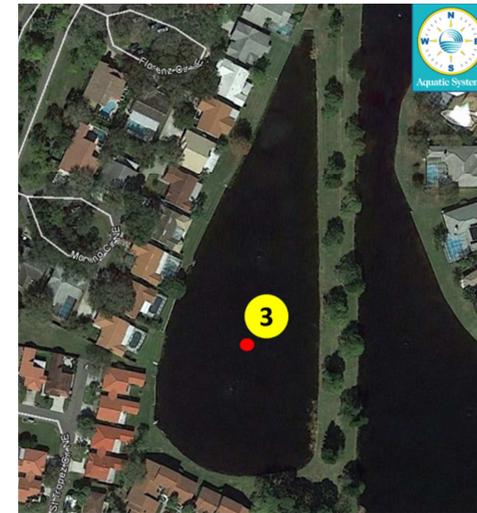
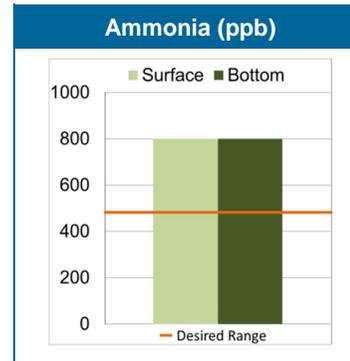
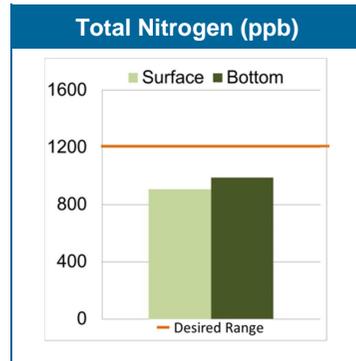
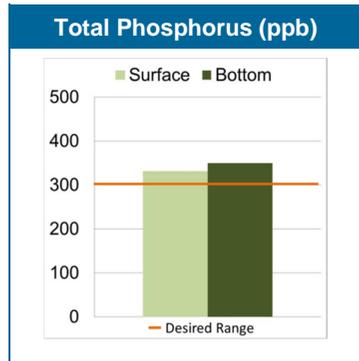


Recommendations for This Lake

- On-going water quality monitoring

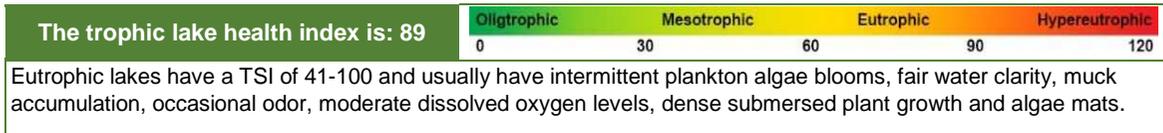
Water Quality Data: Placido Bayou, Site 3

Test	Desired Range	Site 3		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	331	350	High
Nutrients - Total Nitrogen	400-1200 ppb	905	988	Normal
Nutrients - Ammonia	< 500 ppb	800	800	High
Water Clarity - Secchi Depth	≥ 4 Feet	3		Low

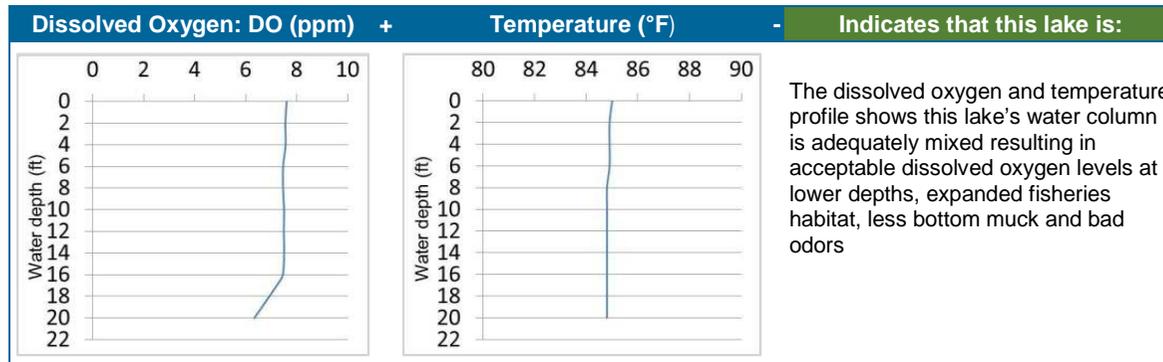


Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 1570	Volume-Gal.: 10,858,000
Surface Acres: 2.5	Total Acre Ft: 33
Depth: 19	

The TN/TP Ratio is: 2.8
 When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.



Observations
 Water quality analysis suggests that Site 3 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.

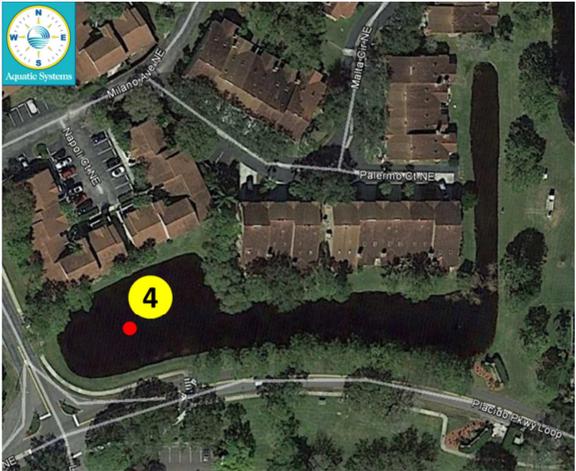
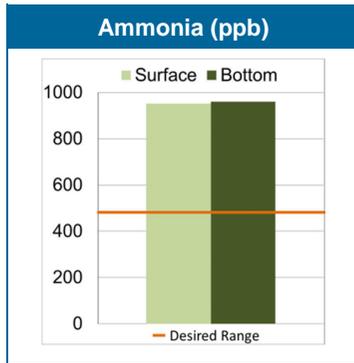
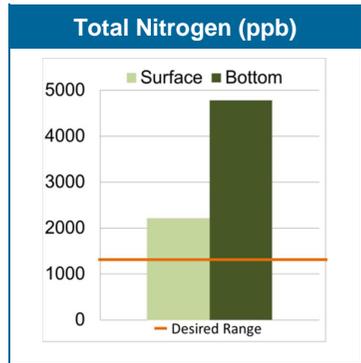
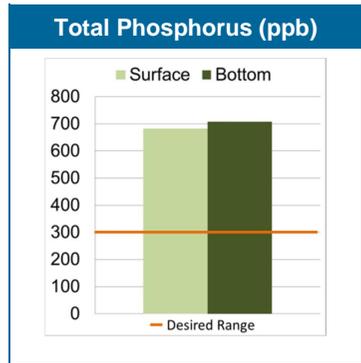


Recommendations for This Lake

- On-going water quality monitoring

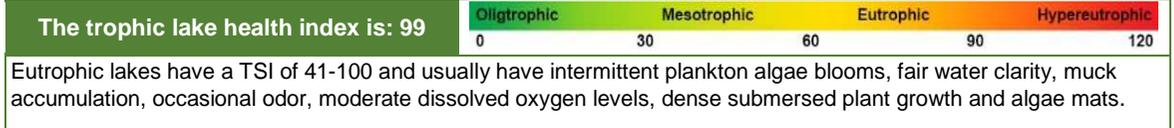
Water Quality Data: Placido Bayou, Site 4

Test	Desired Range	Site 4		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	682	708	High
Nutrients - Total Nitrogen	400-1200 ppb	2210	4780	High
Nutrients - Ammonia	< 500 ppb	950	960	High
Water Clarity - Secchi Depth	≥ 4 Feet	3		Low



The TN/TP Ratio is: 5.0

When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.

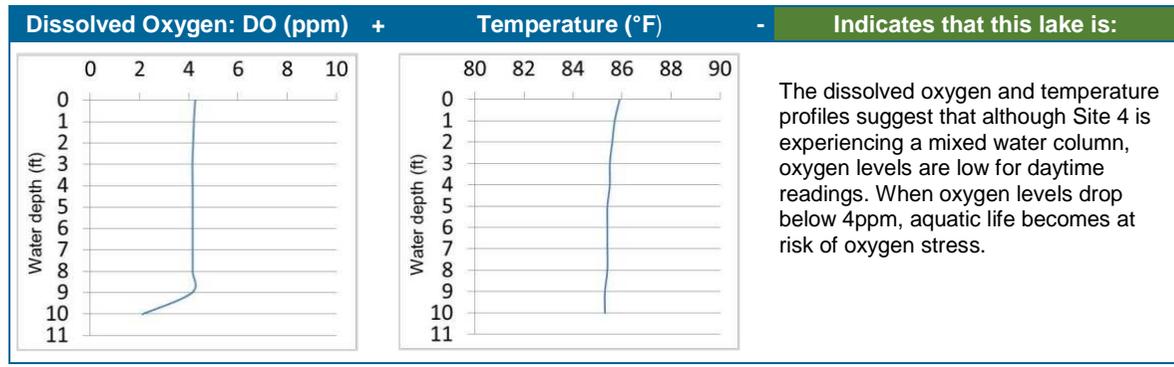


Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 1400	Volume-Gal.: 1,233,000
Surface Acres: 0.7	Total Acre Ft: 3.8
Depth: 10	

Observations

Water quality analysis suggests that Site 4 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.

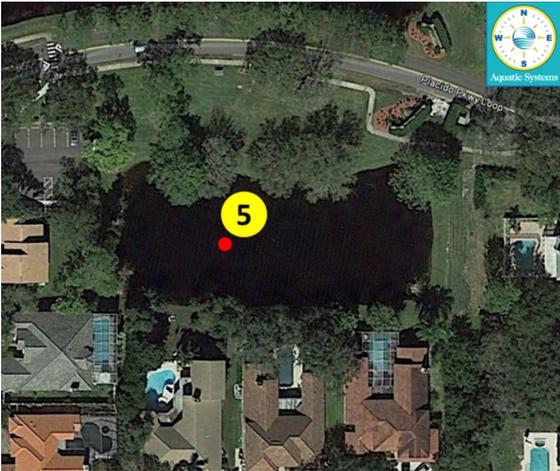
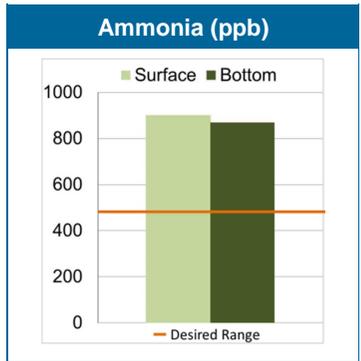
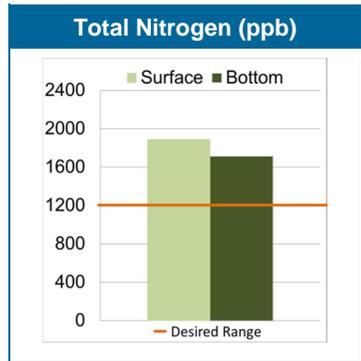
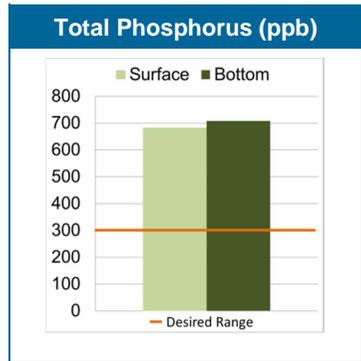
It is also important to note that Site 4 is at risk of oxygen stress. By installing aeration, oxygen levels could be restored for a healthy ecosystem.



- Recommendations for This Lake**
- Alum titrations and treatment for Phosphorus Reduction
 - On-going water quality monitoring

Water Quality Data: Placido Bayou, Site 5

Test	Desired Range	Site 5		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	783	775	High
Nutrients - Total Nitrogen	400-1200 ppb	1890	1710	High
Nutrients - Ammonia	< 500 ppb	900	870	High
Water Clarity - Secchi Depth	≥ 4 Feet	3		Low



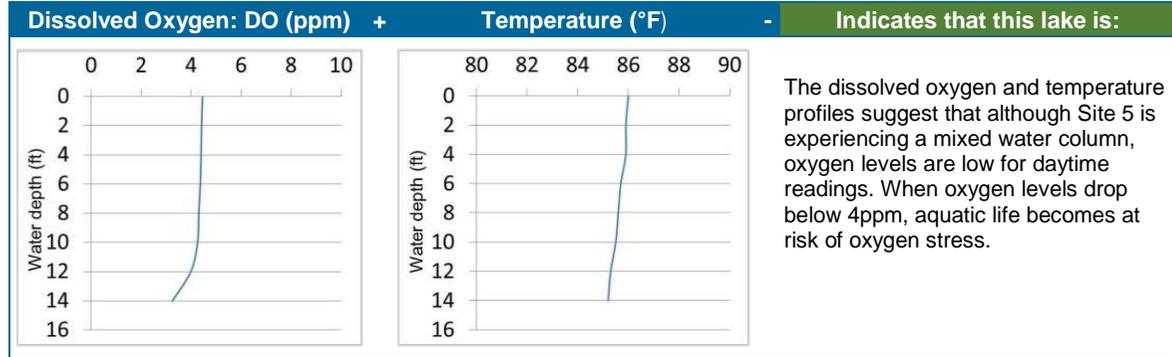
Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 670	Volume-Gal.: 1,624,000
Surface Acres: 0.6	Total Acre Ft: 5.0
Depth: 12	

The TN/TP Ratio is: 2.3
 When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.

The trophic lake health index is: 100

 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.

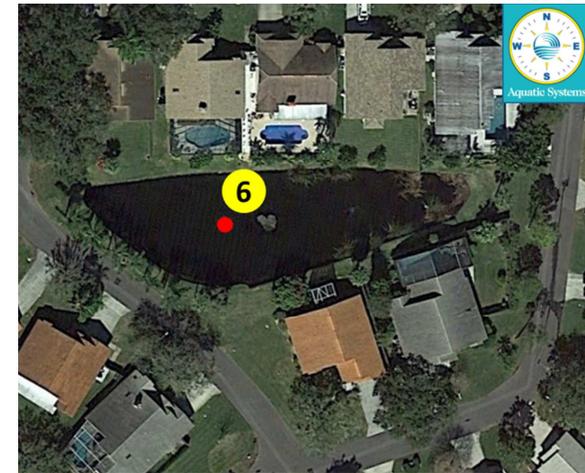
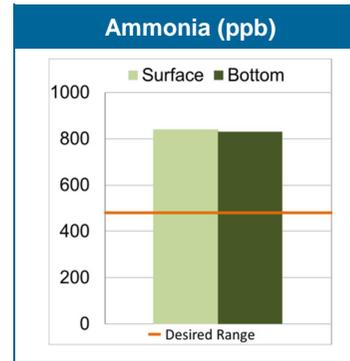
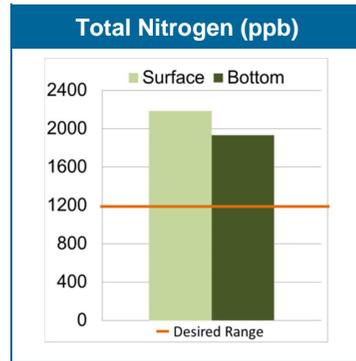
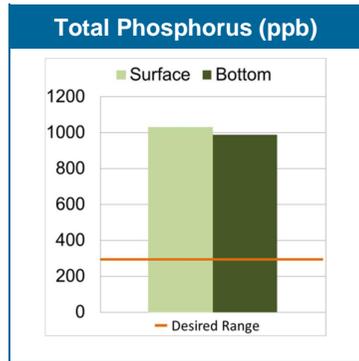
Observations
 Water quality analysis suggests that Site 5 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.
 It is also important to note that Site 5 is at risk of oxygen stress. By installing aeration, oxygen levels could be restored for a healthy ecosystem.



- Recommendations for This Lake**
- Alum titrations and treatment for Phosphorus Reduction
 - On-going water quality monitoring

Water Quality Data: Placido Bayou, Site 6

Site Readings				
Test	Desired Range	Site 6		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	1030	989	High
Nutrients - Total Nitrogen	400-1200 ppb	2180	1930	High
Nutrients - Ammonia	< 500 ppb	840	830	High
Water Clarity - Secchi Depth	≥ 4 Feet	1.5		Low



Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 560	Volume-Gal.: 513,900
Surface Acres: 0.3	Total Acre Ft: 1.6
Depth: 8	

The TN/TP Ratio is: 2.0

When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.

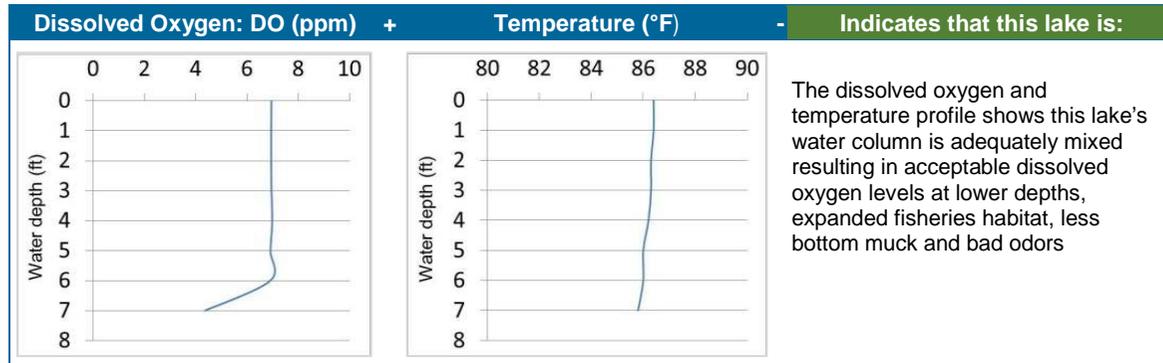
The trophic lake health index is: 104

Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic
0	30	60	90
			120

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.

Observations

Water quality analysis suggests that Site 6 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.



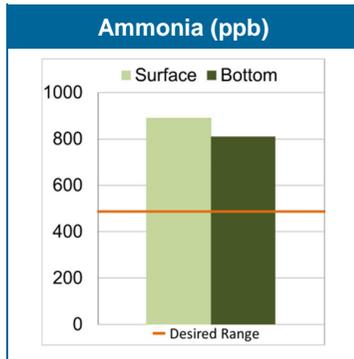
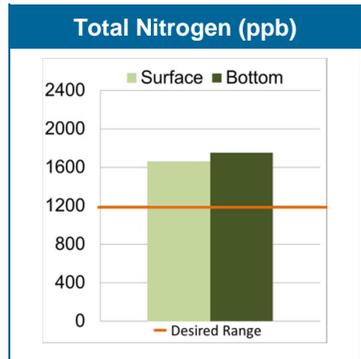
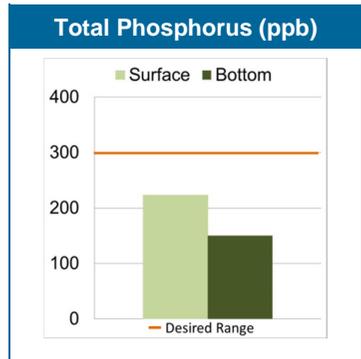
It is recommended to install aeration in order to fully mix the water column at Site 6. When oxygen levels are low at the bottom of the water column, phosphorus may leach out of bottom sediments and ammonia may accumulate to toxic levels.

Recommendations for This Lake

- Alum titrations and treatment for Phosphorus Reduction
- On-going water quality monitoring

Water Quality Data: Placido Bayou, Site 7

Test	Desired Range	Site 7		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	223	150	Borderline
Nutrients - Total Nitrogen	400-1200 ppb	2660	1750	High
Nutrients - Ammonia	< 500 ppb	890	810	High
Water Clarity - Secchi Depth	≥ 4 Feet	0.5		Low

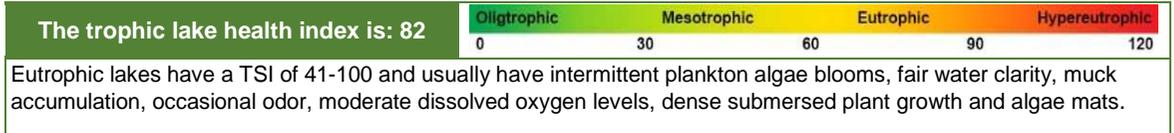


Basic Lake Information

Measured	Calculated Approximation
Perimeter Ft: 6000	Volume-Gal.: 75,558,000
Surface Acres: 12.5	Total Acre Ft: 232
Depth: 26	

The TN/TP Ratio is: 11.8

When the TN/TP ratio is between 10 and 17 the lake favors growth of unsightly Cyanobacteria algae blooms as plankton or filamentous algae mats. Water column phosphorus needs to be reduced to promote more desirable and easier to control green algae growth.

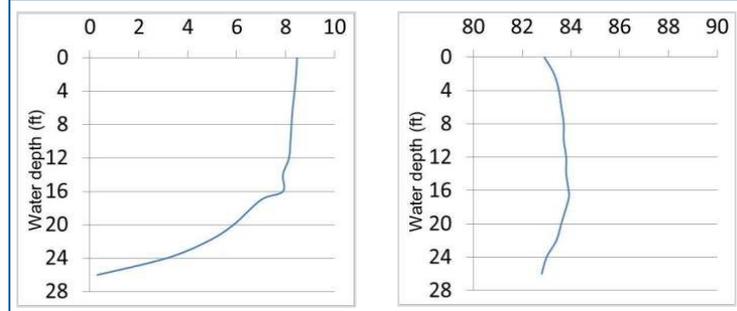


Observations

Water quality testing suggests that Site 7 is experiencing oxygen stratification. When oxygen levels are low on the bottom of the water column, phosphorus may leach out of the bottom sediments and ammonia may accumulate to toxic levels.

Field observation suggests that Site 7 is experiencing foul odors and a heavy plankton algae bloom. The odors are likely a result of hydrogen sulfide production in the anoxic bottom waters. It is also possible that phosphorus levels are even higher than measured if the algae have sequestered the nutrients within their cells.

Dissolved Oxygen: DO (ppm) + Temperature (°F) - Indicates that this lake is:



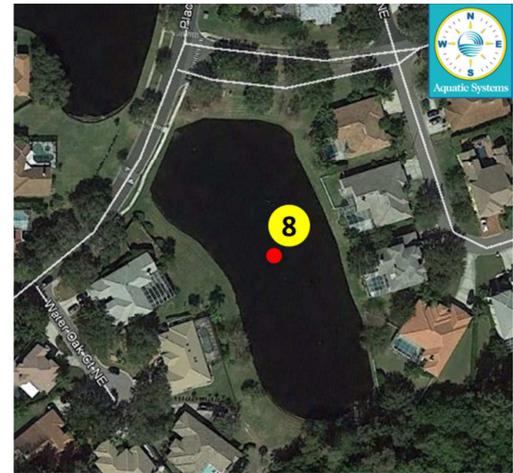
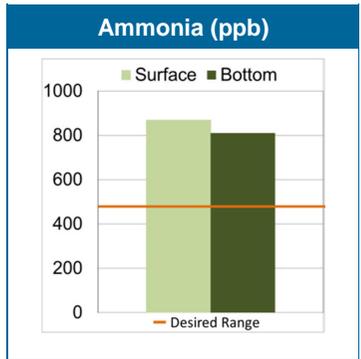
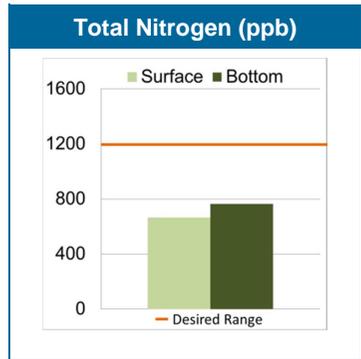
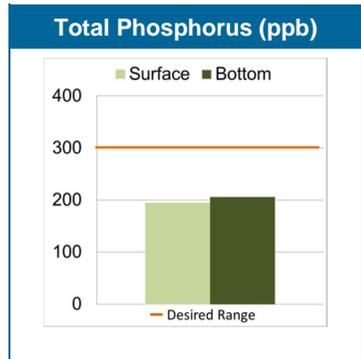
The dissolved oxygen and temperature profile shows the water column is stratified into separate water temperature layers resulting in reduced oxygen concentrations at lower depths often leading to fish kills, algae blooms, muck accumulation and foul odors.

Recommendations for This Lake

- Bathymetric Mapping to determine comprehensive bottom contour and total volume of water within pond
- Aeration for de-stratification
- On-going water quality monitoring

Water Quality Data: Placido Bayou, Site 8

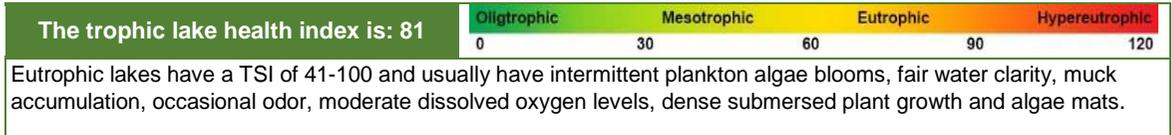
Test	Desired Range	Site 8		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	195	206	Borderline
Nutrients - Total Nitrogen	400-1200 ppb	663	763	Normal
Nutrients - Ammonia	< 500 ppb	870	810	High
Water Clarity - Secchi Depth	≥ 4 Feet	1		Low



Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 1100	Volume-Gal.: 4,680,000
Surface Acres: 1.5	Total Acre Ft: 14.4
Depth: 12	

The TN/TP Ratio is: 3.6

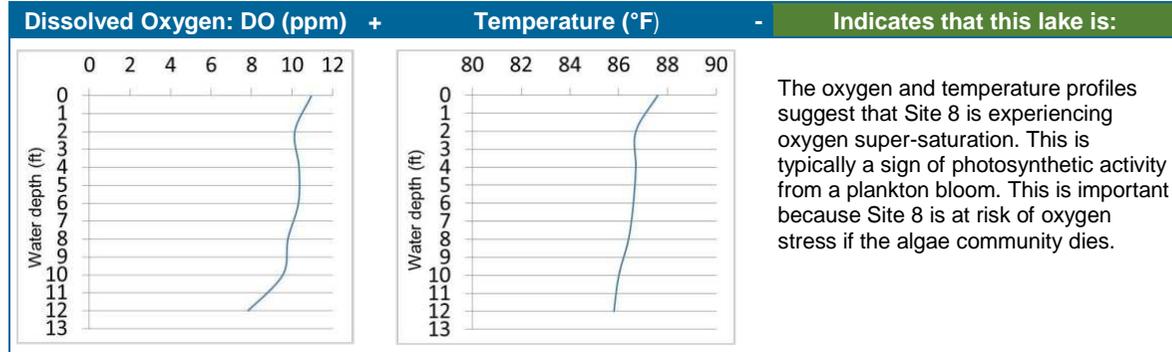
When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.



Observations

Water quality analysis suggests that Site 8 is experiencing oxygen super-saturation. Field observations confirm that Site 8 is experiencing a plankton algae bloom, which is likely the cause of such elevated oxygen levels.

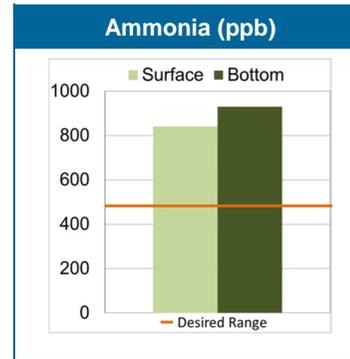
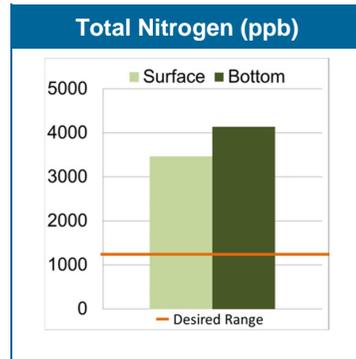
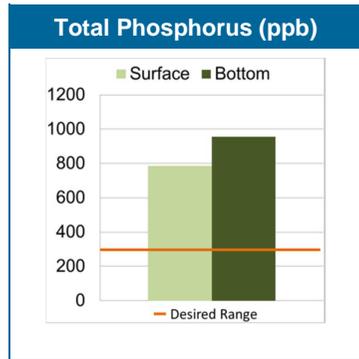
It is also evident that Site 8 is experiencing elevated ammonia levels. It is recommended to install aeration in order to stabilize oxygen levels and reduce ammonia from the water column.



- Recommendations for This Lake**
- Additional aeration for stable oxygen levels and ammonia reduction
 - Additional Alum treatments for nutrient reduction
 - On-going water quality monitoring

Water Quality Data: Placido Bayou, Site 9

Site Readings				
Test	Desired Range	Site 9		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	785	955	High
Nutrients - Total Nitrogen	400-1200 ppb	3460	4140	High
Nutrients - Ammonia	< 500 ppb	840	930	High
Water Clarity - Secchi Depth	≥ 4 Feet	3		Low



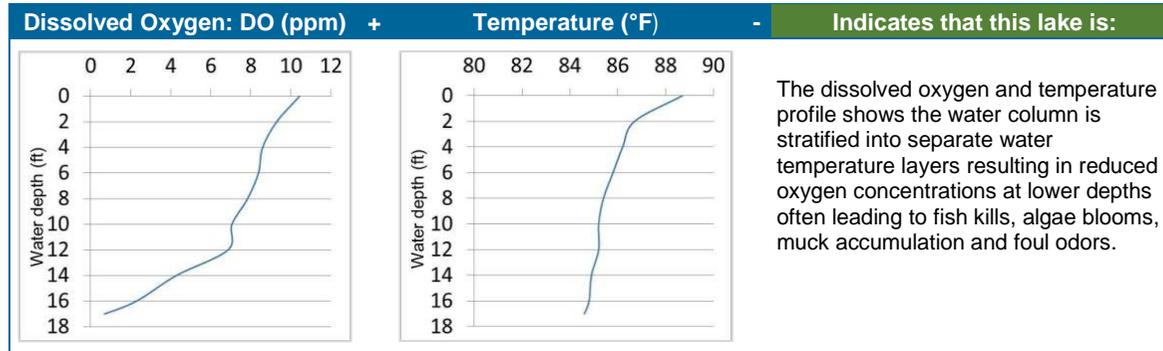
The TN/TP Ratio is: 4.4

When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.

The trophic lake health index is: 103

Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic
0	30	60	90
120			

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.



Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 1200	Volume-Gal.: 8,235,000
Surface Acres: 1.9	Total Acre Ft: 25.3
Depth: 18	

Observations

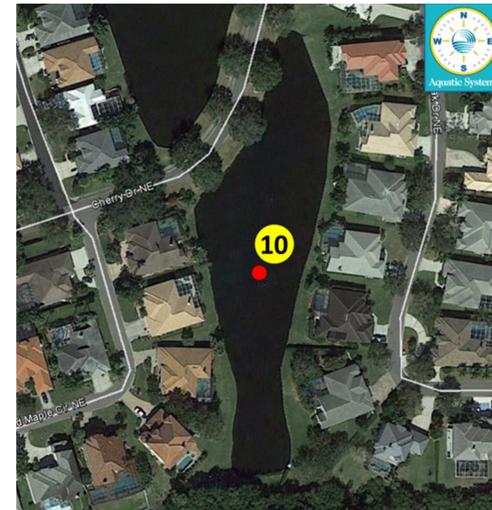
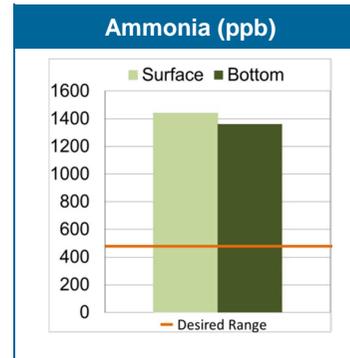
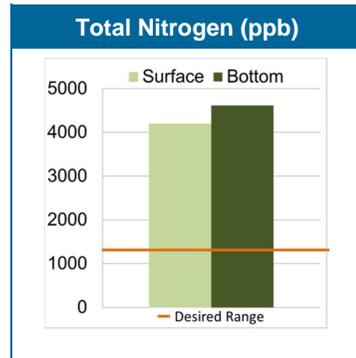
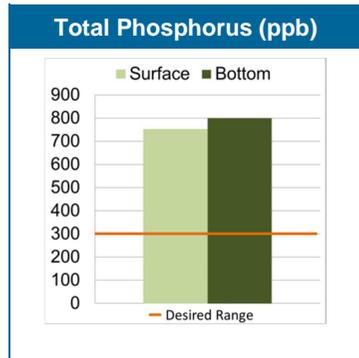
Water quality analysis suggests that Site 9 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.

It is also important to note that Site 9 is experiencing oxygen stratification. This is often the source of various in-lake issues, including elevated nutrients, fish kills and foul odors.

- Recommendations for This Lake**
- Additional aeration for de-stratification
 - Additional Alum for Phosphorus Reduction
 - On-going water quality monitoring

Water Quality Data: Placido Bayou, Site 10

Site Readings				
Test	Desired Range	Site 10		This lake is:
		Surface	Bottom	
Nutrients - Total Phosphorus	< 300 ppb	752	800	High
Nutrients - Total Nitrogen	400-1200 ppb	4195	4615	High
Nutrients - Ammonia	< 500 ppb	1440	1360	High
Water Clarity - Secchi Depth	≥ 4 Feet	3		Low



Basic Lake Information	
Measured	Calculated Approximation
Perimeter Ft: 1500	Volume-Gal.: 5,099,000
Surface Acres: 1.6	Total Acre Ft: 15.7
Depth: 14	

The TN/TP Ratio is: 5.7

When the TN/TP ratio is less than 10 the lake strongly favors growth of cyanobacteria algae blooms that may produce toxins and display a pea soup appearance and/or forms surface mats. Water column phosphorus needs to be reduced.

The trophic lake health index is: 101

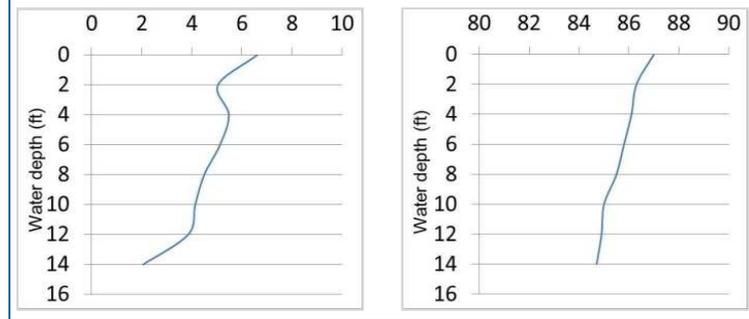
Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic
0	30	60	90
120			

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.

Observations

Water quality analysis suggests that Site 10 is experiencing elevated nutrient levels. Lakes with high nutrient concentrations are likely to experience algal blooms. Phosphorus, in particular, is often the limiting nutrient that fuels algal growth. Since algae use these nutrients for food, algae abundance is often correlated with nutrient availability.

Dissolved Oxygen: DO (ppm) + Temperature (°F) - Indicates that this lake is:



The dissolved oxygen and temperature profile shows the water column is stratified into separate water temperature layers resulting in reduced oxygen concentrations at lower depths often leading to fish kills, algae blooms, muck accumulation and foul odors.

It is also important to note that Site 10 is experiencing oxygen stratification. This is often the source of various in-lake issues, including elevated nutrients, fish kills and foul odors.

Recommendations for This Lake

- Additional aeration for de-stratification
- Additional Alum for Phosphorus Reduction
- 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.

Most of Florida's geology provides for very nutrient rich sediments which cause lakes to have naturally high primary productivity and be naturally eutrophic.

Oligotrophic (<30): Very low biological productivity - Clear Water, bottom, well oxygenated, few plants and animals

Mesotrophic (30-40): Low to medium biological productivity - moderately clear water, abundant plant growth

Eutrophic (50-70): High biological productivity - fair water clarity, muck accumulation, dense plant growth and algae mats

Hypereutrophic (>70): Very high productivity - plankton algae blooms, low oxygen, fish kills, poor water clarity and quality, limited submersed plant growth, muck accumulation, bottom and surface algae mats dominate

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).

Nutrient Tested	Desired Range	Issues with high levels	Likely causes of high levels
Total Phosphorus	<100 ppb	>100 ppb can cause excessive aquatic weeds and algae	Reclaimed water discharge, landscape fertilizer runoff and agricultural drainage, phosphorus laden bottom sediments
Total Nitrogen	400-1200 ppb	>1200 ppb can cause excessive aquatic weeds and algae	Landscape fertilizer runoff
Ammonia	<500 ppb	>500 ppb can be toxic to fish and animals	Organic decomposition, landscape/fertilizer runoff, and anoxic conditions (low oxygen)

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.