

## Placido Bayou Initial Pond Treatment Plan November 2012

Reporting by: Angelo Fanelli, Service Manager, Biologist, Master Naturalist

Management of the ponds in Placido Bayou is not an easy endeavor yet real solutions do exist. Among these are nutrient input reduction, aeration, nutrient inactivation, proper weed and algae management-both chemically and physically, as well as proper aquascaping. Some of these solutions have already begun but the incredibly poor water quality indicates that much more needs to be done.

It is first of all important to realize that excessive algae and duckweed is a symptom of an underlying condition, much like a runny nose when you have a cold. The condition in this case is very high nutrient levels. In such a degraded situation as the water in the ponds at Placido Bayou it is nearly impossible to achieve control of algae and duckweed on a long term basis. The chemical treatments applied kill the algae but it grows back too rapidly to maintain an acceptable look. The good news is that there are things that can be done to cure the underlying problem of excess nutrients.

The upstream end of the drainage system should be the first area of focus. Any efforts done further down the system may be in vain every time it rains. Nothing should ever be dumped into the ponds or allowed to enter the street drains. This includes pet waste, grass clippings and other organic waste, fertilizer, irrigation water or anything else that may add to the nutrient load. A quick inspection on 10/23 found several areas where nutrients were entering the ponds.



Leaking irrigation system



Irrigation water and organic waste in drain





Grass clippings and other organic matter in the water



Nutrient laden food for waterfowl



Dead potted plant dumped into pond



Areas around drains and in swales should never be fertilized. A landscaped buffer with native plants may help.



The three above pictures show what can be achieved with very aggressive chemical treatments. This pond (8) received the legal limit of what can be applied several times to achieve what can be described as acceptable results but not outstanding. This was possible now as the growth rate is slowing down but may not be achievable in mid-summer. The nutrient level must be reduced to reduce the amount of re-growth between treatments.

Once a reduction of nutrients entering the water has been achieved then existing nutrient reduction (primarily phosphorus) must occur. This reduction of phosphorus can be achieved with the utilization of aluminum sulphate. This will remove the nutrients from the water and bind with nutrients in the sediment. This will clean the water but the new water coming into the pond must be as clean as possible in order to maximize results.

In addition to reducing nutrients coming in and removing nutrients already there, the ponds' ability to deal with nutrients properly must be enhanced. The best way to do this is with aeration (which is in place already). There is a limit to how much a pond can handle though and aeration simply increases the amount of nutrients that a pond can properly cycle. The nutrient load entering the ponds combined with the accumulated nutrients is simply too much for the ponds to handle, even with aeration.

Another way to increase the ponds capacity is with floating plants and shoreline plants. Shoreline plants will also help to reduce erosion, which can be another nutrient input. These plants directly absorb nutrients and provide surfaces for beneficial bacteria to grow on. Besides looking beautiful these plants also provide habitat for wildlife.

While some efforts have been made to aquascape the shorelines, survivorship has been low. This is most likely due to the aggressive algae treatments needed to maintain the excessive nutrient condition. The algaecides can burn the plants and over time will kill them. The high salinity of the ponds may also be stressing some species of plants. There is a large amount of bulrush present because it is salt tolerant and more resistant to algaecides than some of the other species planted.



While bulrush is somewhat resistant to the previously mentioned stresses, it is very susceptible to damage from herbicides used on grasses. For this reason grasses have grown in among the bulrush. We are addressing this problem in several ways. First we have sprayed with a grasses only selective herbicide which can only be used above the waterline. We have then sprayed an aquatic approved broad spectrum herbicide on the grass in areas where collateral damage to the bulrush is acceptable or kept to a minimum. Then we will be using a combination of manual and chemical methods to clean out the grass and separate the native growth from the shore. This separation will help to reduce the problem in the future because the grass usually starts on the shore. The two pictures below show the preliminary results of the first selective treatment.



During this initial clean-up process there will be some dead natives seen. Some will be intentional if they are on the sod line or in front of drain pipes. Others will be unavoidable collateral damage.

We did one physical removal day in October to remove plants from the flow pipes and have another scheduled for November. On that second day we will be doing detail work on the native plantings in the most visible areas first. We will be removing the tops of some natives so that the grass can be sprayed without damaging them. The natives will quickly re-sprout through the dead grass.

The areas of highest concern with shoreline plants are the flow pipes. Many, like the one seen below can become blocked with plants and cause flooding. For this reason, our first removal day was focused on these areas.



We will continue to proceed with cleaning up the shoreline growth and plan to install more floating and shoreline plants. Nutrient reduction though will be the keystone of the entire lake management plan at Placido Bayou. All other measures of success will depend on reducing nutrient inputs, and possibly removing nutrients already present. The excessive amount of algae control needed currently is detrimental to any plants that will be installed.



2100 NW 33<sup>rd</sup> Street - Pompano Beach, FL 33069 - 1-800-432-4302

<b>Customer Name</b>	Placido Bayou Community	<b>Sample Date</b>	10-31-12
<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	1	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	5.67	6.0 – 10.0	4.0 – 12.0
pH	7.64	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	5,670.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	3,330.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	61.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	660.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.59	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	0.8	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	>1000.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	670.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	160.0	120.0 – 200.0	> 0.0

**Note: Aquatic Systems, Inc. is not a STATE CERTIFIED laboratory for water quality analysis.**

Chloride level is above the maximum of 600 mg/L for irrigation.

Chloride level is above the desirable range.

There is a higher than normal concentration of ammonia and/or phosphates in the aquatic system.

Possible sources for these nutrients include runoff containing fertilizers or pollutants, or decomposing organic matter. Cutting back on fertilizers should reduce levels of nitrogen and phosphates, and may greatly benefit lake conditions.

Dissolved oxygen level is below desirable range, likely as a result of high organic loading, recent cloudy weather and/or temperature change, or decaying plankton bloom(s).

Please refer to ASI Water Chemistry Fact Sheet for further explanations/information.



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<b>Site Number</b>	2	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	5.89	6.0 – 10.0	4.0 – 12.0
pH	7.64	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	4,880.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	2,840.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	53.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	760.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.78	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	0.6	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	>1000.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	624.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	240.0	120.0 – 200.0	> 0.0

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<b>Site Number</b>	3	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	6.07	6.0 – 10.0	4.0 – 12.0
pH	7.76	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	887.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	483.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	58.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	550.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.35	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	0.9	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	975.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	236.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	200.0	120.0 – 200.0	> 0.0

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Dissolved oxygen level is borderline and may decline further during evening periods.

All other parameters are within desirable ranges.

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<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	4	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	5.67	6.0 – 10.0	4.0 – 12.0
pH	7.79	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	594.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	319.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	132.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	470.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.40	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	19.7	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	607.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	168.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	120.0	120.0 – 200.0	> 0.0

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There is a slightly higher than normal concentration of phosphates in the aquatic system. Possible sources for these nutrients include runoff containing fertilizers or pollutants, or decomposing organic matter. Cutting back on fertilizers should reduce levels of nitrogen and phosphates, and may greatly benefit lake conditions.

Turbidity is above the desirable range. High turbidity levels inhibit light penetration and reduce photosynthesis, therefore reducing the aquatic vegetation's ability to produce oxygen for the lake.

Dissolved oxygen level is below desirable range, likely as a result of high organic loading, recent cloudy weather and/or temperature change, or decaying plankton bloom(s).

All other parameters are within desirable ranges.

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<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	5	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	5.72	6.0 – 10.0	4.0 – 12.0
pH	7.72	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	650.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	350.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	93.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	300.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.32	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	2.2	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	645.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	160.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	160.0	120.0 – 200.0	> 0.0

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All other parameters are within desirable ranges.

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<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	6	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	7.41	6.0 – 10.0	4.0 – 12.0
pH	7.77	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	680.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	369.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	96.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	810.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.33	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	3.4	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	730.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	162.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	100.0	120.0 – 200.0	> 0.0

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Chloride level is above the desirable range.

There is a significant higher than normal concentration of phosphates in the aquatic system.

Possible sources for these nutrients include runoff containing fertilizers or pollutants, or decomposing organic matter. Cutting back on fertilizers should reduce levels of nitrogen and phosphates, and may greatly benefit lake conditions.

Turbidity is above the desirable range. High turbidity levels inhibit light penetration and reduce photosynthesis, therefore reducing the aquatic vegetation's ability to produce oxygen for the lake.

All other parameters are within desirable ranges.

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<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	7	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	6.42	6.0 – 10.0	4.0 – 12.0
pH	7.69	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	668.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	361.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	54.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	1,910.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.29	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	1.0	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	670.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	120.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	100.0	120.0 – 200.0	> 0.0

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<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	8	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	7.12	6.0 – 10.0	4.0 – 12.0
pH	7.64	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	634.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	339.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	61.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	1,700.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	0.32	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	0.8	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	732.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	110.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	120.0	120.0 – 200.0	> 0.0

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<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	9	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	0.15	6.0 – 10.0	4.0 – 12.0
pH	7.29	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	5,580.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	3,230.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	189.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	690.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	1.84	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	8.0	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	>1000.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	676.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	200.0	120.0 – 200.0	> 0.0

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Water quality's ability to support fish and wildlife is questionable.

Chloride level is above the maximum of 600 mg/L for irrigation.

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Possible sources for these nutrients include runoff containing fertilizers or pollutants, or decomposing organic matter. Cutting back on fertilizers should reduce levels of nitrogen and phosphates, and may greatly benefit lake conditions.

Turbidity is above the desirable range. High turbidity levels inhibit light penetration and reduce photosynthesis, therefore reducing the aquatic vegetation's ability to produce oxygen for the lake.

Dissolved oxygen level is below desirable range, likely as a result of high organic loading, recent cloudy weather and/or temperature change, or decaying plankton bloom(s).

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<b>Account Number</b>	0980-2	<b>Technician</b>	EC
<b>Site Number</b>	10	<b>Report Date</b>	11-5-12
<b>Weather</b>	Sunny	<b>Reason for Test</b>	Annual

### Water Quality Parameters

Measurement	Your Lake	Desirable Range	Acceptable Range
Surface Dissolved Oxygen – mg/L	0.55	6.0 – 10.0	4.0 – 12.0
pH	7.17	6.75 – 8.5	5.5 – 9.5
Conductivity – micromhos/cm	11,850.0	50.0 – 1000.0	50-1200.0
Total Dissolved Solids	7,170.0	25.0 – 500.0	25-600
Color, Alpha Platinum – Cobalt	81.0	0.0 – 200.0	0.0-300
Phosphate – µg/L	880.0	0.0 – 150.0	0.0 – 450.0
Nitrogen, Ammonia – mg/L	2.73	0.0 – 0.13	0.00 - 0.50
Turbidity – N.T.U.	1.5	0.0 – 3.0	0.0 - 5.0
Chloride – mg/L	>1000.0	0.0 – 250.0	0.0 - 600.0
Total Hardness (CaCO <sub>3</sub> ) – mg/L	>1000.0	120.0 – 200.0	> 0.0
Total Alkalinity (CaCO <sub>3</sub> ) – ppm	200.0	120.0 – 200.0	> 0.0

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