Lake Seminole Reasonable Assurance Update 2019

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Lake Seminole Reasonable Assurance Plan Update – 2019

The Lake Seminole Reasonable Assurance Plan (RAP) was developed by Pinellas County in 2007 to set forth actions to reduce nutrient loading to Lake Seminole and restore the lake's water quality. Updates were submitted to the Florida Department of Environmental Protection (FDEP) in 2011 and 2014, outlining the progress made towards the goals set forth in the original RAP. This document is the third update to the original RAP and includes a brief overview of progress since 2007 and a detailed description of management actions undergone from 2014 to date.

Monitoring Summary

Pinellas County monitors water quality, phytoplankton, and vegetation in Lake Seminole. Monitoring results and trend analyses are described in the following sections.

Water Quality

Pinellas County samples at two random locations in each lobe (north and south) of Lake Seminole eight times per year, for a total of 32 samples annually. Sampling follows a stratified random design developed by Janicki Environmental (2003). Site locations for 2014 to 2018 are shown in Figure 1, and parameters monitored are listed in Table 1.

Lake Seminole RAP water quality goals are expressed as annual means for chlorophyll-a (chl-a) and the Trophic State Index (TSI). The targets are 30 µg/L chl-a and a TSI of 60. Annual means for chl-a, total nitrogen (TN), total phosphorus (TP), and TSI were calculated for the north and south lobes from the Pinellas County ambient water quality database and are presented in Tables 2 and 3. In general, nutrients and TSI trends have been decreasing as shown in Figure 2 and described in the trend analyses is the following section. However, in 2017 there was a significant increase in mean chl-a and TSI for Lake Seminole. Chl-a levels were elevated during the first two sampling events of the year, in March and April. These events occurred during a drier than usual dry season when the area received only 6.40 inches of rain from October 2016 to May 2017, compared to the 18.37 inches typical average for this period (SWFWMD 2019). During this period, temperatures were also unseasonably warm resulting in lake water temperatures several degrees warmer than average for the time of year. This unusual weather pattern resulted in increased residence time and algae blooms in the lake and was the most likely contributor to the elevated annual means. Other months in 2017 had water quality results more in line with the decreasing trend, and 2018 data indicate a return to this trend (Tables 5 and 6).

Although water quality goals for Lake Seminole are based on the chl-a and TSI targets agreed upon in the RAP, data was also compared to the state numeric nutrient criteria using data from the IWR database. The database includes data from both Pinellas County and the FDEP, but the majority of samples are from the County. Color data indicates a long–term color geometric mean of 37.55 PCUs for the planning period from 2003 to 2018. Based on this assessment, the lake classification for Lake Seminole is "Color > 40

PCU", which coincides with the State's numeric nutrient criteria of 20 µg/L chl-a, 1.27 mg/L TN, and 0.05 mg/L TP. Annual geometric means were calculated for the north and south lobes of Lake Seminole from the Pinellas County ambient water quality database and are presented in Tables 5 and 6. Chl-a, TP, and TN exceeded criteria every year during the planning period; however, Pinellas County data shows a decreasing trend in nutrients over the past ten years as described in the following section.

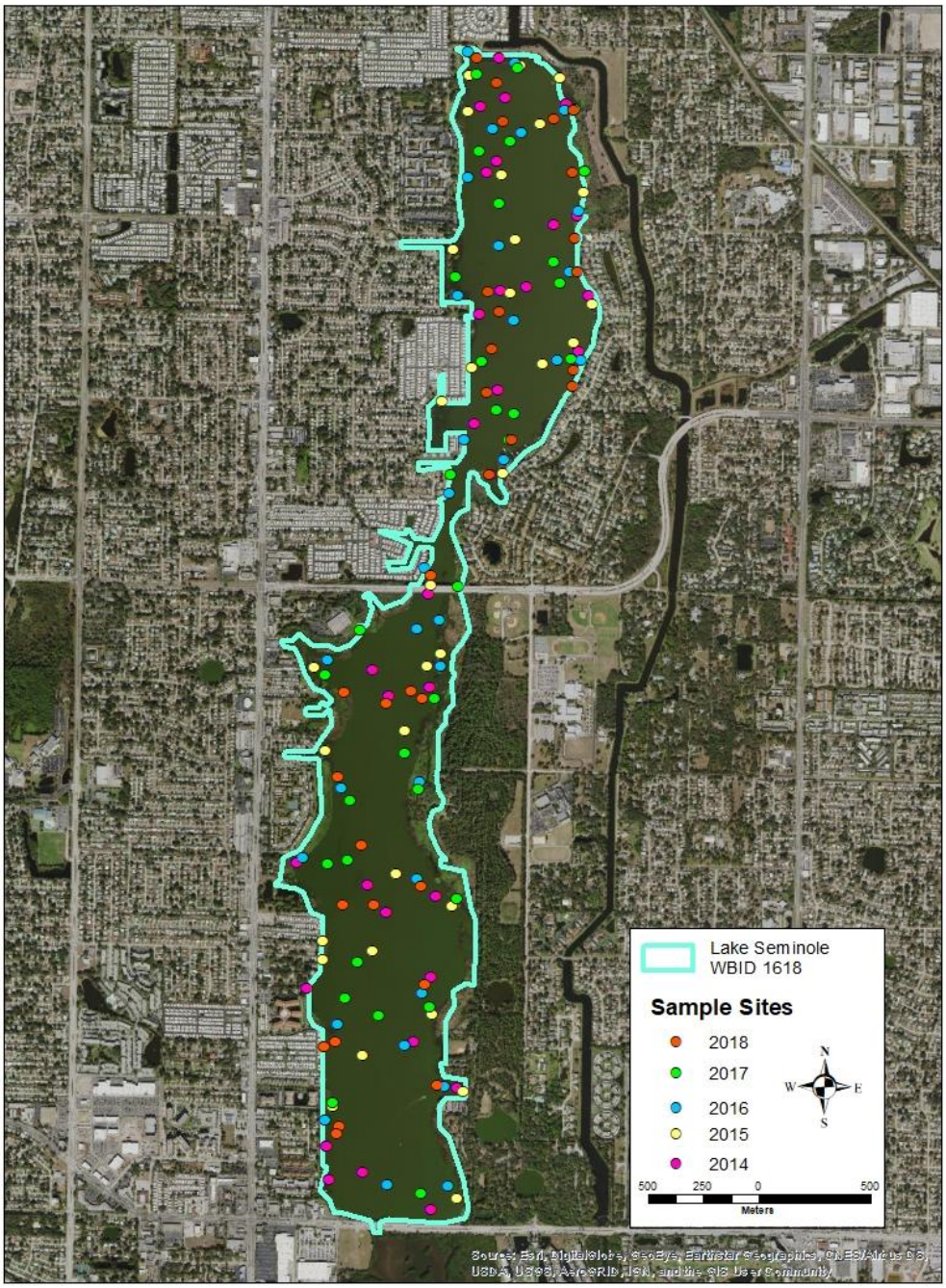

Figure 1. Lake Seminole sampling locations (2014-2018).

Table 1. Lake Seminole water quality monitoring parameters.

Water Quality Indicators	
Aluminum	Phytoplankton Taxonomy
Ammonia	Secchi Disk Depth
Chlorophyll-a, b, c, and Phaeophytin Concentration	Total Kjeldahl Nitrogen
Color	Total Nitrogen
Conductivity	Total Phosphorus
Dissolved Oxygen Concentration and % sat	Total Suspended Solids
Nitrite-Nitrate	Transmissivity
Orthophosphate	Turbidity
pH	Water Temperature

Table 2. Lake Seminole North annual mean TSI and nutrient concentrations, from Pinellas County data only.

Year	TSI	TN (mg/L)	TP (mg/L)	Chl-a (µg/L)
2005	82.6	3.47	0.13	146
2006	81.9	2.87	0.09	83.4
2007	84.4	3.96	0.34	93.9
2008	78.3	3.13	0.11	99.8
2009	83.8	3.63	0.09	115.9
2010	73.4	2.64	0.09	64.6
2011	72	2.13	0.09	61.7
2012	85.4	3.19	0.1	120.6
2013	74.4	2.38	0.08	81.1
2014	78.1	1.59	0.06	59.1
2015	81.9	1.75	0.07	58.2
2016	82.1	1.88	0.08	60.3
2017	86.9	2.18	1	75.8
2018	84	2.08	0.08	71.6

Table 3. Lake Seminole South annual mean TSI and nutrient concentrations, from Pinellas County data only.

Year	TSI	TN (mg/L)	TP (mg/L)	Chl-a (µg/L)
2005	88.8	3.35	0.09	113.2
2006	89.8	3.62	0.08	171.1
2007	89.8	3.04	0.09	105.7
2008	88.8	3.26	0.09	104.6
2009	88.8	3.7	0.08	115.5
2010	85.4	2.6	0.07	75.1
2011	82.3	2.26	0.06	64.9
2012	83.9	2.96	0.08	110
2013	83.9	2.41	0.07	84.6
2014	78.9	1.64	0.05	67.4
2015	83.1	2.03	0.07	67.6
2016	82.2	2.07	0.07	68
2017	87	2.2	0.09	88.4
2018	82.2	2.01	0.06	66.3

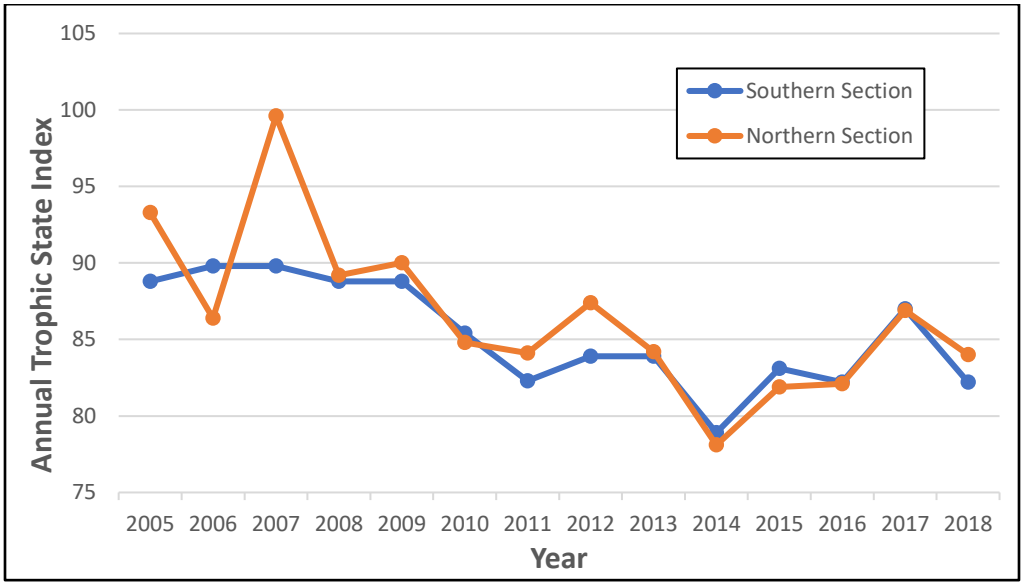

Figure 2. Lake Seminole TSI (2005 to 2018).

Table 4. Lake Seminole North annual geometric means for nutrients, from Pinellas County database.

Year	Chl-a (µg/L)	TN (mg/L)	TP (mg/L)
2005	141.9	3.36	0.13
2006	80.1	2.5	0.09
2007	96.7	3.81	0.32
2008	99.8	3.13	0.11
2009	130.1	3.69	0.08
2010	68.6	2.5	0.08
2011	81.5*	2.08	0.09
2012	107.8	2.93	0.09
2013	77	2.19	0.07
2014	59.1	1.6	0.05
2015	57.1	1.75	0.07
2016	60.3	1.88	0.08
2017	75.8	2.18	0.1
2018	71.6	2.08	0.08

*Laboratory QA/QC problems resulted in several qualified results that were removed for this calculation.

Table 5. Lake Seminole South annual geometric means for nutrients, from Pinellas County database.

Year	Chl-a (µg/L)	TN (mg/L)	TP (mg/L)
2005	113.2	3.32	0.09
2006	133.4	3.89	0.1
2007	109.9	3.03	0.09
2008	104.6	3.26	0.09
2009	134	3.85	0.07
2010	69.7	2.51	0.08
2011	73*	2.17	0.07
2012	97.9	2.69	0.07
2013	80.3	2.2	0.06
2014	67.4	1.64	0.05
2015	67.6	2.03	0.07
2016	68	2.07	0.07
2017	88.4	2.2	0.09
2018	66.3	2.01	0.06

*Laboratory QA/QC problems resulted in several qualified results that were removed for this calculation.

Water Quality Trends

Janicki Environmental recently completed a time series trend analysis for Pinellas County data collected from 2003 to 2018 using the seasonal Kendall Tau Test for Trend. This analysis considered both seasonality and autocorrelation. Results for Lake Seminole are displayed in Table 7. This analysis detected improvements in all water quality parameters, with statistically significant (p-value ≤ 0.05) decreasing trends in chl-a, TN, TP, turbidity, and total suspended solids (TSS) and increasing trends in Secchi disk depth and transmissivity in both portions of the lake (Janicki 2019).

In comparison to the other 57 monitoring stations in Pinellas County waterbodies, only one other had decreasing trends in chl-a, eight others had decreasing trends in TN, sixteen other stations had decreasing trends in TP, and no other waterbody in Pinellas County exhibited decreasing trends in all three nutrient parameters (Janicki 2019). This indicates that the water quality improvement in Lake Seminole is not common across the County and is likely the result of effective completed and ongoing management actions outlined in the RAP.

Table 6. Results of Lake Seminole Kendall Tau trend analysis.

Lake Segment	Parameter	Statistically Significant Trend Direction
SA	Chl-a	Decreasing
SB	Chl-a	Decreasing
SA	Secchi disk	Increasing
SB	Secchi disk	Increasing
SA	Transmisivity	Increasing
SB	Transmisivity	Increasing
SA	Turbidity	Decreasing
SB	Turbidity	Decreasing
SA	TSS	Decreasing
SB	TSS	Decreasing
SA	DO (%Sat)	No trend
SB	DO (%Sat)	No trend
SA	TN	Decreasing
SB	TN	Decreasing
SA	TP	Decreasing
SB	TP	Decreasing

Phytoplankton Community

Phytoplankton samples are collected during ambient water quality monitoring and returned to the Environmental Management Laboratory for preservation, identification, and enumeration. The dominant phytoplankton phylum in Lake Seminole is Cyanophyta, blue-green algae (Figure 3). From 2014 through 2018, blue-green algae consisted of nearly 96% percent annually of the entire lake phytoplankton population. The dominant genera of blue green algae (Figure 4) in the lake are Planktorhrix (37%), Planktolyngbya (18%), Raphidiosis (15%), and Cylindrospermopsis (12%). In 2014 and 2015, Planktothrix dominated the phytoplankton community at roughly 5 million cells per ml. However, during the last three years of the report, 2016-2018, Planktothrix cells per ml increased by over double, with values closer to 12 million cells per ml. There were no differences seen in the percent of Cyanophyta in Lake Seminole during the wet or dry season.

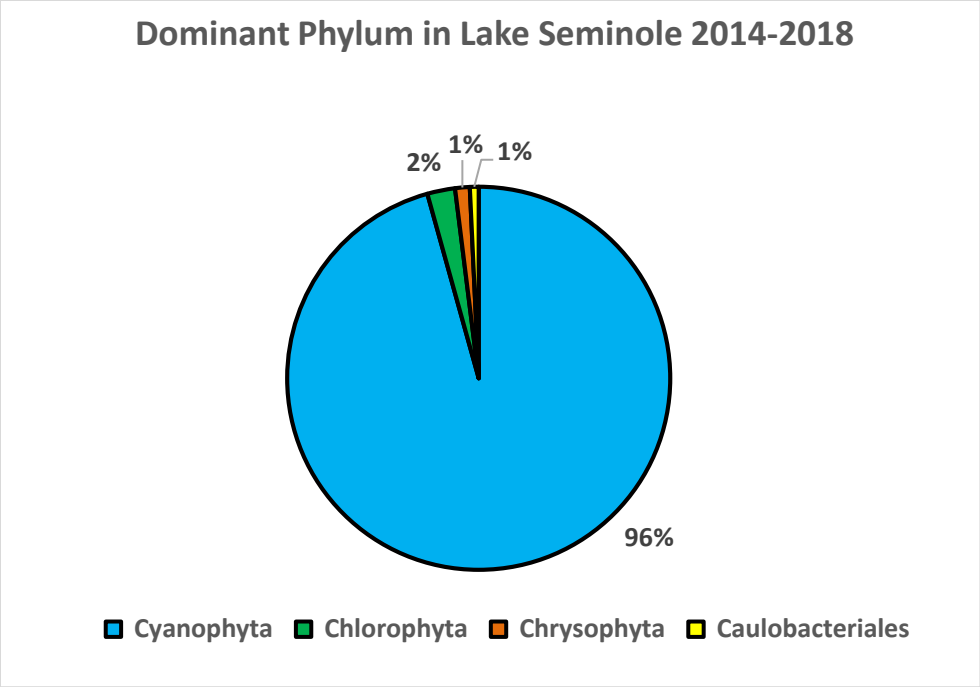

Figure 3. Dominant Phylum in Lake Seminole 2014-2018.

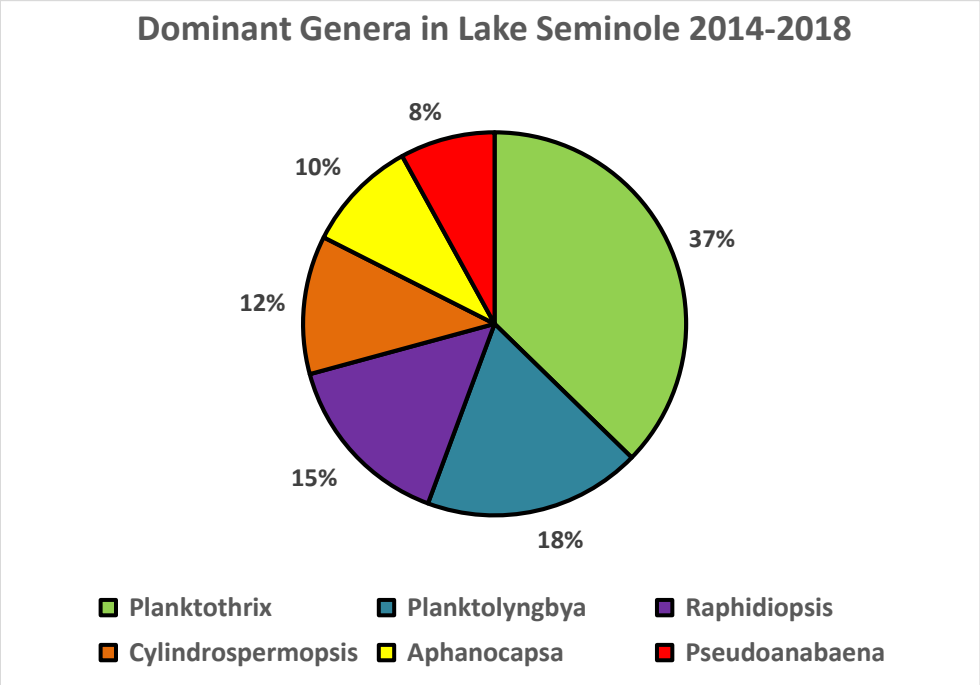

Figure 4. Dominant Genera in Lake Seminole 2014-2018.

Plant Community

Pinellas County developed a county-wide biological monitoring program in 2014 which includes the Lake Vegetation Survey (LVI), Stream Condition Index (SCI), Rapid Periphyton Survey (RPS), and Linear Vegetation Survey (LVS). Staff conducting the monitoring and taxonomy are FDEP certified for these methods and follow FDEP SOPs. An LVI was conducted on Lake Seminole once per year between 2014 and 2018, except for 2015. The first LVI was completed on Lake Seminole on 7/9/2014 with a score of 49 indicating that the lake supports a healthy, well-balanced plant community. Subsequent years, 2016-2018, also resulted in passing LVI scores ranging from the mid 40's to the high 50's (Table 8).

Field observations indicate an increasing trend over the last decade in the abundance of the native species Illinois Pondweed (*Potamogeton illinoensis*) and Eel Grass (*Vallisneria americana*). Many areas previously barren of vegetation or covered in Hydrilla are now inhabited by one or both of these native species of submerged aquatic plants. This is especially true in the northern lobe of Lake Seminole. This has been noted by County staff through field visits to the lake and the numerous calls the County has received from residents who live on the lake inquiring about vegetation (pondweed and eel grass mainly) that they have not previously seen in proximity to their property. Hydrilla management on the lake has been ephemeral, and no large-scale (greater than 5 acres) treatment has occurred on the lake in the last 5 years.

Table 7. Lake Vegetation Index Results for Lake Seminole 2014-2018.

Lake Name	WBID	Sample Date	LVI Score	Average LVI
Seminole	1618	7/9/2014	49	52
		7/6/2016	57	
		8/18/2017	57	
		6/18/2018	46	

Fish Community

Based on electrofishing sampling conducted by FFWCC annually from 2014 to 2018, the lake supports a healthy community of fishes (FFWCC, personal communication). A majority of the fishes in the lake are of the sunfish family (i.e. bluegill, crappie, red ear, bass, etc.) and several killifish species. Several invasive species are found in the lake, mainly Blue Tilapia, a few cichlid species, and armored catfish. Between 2014 and 2018, bluegill (24%-52%), brook silverside (4%-10%), golden shiner (2.4%-17%), and largemouth bass (6%-9%) dominate the lake by number caught (FFWCC, personal communication). However, when looked at on a community basis by weight, largemouth bass (38%-45%), blue tilapia (12%-23%), and Florida gar (6%-11%) dominate the lake (FFWCC, personal communication). While there is some inter-annual variability in fish community composition, it is not unexpected and can be attributed to variability in annual weather patterns that favor one species over another. Lake Seminole exhibits a healthy largemouth bass population. The community structure shows strong recruitment of age-0 bass with a good proportion of those fish living to sexual maturity.

Management Actions

The proposed management actions in the RAP are categorized into structural, management, legal, policy, compliance and enforcement, and public education strategies. The status of each management action is listed below. See the original RAP document for a detailed description of each component.

Structural

1. Excavate organic peat sediments from shoreline areas.

Two segments of sediment (60 total acres) were excavated as reported in the 2011 update. No additional work has been completed since this time, and no additional shoreline excavation is anticipated due to the upcoming sediment removal project.

2. Restore priority wetland and upland habitats.

The management actions set forth in the 2007 RAP were complete as of the 2011 update. However, exotic and invasive species removal in the basin is an ongoing management activity. Ongoing work occurs primarily on the County-owned Management Area, located at the northeast corner of the lake. The project consists of both wetland and upland habitat restoration. The wetland work includes nearly a half acre of exotic plant removal. The upland portion of the project consists of over an acre of mechanical exotic plant removal, continued exotic treatment, and native plantings. Future management in this area will include native wetland and upland plantings.

3. Install stage and flow measurement instrumentation on the Lake Seminole Outfall Control Structure.

Installation of stage measurement instrumentation was complete in 2006. All data is available from the USGS website (www.usgs.gov). The site (station ID 0230889) measures stage but does not include flow.

4. Construct enhanced regional stormwater treatment facilities in priority sub-basins.

Load reductions of 4,222 lbs./yr. TP and 43,812 lbs./yr. TN are estimated to be achieved through operation of alum facilities in subbasins 1, 3, 6, and the Bypass Canal, although the technical issues described below have likely reduced the full capability of the facilities.

Sub-basin 1

Sub-basin 1 has been in operation since 2012. The system had typical early operational problems but those have been corrected and the system is now operational, per design. Monitoring of operational efficiencies for both the wet and dry season will be completed in 2020 and analysis will be provided in the next update.

Bypass Canal

The Bypass Canal treatment facility has been in operation since 2012. The system has had mechanical and electrical issues and was struck by lightning several times, but the issues have been fixed and the system is now operational, per design. Monitoring of operational efficiencies was completed in 2019, and a summary table of the analysis is provided below (Table 8). Overall, the system is functioning as expected, though the removal efficiency of phosphorus is less than anticipated (design reduction estimate of 80%) with an average of 47% reduction. This is due to two events (11/25/19 and 12/3/19) that had significantly lower reductions likely due to weather events, as a lack of reduction was seen in nearly all

parameters tested. Total nitrogen reduction (32%) exceeded design reduction estimates (17%) by 15%. One thing that was noted during the sampling was that aluminum spiked on the outflow for a few of the events. This is likely due to the flow-through rate of the treatment facility being too high; the inflow velocity has been reduced from 10 cfs. to 8 cfs. Further evaluation is needed to determine the optimal flow rate and alum injection rate, and refinements of the system will be discussed in the next update.

Alum Treatment In vs Out Values

Sub-basin 3

Sub-basin 3 has been in operation since late 2013. The system was struck by lightning in mid-2014, but has since been repaired and is currently operational, per design. Monitoring of operational efficiencies for both the wet and dry season will be completed in 2020, and analysis will be available in the next update.

Sub-basin 6

Sub-basin 6 has been in operation since June 2015. Monitoring of operational efficiencies for both the wet and dry season will be completed in 2020-2021, and analysis will be available in the next update.

Sub-basin 2

Sub-basin 2 has been in operation since May 2019. Initial estimates of effectiveness suggest load reductions of 260 lbs./yr. TP and 2,663 lbs./yr. TN. Monitoring of operational efficiencies for both the wet and dry season will be completed in 2020-2021, and analysis will be available in the next update.

Sub-basin 7

The sub-basin 7 system has not been constructed because the existing site had insurmountable design and permitting issues. The County will continue to monitor the lake throughout the dredging project. If it is determined the lake will not achieve the water quality goals without additional load reductions, the County will look for other alternatives.

5. Divert Seminole Bypass Canal flows to improve lake flushing and dilution.

The Bypass Canal Alum Treatment system is currently operational, and rainy season diversion of flows into Lake Seminole occurred for intermittent periods of time during the summers of 2018 and 2019. Pinellas County anticipates conducting this diversion for the entirety of the 2020 rainy season.

6. Dredge organic silt sediments from submerged areas

The County began the design of the Lake Seminole Restoration Project in 2010 with an aim to remove accumulated nutrient-laden sediments from the lake. This project is estimated to result in load reductions of 154,000 lbs. of TP and 832,000 lbs. of TN. The project received permits in late 2013 from FDEP, ERP# 52-0205092-005, and ACOE, Nationwide 27# SAJ-2013-01392 (NW-CMW). A request for proposal (RFP) was released on September 16, 2016, resulting in two responsive proposals. Gator Dredging was ranked the number one firm. The negotiation for the permit modification and design phase was finalized on May 31, 2017, and the agreement was approved by the board on July 17, 2017. Phase I, which included work for professional engineering and permit modification services related to the Gator Dredging proposed upland dewatering area, which will be the permanent home for the lake dredge material, was completed on August 17, 2018. During Phase I, Gator Dredging sub-contracted with AECOM to design the upland Dredge Material Management Area (DMMA). The final plan-set for the upland DMMA was signed and sealed by AECOM, and they are the official Engineer of Record. Phase II, which consists of the construction of the DMMA and the dredging of 903,500 cubic yards from the lake began in late November 2018 (Figure 5). DMMA construction was complete in August 2019, and dredging commenced on November 26, 2019. The dredging portion of the project is expected to take up to 24 months to complete. Once dredging is complete the DMMA will be allowed to dry and settle for at least one year prior to capping and grading of the site. All work on Phase II is expected to be completed by March 2023. Phase II (Construction Services) expenditures are estimated at $17,994,550.00. Including the $668,670.00 in expenditures from Phase I (Permit Modification and Design), the contract total for the project is $18,663,220.00. Results from this project should be available for the next update.

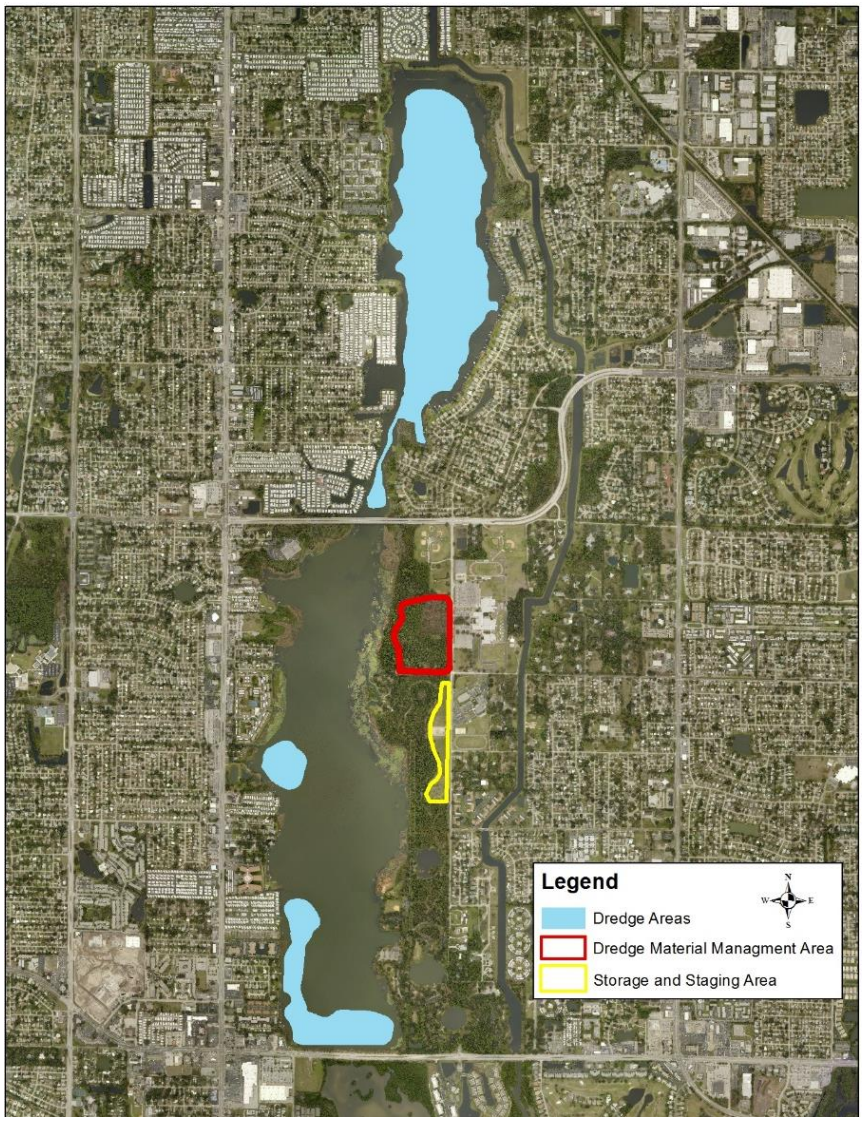

Figure 5. Lake Seminole Dredge Project-Dredge Areas and DMMA Map.

Management

1. Mechanically harvest nuisance aquatic vegetations.

The County has suspended the mechanical harvesting program on Lake Seminole as recommended in the watershed plan. Nuisance aquatic vegetation on Lake Seminole has decreased in recent years and currently, a total of only 20-50 acres per year requires management. Removal is generally needed only on small dispersed areas ranging from less than 0.1 to 1.0 acre, which makes mechanical harvesting difficult and chemical treatment the preferred management approach. After completion of the dredge project (structural action #6) mechanical harvesting may be utilized for larger nuisance vegetation management operations. The County anticipates large scale spatterdock (*Nuphar lutea)* and cattail (*Typha sp.)* removal due to increased clarity in the water column.

2. Improve treatment efficiency of existing stormwater facilities.

In 2014, the County hired a Stormwater Compliance Engineering Specialist for site plan compliance and enforcement. The Environmental Management Division has developed an inventory of all stormwater facilities in the Lake Seminole watershed and the inventory is on an annual inspection cycle. Lake Seminole has been designated as the number one priority basin for proactive site plan compliance reviews. The owners of any facilities deemed out of compliance with site plans will be notified and the County will work cooperatively with the owners to develop and implement an improvement plan. Problems with facilities permitted by the Southwest Florida Water Management District (SWFWMD) will be forwarded to SWFWMD for follow up. Ten facilities have been inspected in the Lake Seminole watershed in response to complaints. Of those ten facilities, seven have successfully worked to get the facility back into compliance and three are currently working to re-gain compliance.

Financial incentives for owners to bring stormwater facilities into compliance include eligibility for Surface Water Assessment fee credits or participation in the County's Adopt-a-Pond program. In 2013, the County adopted a Surface Water Assessment fee to fund stormwater management programs. Property owners that can demonstrate onsite treatment are eligible for up to a 75% mitigation credit. In 2014, as a result of the adoption of the Surface Water Assessment fee, the County reinstated the Adopt-a-Pond program. The Adopt-a-Pond program partners with residents to design, implement, and maintain a five year management plan for privately owned ponds. County supported activities include invasive plant removal, native plantings, pond clean up events, and neighborhood outreach and education. Ponds must be in compliance with all site plans and permits to be eligible for the program. To date, the Adopt-a-Pond program has adopted two ponds in the Lake Seminole watershed. The first pond at Lake Seminole Village had little vegetation, no upland buffer, and was experiencing large scale erosion. The Adopt-a-Pond program helped to solve all three of these issues in 2016. In 2019, a pond off 102nd Ln N that flows directly into the west side of Lake Seminole was adopted. The major work on this pond consisted of bank stabilization, exotic plant removal, and native aquatic and upland plantings.

3. Biomanipulate sport fish populations.

No work has occurred on this topic since the 2011 update. Florida Fish and Wildlife Conservation Commission (FFWCC) staff has indicated a preference to see how the lake responds to the operation of the alum systems and sediment removal prior to any further biomanipulation efforts.

4. **Implement an enhanced lake level fluctuation schedule.**

A lake level fluctuation schedule will be implemented following the sediment removal project.

5. **Inactivate phosphorus through whole lake alum applications (if warranted by monitoring results).**

A whole or targeted lake alum application or other means of sediment inactivation will only be utilized if other restoration projects do not result in significant water quality improvements.

Legal

1. **Adopt a resolution designating the Lake Seminole Watershed as a "Nutrient Sensitive Watershed."**

The 2008 Pinellas County Comprehensive plan Surface Water Element Objective 1.5 states that "Pinellas County shall show measureable improvements in the quality of County waters, as a result of management activities, and the development and implementation of watershed management plans." To address this objective, Policy 1.5.6 includes the establishment of a Nutrient Sensitive Watershed designation for the Lake Seminole Watershed (2008). Effective April 1, 2017, the County has adopted a new Stormwater Manual, which includes Low Impact Development design options for development and redevelopment and establishes the required stormwater quality performance standards. Concurrently, the County updated the associated sections of the Land Development Code. The Manual and Code will include a section on the adoption of special basin criteria allowing for more stringent criteria as needed in designated basins.

Public outreach is also a large part of this management strategy. County-wide public outreach efforts are described in the Public Education element below. Additional targeted outreach in the Lake Seminole basin has coincided with the Lake Seminole dredging project. Pinellas County adopted Florida's most restrictive fertilizer ordinance in 2010. Article VIII, Chapter 58 of the Pinellas County Code requires that residential fertilizer contain at least 50% slow-release nitrogen, a soil test be conducted to confirm the need for phosphorus before it can be applied, and the application and sale of fertilizer containing nitrogen or phosphorus is restricted during the rainy season. It also requires training and certification for commercial applicators and establishes a 10-foot setback or buffer zone from the water. The ordinance is applicable County-wide, including all incorporated and unincorporated areas, which covers the entire Lake Seminole watershed.

2. **Strengthen and standardize local ordinances for regulating stormwater treatment for redevelopment in the Lake Seminole Watershed.**

As described in the previous section, the County has designed a Stormwater Manual and updated development codes for new development and redevelopment which includes Low Impact Development design options. The Pinellas County Stormwater Management Manual functions as a "tool box" of nonstructural and structural stormwater Best Management Practices (BMPs) that can be applied to a variety of redevelopment and development opportunities to satisfy regulatory standards. Many of the receiving waters in Pinellas County are impaired for certain pollutants so a net-benefit approach to reducing stormwater pollutant loadings discharged from the site are a major focus of the manual and code updates.

Policy

1. **Establish a Lake Seminole Watershed Management Area (WMA) through amendments to the Pinellas County, and cities of Largo and Seminole Comprehensive Plans.**

The stormwater manual and land development code updates described in the previous two sections will allow for the adoption of special stormwater criteria in priority basins. Performance standards for redevelopment County-wide exceed the requirements of SWFWMD. The next phase of the stormwater manual development will include working with municipalities to address inconsistencies in regulations. Municipalities have been informed of the County's new manual and code updates and will continue to be updated and encouraged to adopt the same standards and criteria.

Compliance and Enforcement

1. **Expand and enforce restricted speed zones on Lake Seminole.**

This management action was complete as of the 2011 update.

Public Education

1. **Develop and implement a comprehensive public involvement program for the Lake Seminole Watershed.**

On the basin level, public outreach has significantly expanded since the 2014 update. This effort has included in a public meeting in October 2018 to inform the public of the dredge project scope and schedule. Over 200 people attended this meeting. Other outreach efforts included presentations on dredge project details to the students of Osceola High School in March 2019 and lake restoration overview presentations at the Osceola High School PTO meeting in May 2019, the City of Seminole Historic Society in February 2019, and the City of Seminole Rotary Club in November 2019. The County has also spoken to numerous home owner groups and mobile home park groups on the status of the lake, their aquatic vegetation management options, and the ongoing projects around the lake.

The County's Environmental Management website has been available to residents and visitors for several years. In 2010, the website was redesigned to coincide with the County's Watershed Education Campaign initiatives. The website can be found at www.pinellascounty.org/watershed. The site includes explanation of various monitoring and protection activities. An assortment of brochures regarding protection of water resources from stormwater pollution is available on the site. There are about twelve brochures available including general watershed protection and industry specific materials for construction activities, swimming pool maintenance and construction, landscape maintenance activities, restaurant BMPs, power-washing BMPs, painting BMPs, and commercial and industrial business BMPs.

In addition to being available on the website, printed brochures are used by staff during complaint response or proactive residential and commercial inspections and are distributed to interested citizens through outreach events. There are also a variety of door hangers used by volunteers for proactive or complaint driven response distribution to communities. Some of these door hangers include, storm drain

marking, pollution prevention, pet waste pollution prevention, erosion prevention, landscape maintenance, and fertilizer application for nutrient pollution prevention.

Public Service Announcements are also available for viewing on the website. Six videos have been created since 2012 that promote the Environmental Management motto of "Pinellas County is a Watershed, where we Live, Work, and Play." Each video demonstrates how every activity has the potential to impact our waterways. In 2014, the videos ran on local cable network television (variety of channels) and in three local movie theaters on the lobby televisions and during the movie preview sessions. These videos, along with interactive banners and education messages, were also used for digital advertising outreach. In 2013 and 2014 the County advertised the Watershed Campaign on Facebook, Twitter, Tampa Bay Online, and BayNews 9 Online (local news affiliate).

Storm drain marking placards and door hangers have been distributed for years to volunteers as requested throughout the County. Storm drain marking for the Seminole basin mainly occurred in 2015 and 2016, and 56 storm drains were marked by volunteers.

Each spring the County provides the Lakes & Ponds Education Seminar. This half-day seminar is open to all interested citizens in Pinellas County. The event includes exhibitor displays and speaker presentations related to the function and maintenance of stormwater ponds in Pinellas County. Attendees also have the opportunity to take home materials (educational brochures, door hangers, and native plants) to assist them in managing their privately-owned stormwater ponds. The event has occurred annually since 2006.

In 2011, the County began to hold trainings for landscape industry personnel as described in the County Fertilizer Ordinance. The three-hour course is a requirement for certification in landscape Best Management Practices that every employee working in the landscape industry in Pinellas County must complete. Since 2011, approximately 8750 individuals have attended the course. In addition to this course, the County offers Spill Prevention & Response Training, Illicit Discharge Training, and Sediment & Erosion Control Training for industry personnel including private and public organizations.

2. Develop and implement a local citizens Lakewatch program for Lake Seminole.

The County has contacted the University of Florida/IFAS Lakewatch program and discussed the feasibility of restarting the Lakewatch program on Lake Seminole that was discontinued in the mid 2000's. Based on the discussions it was determined that there is no need for the program to be reestablished as the County has an extensive water quality monitoring program in place on Lake Seminole.

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