

2019 Annual Report

JANUARY 1, 2019 TO DECEMBER 31, 2019



Surface Water Improvement and Management Program

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Purpose

This report provides a summary of the Southwest Florida Water Management District Surface Water Improvement and Management (SWIM) Program activities for the 2019 calendar year. This document is intended to fulfill reporting requirements of the Florida Department of Environmental Protection (FDEP).

Introduction

In 1987, the Florida Legislature enacted the Surface Water Improvement and Management Act (Sections 373.451-.4595, Florida Statutes). They recognized water quality in surface waterbodies throughout the state had degraded or were in danger of being degraded, and important functions once performed by associated natural systems were no longer being provided. The functions to be maintained or improved are identified in the SWIM Act and include providing aesthetic and recreational pleasure for the state's citizens; providing habitat for native plants and animals, including endangered and threatened species; providing safe drinking water for the state's growing population; and attracting visitors and accruing other economic benefits. The Act requires each water management district identify and maintain a priority list of waterbodies of regional or statewide significance and develop plans and programs for the improvement of those waterbodies. Waterbodies identified by the districts are approved by the state, including the addition of new waterbodies or the removal of existing ones.

In 2019, the District's Governing Board and the FDEP approved the list of twelve SWIM Priority Waterbodies, as required every five years. No existing SWIM Priority Waterbodies were removed from the list, and no new waterbodies were added. Of the twelve SWIM Waterbodies, three are coastal estuaries (Tampa Bay, Sarasota Bay, Charlotte Harbor), five are first magnitude spring systems (Kings Bay/Crystal River, Rainbow River, Homosassa River, Chassahowitzka River, and Weeki Wachee River), and the remaining four are lake systems (Lake Panasoffkee, Lake Tarpon, Lake Thonotosassa, and the Winter Haven Chain of Lakes). Goals and objectives were developed for each waterbody and are used to guide programs and projects for maintaining or improving water quality, natural systems, and the other functions consistent with the SWIM Act. Essential to carrying out the SWIM Act is the cooperation between the District and local governments and agencies in developing and implementing effective SWIM Plans.

Other District Programs

The District has a wide range of programs, initiatives, and actions that complement and enhance the objectives of the SWIM Act. The programs include planning, regulation, land acquisition, public education, and a cooperative funding program that provides the foundation for the District to accomplish its mission including the objectives of the SWIM Act. Regulating development and water use plays a key role in preserving water quality and habitat by ensuring that stormwater is properly treated, wetland impacts are minimized, and effects to the aquifer are monitored. Public education is a critical element because of the need for public support for these activities. And finally, the District's cooperative funding program provides a significant incentive to local governments and others by funding activities that help protect and restore these waterbodies.

Coastal Estuaries

There are three coastal estuaries in the SWIM Priority Waterbody list. Estuarine environments are a transitional zone from freshwater to saltwater. These fragile systems are dependent on the health of both the freshwater and coastal waters as this zone of interaction represents the base of the food chain and nursery habitat for both environmentally and economically important species. The SWIM coastal estuaries efforts are summarized below.

Estuary	Size (Square Miles)	Watershed (Square Miles)	Restoration /WQ Projects	Restored (Square Miles)	Treated (Square Miles)
Tampa Bay	373	2,200	92/90	9	119
Sarasota Bay	35	212	36/13	1.5	60
Charlotte Harbor	270	4,400	20/9	7	147

In March 2019, SWIM officially released the 2018 seagrass maps for the Suncoast including the estuaries of Tampa Bay, Sarasota Bay, Lemon Bay, and Charlotte Harbor. These maps form the basis by which the health of Suncoast estuaries, and the effectiveness of various resource management actions, are characterized. The Tampa Bay and Sarasota Bay Estuary Programs, and the Coastal and Heartland National Estuary Partnership in Charlotte Harbor and Lemon Bay have established seagrass acreage targets that are assessed using the District's seagrass maps. The 2020 seagrass mapping cycle kicked off in 2019. The imagery acquisition phase began on the first of November. Unlike the 2018 mapping cycle, the 2020 maps will include not only the Suncoast, but also the Springs Coast region. The Suncoast is mapped on a two-year cycle while the Springs Coast is mapped every four years.

Tampa Bay

Tampa Bay was declared an estuary of national significance in 1990 through its inclusion in the Environmental Protection Agency's National Estuary Program. Tampa Bay is Florida's largest open water estuary and includes portions of Hillsborough, Manatee, Pasco and Pinellas Counties. More than two million residents live in the Tampa Bay watershed. Three seaports are located along Tampa Bay's borders, which combined generate \$15 billion to the local economy and support 130,000 jobs. The largest of these, the Port of Tampa, consistently ranks among the busiest ports in the nation. Tampa Bay is also a focal point of the region's premier industry – tourism. The bay and surrounding barrier islands attract nearly 5 million visitors a year. Visitors and residents utilize the bay for sport fishing, boating, kayaking and wildlife observation. Tampa Bay provides critical nesting habitat to 25 wading bird species, averaging an estimated 40,000 nesting pairs annually. One-sixth of the Gulf Coast population of Florida manatees seek refuge during winter near power plants bordering the bay; and more than 200 species of fish utilize the Tampa Bay estuary.

Since 1950, approximately 50 percent of the bay's natural shoreline has been lost to development. Most of the wetland loss occurred before 1970, prior to more stringent protection efforts. The combination of wetlands protection, wetland restoration projects, and improved water quality is responsible for recent increases in coverage estimates for these important fish and wildlife habitats.

Seagrass acreages declined approximately 40 percent between 1950 and 1982. Much of this loss was due to indirect impacts associated with degraded water quality primarily resulting from nitrogen over-enrichment and related increases in algae concentration, causing light limitation to seagrass survival and growth. In 1980, all municipal wastewater treatment plants were required to provide Advanced Wastewater Treatment (AWT) for discharges directly to the bay and its tributaries. In addition to the significant

reductions in nitrogen loadings from municipal wastewater treatment plants, stormwater regulations enacted in the 1980s also resulted in reduced nitrogen loads to the bay. Estimates for average annual total nitrogen loadings to Tampa Bay in 1976 are more than 2.5 times as high as current estimates.

In response to projects funded and managed by SWIM and other nutrient load reduction efforts, water quality has measurably improved in all segments of the bay over the past 30-plus years and Tampa Bay as a whole has more seagrass acreage than it had in 1982.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 92 restoration projects, 90 water quality projects, and 15 ecological studies for Tampa Bay, totaling approximately 9 square miles of restored habitats and 119 square miles of treated watershed.

The following restoration projects were either ongoing or completed in 2019

- **Rock Pond Ecosystem Restoration** – With project cooperator Hillsborough County, Phase 2 of the Rock Ponds project was completed in December 2015, providing 779 acres of various coastal habitats. Four quarters of maintenance were conducted, which concluded the restoration project.
- **Balm Boyette Habitat Restoration** – The Balm Boyette Scrub Preserve is located in southern Hillsborough County. Much of the 5,000-acre preserve is high quality wetland and upland habitat communities. However, a portion of the land was mined for phosphate during the 1960's, leaving a landscape of open water pits and steep slopes. With funding from the Florida Department of Environmental Protection and in cooperation with Hillsborough County, the District created wetlands and restored a stream through a process known as hydraulic carving. Approximately 80 acres were restored or enhanced. The stream restoration reconnected a stream valley to Pringle Branch, a tributary of Fishhawk Creek and the Alafia River. Construction was completed in December 2019. Vegetation maintenance commenced in 2020 and will be conducted quarterly for three years.
- **Terra Ceia Ecosystem Restoration Phase 2** – With design completed during 2015 for a habitat restoration project on approximately 400 acres, covering three parcels in the Terra Ceia area of Tampa Bay, a Request for Bid was issued soliciting for approximately 166 acres of upland restoration. Upland restoration began during December 2017, which has included mechanical removal of non-native plants over much of the project area. Kill-in-place methods to control and remove non-native plants are being used through-out the remainder of the site. During 2019, the installation of native plants was completed, and maintenance is now underway.
- **Palm River Restoration** – Design was completed on a water quality improvement and natural systems enhancement project located just south of the spoil disposal areas in 2015. This project was selected to receive RESTORE Act funding and has been on hold awaiting the transfer of funds. Construction is expected to commence in 2020.
- **Robinson Preserve Phase 2** – This cooperative project with Manatee County will enhance the Phase I restoration by restoring an additional 150 acres through creation of a large estuarine and freshwater wetland, exotic vegetation removal and native planting. Phase 2a construction was completed in 2017. Phase 2b will commence in 2020.
- **Little Manatee River Corridor Restoration Phase 1 Design** – Piezometer wells were established and monitoring of groundwater levels in Areas 7 and 8 began in 2019, based on the 2018 Feasibility Study. The Little Manatee River Corridor Feasibility Study established conceptual plans and prioritized ten areas for restoration in the 7,100 acre Corridor.
- **Gully Branch** – Upland restoration of 444 acres of fallow farm fields began in 2019. This project is in the Little Manatee River Corridor and is part of Area 7 as designated in the 2018 Feasibility Study. The project includes removing non-native or nuisance vegetation and seeding with native plants.

- **Kracker Avenue Restoration Project** – Design and permitting are being finalized. The project will restore 25 acres of estuarine, freshwater, and upland habitats. Construction is anticipated to commence in late 2020.
- **Roosevelt Creek Channel 5 Improvements** – Pinellas County bid the Project to restore 13 acres of natural systems on Channel 5. Due to bid results higher than expected this project was terminated.
- **Frog Creek Wetland Restoration at Terra Ceia** – The Agreement for design was executed in 2019 and initial stages of planning and design are in progress.
- **Mobbly Bayou Wilderness Preserve** – This cooperative project is with Pinellas County, the City of Oldsmar, and the Tampa Bay Environmental Restoration Fund. The project will focus on the restoration and enhancement of tidal creeks and mangrove dominated tidal habitats by re-contouring, using a technique known as hydro-blasting, to reduce the spoil mounds created when the mosquito ditches were dredged. This work will allow new mangrove swamp habitat to become established and will restore a more natural tidal flow and duration of tidal inundation, thereby enhancing existing mangrove swamp and open water habitats. This restoration project will improve and restore habitat functions within the preserve. Project design is expected to be completed in 2020 and the District is pursuing access and construction agreements with Pinellas County and the City of Oldsmar.
- **Boyd Hill Nature Preserve** – Boyd Hill Nature Preserve is located in City of St. Petersburg adjacent to Lake Maggiore. The project includes redesign of current channels bisecting the property as well as back-filling secondary ditches to create and restore natural systems and hydrology within the 245-acre preserve. The project is cooperatively funded by City of St. Petersburg, and the District with grant funding by Tampa Bay Estuary Restoration Fund. Design is expected to commence in 2020.

The following water quality projects were either ongoing or completed in 2019

- **Roosevelt Stormwater Retrofit** – This cooperative project with Pinellas County includes the design, permitting and construction of stormwater BMPs to treat 21 acres of urbanized stormwater runoff. Design and permitting were completed in 2019 and the County began the Request for Bid process. Construction is expected to begin in mid-2020.
- **Sawgrass Lake Restoration Project** – In 2017, the District completed construction on this District initiative to remediate lead contamination from a portion of the 385-acre Sawgrass Lake Park Water Management Area, dredge the lake to hard bottom, and provide water quality improvements that will treat runoff from an estimated 3,587 acres of older, intensely developed and predominantly untreated watershed that drains into Sawgrass Lake and Tampa Bay. The project is in the maintenance phase until 2020.
- **Madeira Beach 137th Avenue Circle BMPs** – The City of Madeira Beach construction of a stormwater retrofit project to treat 5.7 acres of urbanized runoff was 95% completed in 2019.
- **City of Anna Maria North Island BMPs Phases H and J** – City of Anna Maria commenced design of a stormwater retrofit project that treats runoff from a total of 73 acres.
- **Druid Road Stormwater Improvement Area** – The City of Clearwater continued construction on a stormwater retrofit project to treat 42 acres of currently untreated watershed draining to Allen's Creek and Tampa Bay.
- **Delaney Creek Improvements** – Hillsborough County completed design of stormwater improvement BMPs to 130 acres of highly urbanized watershed draining to Delaney Creek. Construction is expected to begin in 2020.

- **East Treasure Island Causeway BMPs** – Redesign is underway by the City of Treasure Island for construction of stormwater improvement BMPs for 8 acres of urbanized watershed, as a drastic change in scope was required due to the City of St. Pete Beach backing out of the agreement with the City of Treasure Island. Construction is proposed to start sometime in 2021, once the new design has been reviewed and approved by the District.
- **Southeast Riverside Water Quality Improvements** – The City of Palmetto began design of a stormwater improvement project treating 62 acres of urban runoff. Construction expected in 2020.
- **St Petersburg Pier Park** – The City of St. Petersburg began construction on a stormwater improvement project at the pier treating 9 previously untreated acres. Expected to be complete in 2020.
- **Pinellas Park Water Management District (PPWMD) Channel 1A2** – The PPWMD began design of a stormwater improvement project treating 23 acres of urban runoff in late 2019.
- **Rubonia Stormwater Quality Improvements** – The County is in the middle of the procurement process for construction of a stormwater management system, including wet ponds and baffle boxes to enhance treatment above permitting requirements for 41 acres of urbanized untreated runoff which flows into Tampa Bay.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Tampa Bay Habitat Master Plan Update** (ongoing)
- **Mill Creek Water Quality Plan** (completed)
- **Nutrient Source Tracking** (ongoing)

Outreach in 2019 – Volunteer Events, Presentations and Education

- SWIM staff provided 8 presentations and field tours of various Tampa Bay restoration projects to various parties including: multiple tours of Rock Ponds: Canadian Ecosystem Group Tour with Tampa Bay Water, SWFWMD General Services staff tour, Ecological Engineering USF Tour, University of Tampa Ornithology Class, Master Naturalist Class Tour, University of Tampa Biology Professors Research Tour. And two tours were conducted at both Rock Ponds and Terra Ceia Phase 2: SWFWMD Hydraulic Data Staff tour and Bay Grasses and Classes instructor tour. Numerous media outlets including television and newspapers visited the Balm Boyette Habitat Restoration Project and published reports on the project. Several tours, including FDEP and District staff were conducted to the Balm Boyette project.
- SWIM projects for Tampa Bay garnered at least 17 newspaper, newsletter, and internet articles.
- In Hillsborough County, 18,127 sixth-grade students attended a three-day field trip program at Nature's Classroom. The facility is located along the banks of the Hillsborough River in the District's Lower Hillsborough Wilderness Preserve. Also, at Nature's Classroom, 152 students attended a water-resources summer camp. Further down the river sits Lettuce Lake Park where the District funded a field trip program for 1,512 students in grades 3–5. More than 900 teachers and chaperones attended these programs.
- In Pinellas County, more than 6,200 fourth-grade students and 1,200 teachers and chaperones attended field trip programs at either the Boyd Hill Nature Preserve or the Brooker Creek Environmental Education Center at the Brooker Creek Preserve. Students experience one of these watersheds by learning about the flora and fauna as well as participating in water quality testing, dip netting and more.

- In Manatee County, 2,539 fifth-grade students and 255 teachers and chaperones learned about the Tampa Bay watershed through field trip programs at Emerson Point Park and Anna Maria Island. Activities included dip netting, water quality testing, nature walks and more. Also, 41 high school students and 3 teachers participated in the Manasota Regional Envirothon competition, where students were tested on a variety of topics, including water resources.
- Educational signage was developed and installed at Keep Tampa Bay Beautiful's new environmental education center located at the Reed Property along the Hillsborough River. The signage focuses on the Hillsborough River watershed, human impact to water resources, the Reed Property shoreline restoration project and aquatic species.

Awards

- Since 1987, the District has received a total of 64 awards for its SWIM Program projects and personnel.

Sarasota Bay

In 1987, Sarasota Bay was identified as an estuary of national significance in the Water Quality Act of 1987. The District was the initial local program sponsor and played a major role in shaping the restoration plan. Subsequent to approval of the Comprehensive Conservation and Management Plan (CCMP) in 1995, Sarasota Bay was added to the District's SWIM Priority List.

The Sarasota Bay restoration strategy focuses on improving juvenile fish habitat and restoring wetlands and seagrasses that were lost as a result of historic dredge and fill operations and pollution. Projects completed by the SWIM Program and other agencies have restored tidal and freshwater wetlands; created coastal upland habitats; and created bay bottom habitat.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 36 restoration projects, 13 water quality projects, and 6 ecological studies for Sarasota Bay, totaling approximately 1.5 square miles of restored habitat and 60 square miles of treated watershed.

The following restoration projects were either ongoing or completed in 2019

- **Hudson Bayou In-Stream Restoration and Water Quality Improvement** – is a 2015 cooperative funding project with Sarasota County in partnership with the Sarasota County School Board to design, permit and construct urban upland and channel shoreline restoration and BMP water quality improvements in the Hudson Bayou watershed of Sarasota Bay. Construction of the project began in 2019 and was close to completion by the end of 2019. Upon completion the project is estimated to remove 304 pounds of total nitrogen and 13,241 pounds total suspended solids per year by treating stormwater runoff from approximately 837 acres of highly urbanized watershed.

The following water quality projects were either ongoing or completed in 2019

- **Central Holmes Beach BMPs** – This cooperative project with City of Holmes Beach includes the design, permitting and construction of stormwater BMPs to treat 127 acres of urbanized stormwater runoff. Construction of the third and final phase was completed in 2019.
- **Bradenton Beach BMPs Avenues B and C** – This cooperative project with the City of Bradenton Beach includes design, permitting and construction of stormwater BMPs to treat 34 acres of highly urbanized stormwater runoff. Construction on Avenue C was completed in 2019 and design for Avenue B is ongoing.

- **Northern Holmes Beach BMPs Basins 10 & 12** – The City of Holmes Beach Project includes design, permitting and construction of stormwater BMPs to treat 20 acres of urban stormwater runoff. The project commenced in late 2019.
- **Selby Stormwater Management System** – Design is underway by Marie Selby Botanical Gardens for construction of enhanced BMPs to treat stormwater runoff from approximately 4.7 acres of urbanized watershed above and beyond permitting requirements area draining directly to Hudson Bayou and ultimately Sarasota Bay, a SWIM priority waterbody. Construction is proposed to start Fall 2021.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Phillippi Creek Barrier Removal and Restoration** (completed)
- **Bowlees Creek Water Quality Plan Study** (ongoing)
- **City of Venice Stormwater Outfall Study** (ongoing)

Outreach in 2019 – Volunteer Events, Presentations and Education

- In Sarasota County, 1,441 fifth-grade students and 73 teachers and chaperones attended field trip programs led by Around the Bend Nature Tours to learn about Sarasota Bay at either Ken Thompson Park or Bay Preserve. Activities included water quality testing, dip netting, nature walks and more. Also, 79 high school students and 4 teachers participated in the Manasota Regional Envirothon competition, where students were tested on a variety of topics, including water resources.

Charlotte Harbor

Charlotte Harbor is a District SWIM Priority Waterbody and has also been declared an estuary of national significance through its inclusion in the U.S. Environmental Protection Agency's National Estuary Program in 1995. It is Florida's second largest open water estuary and is considered one of the most productive estuarine systems on the west coast of Florida. Because of its productivity, Charlotte Harbor has become a world-class destination for recreational fishing. Charlotte Harbor is the home for more than forty species of animals listed by the state as either endangered, threatened, or of special concern. Significant habitat losses within the harbor and its watershed have been documented and have been attributed to a variety of human activities. In the headwaters of the Peace and Myakka Rivers, large tracts of pine flatwoods, sandhill scrub, and other habitat types have been converted to agricultural land uses. In the Upper Peace River, much of the watershed has also been converted to phosphate mines. In the lower Peace and Myakka Rivers, once-large expanses of salt marsh and mangrove habitats have been drained and filled and replaced by residential housing in finger-fill canal communities. Water clarity data and seagrass acreage have been collected since 2002 by the Coastal Charlotte Harbor Monitoring Network and the District, respectively. In August 2009, the Charlotte Harbor National Estuary Program (CHNEP) adopted seagrass targets for each of the segments in Charlotte Harbor. In May 2011, the CHNEP adopted water clarity targets for each of the segments.

After much work by the CHNEP, with cooperative funding from the District, the CHNEP proposed Numeric Nutrient Criteria to the Florida Department of Environmental Protection (FDEP) for each of the segments within the Southwest Florida Water Management District. The FDEP adopted these criteria by rule in June 2012 and the US Environmental Protection Agency approved these rules in November 2012. The CHNEP along with the Tampa Bay and Sarasota Bay Estuary Programs continued a project to develop water quality criteria for tidal streams to supplement the estuarine Numeric Nutrient Criteria.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 20 restoration projects

and 33 ecological studies for Charlotte Harbor, totaling approximately 4,575 acres of restored coastal habitats. Since 2004, the District and its cooperators have completed 9 water quality improvement projects that are providing treatment for nearly 94,598 acres of watershed.

The following restoration projects were either ongoing or completed in 2019

- **Coral Creek Ecosystem Restoration Phase 2** – Completed construction on approximately 300 acres of District and Florida Department of Environmental Protection co-owned property within the Charlotte Harbor Preserve State Park. Restoration components included non-native vegetation removal and enhancement and creation of freshwater and intertidal wetlands.
- **Lemon Bay Habitat Restoration** – Continued construction planning of an 80-acre coastal habitat restoration project including non-native vegetation removal and enhancement and creation of freshwater and intertidal wetlands at the Wildflower Preserve in Charlotte County. Construction will be completed in 2020.
- **Dona Bay Surface Water Storage Facility** – The redesign is currently underway, to account for 3rd party review changes and incorporation of stormwater drainage at the SW corner of the storage facility, for the proposed Venice development. The County proposes to have final design no later than March 2021. District staff will start developing the 3rd Party Review TWA a few months prior to the design deliverable being complete.
- **Myakka State Forest WQ and Bank Stabilization** – Approval from Florida Forestry Services was received June 2020. The EOR/CEI consultant was brought under contract for bidding, construction, Gopher tortoise, and closeout tasks. The project will be ready for construction when weather conditions/water levels are appropriate.

The following water quality projects were either ongoing or completed in 2019

- **Lake Gwyn East Surface Water Restoration** – Construction of 60-acres of freshwater wetlands to treat 378 acres of stormwater runoff and restore the eastern portion of Lake Gwyn in Polk County in 2018. Construction is still ongoing and will help improve water quality within the Peace Creek watershed.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Charlotte Harbor SWIM Plan** – Work began in 2018 to update the SWIM plan and issues and drivers and water quality analyses were completed in 2019. The final update to the plan is expected in mid-2020.
- **Lake Hancock Lake Level Modification Monitoring Project** (ongoing)
- **Charlotte Harbor Flatwoods Initiative Support** (ongoing)
- **Coastal Charlotte Harbor Monitoring** (ongoing)
- **The CHNEP, with District funding through the annual workplan agreement, completed the Habitat Restoration Needs update that identifies restoration and preservation opportunities throughout the Charlotte Harbor & Lemon Bay Basins.**
- **Downs' Water Control Structure – Feasibility Study** (ongoing)
- **Upper Myakka Lake Water Control Structure and Restoration** (ongoing)

Outreach in 2019 – Volunteer Events, Presentations and Education

- In Charlotte County, 961 fourth-grade students and 123 teachers and chaperones attended field trip programs with the Charlotte Harbor Education Center at either Alligator Creek Preserve, the lower Peace River, Cedar Point Environmental Park or Lemon Bay. Students experience the Peace River watershed at one of these locations by learning about the wildlife, participating in water quality testing and more. Also led by the Charlotte Harbor Education Center, more than 900 second grade students and 281 teachers and chaperones learned about Charlotte Harbor by participating in a one-hour seagrass wading field trip.
- In Hardee County, 360 fifth grade students and 18 teachers and chaperones attended a field study program in Punta Gorda, where they boarded a boat to study Charlotte Harbor. Led by the Outdoor Classroom, students learned about the history and geography of the area, as well as participated in water quality testing.
- Several tours of the Lake Hancock Outfall Treatment Wetland were conducted.

Spring Systems

It has been recognized in statute that the spring systems of the state are a public value as they “provide immeasurable natural, recreational, economic and inherent value” to the citizens of the state of Florida (F.S. 373.801). The quality of a spring is a function of aquifer health, and aquifer health is a function of springshed land-use. Primary protection of spring systems involves protection of the spring vent as well as the spring runs and associated shorelines. Secondary protection comes in the form of addressing intensive land-use within the springshed, particularly adjacent to the spring run and where high recharge soils occur. Many spring systems in Florida have experienced significant ecological shifts caused by both natural variability and human activities. To address these issues and recognizing that one entity alone cannot do it all, the District created a multi-stakeholder partnership called the Springs Coast Steering Committee (SCSC) in August 2014. The District formulates plans to address adverse issues with each of the five springs systems for the SCSC to consider and approve. This process assures that projects are focused on improvements to these spring systems. The main issues facing the springs systems include:

- Elevated Nitrate Concentrations
- Reduced Water Clarity
- Reduced Volume and Streamflow
- Altered Aquatic Vegetation Community
- Changing Salinity (Homosassa River)
- Sedimentation (Weeki Wachee River)
- Sea-level Rise (Crystal River/Kings Bay)

The SWIM Plans for all springs are divided into water quality, water quantity, and natural systems. There are five spring-systems in the SWIM Priority Waterbody list. The SWIM efforts for these systems are summarized below.

Spring	Size	Watershed (Square Miles)	Springshed (Square Miles)	Total Restoration or Water Quality Projects
Chassahowitzka River	6 River Miles	91.7	168	2
Crystal River/Kings Bay	600 Acres	68.7	255	18
Homosassa River	8 River Miles	55.7	286	1
Rainbow River	6 River Miles	73.5	741	13
Weeki Wachee River	7.8 River Miles	38.1	277	2

For Crystal River, Homosassa River, Chassahowitzka River, and Weeki Wachee River, the 2020 seagrass mapping cycle kicked off in 2019. The imagery acquisition phase began on the first of November. Unlike the 2018 mapping cycle, the 2020 maps will include not only the Suncoast, but also the Springs Coast region. The Suncoast is mapped on a two-year cycle while the Springs Coast is mapped every four years.

Crystal River/Kings Bay

The Crystal River/Kings Bay complex is designated by the state as an Outstanding Florida Water (OFW) and a SWIM Priority Waterbody. Kings Bay is a spring-fed estuary with an average depth of 3-10 feet and forms the headwaters of the Crystal River. The Crystal River flows from southeast to northwest flowing to the Gulf of Mexico. Collectively, King Bay's numerous springs and countless seeps form the sixth largest spring system in Florida, by discharge. With over 70 documented springs and an average watertemperature ranging between 66-76 degrees Fahrenheit, Kings Bay forms the largest natural warm water refuge for the Florida Manatee in the United States. In recent years, record numbers of manatee have called Kings Bay home to escape the colder Gulf of Mexico. In 2018, over 2,000 manatees were observed in Kings Bay during the winter and over 300 were observed over the summer. Crystal River/Kings Bay has become one of the largest tourist destinations for manatee viewing in the nation.

While the system is best known for manatees, it is also home to a rich diversity of other species. The Florida Fish and Wildlife Conservation Commission observed 21 species of amphibians, 47 species of reptiles, 191 species of birds, and 22 species of mammals; including 26 state or federally protected species.

In January 2016, the SCSC approved the Crystal River/Kings Bay SWIM Plan. The Plan identifies four main issues facing Crystal River/Kings Bay: (1) Sea-level Rise, (2) Reduced Water Clarity, (3) Altered Aquatic Vegetation Community, and (4) Elevated Nitrate Concentrations in the Springs. The SWIM Plan also identifies several numeric targets or quantifiable objectives that represent long-term goals used to develop management actions and projects to help track success. Management actions and projects identified in the Crystal River/Kings Bay SWIM Plan are divided into the three focus areas: (1) Water Quality, (2) Water Quantity, and (3) Natural Systems (Habitat). For Water Quality the priority management actions address septic tanks, stormwater, and urban & residential fertilizer use. For Water Quantity, priority management actions address minimum flows and levels and water conservation. For Natural Systems, priority management actions address habitat restoration and habitat conservation.

An integral part of the District's springs education and outreach goal is to increase the public's awareness of the issues related to Crystal River/Kings Bay, and to encourage good stewardship of one of Florida's most precious natural resources.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 7 restoration projects, 11 water quality projects, and 22 ecological studies for Crystal River/Kings Bay.

Notable Accomplishments

During 2019, the District and a cooperator completed or continued several construction projects, studies, and monitoring programs. These projects are summarized below:

- The District completed the Living Shoreline/Oyster Habitat Feasibility Study which included a feasibility study to identify appropriate areas for living shoreline and/or oyster reef enhancement/creation along the Crystal River and Homosassa River systems. This project also produced conceptual design plans for two sites: one for the Crystal River and one for the Homosassa River.
- Completed a status and trends analysis specific to the quantifiable objectives specified in the SWIM plan.
- The District worked with Citrus County to initiate the removal of several existing private wastewater package plants within the springshed. In 2019 the construction phase of this project continues (P117).
- The District continues to work with the City of Crystal River and Citrus County on multiple projects that would remove over 600 septic tanks from the springshed (W434, W430, W432).
- The Three Sisters Canal Bank Shoreline design project continued in 2019 with initiation of 60 percent plans. The District is coordinating with the City of Crystal River and the US Fish and Wildlife Service on revisions to the design to maximize manatee refuge areas (W431).
- The City of Crystal River completed design and permitting for the cooperatively funded Hunter Springs Stormwater BMP modification.
- Completed the sixteenth year of Kings Bay water quality monitoring. Twelve bay-wide stations are monitored on a quarterly basis to track water quality status and trends.
- Completion of Project COAST in 2019 marks the 21st year of District water quality monitoring in the nearshore coastal waters and tidal rivers of the Springs Coast. This project began in 1998 in partnership with the University of Florida until 2015. From 2015 to the present, the District redesigned Project COAST by conducting all sampling and laboratory analyses in-house, discontinuing redundant sampling stations, and greatly increasing the suite of water quality parameters. This redesign resulted in a more analytically robust product while reducing overall project costs. For the Crystal River portion of this project, 7 fixed stations are monitored quarterly for a suite of water quality parameters including total nitrogen, total phosphorous, nitrate, phosphate, chlorophyll-a, turbidity, color, and clarity.
- Completed multi-year study with the Florida Fish and Wildlife Conservation Commission (FWC) to characterize and quantify the fish community in Kings Bay (P178).
- Completed seasonal mapping analysis of the Kings Bay submerged aquatic vegetation collected 2017-2018 (W457).

The following studies and data collection efforts were either ongoing or completed in 2019

- **Springs Coast Fish Community Assessment** (completed)
- **Vegetation Evaluation and Mapping 2017–2018** (completed)

Outreach in 2019 – Volunteer Events, Presentations and Education

- Staff gave a presentation at the annual Manatee Eco-Tourism Association (META) Dive Boat Captains and Eco-tour guide Certification Workshop. META is an organization in Citrus County devoted to sustainable eco-tourism in Kings Bay and throughout Citrus County waterways.
- Hosted a Submerged Aquatic Vegetation (SAV) identification workshop during the META Educational Lecture Series. Staff led a hands-on workshop educating META members and non-members on how to identify common desirable and invasive SAV species found in Kings Bay.
- Staff conducted a workshop at the Florida Marine Science Educators Association annual conference in Crystal River. Staff gave an overview of the Springs Coast, the issues and drivers facing the region's waterways, and actions being done to help improve these systems.
- Coordinated the sixth year of a campaign to position the District as an organization that cares about the springs and is working to protect them. After the campaign, staff completed the sixth year of a public perception survey to better understand the public's opinions, knowledge, attitudes and beliefs regarding the health of the springs and the District's efforts to restore them.
- Staff gave two presentations on this springs system and hosted springs outreach booths at two events. Approximately 800 people visited these booths.
- Staff hosted a kayak tour of Three Sisters Springs for elected officials and members of the public as part of Save Our Water Week events. About 40 people attended the event.
- Funded hands-on field trip programs where students learned first-hand about the importance of Crystal River/Kings Bay and local water resources while visiting the Citrus County Marine Science Station. The program reached 1,079 fourth-grade students, 783 seventh-grade students, 607 high school students, and 79 teachers and funded an educational summer camp reaching 85 students.

Rainbow River

The Rainbow River is an important natural resource to the people of the state of Florida. From an ecological perspective, the river has an abundance of diverse plant communities providing excellent habitat for many species of fish and wildlife. Rainbow River's natural beauty makes the river an important recreational resource. Over 200,000 people visit the river annually to dive, swim, boat, and fish. Of the 33 first magnitude springs in the State of Florida, Rainbow Springs, forming the headwaters of the Rainbow River, is the fourth largest in terms of discharge. The Rainbow River discharges an average of 763 cubic feet per second (cfs), or 493 million gallons per day (mgd) into the Withlacoochee River, just upstream of Lake Rousseau. The Rainbow River, because of exceptional scenic beauty and its ecological significance, has been designated by the State to be an Outstanding Florida Water (OFW), an Aquatic Preserve, and a SWIM Priority Waterbody. Also, in 1972 Rainbow Springs was designated a National Natural Landmark by the National Park Service.

Overall, the Rainbow River is an ecologically healthy system. However, the river should not be thought of as being pristine. Past human activities over the last 150 years have significantly altered the character of the river, especially in the lower reaches. Most of the watershed remains largely rural, but parts of the watershed are rapidly losing their rural character. Land use immediately surrounding the Rainbow River has slowly transitioned from mining and agriculture to residential. Future residential and commercial development throughout the Rainbow River watershed is expected to increase and could compromise the status of the river and its many springs.

In December 2015, the SCSC approved the Rainbow River SWIM Plan. The Plan identifies four main issues facing the Rainbow River: (1) Elevated Nitrate Concentrations, (2) Reduced Water Clarity in the Lower River, (3) Long-term Streamflow Reduction, and (4) Altered Aquatic Vegetation Community. The SWIM Plan also identifies several numeric targets or quantifiable objectives that represent long-term goals used to develop

management actions and projects to help track success. Management actions and projects identified in the Rainbow River SWIM Plan are divided into the three focus areas: (1) Water Quality, (2) Water Quantity, and (3) Natural Systems (Habitat). For Water Quality the priority management actions address agricultural operations and septic tanks. For Water Quantity, priority management actions address water conservation and minimum flows and levels. For Natural Systems, priority management actions address invasive species management and recreation management.

An integral part of the District's springs education and outreach goal is to increase the public's awareness of the issues related to the Rainbow River, and to encourage good stewardship of one of Florida's most precious natural resources.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 13 water quality projects and 17 ecological studies for Rainbow River.

Notable Accomplishments

In 2019, several projects were either initiated or ongoing to aid in developing and implementing protection and management strategies for the Rainbow River. The District is working with Marion County through cooperative funding initiatives and has ongoing projects that are providing stormwater treatment in the watershed. Specific efforts are summarized below:

- Completed construction of two cooperative funding projects with Marion County to improve stormwater treatment by implementing stormwater BMPs. These projects will reduce nutrient loads within the Rainbow Springs watershed (N848, WR04).
- Completed a multi-year study with the Florida Fish and Wildlife Conservation Commission (FWC) to characterize and quantify the fish community of Rainbow River (P178).
- Completed a flow mapping project to better understand nutrient cycling and the distribution of submerged aquatic vegetation in the Rainbow River (WR07).
- Initiated project to post process three miles of LiDAR data acquired in 2017 to provide an independent bathymetric surface to compare with previously collected spatial water-velocity profile and water depth data which extends into the floodplain (W420).
- Continued submerged aquatic vegetation mapping in the river to support the natural systems quantifiable objective specified in the adopted SWIM Plan (WS01).
- Completed a status and trends analysis specific to quantifiable objectives identified in the SWIM Plan.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Submerged Aquatic Vegetation and Velocity Data Collection** (completed)
- **Spatial Flow Mapping of the Rainbow River** (completed)
- **Springs Coast Fish Community Assessment** (completed)
- **Springs SAV Mapping and Data Collection** (ongoing)
- **Rainbow River Topobathymetry Post Processing** (ongoing)

Outreach in 2019 – Volunteer Events, Presentations and Education

- Coordinated the sixth year of a campaign to position the District as an organization that cares about the springs and is working to protect them. After the campaign, staff completed the sixth year of a public perception survey to better understand the public's opinions, knowledge, attitudes and beliefs regarding the health of the springs and the District's efforts to restore them.

Homosassa River

The Homosassa River is a first-magnitude tidal spring system and is designated by the state as an Outstanding Florida Water (OFW) and a SWIM Priority Waterbody. The Homosassa River is a slow-moving tidal river from the headsprings to the Gulf of Mexico at Homosassa Bay in Citrus County, Florida. The Homosassa River springshed, which contributes groundwater to the brackish Homosassa Springs, contains altered urbanized and agricultural lands, and natural forested uplands and wetlands. This springshed covers portions of Citrus and Hernando counties. The springs have been a tourist attraction since the early 1900s, when trains would stop to let rail passengers rest at the springs. The headsprings are located within the Homosassa Springs State Wildlife Park, which serves as a wildlife rehabilitation center for orphaned or injured manatees and other animals. Manatees, along with many freshwater and saltwater fish, can be seen year-round at the park's fishbowl observatory.

In August 2017, the SCSC approved the Homosassa River SWIM Plan. The Plan identifies four main issues facing the Homosassa River: (1) Nitrate Enrichment, (2) Changing Salinity, (3) Potential Decrease in Historic Flows, and (4) Altered Aquatic Vegetation. The SWIM Plan also identifies several numeric targets or quantifiable objectives that represent long-term goals used to develop management actions and projects to help track success. Management actions and projects identified in the Homosassa River SWIM Plan are divided into the three focus areas: (1) Water Quality, (2) Water Quantity, and (3) Natural Systems (Habitat). For Water Quality the priority management actions address septic tanks, urban & residential fertilizer use, and agricultural operations. For Water Quantity, priority management actions address conservation and minimum flows and levels. For Natural Systems, priority management actions address monitoring & research, and habitat restoration.

An integral part of the District's springs education and outreach goal is to increase the public's awareness of the issues related to the Homosassa River, and to encourage good stewardship of one of Florida's most precious natural resources.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 1 water quality project and 8 ecological studies for Homosassa River.

Notable Accomplishments

- The District completed the Living Shoreline/Oyster Habitat Feasibility Study which included a feasibility study to identify appropriate areas for living shoreline and/or oyster reef enhancement/creation along the Homosassa River and Crystal River systems. This project also produced conceptual design plans for two sites: one for the Homosassa River and one for Crystal River (WS02).
- Completed construction on a project to provide water quality treatment of stormwater runoff from the directly connected areas north of Halls River Road (CR490A) and east of U.S. Highway 19. By treating the stormwater before entering Pepper Creek and the South Fork of the Homosassa River, the improvements will directly benefit the Homosassa River and the Homosassa River Wildlife State Park and reduce pollutant loading to the springs (WH04).
- The Homosassa Springs Floating Wetland Treatment System Performance Report was completed and included recommendations on installation, plant selection and operation and maintenance to optimize habitat and water quality improvement aspects of these types of systems. Additionally, the permits for the installation of these systems and operation and maintenance of the floating wetlands were transferred to the State Park (P702).
- Completed multi-year study with the Florida Fish and Wildlife Conservation Commission (FWC) to characterize and quantify the fish community of the Homosassa River (P178).
- Continued seasonal mapping of the submerged aquatic vegetation (WS01).

- Completed SWIM plan quantifiable objective assessment of “no net loss of natural shoreline” for annual update of historical data.
- Completed the reevaluation of the minimum flows (B822).
- The District continues to work with Citrus County on multiple projects that would remove over 250 septic tanks from the springshed (WH04, Q134).
- The completion of Project COAST in 2019 marks the 21st year of District water quality monitoring in the nearshore coastal waters and tidal rivers of the Springs Coast. This project began in 1998 in partnership with the University of Florida until 2015. From 2015 to the present, the District redesigned Project COAST by conducting all sampling and laboratory analyses in-house, discontinuing redundant sampling stations, and greatly increasing the suite of water quality parameters. This redesign resulted in a more analytically robust product while reducing overall project costs. For the Homosassa River portion of this project, 7 fixed stations are monitored quarterly for a suite of water quality parameters including total nitrogen, total phosphorous, nitrate, phosphate, chlorophyll-a, turbidity, color, and clarity.
- The completion of the District’s Coastal Rivers Water Quality Monitoring Network marks the 13th year of monitoring surface water quality in the Homosassa River. Five stations are sampled quarterly for a suite of water quality parameters including total nitrogen, total phosphorous, nitrate, phosphate, chlorophyll-a, turbidity, color, and clarity. This project represents the most consistent, long-term water quality dataset for the Homosassa River.
- The completion of the District’s Springs Water Quality Monitoring Network marks the 18th year of monitoring water quality in the Homosassa Springs complex. Individual spring vents have been sampled at least quarterly since the early 1990s. This network is the primary source of data tracking nitrates and other potential pollutants in our springs.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Springs Coast Fish Community Assessment** (completed, P178)
- **Springs SAV Mapping and Data Collection** (ongoing, WS01)

Outreach in 2019 – Volunteer Events, Presentations and Education

- Coordinated the sixth year of a campaign to gain community support and inform the public that the District is committed to improving the health of the springs and has the scientific knowledge to do so. After the campaign, staff completed a public perception survey to better understand the public’s opinions, knowledge, attitudes and beliefs regarding the health of the springs and the District’s efforts to restore them.
- Staff gave a presentation to the Homosassa River Alliance.

Chassahowitzka River

The Chassahowitzka River is a first-magnitude spring system and is designated by the state as an Outstanding Florida Water (OFW) and a SWIM Priority Waterbody. The Chassahowitzka River is a tidally influenced spring-fed river and associated estuary that originates from multiple spring vents and numerous spring-fed creeks that join the river as it flows towards the Gulf of Mexico in Citrus County. Aquatic plant life can be abundant in the upper river, and numerous wildlife, bird, and fish species are found in this coastal river. The Chassahowitzka River springshed, which contributes groundwater to the Chassahowitzka Springs, includes upland forests, urban areas, agricultural activities, and wetland forests. This springshed covers

portions of Citrus and Hernando counties. The lower half of the Chassahowitzka River is part of the more than 31,000-acre Chassahowitzka National Wildlife Refuge. While the river's shoreline is mostly natural, the headsprings area contains a small marina with a public boat ramp. A nearby residential community is connected to the headsprings through a canal system.

In August 2017, the SCSC approved the Chassahowitzka River SWIM Plan. The Plan identifies four main issues facing the Chassahowitzka River: (1) Nitrate Enrichment, (2) Changing Salinity, (3) Potential Decrease in Historic Flows, and (4) Altered Aquatic Vegetation. The SWIM Plan also identifies several numeric targets or quantifiable objectives that represent long-term goals used to develop management actions and projects to help track success. Management actions and projects identified in the Chassahowitzka River SWIM Plan are divided into the three focus areas: (1) Water Quality, (2) Water Quantity, and (3) Natural Systems (Habitat). For Water Quality the priority management actions address septic tanks, urban & residential fertilizer use, and agricultural operations. For Water Quantity, priority management actions address conservation and minimum flows and levels. For Natural Systems, priority management actions address monitoring & research, and habitat conservation.

An integral part of the District's springs education and outreach goal is to increase the public's awareness of the issues related to the Chassahowitzka River, and to encourage good stewardship of one of Florida's most precious natural resources.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 1 restoration project, 1 water quality project, and 9 ecological studies for Chassahowitzka River.

Notable Accomplishments

- Completed multi-year study with the Florida Fish and Wildlife Conservation Commission (FWC) to characterize and quantify the fish community of Chassahowitzka River (P178).
- Continued seasonal mapping of the submerged aquatic vegetation (WS01).
- Completed a status and trends analysis specific to the quantifiable objectives specified in the SWIM Plan.
- The District worked with Citrus County to complete the construction of the expansion and upgrade of a wastewater treatment facility to allow for the advanced treatment of wastewater and produce high quality reclaimed water for irrigation (N696).
- Completed the reevaluation of the minimum flows (B823).
- The completion of Project COAST in 2019 marks the 21st year of District water quality monitoring in the nearshore coastal waters and tidal rivers of the Springs Coast. This project began in 1998 in partnership with the University of Florida until 2015. From 2015 to the present, the District redesigned Project COAST by conducting all sampling and laboratory analyses in-house, discontinuing redundant sampling stations, and greatly increasing the suite of water quality parameters. This redesign resulted in a more analytically robust product while reducing overall project costs. For the Chassahowitzka River portion of this project, 7 fixed stations are monitored quarterly for a suite of water quality parameters including total nitrogen, total phosphorous, nitrate, phosphate, chlorophyll-a, turbidity, color, and clarity.
- The completion of the District's Coastal Rivers Water Quality Monitoring Network marks the 13th year of monitoring surface water quality in the Chassahowitzka River. Five stations are sampled quarterly for a suite of water quality parameters including total nitrogen, total phosphorous, nitrate, phosphate, chlorophyll-a, turbidity, color, and clarity. This project represents the most consistent, long-term water quality dataset for the Chassahowitzka River.

- The completion of the District's Springs Water Quality Monitoring Network marks the 18th year of monitoring water quality in the Chassahowitzka Springs complex. Individual spring vents have been sampled at least quarterly since the early 1990s. This network is the primary source of data tracking nitrates and other potential pollutants in our springs.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Springs Coast Fish Community Assessment** (completed)
- **Springs SAV Mapping and Data Collection** (ongoing)

Outreach in 2019 – Volunteer Events, Presentations and Education

- Coordinated the sixth year of a campaign to position the District as an organization that cares about the springs and is working to protect them. After the campaign, staff completed the sixth year of a public perception survey to better understand the public's opinions, knowledge, attitudes and beliefs regarding the health of the springs and the District's efforts to restore them.
- Staff gave a presentation to the Chassahowitzka River Keepers.

Weeki Wachee River

The Weeki Wachee River is a first-magnitude spring system and is designated by the state as an Outstanding Florida Water (OFW) and a SWIM Priority Waterbody. The Weeki Wachee River flows from the headspring to the Gulf of Mexico at Bayport in Hernando County, Florida. Most of the river's spring flow comes from the main headspring; however, springs of Twin Dees, Salt, and Mud River contribute to the overall river discharge as well. The river is relatively narrow and stream-like in the upper portion, and gradually widens as it reaches the Gulf. The Weeki Wachee River springshed, which contributes groundwater to Weeki Wachee Springs, is comprised of urban areas, agricultural lands and forested uplands. This springshed covers portions of Hernando and Pasco counties. The headspring is home to Weeki Wachee Springs State Park, which features a water park and the famous underwater mermaid show.

In March 2017, the SCSC approved the Weeki Wachee River SWIM Plan. The Plan identifies four main issues facing the Weeki Wachee River: (1) Nitrate Enrichment, (2) Potential decrease in historic flows, (3) Altered Aquatic Vegetation, and (4) Sedimentation. The SWIM Plan also identifies several numeric targets or quantifiable objectives that represent long-term goals used to develop management actions and projects to help track success.

Management actions and projects identified in the Weeki Wachee River SWIM Plan are divided into the three focus areas: (1) Water Quality, (2) Water Quantity, and (3) Natural Systems (Habitat). For Water Quality the priority management actions address septic tanks, urban & residential fertilizer use, and agricultural operations. For Water Quantity, priority management actions address conservation and alternative water supply. For Natural Systems, priority management actions address habitat conservation and recreation management.

An integral part of the District's springs education and outreach goal is to increase the public's awareness of the issues related to the Weeki Wachee River, and to encourage good stewardship of one of Florida's most precious natural resources.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 2 water quality projects and 6 ecological studies for Weeki Wachee.

Notable Accomplishments

- Completed multi-year study with the Florida Fish and Wildlife Conservation Commission (FWC) to characterize and quantify the fish community of the Weeki Wachee River (P178).
- Initiated an ecologically based carrying capacity study to evaluate the effects of recreational use on the natural systems of the river. Data collection spanned a 12-month period beginning in June 2018 and the final report was completed by the end of 2019.
- Facilitated inter-agency meeting to review draft ecologically based carrying capacity study.
- Managing a multi-year project evaluating accumulated sediments in the river and identifying where future removal of sediments will benefit the river's ecosystem. Design neared completion in December 2019. The FDEP Environmental Resource Permit was issued in November 2019. Final design will be completed following issuance of the US Army Corps of Engineer's Nationwide authorization. Pending state funding, construction is expected to commence in the spring of 2021.
- Continued to implement a project with Hernando County to construct a reclaimed water main (N696).
- Continued seasonal mapping of the submerged aquatic vegetation (WS01).
- The completion of Project COAST in 2019 marks the 21st year of District water quality monitoring in the nearshore coastal waters and tidal rivers of the Springs Coast. This project began in 1998 in partnership with the University of Florida until 2015. From 2015 to the present, the District redesigned Project COAST by conducting all sampling and laboratory analyses in-house, discontinuing redundant sampling stations, and greatly increasing the suite of water quality parameters. This redesign resulted in a more analytically robust product while reducing overall project costs. For the Weeki Wachee River portion of this project, 7 fixed stations are monitored quarterly for a suite of water quality parameters including total nitrogen, total phosphorous, nitrate, phosphate, chlorophyll-a, turbidity, color, and clarity.
- The completion of the District's Coastal Rivers Water Quality Monitoring Network marks the 13th year of monitoring surface water quality in the Weeki Wachee River. Five stations are sampled quarterly for a suite of water quality parameters including total nitrogen, total phosphorous, nitrate, phosphate, chlorophyll-a, turbidity, color, and clarity. This project represents the most consistent, long-term water quality dataset for the Weeki Wachee River.
- The completion of the District's Springs Water Quality Monitoring Network marks the 18th year of monitoring water quality in the Weeki Wachee Springs complex. Individual spring vents have been sampled at least quarterly since the early 1990s. This network is the primary source of data tracking nitrates and other potential pollutants in our springs.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Springs Coast Fish Community Assessment** (completed)
- **Springs SAV Mapping and Data Collection** (ongoing)
- **Weeki Wachee Natural System Carrying Capacity** (ongoing)

Outreach in 2019 – Volunteer Events, Presentations and Education

- Coordinated the sixth year of a campaign to position the District as an organization that cares about the springs and is working to protect them. After the campaign, staff completed the sixth year of a public perception survey to better understand the public's opinions, knowledge, attitudes and beliefs regarding the health of the springs and the District's efforts to restore them.

- Staff gave a presentation to the Hernando Environmental Land Protectors.
- Funded hands-on field trip programs for students in Hernando County to attend the Springs Coast Environmental Education Center. The program reached 1,565 second-grade students, 1,510 fourth-grade students, 1,434 fifth-grade students, 1,177 sixth-grade students and 667 teachers and chaperones.

Lake Systems

When a river, lake, estuary, or spring does not meet state water quality standards, the Florida Department of Environmental Protection (FDEP) determines a water quality restoration goal known as a Total Maximum Daily Load (TMDL) that will restore the waterbody so that it meets its standards. TMDLs address a specific impairment for a waterbody; therefore, a waterbody may have multiple TMDLs to address different pollutants.

Along with setting TMDLs, FDEP sets minimum water levels for lakes. Section 373.042(1), F.S. defines minimum flows and minimum water levels (MFLs) as the point at which further water withdrawals would be significantly harmful to the water resources or ecology of the area. As a part of fulfilling its mission and statutory responsibilities, the District establishes MFLs for priority waterbodies within our boundaries. MFLs are used both in planning for future water uses and in regulating water withdrawals. For waterbodies that are below their minimum flow, minimum level, or are projected to fall below their minimum flow or level within 20 years, the District is required to implement a recovery or prevention strategy to ensure the MFL is maintained over the long term.

There are four lake systems in the SWIM Priority Waterbody list.

Lake	Surface Area (Acres)	Watershed (Square Miles)	Number of Restoration or Water Quality Projects	Number of Studies
Lake Panasoffkee	3,200	230	1	6
Lake Tarpon	2,534	57.5	4	8
Lake Thonotosassa	800	49.1	5	2
Winter Haven Chain of Lakes	7516 (Total)	32.5	12	4

Lake Panasoffkee

Lake Panasoffkee, a SWIM Priority Waterbody and an Outstanding Florida Water (OFW), is the largest lake in Sumter County. Historically, the lake has supported a nationally renowned sport fishery, especially for red-ear sunfish. An estimate of angler expenditures on Lake Panasoffkee conducted in 1998 yielded a value of approximately \$2.0 million. This fishery, along with the natural resource values of the lake, makes Lake Panasoffkee important to the local and regional economy and the environment. The lake has a surface water area of approximately 3,200 acres. The lake is considered shallow with a maximum depth of approximately ten feet. Direct surface water inflows to Panasoffkee include Big Jones and Little Jones Creeks on the northern end and Shady Brook on the southern end. However, much of this surface water flow is attributed to spring discharges in the stream channels. Therefore, groundwater accounts for more than 40 percent of the lake's inflows. The only discharge from the lake is the Outlet River, which flows from the western shore of the lake to the Withlacoochee River.

Due to the substantial influence of groundwater on the lake, water quality in Lake Panasoffkee has been considered good since the initial Lake Panasoffkee SWIM Plan was drafted in 1989. The Trophic State Index

(TSI) remained relatively unchanged since 1977.

While water quality in Lake Panasoffkee has been considered good, diagnostic studies completed by the SWIM Program in 1995 provided evidence that aesthetic and recreational uses of the lake had been impacted. Concerned for the health of Lake Panasoffkee, the Legislature passed Chapter 98-69, Laws of Florida, creating the Lake Panasoffkee Restoration Council (Council) within the District. The Council's November 25, 1998 Report to the Legislature identified sediment accumulation and encroachment of emergent vegetation as the primary issues threatening the lake.

This report, which established the Restoration Plan for Lake Panasoffkee, was incorporated into the April 2000 update of the Lake Panasoffkee SWIM Plan. The Restoration Plan consisted of a multi-step dredging plan to improve fisheries habitat, restore the historic shoreline and facilitate navigation. The restoration project, which was completed in 2008, restored approximately 175 acres of historic fish bedding areas, restored the historic lake shoreline, increased open water area of the lake by 37%, and removed an approximated 8.3 million cubic yards of sediment.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 1 restoration project and 6 ecological studies for Lake Panasoffkee for a total of approximately 1,744 acres of restored wetlands.

Notable Accomplishments

- Following the completion of the dredging in 2008, the District initiated a long-term monitoring program for Lake Panasoffkee. The District continues to track water quality and water clarity changes and native vegetation recruitment in the dredged areas.
- The District continues to monitor discharge through the Outlet River to ensure suitable outflow occurs. In addition, water quality data is collected on a bi-weekly basis to help promote optimal water quality conditions in Lake Panasoffkee and to assist operational decisions on the Wysong-Coogler Water Conservation Structure.

The following studies and data collection efforts were either ongoing or completed in 2019

- **Lake Panasoffkee Water Quality Monitoring** (ongoing)
- **SAV Recruitment/Water Clarity Monitoring** (ongoing)
- **Lake June-in-Winter Watershed Monitoring** (ongoing)

Lake Tarpon

Lake Tarpon, an Outstanding Florida Water (OFW), is also a waterbody on the District's SWIM Priority List. Due to its reputation as a largemouth bass sport fishery, the lake was designated as a State Fish Management Area by a Special Resolution of the Pinellas County Board of County Commissioners in 1963. This sport fishery, along with historically good water quality and the existence of two regional County parks on its shore made Lake Tarpon a significant environmental, economic, and recreational resource in the Tampa Bay area. Lake Tarpon is the largest freshwater lake in the Tampa Bay area. The lake is relatively shallow with a mean depth of seven (7) feet. The major source of surface water inflow is through Brooker Creek, which enters the lake at its lower southeastern corner. The Lake Tarpon Outfall Canal and Structure serves as the only surface water outfall for the lake. This canal and structure operated and maintained by the District connects the southernmost end of the lake with Old Tampa Bay and is intended to provide flood control for the Lake Tarpon watershed.

The first indication of degraded water quality in Lake Tarpon was a blue-green algae bloom in 1987. Subsequently, the first Lake Tarpon SWIM Plan was prepared in 1989. This first SWIM Plan focused on diagnostic/feasibility studies to evaluate water quality in the lake and identify potential sources of

nutrients. These conditions, along with Pinellas County's Growth Management Plan requirements, led Pinellas County to develop the Lake Tarpon Watershed Management Plan. This Plan was incorporated into the Lake Tarpon SWIM Plan Update completed in 2001.

The 2001 Lake Tarpon SWIM Plan recognizes declining water quality (specifically with regard to algae and nutrients) as the primary concern with Lake Tarpon. Declining water quality can lead to the increase of undesirable blooms of algae, loss of more desirable rooted aquatic plants, and negative impacts to sport fish populations. The 2001 Lake Tarpon SWIM Plan identifies strategies to improve and protect water quality, which are aimed at reducing internal and external sources of nutrients. Additionally, the 2001 SWIM Plan includes projects to restore hydrology and habitat in the Brooker Creek watershed.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 3 restoration projects, 1 water quality project, and 8 ecological studies for Lake Tarpon for a total of approximately 29.2 acres of restored habitats. Since 2011, the District and its cooperators have completed a water quality improvement project that is providing treatment for nearly 360 acres of watershed.

Lake Thonotosassa

Lake Thonotosassa is the largest natural lake in Hillsborough County while also being the county's most degraded surface waterbody due to nutrient-rich point source discharges, which occurred over a period of several decades. In recognition of the lake's regional significance, its highly impacted water quality, and the fact it discharges to a segment of the Hillsborough River which provides the municipal water supply for the City of Tampa, Lake Thonotosassa was designated a SWIM Priority Waterbody in 1988.

Development of a SWIM plan was initiated in 1989, and the initial plan was approved by the Florida Department of Environmental Regulation and adopted by the District in 1990. A second, more detailed plan was completed and approved in 1996.

During the late 1980's and early 1990's, pollutant loading to the lake consisted of approximately 60 percent non-point and 40 percent point source discharges. The strategy for improving water quality within the lake was to first focus on eliminating point source discharges within the watershed, then concentrate on non-point sources. Two major point source discharges were removed in the 1990's.

In 1992, a seafood packing plant that discharged to Baker Creek ceased operation. In 1997, the City of Plant City Wastewater Treatment Plant discharge was redirected away from the lake to the East Side Canal and some of the discharge was reused through the implementation of the City's reuse system, partially funded through the District's New Water Sources Initiative Program. During the latter half of the 1990's, the SWIM Program began working with several cooperators to implement stormwater improvement projects to treat non-point source pollution within the watershed.

One significant project completed in 1999 is the Lake Thonotosassa Marsh Restoration Project. This 51-acre marsh system is designed to treat inflow water from Baker Creek prior to its discharge into the lake. Other water quality improvement projects include the Plant City Pistol Range Stormwater Treatment Project and the three-phased Hillsborough County Baker/Pemberton Creek Erosion Control Project. Each of these projects addresses non-point source pollution entering Lake Thonotosassa. The SWIM Program implemented a study, completed in 2012, to refine the water and nutrient budgets for the lake and develop a linked watershed/waterbody model to evaluate and recommend Best Management Practices (BMPs) to best achieve the identified pollutant load reduction goals. The Lake Thonotosassa Nutrient Source Tracking Study was completed in 2016 and some structural and non-structural BMPs were proposed. Structural BMPs may be implemented with the County during future cooperative funding cycles.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 2 restoration projects, 3 water quality projects, and 2 ecological studies for Lake Thonotosassa for a total of approximately 101 acres of restored habitats.

Notable Accomplishments

- District staff participated in the Florida Department of Environmental Protection's development of the nutrient Total Maximum Daily Loads (TMDLs) for Lake Thonotosassa.
- As part of the Florida Department of Transportation Mitigation Program, a long-term nuisance vegetation management program continues to control nuisance exotic plants in the treatment marsh.

Winter Haven Chain of Lakes

The Winter Haven Chain of Lakes is comprised of 19 interconnected lakes located within and around the City of Winter Haven in north-central Polk County. The Chain consists of two "chains" of lakes – the Southern and Northern Chains. The watershed of the Chain of Lakes includes portions of the cities of Winter Haven, Lake Alfred, and Auburndale.

Water quality in the Chain of Lakes varies from lake to lake and between the northern and southern chains. Pollution sources present by 1949 included wastes from chemical fertilizer plants, citrus packing, citrus and vegetable canning, soft drink production, milk bottling, and untreated municipal waste. Considerable improvement occurred in the management of these industries by 1970. More recent improvements were the elimination of the City of Winter Haven's wastewater treatment plant discharge to Lake Conine in 1992; however, non-point sources such as urban stormwater pollution and septic tank seepage still need to be addressed for all lakes on the Chain.

An investigation of lake sediment cores from five lakes on the Chain was conducted to evaluate historical changes in water quality. Sediments dated to about 1860 indicated the lakes were historically in the mesotrophic to eutrophic range (slightly to moderately nutrient enriched) with a lack of blue green algae blooms during the summer.

In 2010, a study (Winter Haven Chain of Lakes Water Quality Management Plan, PBS&J) was completed that characterized water quality and prioritized restoration projects to address water quality issues in the Chain of Lakes. It was found that most of the lakes in the Chain are impaired for nutrients. Among the impaired lakes, five exhibit improving trends in water quality, while the remaining 14 exhibit declining or no trends in water quality.

Of the unimpaired lakes, three had declining trends in water quality and none had improving trends. Stormwater treatment projects have been implemented for seven lakes (Howard, May, Lulu, Hartridge, Jessie, Cannon, and Mariana) in the Chain to reduce nutrient loads to the lakes. Of these seven lakes, Lake Hartridge is the only lake not impaired due to high nutrient levels. Of the other six of these seven lakes with past projects, all but Cannon and Jessie exhibit improving trends in water quality.

While traditional stormwater treatment projects can successfully reduce external nitrogen and phosphorus loadings to the lakes, historic point and non-point source runoff and subsequent sediment accumulation in some lakes resulted in internal phosphorus loads that existing stormwater projects cannot treat. Consequently, both traditional and non-traditional water quality management projects are proposed to address both external and internal phosphorus loading to the Chain of Lakes.

Summarizing 1989-2019, the SWIM Program and its cooperators have completed 12 water quality projects and 4 ecological studies for Winter Haven Chain of Lakes, providing treatment for nearly 5,200 acres of watershed.

The following projects and studies were either ongoing or completed in 2019

- **Winter Haven Ridge Implementation of Stormwater BMPs** – This project will result in the construction of twelve low impact design BMPs that will treat approximately 4.5 acres of stormwater runoff in the Winter Haven Ridge area. The project will improve stormwater treatment through the installation or creation of rain gardens, improved swales and other passive treatment methods to reduce nutrient loading to the Chains of Lakes and improve surficial aquifer recharge within the area. The conceptual design and scope of the project have been revised and design will continue in 2020.
- **South Lake Conine Watershed Restoration** – This project is a cooperative funding project with the City of Winter Haven for the construction of approximately 34 acres of wetlands along Lake Conine, part of the Winter Haven Chain of Lakes. The Agreement was executed in 2018 and construction has been delayed due to increased construction costs and securing a contractor.

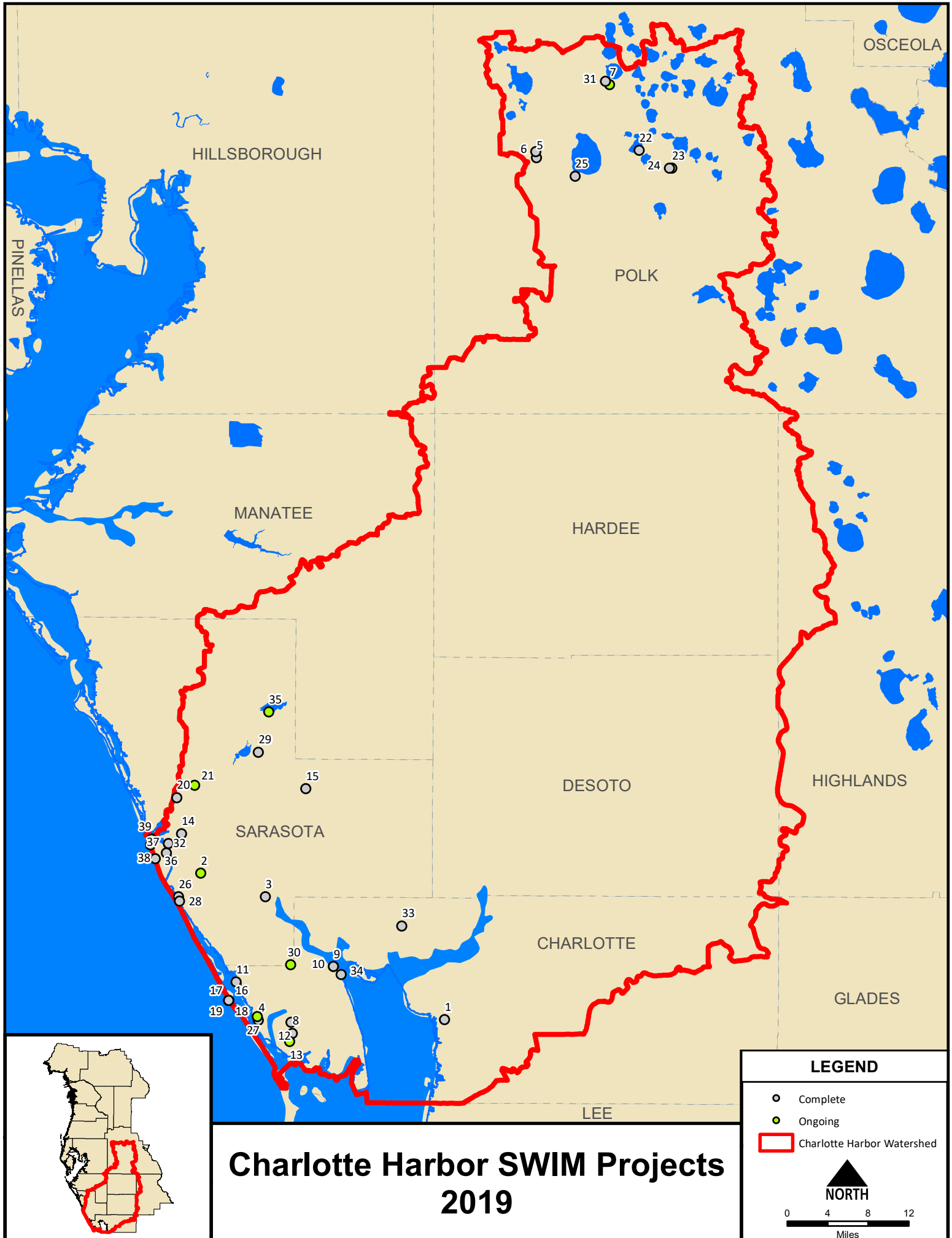
Other Systems

While some projects do not directly involve waterbodies identified as District Priority waterbodies in the Strategic Plan these projects were either selected based on the Governor's recent Executive Order requiring the districts to prioritize funding to focus on projects that will address harmful algal blooms and maximize nutrient reductions or involve natural systems restoration opportunities identified through the Cooperative Funding Program. These projects are consistent with that directive.

The following projects and studies were either ongoing or completed in 2019

- **Pasture Reserve Restoration** – This project is a cooperative funding project with Lake County for the restoration and enhancement of 810 acres of uplands and wetlands. The Agreement was executed in 2019 and is currently in the design phase.
- **Beach Street Stormwater System Improvements Area** – This project is with the City of New Port Richey for design, permitting and construction of stormwater improvement BMPs to treat 13 acres of highly urbanized runoff and improve water quality discharging to the Pithlachascotee River. Construction is proposed to start Fall 2020.
- **Pinellas Road Stormwater BMPs** – The Town of Belleair commenced construction of a stormwater retrofit project to treat 22.3 acres of highly urbanized watershed discharging to Clearwater Harbor South.
- **Lake Hunter BMP Project** – The City of Lakeland began construction of stormwater improvement BMPs to treat runoff from an 84-acre urban watershed draining to Lake Hunter.

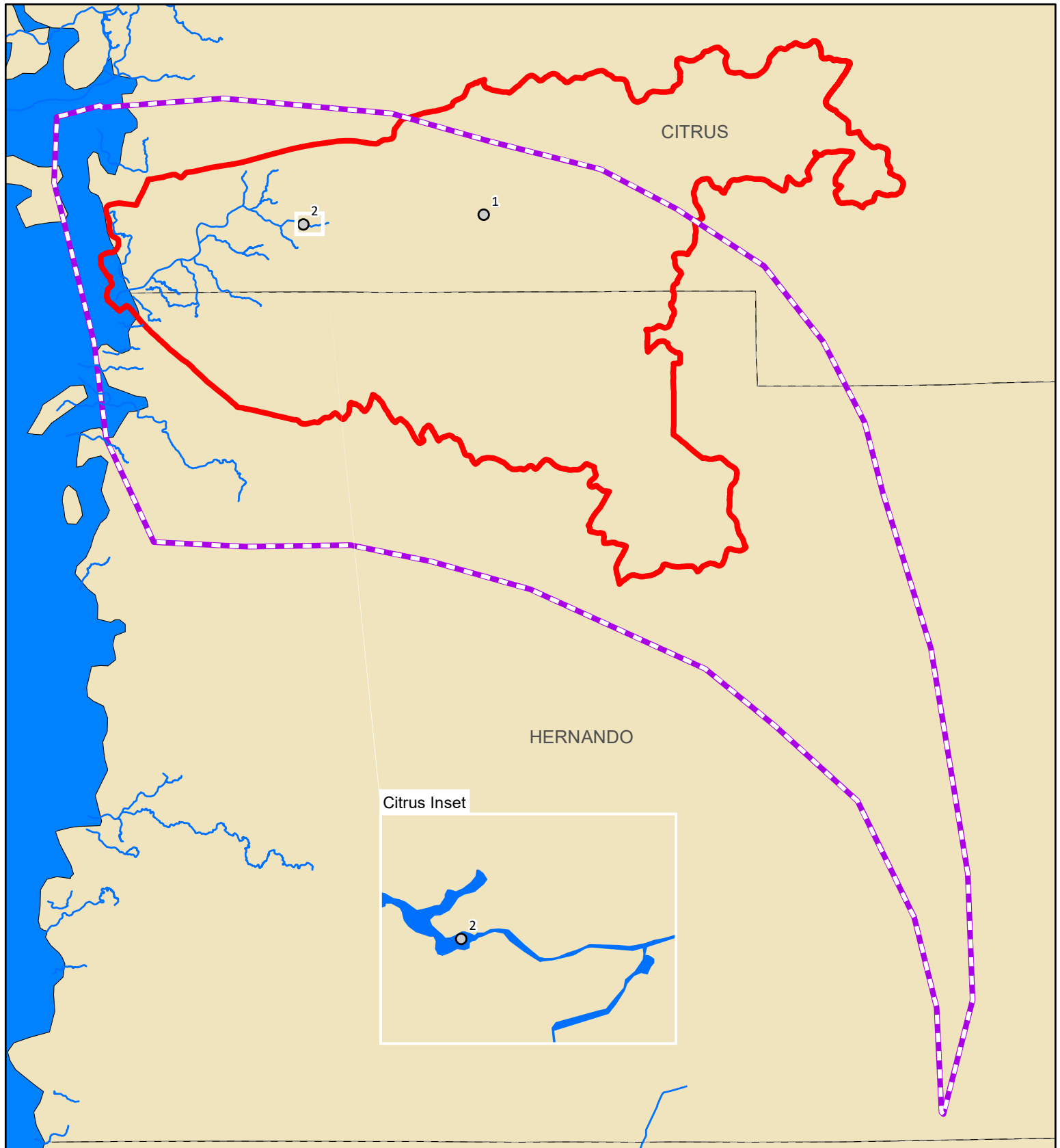
Appendix A: Maps



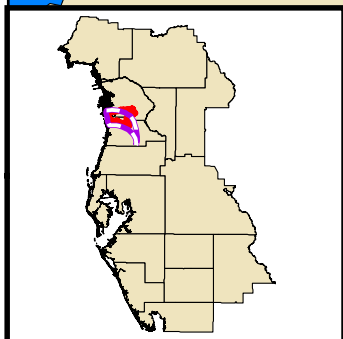
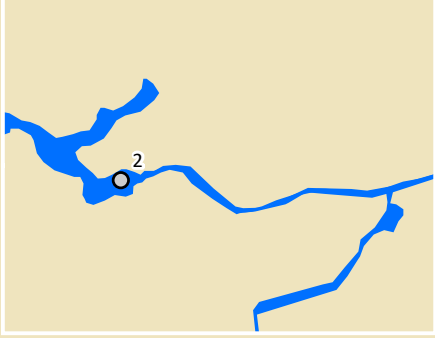
Charlotte Harbor SWIM Projects 2019

Charlotte Harbor Projects Legend

Map Number	Project Name	Status
1	Alligator Creek	Complete
2	Alligator Creek In-Stream Restoration	Ongoing
3	Alligator Creek In-Stream Restoration	Complete
4	Amberjack Slough	Complete
5	Banana Lake: Elizabeth Place Wetland Treatment System Phase II	Complete
6	Banana Lake: Shoreline Revegetation Project	Complete
7	Bridgers Avenue Drainage & Water Quality Project	Ongoing
8	Cape Haze Pioneer Trail	Complete
9	Cattle Dock Point Phases I	Complete
10	Cattle Dock Point Phases II	Complete
11	Cedar Point Restoration	Complete
12	Coral Creek Phase 1	Complete
13	Coral Creek Phase 2	Ongoing
14	Curry Creek Preserve Restoration	Complete
15	Deer Prairie Slough	Complete
16	Don Pedro Phase I	Complete
17	Don Pedro Phase II	Complete
18	Don Pedro Phase III	Complete
19	Don Pedro Phase IV	Complete
20	Dona Bay Conveyance System	Complete
21	Dona Bay Surface Water Storage Facility	Ongoing
22	Eagle Lake Bingham Street Stormwater Retrofit	Complete
23	Lake Gwyn East Surface Water Restoration	Ongoing
24	Lake Gwyn Surface Water Restoration	Complete
25	Lake Hancock Outfall Treatment Project	Complete
26	Lemon Bay Ecosystem Restoration	Complete
27	Lemon Bay Habitat Restoration	Ongoing
28	Lemon Bay Site Enhancement	Complete
29	Myakka Island Ecosystem Restoration	Complete
30	Myakka State Forest Water Quality and Bank Stabilization	Ongoing
31	PK Avenue/Lake Lena Stormwater Improvements	Complete
32	South Venice Waterway Restoration Project	Complete
33	Sunshine Lake/Sunrise Waterway Floating Treatment Wetlands	Complete
34	Upper Myakka Flatford Restoration Feasibility and Prioritization Project	Complete
35	Upper Myakka Lake Water Control Structure and Restoration Options	Ongoing
36	Venice Beach Water Quality Project	Complete
37	Venice Hatchett Creek Stormwater Retrofit	Complete
38	Venice Outfall 1 and 2 Improvements	Complete
39	Venice/Laguna Drive Water Quality Improvement	Complete



Citrus Inset



Map Number	Project Name	Status
1	Reclaimed Water - Sugarmill Woods Advanced Wastewater	Complete
2	Restoration - Chassahowitzka Spring Sediment Removal	Complete

Chassahowitzka SWIM Projects 2019

Complete

Chassahowitzka River Springshed

Chassahowitzka Watershed

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Crystal River/Kings Bay Inset

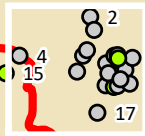
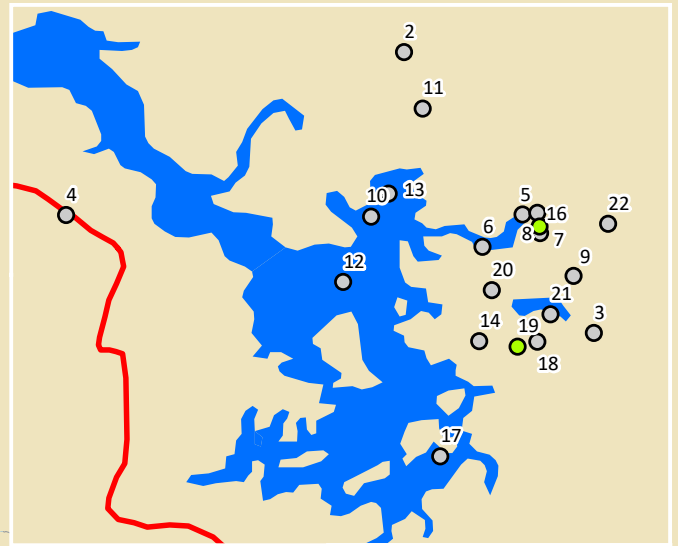
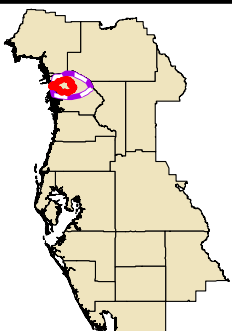
Crystal River/Kings Bay SWIM Projects 2019

LEGEND

- Complete
- Ongoing
- ▭ Crystal River Watershed
- ▭ Crystal River/Kings Bay Springshed

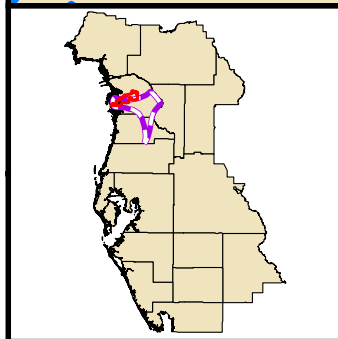
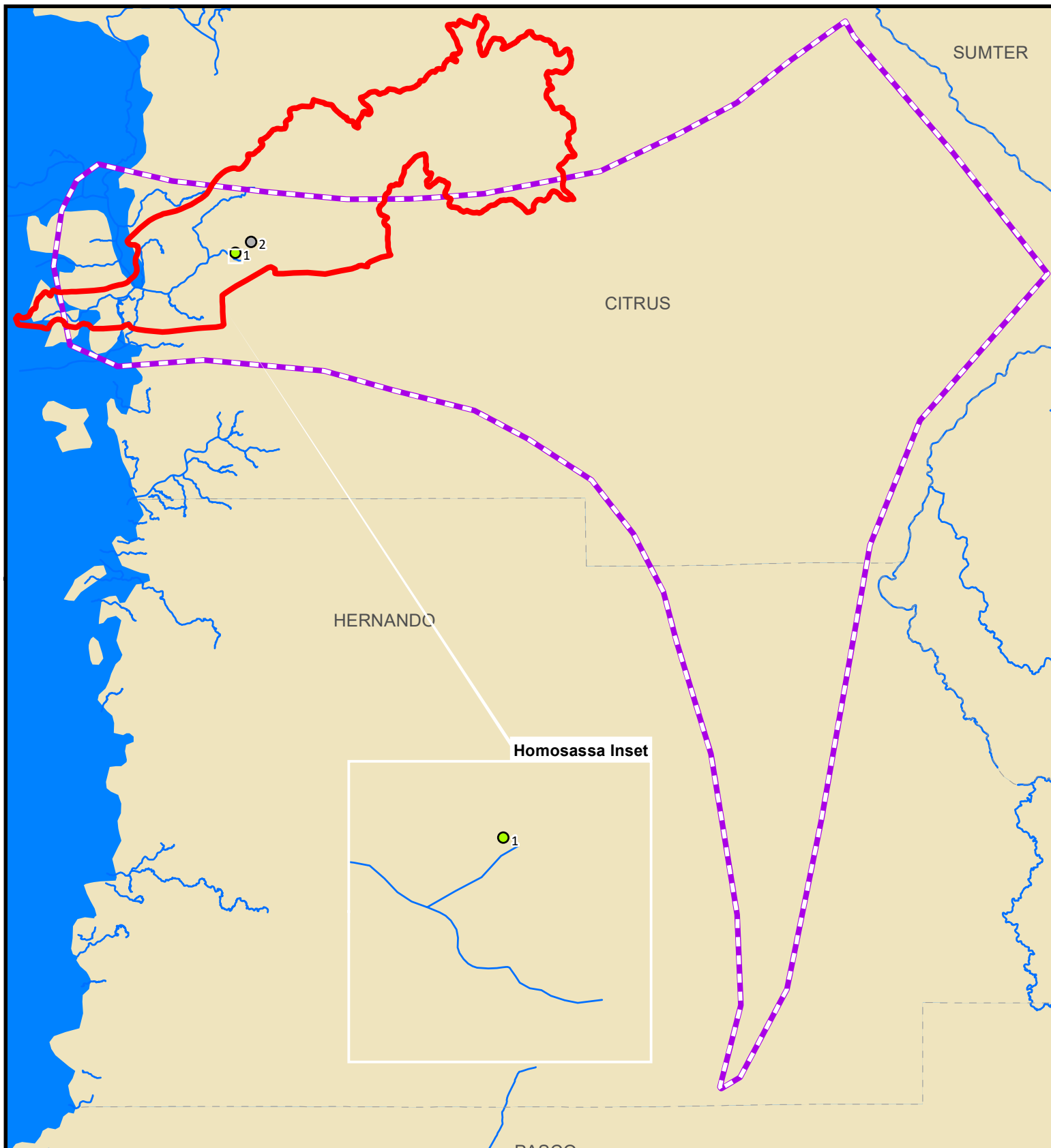


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Crystal River/Kings Bay Projects Legend

Map Number	Project Name	Status
1	Citrus County Package Plants	Ongoing
2	City of Crystal River to Duke Energy Reclaimed Water Project	Complete
3	Crystal Center Stormwater Runoff Mitigation	Complete
4	Fort Island Trail Force Main Project	Complete
5	Hunter Springs Cove Living Shoreline	Complete
6	Hunter Springs Dredging Project	Complete
7	Hunter Springs Stormwater retrofit	Ongoing
8	Hunter Springs Stormwater Treatment Pond Expansion	Complete
9	Kings Bay Plaza Stormwater Runoff Management	Complete
10	Kings Bay Sediment Removal	Complete
11	Kings Bay Stormwater Improvement Projects Phase I	Complete
12	Kings Bay Stormwater Projects	Complete
13	Lyngbya Removal and Revegetation Pilot Project	Complete
14	Palm Island Stormwater Rehab	Complete
15	Red Fish Hole Restoration	Ongoing
16	Springs Aquatic Vegetation Restoration: Hunters Cove/Kings Bay	Complete
17	Tarpon Hole Dredging Project	Complete
18	Three Sisters Bank Stabilization Project	Complete
19	Three Sisters Canal Shoreline Stabilization	Ongoing
20	Three Sisters Springs Sediment Removal Project	Complete
21	Three Sisters Springs Wetland Treatment Project	Complete
22	US 19 Stormwater Improvements	Complete



Map Number	Project Name	Status
1	Homosassa Floating Wetland Implementation	Ongoing
2	Homosassa Southfork Water Quality Improvement	Complete

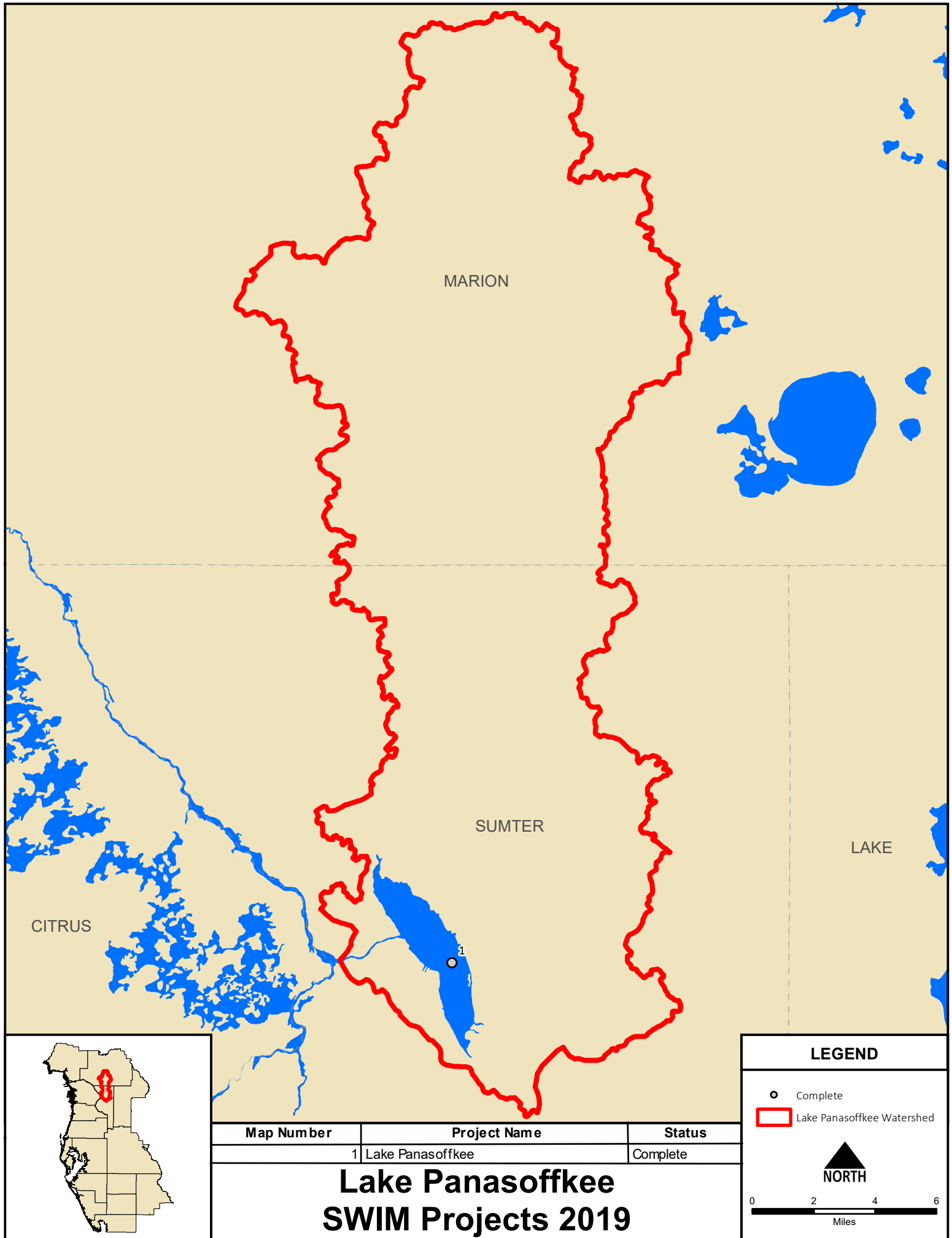
Homosassa River SWIM Projects 2019

LEGEND

- Complete
- Ongoing
- Homosassa River Watershed
- Homosassa River Springshed

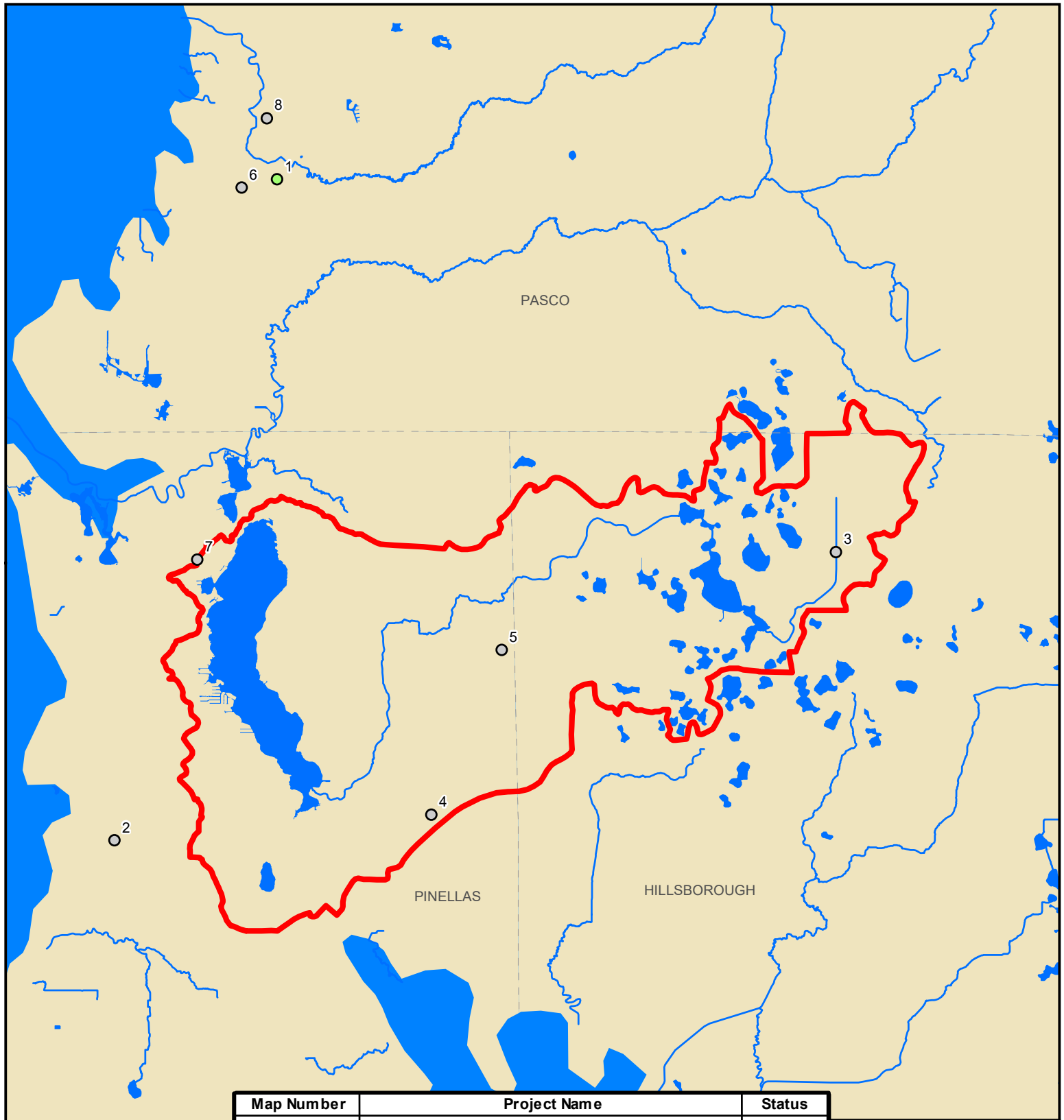
NORTH

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Map Number	Project Name	Status
1	Lake Panasoffkee	Complete

Lake Panasoffkee SWIM Projects 2019

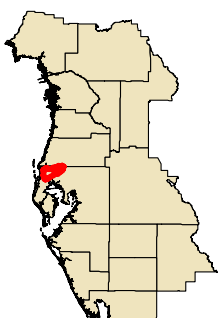
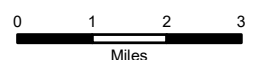


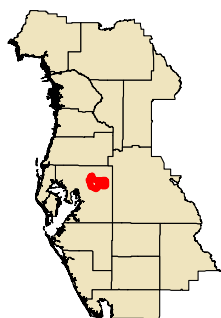
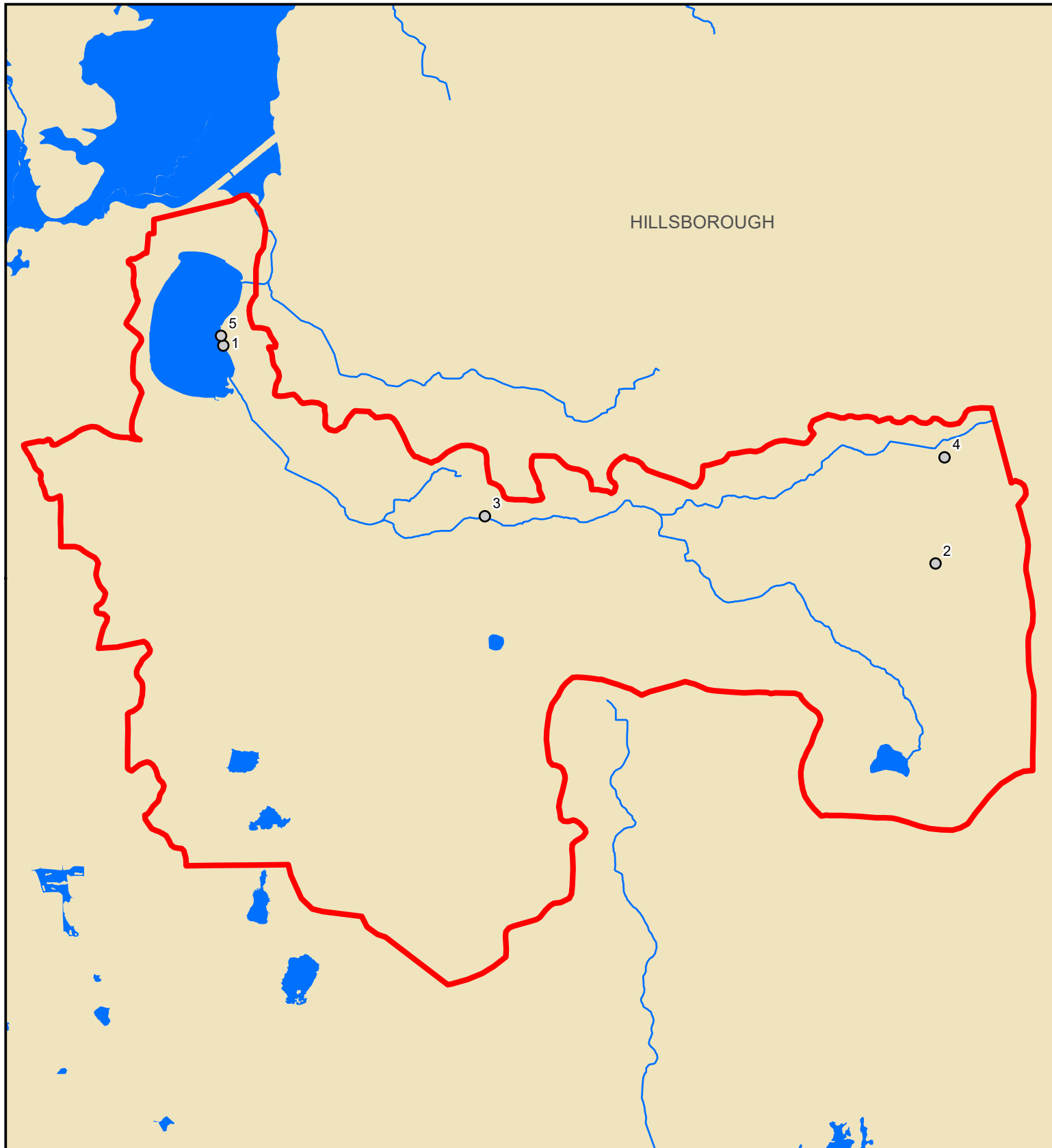
Map Number	Project Name	Status
1	Beach Street Stormwater System Improvements	Ongoing
2	Bee Branch Improvements	Complete
3	Brooker Creek ELAPP Site Restoration	Complete
4	Brooker Creek Hydrologic Restoration on Channel "F"	Complete
5	Brooker Creek Hydrological Restoration on Channel "L"	Complete
6	Hemlock Drive Stormwater System Improvements	Complete
7	Lake Tarpon Area 6	Complete
8	Orange Lake Restoration	Complete

Lake Tarpon SWIM Projects 2019

LEGEND

- Ongoing
- Complete
- Lake Tarpon Watershed



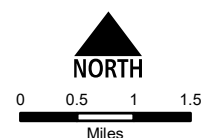


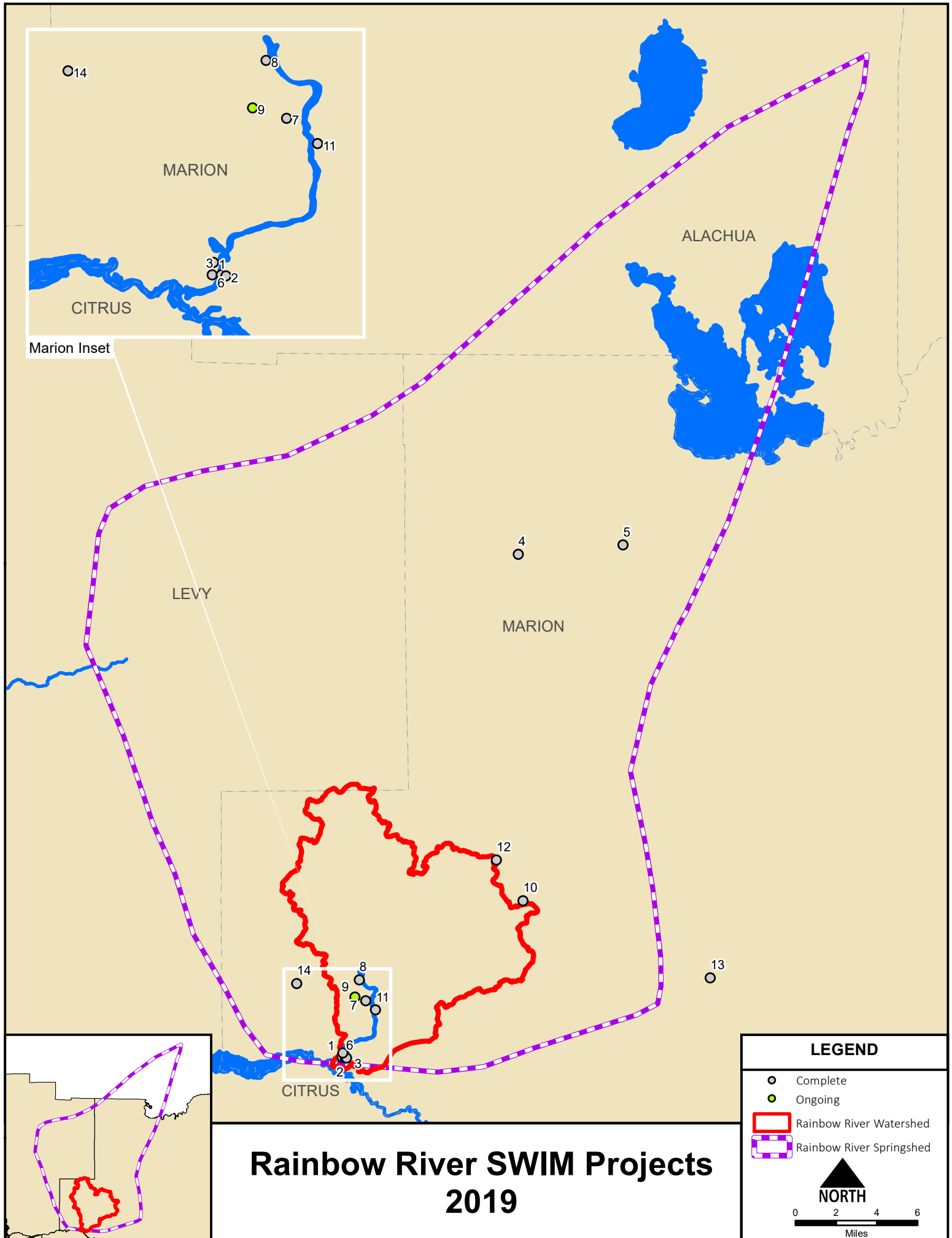
Map Number	Project Name	Status
1	Lake Thonotosassa Marsh Restoration	Complete
2	Lake Thonotosassa Source Tracking/Implementation	Complete
3	Pemberton/Baker Creek Erosion Management	Complete
4	Plant City Pistol Range-Westside Canal Stormwater Treatment	Complete
5	Submerged Aquatic Plant Revegetation	Complete

Lake Thonotosassa SWIM Projects 2019

LEGEND

- Complete
- Lake Thonotosassa Watershed





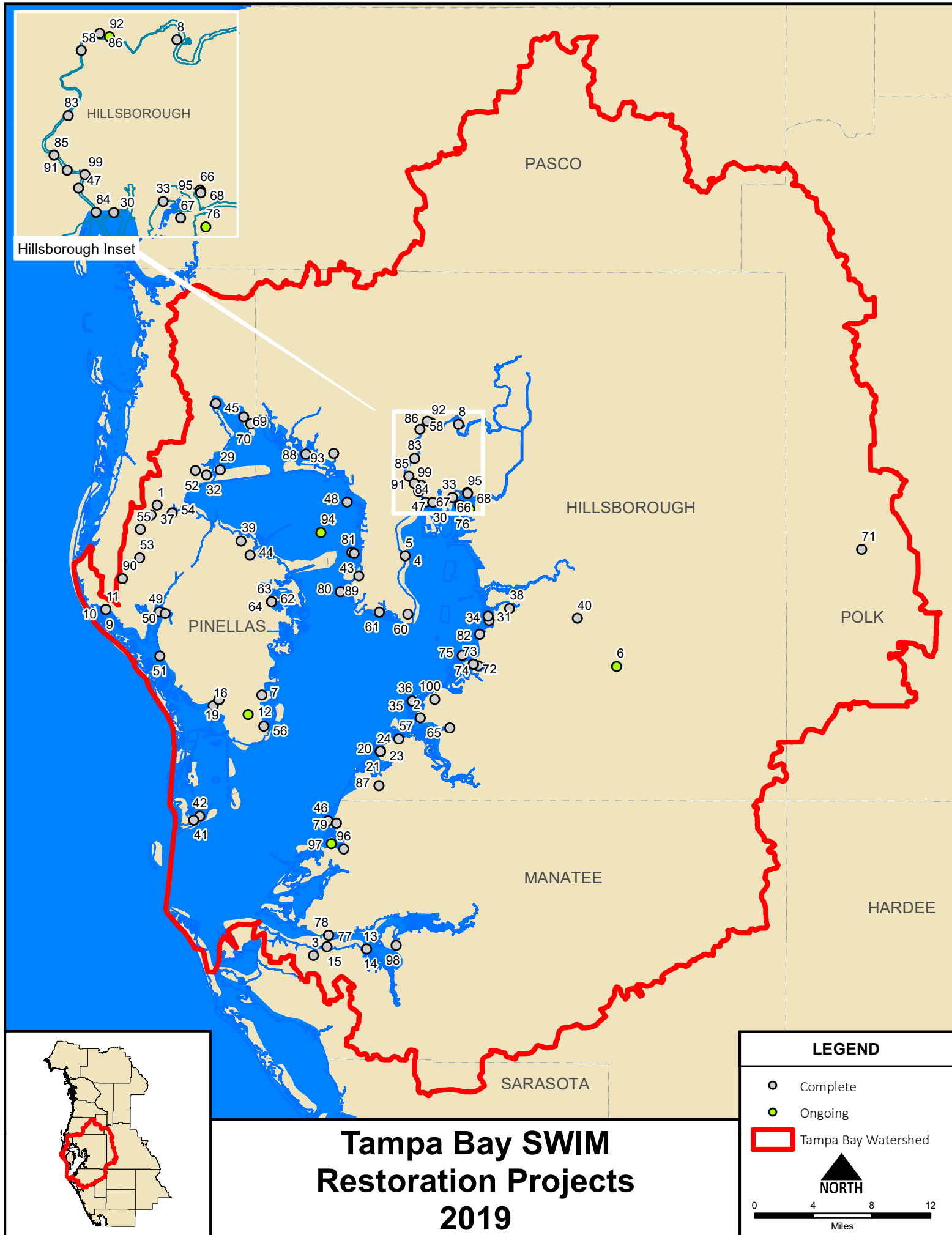
Rainbow River Projects Legend

Map Number	Project Name	Status
1	Blue Cove Lake-Implementation of BMPs	Complete
2	Blue Run Park Stormwater Management Project	Complete
3	C.R. 484 Stormwater Outfall Retrofit	Complete
4	NW 119th Avenue Stormwater Retrofit	Complete
5	NW HWY 225 Stormwater Retrofit	Complete
6	Pennsylvania Ave. Stormwater Retrofit	Complete
7	Rainbow River Springshed Stormwater Retrofits	Complete
8	Rainbow Springs County Club Estates Stormwater Retrofit	Complete
9	Rainbow Springs Innovative Stormwater Retrofit	Ongoing
10	Rolling Hills Stormwater Retrofit	Complete
11	Sa-Te-Ke Village Stormwater Retrofit	Complete
12	SW 16th and SW 14th Stormwater Retrofit	Complete
13	SW 85th Street & SW 40th Avenue-Implementation of BMPs	Complete
14	Village of Rainbow Springs Stormwater Retrofit	Complete



Sarasota Bay Projects Legend

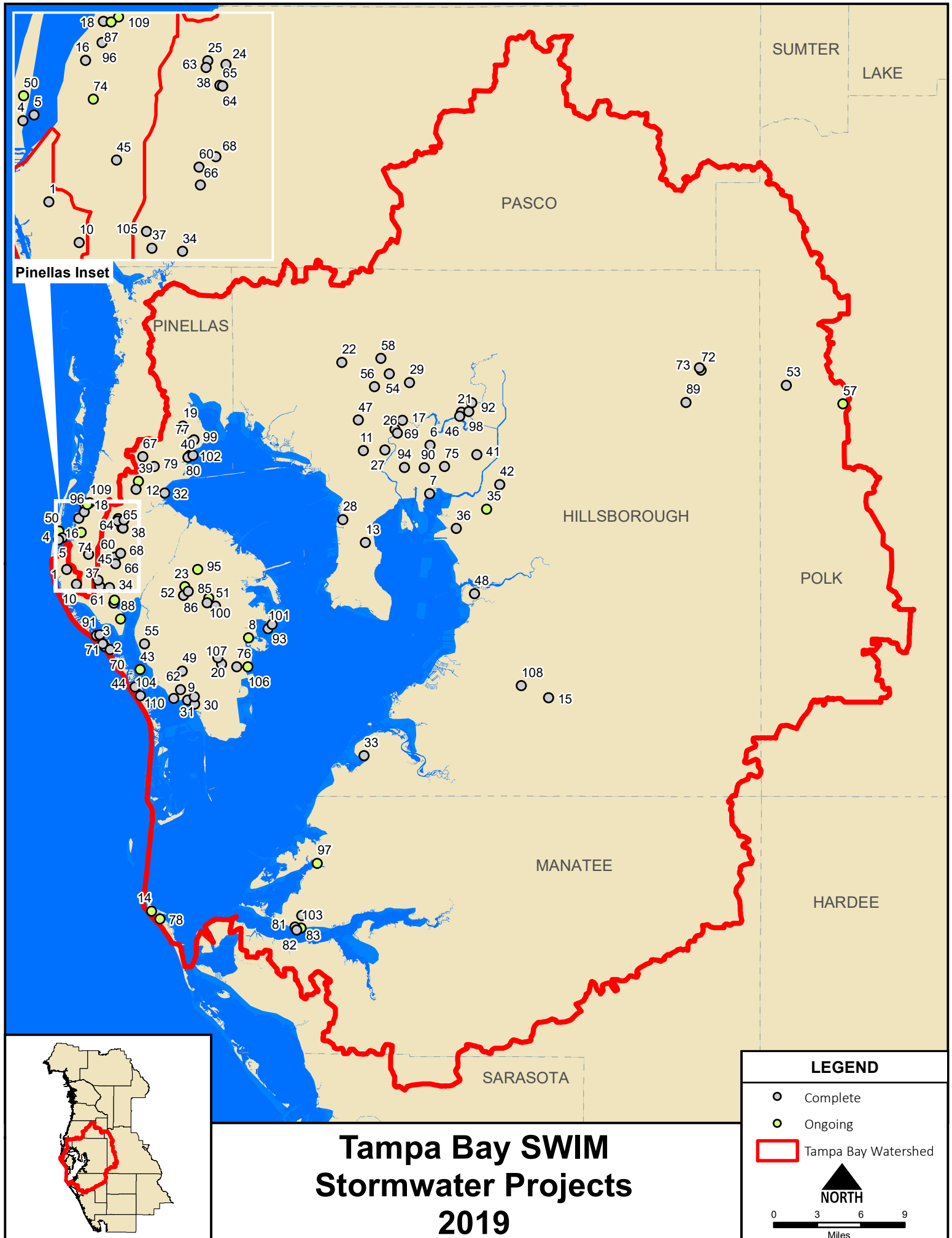
Map Number	Project Name	Status
1	10th Street Outfall BMPs	Complete
2	6th Street Canal	Complete
3	Anna Maria BMPs Phase 3	Complete
4	Anna Maria North Island BMPs	Complete
5	Bay Walk Creek	Complete
6	Bayfront Park	Complete
7	Bayshore North-Artificial Reef	Complete
8	Bayshore South-Artificial Reef	Complete
9	Blackburn Point Park Addition Restoration	Complete
10	Bowlees Creek Island	Complete
11	Bradenton Beach - 23rd Street North to 25th Street North BMPs	Complete
12	Bradenton Beach BMPs Avenues B and C	Ongoing
13	Bradenton Beach Pier-Artificial Reef	Complete
14	Bradenton Beach Stormwater Retrofits	Complete
15	Catfish Creek	Complete
16	Catfish Creek Stormwater Facility	Complete
17	Celery Fields Restoration	Complete
18	Central Holmes Beach Water Quality BMPs	Complete
19	City of Anna Maria - Implementation of BMPs	Complete
20	Coastal Basin Beach Road	Complete
21	Cortez Preserve Restoration	Complete
22	Cortez Schoolhouse Restoration	Complete
23	Crosley Estates Restoration	Complete
24	Durante Park	Complete
25	Enhanced Stormwater Management Project	Ongoing
26	FISH Preserve Phase I	Complete
27	GWIZ	Complete
28	Herb Dolan Park Living Shoreline	Complete
29	Hog Creek	Complete
30	Holmes Beach Stormwater Improvements CIP	Complete
31	Holmes Beach Stormwater Retrofits	Complete
32	Hudson Bayou In-Stream Restoration and Water Quality Improvement	Ongoing
33	Joan Durante Park	Complete
34	Leffis Key	Complete
35	Neal Preserve	Complete
36	New College	Complete
37	Nicholson Drainage Channel Stormwater Treatment Project	Complete
38	North Lido Park	Complete
39	Pelican Cove Stormwater Retrofit	Complete
40	Perico Bayou Restoration	Complete
41	Perico Preserve	Complete
42	Phillipi Creek In-Stream Restoration	Complete
43	Quick Point Phase I	Complete
44	Red Bug Slough Restoration	Complete
45	Robinson Preserve	Complete
46	Runaway Bay - Shoreline Restoration	Complete
47	Sarasota Bay Habitat Restoration	Complete
48	Sister Keys	Complete
49	South Creek Floodplain Restoration	Complete
50	South Lido Restoration	Complete
51	Spoil Islands - Bird Colony	Complete
52	Ungarelli Preserve	Complete



Tampa Bay Restoration Projects Legend

Map Number	Project Name	Status
1	Allen's Creek Red Maple Swamp	Complete
2	Bahia Beach Habitat Restoration	Complete
3	Ballard Restoration	Complete
4	Ballast Point Park Phase 1	Complete
5	Ballast Point Park Phase Seawall Enhancement	Complete
6	Balm Boyette Habitat Restoration	Ongoing
7	Bartlett Park	Complete
8	Blackwater Hammock Park Shoreline Restoration	Complete
9	Boca Ciega Phase 1	Complete
10	Boca Ciega Phase 2	Complete
11	Boca Ciega Phase 3	Complete
12	Boyd Hill Nature Preserve	Ongoing
13	Braden River Phase 1	Complete
14	Braden River Phase 2	Complete
15	Bradenton Riverwalk Restoration	Complete
16	Clam Bayou Habitat Restoration Phase 1	Complete
17	Clam Bayou Phase 2a	Complete
18	Clam Bayou Phase 2b	Complete
19	Clam Bayou Phase 3	Complete
20	Cockroach Bay Phase 1 Uplands	Complete
21	Cockroach Bay Phase 1A1	Complete
22	Cockroach Bay Phase 1A2	Complete
23	Cockroach Bay Phase 1B1	Complete
24	Cockroach Bay Phase 1B2	Complete
25	Cockroach Bay Phase 2 Uplands	Complete
26	Cockroach Bay Phase Braided Tidal Creek	Complete
27	Cockroach Bay Phase C	Complete
28	Cockroach Bay Phase Freshwater Wetlands	Complete
29	Cooper's Point	Complete
30	Cotanchobee Fort Brooke Park	Complete
31	Davis Tract	Complete
32	Del Oro	Complete
33	Desoto Park Addition Shoreline Restoration	Complete
34	Dug Creek	Complete
35	E.G. Simmons Park Phase 1	Complete
36	E.G. Simmons Park Phase 2	Complete
37	Eagle Lake	Complete
38	Ekker Preserve	Complete
39	Feather Sound Tidal Wetland Restoration	Complete
40	Fish Hawk Creek Preserve Habitat Restoration	Complete
41	Ft. DeSoto Park Recirculation Phase 1	Complete
42	Ft. DeSoto Park Recirculation Phase 2	Complete
43	Gandy Park	Complete
44	Gateway Tract	Complete
45	Harbor Palms Park	Complete
46	Hendry Delta	Complete
47	Hillsborough River West Bank Shoreline Restoration	Complete
48	Howard Franklin East	Complete
49	Joe's Creek 1	Complete
50	Joe's Creek School Site	Complete

Map Number	Project Name	Status
51	Jungle Prada Park	Complete
52	Kapok Wetland/Floodplain Restoration	Complete
53	Lake Seminole Aquatic Life Enhancement	Complete
54	Lancaster Tract	Complete
55	Largo Central Park Wetland Enhancement	Complete
56	Little Bayou	Complete
57	Lost River Preserve	Complete
58	Lowry Park	Complete
59	MacDill Air Force Base Phase 2	Complete
60	MacDill Air Force Base Phase 3	Complete
61	MacDill Air Force Base: Mangrove Restoration	Complete
62	Mangrove Bay Phase 1	Complete
63	Mangrove Bay Phase 2	Complete
64	Mangrove Bay Phase 3	Complete
65	Marsh Creek	Complete
66	McKay Bay - East Shore Commerce Park Parcel Stormwater Retrofit	Complete
67	McKay Bay Dredge Hole Restoration	Complete
68	McKay Bay Nature Preserve	Complete
69	Mobbly Bay	Complete
70	Mobbly Bayou Wilderness Preserve	Complete
71	Mulberry - NE 4th Ave Alafia Wetlands Restoration (REDI)	Complete
72	Newman's Branch Phase I	Complete
73	Newman's Branch Phase II	Complete
74	Newman's Branch Phase III	Complete
75	North Apollo Beach	Complete
76	Palm River Restoration Phase II	Ongoing
77	Palmetto Estuary Habitat Restoration Phase 1	Complete
78	Palmetto Estuary Habitat Restoration Phase 2A	Complete
79	Peanut Lake	Complete
80	Picnic Island	Complete
81	Polanis Park	Complete
82	Port Redwing/Schultz Preserve	Complete
83	Reed Property	Complete
84	Ribbon of Green	Complete
85	River Garden	Complete
86	River Tower	Complete
87	Rock Ponds	Complete
88	Rocky Creek Preserve Restoration	Complete
89	South Tampa Greenway/Tappan Site	Complete
90	St. Petersburg College Natural Park	Complete
91	Stewart Middle Magnet School	Complete
92	Sulphur Restoration	Ongoing
93	Sweetwater Creek	Complete
94	Tampa Bay Environmental Restoration Fund	Ongoing
95	Tampa Shoreline Restoration Initiative	Complete
96	Terra Ceia Isles Habitat Restoration	Complete
97	Terra Ceia Phase 2 Project	Ongoing
98	Tom Bennett Park	Complete
99	Ulele Spring	Complete
100	Wolf Branch Creek Habitat Restoration	Complete



Tampa Bay SWIM Stormwater Projects 2019

LEGEND

- Complete
- Ongoing
- Tampa Bay Watershed



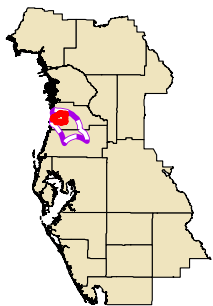
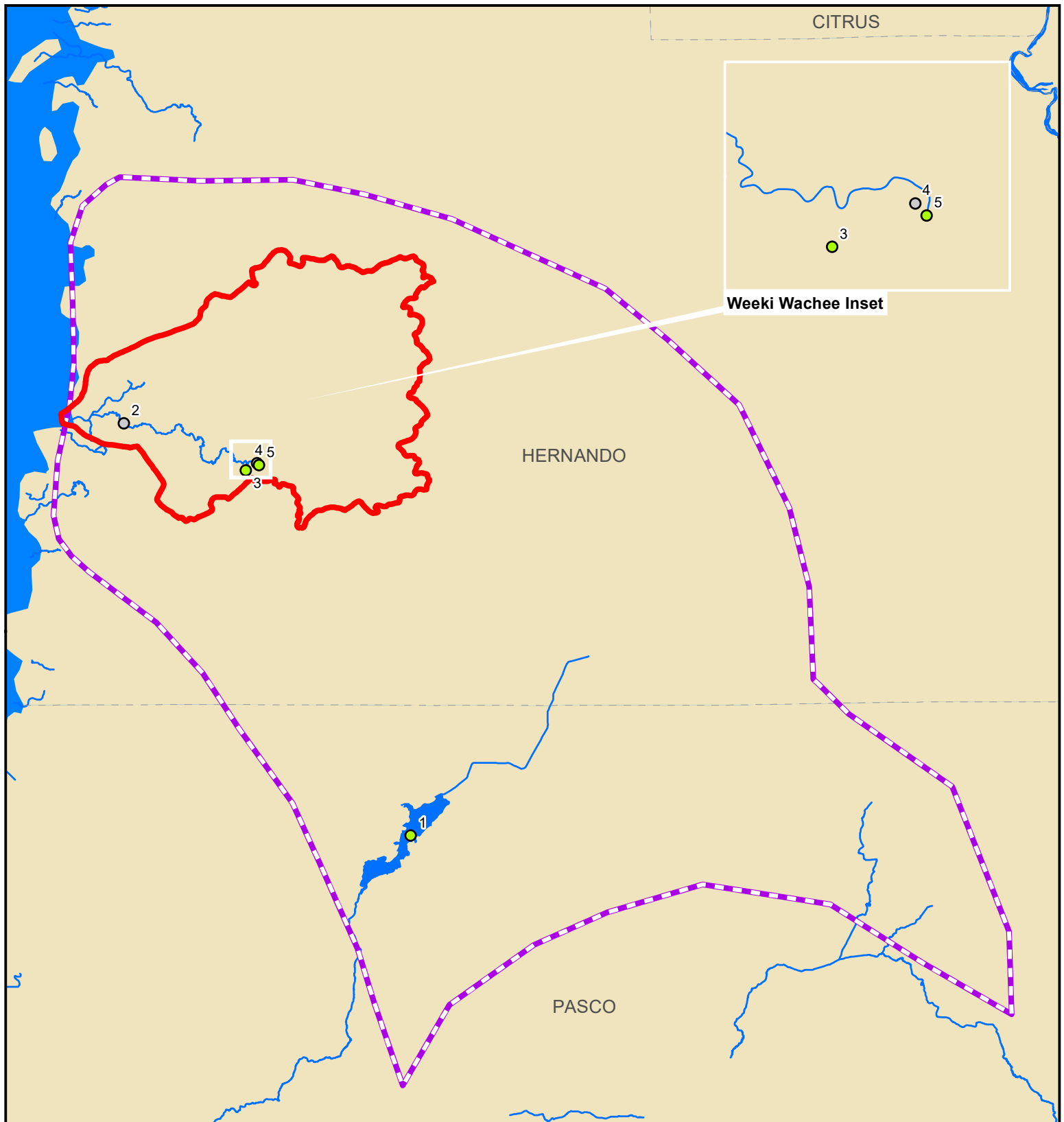
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Tampa Bay Stormwater Projects Legend

Map Number	Project Name	Status	Map Number	Project Name	Status
1	102nd Avenue Pond Enhancement	Complete	36	Delaney Creek Wetland Treatment	Complete
2	137th Avenue Circle BMPs	Complete	37	Dogleg Pond Stormwater Enhancement	Complete
3	141st Avenue Stormwater Retrofit	Complete	38	Downtown Largo Regional Stormwater Treatment Facility	Complete
4	20th Ave Parkway Stormwater Improvements	Complete	39	Druid Road Stormwater Improvement Area	Ongoing
5	20th Avenue Stormwater Improvements	Complete	40	East Gate Drainage Improvements	Complete
6	30th Street and Hillsborough Ave. Stormwater Improvement	Complete	41	East Lake Outfall Water Quality Improvement	Complete
7	30th Street Baffle Box	Complete	42	East Shore Commerce Regional Stormwater Treatment Facility	Complete
8	34th Avenue NE Water Quality Improvements	Ongoing	43	East Treasure Island Causeway BMPs	Ongoing
9	49th Street Outfall Treatment	Complete	44	Egan Park Best Management Practices	Complete
10	94th Avenue Stormwater Pond Enhancement	Complete	45	EMS Pond Stormwater Enhancement	Complete
11	Al Lopez Park Stormwater Retrofit	Complete	46	FDOT 56th Street Outfall Stormwater Retrofit	Complete
12	Allen's Creek Improvements at Plumb Elementary	Complete	47	FDOT North Dale Mabry Hwy Retrofit & Restoration	Complete
13	Alline Ave. Stormwater Improvement	Complete	48	Gibsonton on the Bay	Complete
14	Anna Maria North Island BMPs Phases H and J	Ongoing	49	Gulfport-49th Street Drainage Improvements	Complete
15	Balm Road Marsh	Complete	50	Harbor Dr. & LaHacienda Dr. Stormwater Improvements	Ongoing
16	Basin SD-2 and SD-3 Improvements	Complete	51	Haynsworth Tract Regional Stormwater Treatment Facility	Complete
17	Bath Club Concourse Stormwater Retrofit	Complete	52	Implementation of BMPs at England Brothers Park	Complete
18	Bayview Drive Drainage Improvements	Complete	53	Itchepackesassa Creek Regional Stormwater System	Complete
19	Bishop Creek Streambank	Complete	54	Jean Park Ponds/Cedar Lake Water Quality Improvement Study	Complete
20	Booker Lake Regional Stormwater Treatment Facility	Complete	55	Jungle Lake Enhancement Project	Complete
21	Broadway Outfall Stormwater Retrofit	Complete	56	Lake Carrol Stormwater Retrofit	Complete
22	Brushy Creek Wetland Treatment	Complete	57	Lake Hunter BMP Project	Ongoing
23	Channel 1A2 Stormwater Quality Improvements	Ongoing	58	Lake Magdalene BMPs	Complete
24	City of Largo Allen's Creek and McKay Creek Inlet Inserts	Complete	59	Lake Seminole Dredging Project	Ongoing
25	City of Largo CDS Unit	Complete	60	Lake Seminole Watershed Stormwater Pollution Reduction	Complete
26	City of Tampa Stormwater Filtration Devices	Complete	61	Lake Seminole Weir Stage and Flow Device	Complete
27	City of Tampa Urban Lake Rescue: Edna	Complete	62	Lake Tomlinson Restoration	Complete
28	City of Tampa Urban Lake Rescue: Kipling	Complete	63	Largo Highland Avenue Retrofit Project	Complete
29	City of Tampa Urban Lake Rescue: Roberta	Complete	64	Largo Regional Outfall Modification	Complete
30	Clam Bayou Stormwater Improvements	Complete	65	Largo Regional Stormwater Treatment Facility	Complete
31	Clam Bayou Stormwater Pond	Complete	66	Largo ST Quality Retrofit - 101st St.	Complete
32	Clearwater Tropic Hills Drainage Improvements	Complete	67	Logan Street Pond	Complete
33	Cockroach Bay Phase Stormwater Pond	Complete	68	Long Bayou - Lake Seminole Bypass Canal Treatment Facility	Complete
34	Creation Pond Stormwater Enhancement	Complete	69	Lowry Park East & West	Complete
35	Delaney Creek Improvements	Ongoing			

Tampa Bay Stormwater Projects Legend

Map Number	Project Name	Status	Map Number	Project Name	Status
70	Madeira Beach - Boca Ciega Drive BMPs	Complete	104	St. Pete Beach Public Works Facility Stormwater Retrofit Improvements	Complete
71	Madeira Public Works Yard Stormwater Retrofit	Complete	105	St. Pete Junior College Stormwater Retrofit	Complete
72	McIntosh Park	Ongoing	106	St. Petersburg Pier Park	Ongoing
73	McIntosh Park Stormwater Treatment Wetland	Complete	107	St. Petersburg Public Works Storage Yard Stormwater Retrofit Project	Complete
74	McKay Creek Water Quality Improvements near Hickory Lane	Ongoing	108	Sumner Road Stormwater Management Improvement	Complete
75	Melbourne Pond Stormwater Retrofit	Complete	109	Town of Belleair Palmetto Rd. BMPs	Ongoing
76	Mirror Lake Stormwater Retrofit	Complete	110	Wood Ibis Park Stormwater Retrofit	Complete
77	Mullet Creek Water Quality Improvement	Complete			
78	N IMP- Water Quality - Northern Holmes Beach BMPs - Basins 10 & 12	Ongoing			
79	Old Coachman (Channel H) Stormwater Retrofit	Complete			
80	Old Tampa Bay Water Quality and Drainage Improvements	Complete			
81	Palmetto 5th Street LID	Complete			
82	Palmetto CRA Riverside Boat Ramp	Complete			
83	Palmetto Gateway LID	Complete			
84	Palmetto MLK Park Low Impact Design and Wetland Restoration	Complete			
85	Pinellas Park Implementation of BMPs Sawgrass Lake Watershed	Complete			
86	Pinellas Park Improvement of BMPs for Homeland Basin/Sawgrass	Complete			
87	Pinellas Road Stormwater BMPs	Ongoing			
88	Pinellas Trail - 54th Ave Stormwater Improvements	Ongoing			
89	Pistol Range Stormwater Retrofit	Complete			
90	Pond 56	Complete			
91	Rex Place Stormwater BMPs	Complete			
92	Riverhills Drive Outfall 1 & 2 Stormwater Retrofit	Complete			
93	Riviera Bay Snell Island Vaults	Complete			
94	Robles Park WQ and Natural Systems Improvement	Complete			
95	Roosevelt Stormwater Retrofit Project	Ongoing			
96	Rosery Road BMPs	Complete			
97	Rubonia Subdivision Stormwater Management Improvements	Ongoing			
98	S. Glen Arven Ave. Outfalls Stormwater Retrofit	Complete			
99	Safety Harbor Public Works Stormwater Retrofit	Complete			
100	Sawgrass Lake Restoration	Ongoing			
101	Shore Acres Stormwater Vaults	Complete			
102	South Green Springs Stormwater Retrofit	Complete			
103	Southeast Riverside Water Quality Improvements	Ongoing			

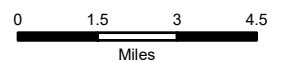


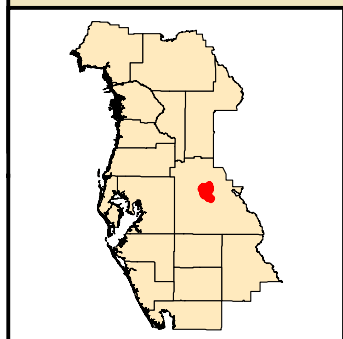
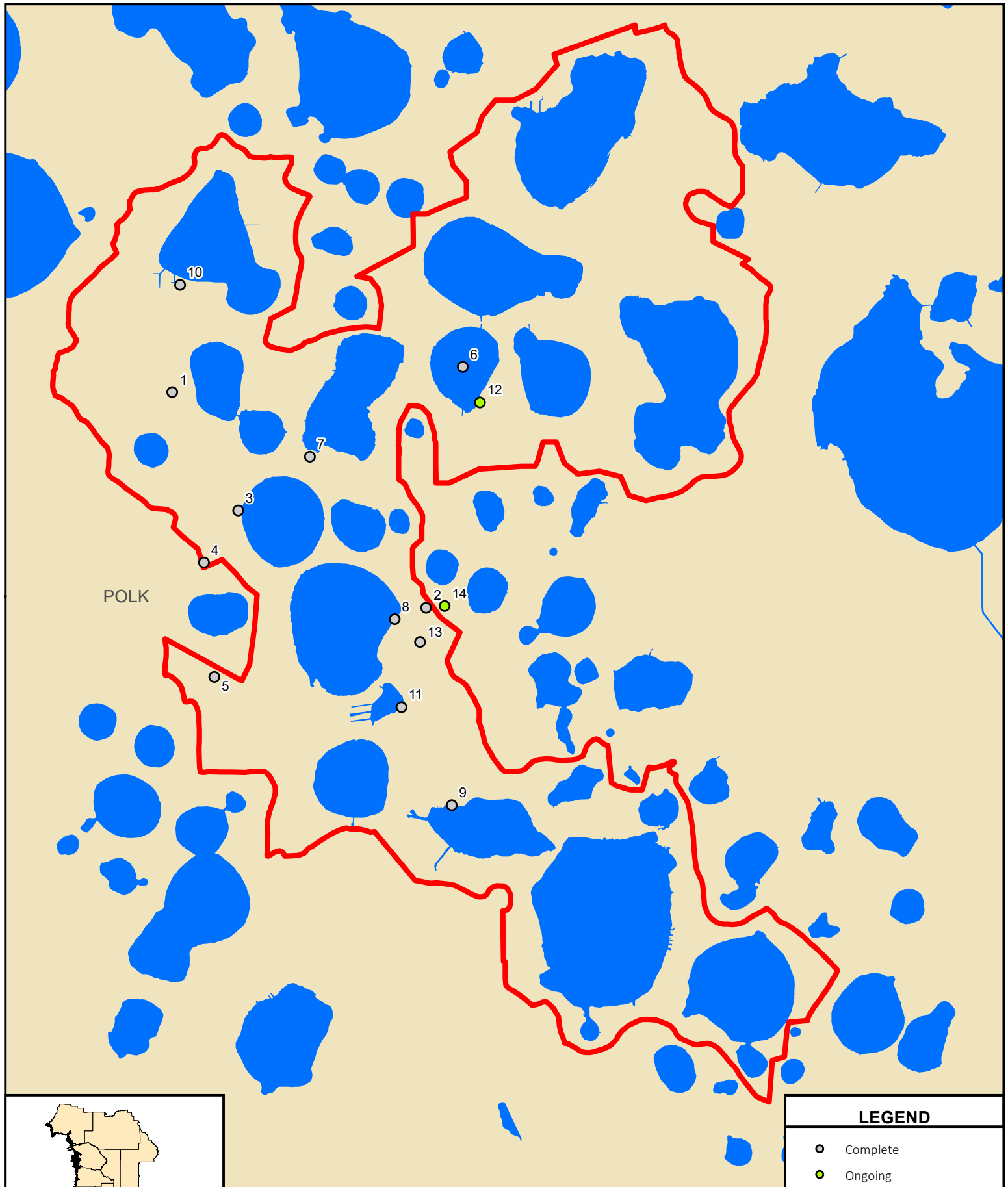
Map Number	Project Name	Status
1	Crew's Lake Restoration	Ongoing
2	Rogers Park LID Implementation	Complete
3	US 19 Reclaimed Water Transmission	Ongoing
4	Weeki Canoe Launch	Complete
5	Weeki Wachee Springshed Stormwater Retrofits	Ongoing

Weeki Wachee SWIM Projects 2019

LEGEND


- Ongoing
- Complete
- Weeki Wachee Watershed
- Weeki Wachee Springshed








Winter Haven SWIM Projects 2019

LEGEND

 Complete

 Ongoing

 Chain of Lakes Watershed


NORTH

00.61.21.8

Miles

Winter Haven Projects Legend

Map Number	Project Name	Status
1	Derby Ditch Retrofit	Complete
2	Downtown Winter Haven Stormwater Improvement	Complete
3	Inwood Ditch Alum Injection Project	Complete
4	Inwood Water Quality Stormwater Retrofit	Complete
5	Jan Phyl Stormwater Treatment Project	Complete
6	Lake Conine Whole Lake Alum Treatment	Complete
7	Lake Hartridge Stormwater Treatment Project	Complete
8	Lake Howard Alum Injection	Complete
9	Lake Lulu Stormwater Treatment Project	Complete
10	Lake Mariana: Construction of Wet Detention Pond	Complete
11	Lake May Stormwater Management Project	Complete
12	South Lake Conine Watershed Restoration	Ongoing
13	Winter Haven LIDs	Complete
14	Winter Haven Ridge Implementation of Stormwater BMPs	Ongoing