

# 2021 Annual Report

January 1, 2021 to December 31, 2021



## Surface Water Improvement and Management Program



Cover photo: Palm River Restoration Project Phase 2 East McKay Bay, photo by Aerial Innovations

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# Table of Contents

|                                  |    |
|----------------------------------|----|
| Purpose.....                     | 4  |
| Introduction.....                | 4  |
| Other District Programs.....     | 4  |
| Coastal Estuaries.....           | 5  |
| Tampa Bay.....                   | 6  |
| Sarasota Bay.....                | 11 |
| Charlotte Harbor.....            | 12 |
| Spring Systems.....              | 16 |
| Chassahowitzka River.....        | 17 |
| Crystal River/Kings Bay.....     | 18 |
| Homosassa River.....             | 21 |
| Rainbow River.....               | 22 |
| Weeki Wachee River.....          | 24 |
| Lake Systems.....                | 27 |
| Lake Panasoffkee.....            | 27 |
| Lake Tarpon.....                 | 28 |
| Lake Thonotosassa.....           | 29 |
| Winter Haven Chain of Lakes..... | 30 |
| Other Systems.....               | 32 |
| Appendix A: Maps.....            | 33 |

## Purpose

This report provides a summary of the Southwest Florida Water Management District Surface Water Improvement and Management (SWIM) Program activities for the 2021 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.

The District's Governing Board and the FDEP are required to approve the list of SWIM Priority Waterbodies every five years. The last update in 2020 approved the current list of twelve Priority Waterbodies. 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.

The work done by SWIM is highly recognized. Since 1987, SWIM Program projects and personnel have received a total of 65 awards. SWIM projects were recognized in at least 21 newspaper, newsletter, and internet articles during 2021. The Tampa Bay Florida Public Relations Association recognized the District in April 2021 for its Weeki Wachee River Tips video educating the public on how to protect the river.

## 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<br>(Square Miles) | Watershed<br>(Square Miles) | Restoration<br>/WQ Projects | Restored<br>(Square Miles) | Treated<br>(Square Miles) |
|-------------------------|------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------|
| <b>Tampa Bay</b>        | 373                    | 2,200                       | 124/99                      | 11.5                       | 132                       |
| <b>Sarasota Bay</b>     | 35                     | 212                         | 39/14                       | 1.4                        | 62                        |
| <b>Charlotte Harbor</b> | 270                    | 4,400                       | 28/11                       | 8.2                        | 153                       |

In 2021, SWIM's Seagrass Mapping Program completed its most recent seagrass habitat maps for the estuaries of Tampa Bay, Sarasota Bay, Lemon Bay, and Charlotte Harbor, and for the Springs Coast region which includes the nearshore coastal waters from Waccasassa Bay south to Anclote River and the estuarine portions of the following SWIM Priority Waterbodies: Crystal River/Kings Bay, Homosassa River, Chassahowitzka River, and Weeki Wachee River. Seagrass habitat from Tampa Bay south to Charlotte Harbor are mapped on a two-year cycle with the next map scheduled for 2022. The Springs Coast is mapped every four years with the next map scheduled for 2024.

The SWIM Program maps seagrass habitat to "take the pulse" of these estuaries to help guide resource management actions and projects designed to maintain and improve the health of these priority waterbodies. Approximately 70% of the recreationally and commercially important species of fish, crabs, and shrimp in the Gulf of Mexico spend at least a portion of their lives in seagrass meadows. Seagrasses are a major source of food for both manatees and sea turtles, help maintain good water quality, and minimize impacts from storms and boat wakes. Because seagrasses are sensitive to water quality changes, impacts from red tide, hurricanes, and other episodic events, they make excellent barometers of overall estuarine health.



# Tampa Bay

## Background

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.

## Tampa Bay National Estuary Program

The Tampa Bay National Estuary Program Interlocal Agreement established the Tampa Bay Estuary Program (TBEP) as an independent special district in 1998. The District partners with TBEP for their Annual Workplan to provide funding and participates in three main areas. First, the District's SWIM program carries out projects that will address water quality and habitat restoration within the bay. Second, the District has contributed funding to the TBEP since 1990 to carry out the administration and implementation of projects identified in the TBEP Comprehensive Conservation and Management Plan. Finally, the District provides staff to sit on the technical, management and policy (Governing Board Member) boards, the Nitrogen Management Consortium and the newly established Habitat Restoration Consortium, described below.

In August 2020, TBEP adopted the updated Habitat Master Plan (HMP) which establishes 2030 protection and restoration targets and longer term 2050 goals for critical habitats from the open waters of Tampa Bay to the headwaters and uplands of the Tampa Bay watershed. As described within the HMP, the Habitat Restoration Consortium (HRC) was established as a subcommittee of the TBEP Technical Advisory Committee (TAC) to provide a framework for coordinating habitat restoration activities throughout the Tampa Bay watershed. It consists of representatives from regulatory agencies; the private sector; and local, regional, state and federal land managers or restoration practitioners. The purpose of the HRC is to implement the HMP through encouraging the sharing of technical information, creation of new partnerships, watershed-level planning, identification of potential projects (and potential funding sources), and reporting on annual progress toward managing Tampa Bay's habitats. The HRC may also review proposed projects for consistency with the TBEP Comprehensive Conservation and Management Plan (2017 Update) and the HMP. SWIM staff currently serve as a co-chair of the TBEP HRC.

## Tampa Bay Environmental Restoration Fund

The District cooperatively funds the Tampa Bay Environmental Restoration Fund (TBERF). TBERF was established to fund restoration, water quality, research and education initiatives in Tampa Bay. The following projects are currently being managed and funded through TBERF: Mobbly Bayou is in progress; Boyd Hill Freshwater Wetland Restoration project is in the design and permitting phase; Audubon FL Sunken Island Habitat Restoration completed phase 1 of 4; Pinellas County Philippe Park Living Shoreline has Phase 1 completed and Phase 2 underway; the District's Kracker Avenue is ongoing; Hillsborough County's Lower Green Swamp Preserve Freshwater Wetland Hydrologic Restoration pre-construction monitoring is in progress; and SPC Living Shoreline project is ongoing. TBERF projects completed in 2021 include: Bay Grasses in Classes Coastal Resilience project and the Palm River/East McKay Bay construction was completed with maintenance underway.

## Seagrass

Seagrass acreages in Tampa Bay 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. However, recent water quality declines in Old Tampa Bay, and other bay segments, resulted in a 16% loss of mapped seagrass between 2018 and 2020. Despite these losses, seagrass acreage in Tampa Bay still remains well above 1982 totals. The next mapping cycle for Tampa Bay will be in 2022.

## SWIM Plan

The kick-off meeting for the Tampa Bay SWIM Plan Update was held in February 2021 with Tampa Bay Estuary Program and the consultant. Throughout the remainder of 2021, issues and drivers for water quality and natural systems were identified and water quality and habitat status and trends were summarized. This information was presented at two Technical Stakeholders meetings which were convened to bring together local and state water resource managers to review and provide input on these work products. The third and final Technical Stakeholders meeting is planned for Spring 2022 and drafting the SWIM plan will begin in Summer 2022.

In 2021, SWIM completed Restoration Site Assessments to evaluate a subset of completed SWIM restoration projects within Tampa Bay. An adapted methodology of the Uniform Mitigation Assessment Method (UMAM) was utilized to score site conditions and restoration success. Site information is available within an ArcGIS dashboard, the SWIM Restoration Geodatabase, and via reports compiled for cooperators. Results from these assessments will be used for CFI project metrics, contractual compliance, and project planning.

Summarizing 1989-2021, the SWIM Program and its cooperators have completed 124 restoration projects and 99 water quality projects for Tampa Bay, totaling over 7,300 acres of restored habitats and nearly 85,000 acres of treated watershed.

The following projects were either ongoing or completed in 2021:

**Anna Maria BMPs Phase K** - This cooperative project with City of Anna Maria includes the design, permitting and construction of stormwater BMPs to treat 53 acres of urbanized stormwater runoff. Construction began in May 2021 and is expected to be complete in November 2022.

**Anna Maria North Island BMPs Phase H & J** - This cooperative project with City of Anna Maria includes the design, permitting and construction of stormwater BMPs to treat 75 acres of urbanized stormwater runoff. Construction is underway and anticipated to be complete in mid-2022.

**Balm Boyette Habitat Restoration** - Approximately 80 acres of wetlands and stream were restored or enhanced. Stream restoration reconnected a stream valley to Pringle Branch, a tributary to Fishhawk Creek and the Alafia River. Construction was completed in 2019. Vegetation maintenance commenced in 2020 and is ongoing until 2023.

**Boyd Hill Nature Preserve** - This cooperative project with City of St. Petersburg includes the design, permitting and construction of 30 acres of freshwater and upland habitats. Design and permitting were ongoing in 2021 and are anticipated to be complete in 2022 with the District preparing to bid construction in mid-2022.

**Channel 1A2 Stormwater Quality Improvements** - This cooperative project with Pinellas Park Water Management District includes the design, permitting and construction of stormwater BMPs to treat 23 acres of urbanized stormwater runoff. Construction began in 2021. Construction is anticipated to be completed in mid-2022.

**Delaney Creek Improvements** - This cooperatively funded project with Hillsborough County includes the construction of stormwater improvement BMPs to treat 130 acres of highly urbanized watershed draining to Delaney Creek. Construction is expected to begin in early 2022.

**East Treasure Island Causeway BMPs** - This is a cooperatively funded project with the City of Treasure Island. This project includes construction of stormwater retrofits, to reduce pollutant loads to Boca Ciega Bay. The drainage area includes approximately 8 acres of urbanized watershed within the City of St. Petersburg and right-of-way controlled by the City of Treasure Island. Construction is underway and proposed to be complete 2022.

**Frog Creek Wetland Restoration at Terra Ceia** - The project consists of the hydrologic and habitat enhancement and restoration of approximately 100 acres of interconnected borrow pits located on the approximately 129-acre District owned Frog Creek Tract in Manatee County. Enhancements include the creation of littoral zones and the removal of exotic species. During 2021, 30% design plans were submitted and reviewed.

**Gully Branch Upland Restoration** - This SWIM project includes implementation of 444 acres of upland natural system restoration within the District owned Little Manatee River Corridor. The Contractor continued to treat non-native and nuisance vegetation in 2021. It is anticipated that seeding will begin



in 2022. Design and permitting were completed in 2021 and the County began the Request for Bid process. Construction is expected to begin in mid-2022.

**Ibis Stormwater Pond Retrofit** - Pinellas County began construction of stormwater retrofits including baffle boxes, a littoral shelf with submerged aquatic vegetation, and rain gardens to reduce pollutant loads from 12.8 acres of residential watershed draining to Boca Ciega Bay.

**Kracker Avenue Restoration** - This Cooperative Funded project with Hillsborough County includes the design, permitting and construction of 24.6 acres of coastal ecosystem restoration on a County owned abandoned fish farm. Construction began in June 2021.

**Lake Hunter BMP Project** - This cooperatively funded project with the City of Lakeland includes design, permitting, and construction of stormwater improvement BMPs to treat runoff from an 84-acre urban watershed draining to Lake Hunter. Construction was completed in 2021.

**Lake Seminole Dredging Project** - This cooperative project with Pinellas County includes the design, permitting and dredging of approximately 903,000 cubic yards of muck from Lake Seminole. Dredging was complete in 2020 and restoration is ongoing in 2021. The County anticipates completion of restoration in early 2022.

**Little Manatee River Corridor: Area 8 Hydrologic Restoration** - This SWIM project includes the design, permitting and construction of 1,424 acres of natural system restoration. The District completed the Request for Proposals and selected a Consultant to design the restoration project in 2021. A Contract was executed at the end of 2021 with design commencing in January 2022.

**McIntosh Park Integrated Water Master Plan** - This project includes 30% design and third-party review of a 100-acre treatment wetland that will accept at least 1.5mgd reclaimed water to improve hydrology in the system. Thirty percent design and the Third-Party Review were completed in 2021.

**Northern Holmes Beach BMPs Basins 10 and 12** – This project for design, permitting, and construction of stormwater retrofits to treat 20 acres of urbanized stormwater runoff, to reduce pollutants to Tampa Bay by 15,848 lb/yr TSS and 187 lb/yr TN was completed in 2021.

**Nutrient Source Tracking** - Review existing watershed data and conduct additional sampling to assess nutrient loading into the McKay Creek, Allen's Creek, and Curlew Creek watersheds using isotope analysis and development of a conceptual plan to reduce the nutrient sources. Data collection phase was ongoing at the end of 2021.

**Palm River Restoration Phase 2** - This project included construction of 3 stormwater ponds to treat previously untreated stormwater from a 436-acre urban basin prior to discharging into McKay Bay. The project also included exotic and invasive plant removal and enhancement of 50 acres of coastal habitat. Construction was completed in 2021 and vegetation maintenance is ongoing.

**Roosevelt Stormwater Retrofit Project** - Pinellas County completed construction of stormwater BMPs to treat 21 acres of urbanized stormwater runoff draining to Old Tampa Bay.

**Rubonia Subdivision Stormwater Management Improvements** - This is a cooperatively funded project with Manatee County and includes construction of an enhanced stormwater management system to include wet ponds and baffle boxes providing enhanced treatment above permitting requirements for

currently untreated runoff from the historic Rubonia subdivision to McMullen Creek in Manatee County, which flows into Tampa Bay. The drainage area includes approximately 41 acres of urbanized watershed. BMPs will be implemented in the historic Subdivision of Rubonia. Construction is currently underway and is proposed to be complete 2022.

**Southeast Riverside Water Quality Improvements** - This cooperative project with City of Palmetto CRA includes the design, permitting and construction of stormwater BMPs to treat 62 acres of urbanized stormwater runoff. Construction began in 2021 and anticipate construction completion in 2022.

**Study: Pearce Drain/Gap Creek Water Quality Plan** - An assessment for nutrients and to propose conceptual BMPs including stormwater improvements with an emphasis on Low Impact Development (LID) and/or natural system restoration projects in support of reducing nutrient loads in the 10 square mile watershed which discharges to Tampa Bay, a SWIM priority water body. The draft Watershed and Water Quality Assessment report was delivered in 2021.

**Terra Ceia Huber Tract Wetland Restoration** - This project will restore and enhance approximately 83 acres of uplands on the Huber Tracts and 29 acres on the Frog Creek Tract. The project also will create up to 3 acres of high salt marsh on the Huber Tracts.

**Town of Redington Beach Stormwater Retrofits** - This cooperative project with Town of Redington Beach includes the design, permitting and construction of stormwater BMPs to treat 5.15 acres of urbanized stormwater runoff. Design and permitting were completed in 2021 and the Town plans to bid and construct the project in late 2022.

**Weedon Island Tidal Marsh** - Hydrological restoration over approximately 42 acres in Weedon Island Preserve involving elimination of stagnant ditches, dredging of existing ditches to improve circulation, and restoration of diurnal sheet flow by removing spoil mounds. Design was completed during 2021 and permitting is in progress.

#### Outreach in 2021 – Volunteer Events, Presentations, and Education:

- SWIM staff provided presentations, volunteer events, and field tours of various Tampa Bay restoration projects to various parties including: tours of Rock Ponds with the Audubon Society, volunteer plantings with Tampa Bay Grasses and Classes at Terra Ceia Phase 2 and Rock Ponds, and volunteer events to prepare Rock Ponds for upcoming controlled burns.
- Tampa Bay Times visited the Kracker Avenue Restoration Project in July 2021 and a story was published in the Times in August 2021.
- In Hillsborough County, 36,573 sixth-grade students and approximately 130 teachers participated in virtual field trip programming led by Nature’s Classroom. In person field trips on site at Nature’s Classroom, located along the banks of the Hillsborough River in the District’s Lower Hillsborough Wilderness Preserve, were not possible due to COVID-19. Additional District funded field trips and summer camps that typically occur for Hillsborough County students did not occur in the 2020-2021 school year due to COVID-19.
- In Pinellas County, 3,985 fourth-grade students and 196 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 addition to the in-person field trips, approximately 161 students and 19 teachers engaged in virtual water education videos and activities developed by the educators at Brooker Creek and Boyd Hill with support of District funds.

## Sarasota Bay

### Background

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.

### Sarasota Bay Estuary Program

The Sarasota Bay Estuary Program (SBEP) Comprehensive Management Plan Development and Implementation is a project to coordinate the partnership between the SBEP and the District. The District has assisted in the implementation of the SBEP since its inception in 1989. The District participates in three main areas. First, the District's SWIM program carries out projects that will address water quality and habitat restoration within the Harbor. Second, pursuant to the Interlocal Agreement, adopted in 2004, the District provides annual funding through the Annual Workplan Agreements with the SBEP to carry out the administration and implementation of projects identified in the SBEP Comprehensive Conservation and Management Plan. Finally, the District provides staff to sit on the technical, management and policy (Governing member) committees of the program.

Summarizing 1989-2021, the SWIM Program and its cooperators have completed 39 restoration projects and 14 water quality projects for Sarasota Bay, totaling nearly 900 acres of restored habitat and over 39,000 acres of treated watershed.

The following projects were either ongoing or completed in 2021:

**Bradenton Beach BMPs Avenues B and C** - This cooperative project with City of Bradenton Beach includes the design, permitting and construction of stormwater BMPs to treat 34 acres of urbanized stormwater runoff. Design and permitting were completed in 2020 with Construction anticipated to begin in October 2022.

**Sarasota County Denitrification Study** - This cooperative project with Sarasota County will evaluate groundwater quality impacts associated with various land uses and identify BMP implementation projects within Sarasota County watersheds. In 2021, the project was approved by the County Commission, the agreement was executed, the consultant was chosen and preliminary plans were coordinated between the county and consultant.

**Study: Bowless Creek Water Quality Plan** - This study is a cooperative funding with Manatee County to evaluate water quality impacts, stormwater improvement BMPs and opportunities for low impact

development (LID) and natural system restoration projects in the Bowlees Creek watershed, which drains approximately 9 square miles of “old urban” development adjacent to Sarasota Bay. The Surface Water Resource Assessment (SWRA) is to provide an assessment for nutrients to propose conceptual BMPs including stormwater improvements with an emphasis on LID and/or natural system restoration projects in support of reducing loads in the Bowlees Creek watershed. The project was completed in 2021.

Outreach in 2021 – Volunteer Events, Presentations, and Education:

- In Sarasota County, 527 fifth-grade students and 14 teachers participated in a virtual field trip program led by the Mote Marine Laboratory to learn about Sarasota Bay. Each virtual trip included a 50-minute interactive program focused on water habitats, water quality and methods of scientific research in estuarine environments.

## Charlotte Harbor

### Background

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 (USEPA) in 1995. As a result of this designation, the Coastal and Heartland National Estuary Program (CHNEP) (formerly known as the Charlotte Harbor National Estuary Program) was established to assist the region in developing a comprehensive plan for the restoration and protection of Charlotte Harbor.

Charlotte Harbor 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, it has become a world-class destination for recreational fishing. 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. Charlotte Harbor is the home for more than forty species of animals listed by the state as either endangered, threatened, or of special concern.

### Coastal and Heartland National Estuary Program

Partners in the CHNEP include the Southwest Florida and South Florida Water Management Districts, USEPA, Florida Department of Environmental Protection, other state and federal agencies, and local governments from the watershed. The goals and strategies for the Harbor are identified in the Comprehensive Conservation and Management Plan (CCMP) for Charlotte Harbor which provides guidance to each entity on their contribution to restore the Harbor. The District participates in three main areas. First, the District's SWIM program carries out projects that will address water quality and habitat restoration within the Harbor. Second, the District has contributed annual funding through the Annual Workplan Agreements with the CHNEP since 1997 to carry out the administration and implementation of projects identified in the CHNEP Comprehensive Conservation and Management Plan. And finally, the District provides staff to sit on the technical, management and policy (Governing

member) committees of the program. The District's annual budget includes funding support to the CHNEP and District staff salaries and travel to administer the project, which includes attending board meetings and other workshops and invoicing.

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.

#### Charlotte Harbor Flatwoods Initiative

The Charlotte Harbor Flatwoods Initiative (CHFI) is a multi-agency initiative lead by the South Florida Water Management District to restore flows, promote sheet flow enhancement, and restore wetland hydroperiods in Babcock Webb and Yucca Pens Wildlife Management Area (WMA); and improve the timing and magnitude of flows to tidal creeks west of Yucca Pens WMA. The FY2020 Cooperative Agreement with CHNEP included funds to support the CHFI through installation and maintenance of hydrologic monitoring stations (wells, rain gages and flow monitoring) and collection of data from these stations. During 2021, quarterly sampling at the monitoring stations continued and is expected to be complete in early 2022, ahead of the hydrological model development.

#### Coastal Charlotte Harbor Monitoring Network

The Coastal Charlotte Harbor Monitoring Network (CCHMN) is an ongoing project to monitor water quality in Charlotte Harbor. The purpose of the project is to establish long-term water quality monitoring stations in Charlotte Harbor and the estuarine areas of the Peace and Myakka Rivers. The CCHMN is a collaborative effort, which began in 2000, between the District, Charlotte County and the Florida Fish and Wildlife Conservation Commission (FWCC). Water clarity data and seagrass acreage have been collected since 2002 through the CCHMN and the District, respectively. Data collected through the CCHMN are essential for planning and management of habitat restoration and water quality improvement projects and providing data for comparison to water quality targets adopted by the CHNEP and the State. In August 2009, CHNEP adopted seagrass targets for each of the segments in Charlotte Harbor.

The CCHMN is implemented through the District's Annual Workplan Agreements with the CHNEP. Through a separate agreement with CHNEP, the FWCC is responsible for collection of samples at 30 randomly selected sites per month, in accordance with the CCHMN Standard Operating Procedures. CHNEP is responsible for coordinating with the County to ensure that the County continues funding laboratory analyses of all water quality parameters including nutrients, color and turbidity. CHNEP also is responsible for water quality data compilation, quality assurance/quality control, and submission of the data to the District. The District is responsible for the upload of the data to the Florida Department of Environmental Protection's (FDEP) database for water quality data.

Summarizing 1989-2021, the SWIM Program and its cooperators have completed 28 restoration projects, totaling more than 5,200 acres of restored coastal habitats. Since 2004, the District and its cooperators have completed 11 water quality improvement projects that are providing treatment for over 98,000 acres of watershed.



The following projects were either ongoing or completed in 2021:

**Bridgers Avenue Drainage & Water Quality Project** - This cooperative project with Polk County includes the construction of stormwater BMPs to treat 77 acres of urbanized stormwater runoff. Construction began in 2021 and the County anticipates construction to be completed in early 2022.

**Cape Haze Phase 3 Ecosystem Restoration** - The 3rd phase within the approximately 2,600-acre Coral Creek property, co-owned by the District and Florida Department of Environmental Protection (FDEP) and includes the design and permitting of approximately 680 acres of coastal restoration. The project will create and enhance natural systems, including estuarine and freshwater wetlands and adjacent uplands within the Charlotte Harbor watershed, a SWIM priority of water body. The scope of work and fees were negotiated with our consultant for permitting and design.

**Crystal Lake Water Quality Improvement Study** - Feasibility study to evaluate nutrient reduction sediment treatment options to improve water quality in Crystal Lake. A previous study showed that sediment cycling contributes over 90 percent of the phosphorus load to the lake. The feasibility study will evaluate options to reduce the phosphorus flux from the sediments to improve water quality. The study will include at least one additional lake to expand the study for application to other lakes. Data collection in progress at the end of 2021.

**Dona Bay Surface Water Storage Facility** - This is a cooperatively funded project with Sarasota County and includes a third-party review and construction of a 380-acre surface water storage and treatment facility to improve water quality in Dona Bay. This Facility is the second stage of the implementation plan for the Dona Bay Watershed Management Plan. The District and County are resolving comments generated out of the third-party review process. In 2021, the County provided design documents for a Third-Party Review by the District's consultant; and the draft Third-Party Review report was provided for review.

**Feasibility Study: Downs' Water Control Structure** - This cooperatively funded project is with FDEP to conduct a study to investigate the feasibility of removing or modifying an existing low water control structure near the southern boundary of the Myakka River State Park with an objective to restore natural systems, restore historic timing of dry season flows and/or improve water quality in the Myakka River and ultimately Charlotte Harbor. The study shall include quantification of the resource benefits for study alternatives. The project was completed in 2021.

**Lake Annie Surface Water Feasibility Study** - A feasibility study investigating the diversion of water from the Peace Creek Canal to a series of previously excavated areas for wetland habitat restoration and water quality improvement for Lake Annie. The project will quantify benefits and develop cost estimates. As of the end of 2021, the draft final report was submitted and reviewed.

**Lake Gwyn East Surface Water Restoration** - The project consists of the restoration of approximately 60 acres of freshwater wetland and upland habitats to treat stormwater runoff from a 378-acre drainage basin. The Resource Benefit is the removal of an estimated 490lbs/yr Total Phosphorous (TP) flowing into Wahneta Canal. Project was completed and final payment was made in August 2021.

**Myakka State Forest Water Quality and Bank Stabilization** - This project consists of water quality and flood improvements on the north side of Foresman Boulevard, installation of a low water crossing on a trail road to protect and preserve an existing natural wetland, and approximately 650 linear feet of

stream restoration, including exotic vegetation removal, to prevent sedimentation into Newgate and Lafitte Waterways, which flows into Oyster Creek and to Lemon Bay. The project will result in an environmental net benefit and will focus on recovering the functions of water storage and conveyance in an impacted stream and drainage swale, and recapturing the benefits of water quality and wildlife habitat formerly provided by the impacted system in its undisturbed state. In 2021, the District's procurement process to acquire a construction contractor was started, and Gopher Tortoise tasks were started. Construction anticipated for early 2022.

**Venice Stormwater Outfall Monitoring** - The project is cooperatively funded with the City of Venice to implement stormwater outfall monitoring to assess the pollutant loading from five outfalls. Nutrient source tracking will be conducted and development of a prioritization plan to identify the highest pollutant contributors. The benefit of this project is the assessment of nutrient loading into the Gulf of Mexico from several outfalls within the City of Venice and the development of a prioritization and conceptual plan for future Best Management Practices (BMP) improvements. The project was completed in 2021.

#### Outreach in 2021 – Volunteer Events, Presentations, and Education:

- In Charlotte County, 727 fourth-grade students, 916 second-grade students and 91 teachers participated in virtual field trip programs with the Charlotte Harbor Education Center. Through the virtual programs, students engaged in activities to learn more about the Peace River watershed and Charlotte Harbor, including wildlife, water quality and more. In Hardee County, 259 fifth-grade students and 17 teachers and chaperones attended a field study program led by the Outdoor Classroom, where they boarded a boat in Punta Gorda to study Charlotte Harbor.
- 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 Volume and Streamflow
- Reduced Water Clarity
- Altered Aquatic Vegetation Community
- Sea-level Rise (Crystal River/Kings Bay)
- Changing Salinity (Homosassa River)
- Sedimentation (Weeki Wachee River)

Project Coast is a long-term continuous monitoring network that maintains situational awareness for the entire Spring Coast and reinforces the “Springshed to Sea” approach to managing natural resources in the Spring Coast region. These data are crucial to assessing the status and trends in surface water quality along the Springs Coast, home to the second largest sea grass area in the United States. These data are used in conjunction with the District’s Springs Coast Seagrass Mapping project (B107) to investigate the effects of water quality on sea grass coverage and vice versa. Samples are collected at 60 stations quarterly to match the schedule currently employed for Quarterly Springs and Coastal Rivers sampling. Water quality analyses for this project are performed by the District Laboratory.

The SWIM Plans for all springs are divided into water quality, water quantity, and natural systems. Refinements to the quantifiable objectives in the Springs’ SWIM Plans were initiated in 2020. Refinements to the Rainbow River quantifiable objectives were approved by the Springs Coast Steering Committee in July 2021.

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 |
|--------------------------------|-----------------|--------------------------|---------------------------|---|
| <b>Chassahowitzka River</b>    | 6 River Miles   | 91.7                     | 168                       | 2   |
| <b>Crystal River/Kings Bay</b> | 600 Acres       | 68.7                     | 255                       | 21  |
| <b>Homosassa River</b>         | 8 River Miles   | 55.7                     | 286                       | 2   |
| <b>Rainbow River</b>           | 6 River Miles   | 73.5                     | 741                       | 15  |
| <b>Weeki Wachee River</b>      | 7.8 River Miles | 38.1                     | 277                       | 2   |

For the Springs Coast region including the estuaries of Crystal Bay, Homosassa River, Chassahowitzka River, and Weeki Wachee River, the most recent seagrass maps were released in December 2021. These maps are created through photointerpretation of aerial imagery collected for the specific purpose of mapping seagrass and other submerged habitat. Unlike other areas in the state of Florida experiencing significant seagrass habitat loss, the Springs Coast region has remained remarkably stable. In 2016 there were 577,920 mapped acres of seagrass habitat. In 2020, the total was 586,512 acres, a slight (1.5%) increase over the four-year period. The next mapping cycle for Springs Coast is scheduled for 2024.

## 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.

Submerged aquatic vegetation (SAV) communities are significant contributors to ecosystem structure and function in spring systems and provide important ecosystem services including food and habitat for wildlife, nutrient cycling and removal, suspended particle filtration, sediment stabilization, and water clarity improvement. In recognition of the importance of SAV, the District assesses the status and trends of the SAV twice a year in the Chassahowitzka River. This data is also used in support of monitoring the quantifiable objectives in the Surface Water Improvement and Management Plan and the associated MFL reevaluation for this system. The most abundant species in the Chassahowitzka River include *Vallisneria americana* (eelgrass), *Najas guadalupensis* (southern naiad), *Zannichellia palustris* (horned pondweed), *Chaetomorpha* spp. (sea emerald), *Myriophyllum spicatum* (Eurasian milfoil), *Hydrilla verticillata* (water thyme), and filamentous algae. Water quality and other parameters, including specific conductance, turbidity, flow velocity, tree canopy cover, and substrate type, are also collected during

sampling efforts. These parameters help to determine the causes of spatial distribution and changes over time of the SAV communities. Some of the major drivers of SAV communities in the Chassahowitzka River include salinity fluctuations and herbivory by animals including manatees.

The District's Coastal Rivers Water Quality Monitoring Network began in October of 2005 for 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 District's Springs Water Quality Monitoring Network has been sampling individual spring vents, at least quarterly, to monitor water quality in the Chassahowitzka Springs complex since 1993. This network is the primary source of data tracking nitrates and other potential pollutants in our springs.

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.

As of January 2014, the Governing Board of the Southwest Florida Water Management District approved inclusion of the Chassahowitzka River as a SWIM Priority Waterbody. Summarizing 2014-2021, the SWIM Program and its cooperators have completed 1 restoration project, 1 water quality project, and 7 ecological studies for Chassahowitzka River.

Outreach in 2021 – Volunteer Events, Presentations, and Education:

- Coordinated social media outreach with specific messaging about protecting springs. That social media outreach had a reach of 736,001.
- April is Springs Protection Awareness Month and an article highlighting springs protection was featured in the Citrus County Chronicle in April 2021.

## 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 water temperature 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 2021, over 600 manatees were observed in Kings Bay during the winter. 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.

Submerged aquatic vegetation (SAV) communities are significant contributors to ecosystem structure and function in spring systems and provide important ecosystem services including food and habitat for wildlife, nutrient cycling and removal, suspended particle filtration, sediment stabilization, and water clarity improvement. In recognition of the importance of SAV, the District assesses the status and trends of the SAV twice a year in Kings Bay. This data is also used in support of monitoring the quantifiable objectives in the Surface Water Improvement and Management Plan and the associated MFL reevaluation for this system. The most abundant species in the Kings Bay include *Vallisneria americana* (eelgrass), *Najas guadalupensis* (southern naiad), *Hydrilla verticillata* (water thyme), and filamentous algae. Water quality and other parameters, including specific conductance, turbidity, and substrate type, are also collected during sampling efforts. These parameters help to determine the causes of spatial distribution and changes over time of the SAV communities. Some of the major drivers of SAV communities in Kings Bay include competition from exotic invasive species, salinity fluctuations, and herbivory by animals including manatees.

Kings Bay water quality monitoring began in June of 2003. The monitoring consists of twelve bay-wide stations which are monitored on a quarterly basis to track water quality status and trends.

The District continues to work with the City of Crystal River and Citrus County on multiple septic conversion projects that would reduce pollutant loads by an estimated 7,000 pounds per year of total nitrogen from the springshed.

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.

In 1987 the Florida Legislature created the Surface Water Improvement and Management (SWIM) Act to protect, restore, and maintain Florida's highly threatened surface water bodies. Under this act, the state's five water management districts identified a list of priority water bodies within their authority and implemented plans to improve them. The first SWIM plan for Crystal River/Kings Bay was completed in 1989. Summarizing 1989-2021, the SWIM Program and its cooperators have completed 8 restoration projects, 13 water quality projects, and 21 ecological studies for Crystal River/Kings Bay.

The following projects were either ongoing or completed in 2021:

**Hunter Springs Stormwater Modification** - The City of Crystal River completed modifications to an existing drainage retention area to improve stormwater quality discharging to the Hunter Springs area of Kings Bay.

**Red Fish Hole Restoration** - Completed a feasibility study to generate conceptual designs for a hydrologic restoration project at Red Fish Hole, a historically disturbed coastal site within Crystal River Preserve State Park.

**Shoreline Condition Mapping of Crystal River/King's Bay** - Work was completed to characterize and analyze the shoreline types and emergent aquatic vegetation present in Crystal River and Kings Bay. A comparison of the current shoreline type and emergent aquatic vegetation to a previous (2010) mapping effort was conducted in support the natural systems quantifiable objectives in the Crystal River/Kings Bay SWIM Plan.

**Three Sisters Canal Shoreline Stabilization** - This project is to design, permit and construct a stabilization project for canal shoreline surrounding the Three Sisters Springs Wildlife Refuge, co-owned by the District and the City. Design of the project continued in 2021 with completion of 60 percent plans for a revised project area that encompasses approximately 390 feet of shoreline at the confluence of the spring run and confluence of the canal adjacent to Idiot's Delight spring. A public meeting for adjacent property owners and water-based businesses was held to provide an update on the project. Permit applications were submitted to the FDEP and the US Army Corps of Engineers. The FDEP permit was received in December 2021. Upon receipt of the USACOE permit, final design will be completed and bid documents will be developed. Construction is anticipated to occur between April and November 2023.

Outreach in 2021 – Volunteer Events, Presentations, and Education:

- Coordinated social media outreach with specific messaging about protecting springs. That social media outreach had a reach of 736,001.
- The District hosted a kayak tour of Three Sisters Springs for Save Our Waters Week.
- The District published a column in the Citrus County Chronicle for Save Our Waters Week
- An article about Crystal River's submerged aquatic vegetation mapping and spatial trends was published in the Citrus County Chronicles in February of 2021.
- April is Springs Protection Awareness Month and an article highlighting springs protection was featured in the Citrus County Chronicle in April 2021.
- Staff gave a presentation to the Friends of Crystal River National Wildlife Refuge. Staff gave an overview of the District's role in protecting Crystal River, including previous and upcoming projects.
- Developed Three Sisters education materials which including producing a video and distributing more than 13,000 educational items to area businesses and groups.
- 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 882 fourth-grade students, 667 seventh-grade students, 368 high school students, and 65 teachers. The District also provided funding to support educational

summer camps at the Marine Science Station, where seventy middle and high school students explored the local springs system, rivers and estuaries.

## 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.

Submerged aquatic vegetation (SAV) communities are significant contributors to ecosystem structure and function in spring systems and provide important ecosystem services including food and habitat for wildlife, nutrient cycling and removal, suspended particle filtration, sediment stabilization, and water clarity improvement. In recognition of the importance of SAV, the District assesses the status and trends of the SAV twice a year in the Homosassa River. This data is also used in support of monitoring the quantifiable objectives in the Surface Water Improvement and Management Plan and the associated MFL reevaluation for this system. The most abundant species in the Homosassa River include *Vallisneria americana* (eelgrass), *Najas guadalupensis* (southern naiad), *Zannichellia palustris* (horned pondweed), *Chaetomorpha spp.* (sea emerald), and filamentous algae. Water quality and other parameters, including specific conductance, turbidity, flow velocity, tree canopy cover, and substrate type, are also collected during sampling efforts. These parameters help to determine the causes of spatial distribution and changes over time of the SAV communities. Some of the major drivers of SAV communities in the Homosassa River include salinity fluctuations, sediment accumulation, and herbivory by animals including manatees.

The District's Coastal Rivers Water Quality Monitoring Network began in October of 2005 for 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 District's Springs Water Quality Monitoring Network has been sampling individual spring vents, at least quarterly, to monitor water quality in the Homosassa Springs complex since 1993. This network is the primary source of data tracking nitrates and other potential pollutants in our springs.

The District continues to work with Citrus County on multiple septic conversion projects that would reduce pollutant loads by an estimated 3,600 pounds per year of total nitrogen from the springshed.

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.

As of January 2014, the Governing Board of the Southwest Florida Water Management District approved inclusion of the Homosassa River as a SWIM Priority Waterbody. Summarizing 2014-2021, the SWIM Program and its cooperators have completed 1 restoration project, 1 water quality project, and 9 ecological studies for Homosassa River.

Outreach in 2021 – Volunteer Events, Presentations, and Education:

- Coordinated social media outreach with specific messaging about protecting springs. That social media outreach had a reach of 736,001.
- Staff gave a presentation to the Homosassa River Alliance.
- April is Springs Protection Awareness Month and an article highlighting springs protection was featured in the Citrus County Chronicle in April 2021.

## 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.

Submerged aquatic vegetation (SAV) communities are significant contributors to ecosystem structure and function in spring systems and provide important ecosystem services including food and habitat for wildlife, nutrient cycling and removal, suspended particle filtration, sediment stabilization, and water clarity improvement. In recognition of the importance of SAV, the District assesses the status and trends of the SAV twice a year in Rainbow River. This data is also used in support of monitoring the quantifiable objectives in the Surface Water Improvement and Management Plan and the associated MFL reevaluation for this system. The most abundant species in Rainbow River include *Sagittaria kurziana* (strap-leaf Sagittaria), *Vallisneria americana* (eelgrass), *Najas guadalupensis* (southern naiad), *Ludwigia repens* (primrose willow), *Hydrilla verticillata* (water thyme), and filamentous algae. Water quality and other parameters, including specific conductance, turbidity, flow velocity, tree canopy cover, and substrate type, are also collected during sampling efforts. These parameters help to determine the causes of spatial distribution and changes over time of the SAV communities. Some of the major drivers of SAV communities in Rainbow River include competition from exotic invasive species and recreation and herbivory by animals including manatees.

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.

In 1987 the Florida Legislature created the Surface Water Improvement and Management (SWIM) Act to protect, restore, and maintain Florida's highly threatened surface water bodies. Under this act, the state's five water management districts identified a list of priority water bodies within their authority and implemented plans to improve them. The first SWIM plan for Rainbow River was completed in 1989. Summarizing 1989-2021, the SWIM Program and its cooperators have completed 1 restoration project, 14 water quality projects, and 13 ecological studies for Rainbow River.

The following projects were either ongoing or completed in 2021:

**Investigation of Iron Stimulation of Filamentous Algal Growth in Rainbow River** - Work began in 2021 to investigate whether there is a correlation between iron concentrations and filamentous algae growth in Rainbow River. This is a follow-up to a study completed by the University of Florida in 2017. Understanding the ecosystem dynamics of filamentous algae in Rainbow River support the natural systems quantifiable objectives in the Rainbow River SWIM Plan. This study is ongoing.



## Outreach in 2021 – Volunteer Events, Presentations, and Education:

- Coordinated social media outreach with specific messaging about protecting springs. That social media outreach had a reach of 736,001.
- April is Springs Protection Awareness Month and an article highlighting springs protection was featured in the Citrus County Chronicle in April 2021.

## 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.

Submerged aquatic vegetation (SAV) communities are significant contributors to ecosystem structure and function in spring systems and provide important ecosystem services including food and habitat for wildlife, nutrient cycling and removal, suspended particle filtration, sediment stabilization, and water clarity improvement. In recognition of the importance of SAV, the District assesses the status and trends of the SAV twice a year in the Weeki Wachee River. This data is also used in support of monitoring the quantifiable objectives in the Surface Water Improvement and Management Plan and the associated MFL reevaluation for this system. The most abundant species in the Weeki Wachee River include *Vallisneria americana* (eelgrass), *Najas guadalupensis* (southern naiad), *Hydrilla verticillata* (water thyme), and filamentous algae. Water quality and other parameters, including specific conductance, turbidity, flow velocity, tree canopy cover, and substrate type, are also collected during sampling efforts. These parameters help to determine the causes of spatial distribution and changes over time of the SAV communities. Some of the major drivers of SAV communities in the Weeki Wachee River include sedimentation and recreation.

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.

The District's Coastal Rivers Water Quality Monitoring Network began in October of 2005 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 District's Springs Water Quality Monitoring Network has been sampling individual spring vents, at least quarterly, to monitor water quality in the Weeki Wachee Springs complex since 1993. This network is the primary source of data tracking nitrates and other potential pollutants in our springs.

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.

As of January 2014, the Governing Board of the Southwest Florida Water Management District approved inclusion of the Weeki Wachee as a SWIM Priority Waterbody. Summarizing 2014-2021, the SWIM Program and its cooperators have completed 2 water quality projects and 8 ecological studies for Weeki Wachee.

The following projects were either ongoing or completed in 2021:

**Weeki Wachee Channel Restoration** – Evaluation of accumulated sediments in the river and their removal to benefit the river's ecosystem. The District received funding from the state's General Appropriations Act for the evaluation, design, and permitting of the project which was completed in late 2019. Additional state funding was approved in the 2020 legislative session for project implementation. A contractor has been hired through a competitive bid process to complete the restoration project using the state funding and additional District funding. Construction will commence in early 2022.

**Weeki Wachee Sediment Management Structures** - This project includes design and permitting of sediment management structures that will provide habitat and enhance the Weeki Wachee River Restoration Project. The project is ongoing.

**Weeki Wachee Springshed Nitrogen Removal Stormwater Retrofits** - This is a cooperatively funded project with Hernando County to retrofit existing urban drainage retention areas with denitrification cells. Construction began in 2021.

Outreach in 2021 – Volunteer Events, Presentations, and Education:

- Launched the Weeki Wachee education campaign which included distributing more than 10,000 educational materials to 54 businesses; nine media stories; reaching more than 600,000 on social media with "Weeki Wednesday" posts; four new videos; two new river signs and 50 framed educational messages for 50 vacation rentals.
- Gave presentations to the Brooksville Rotary and Weeki Wachee Crime Watch groups about the Weeki campaign.
- Coordinated social media outreach with specific messaging about protecting springs. That social media outreach had a reach of 736,001.

- Funded a workshop to educate Hernando County residents with septic systems about how their actions on land are connected to groundwater/drinking water quality and the quality of water in local springs and rivers. Approximately 30 residents participated.
- 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 1,405 second-grade students, 1,157 fourth- grade students, 1,215 fifth-grade students, 755 sixth-grade students and 275 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 |
|------------------------------------|----------------------|--------------------------|---|-------------------|
| <b>Lake Panasoffkee</b>            | 3,200                | 230                      | 3   | 3                 |
| <b>Lake Tarpon</b>                 | 2,534                | 57.5                     | 9   | 8                 |
| <b>Lake Thonotosassa</b>           | 800                  | 49.1                     | 5   | 2                 |
| <b>Winter Haven Chain of Lakes</b> | 7516 (Total)         | 32.5                     | 13  | 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.

That 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.

A restoration and monitoring project for Lake Panasoffkee, which is funded through the SWIM Program, has involved dredging the lake bottom and littoral zone areas to remove areas of accumulated sediment. 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. Field parameters and water quality samples are collected at four stations on Lake Panasoffkee on a quarterly basis. The stations are located at the north, central, south, and outlet canal areas of the lake.

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.

Summarizing 1989-2021, the SWIM Program and its cooperators have completed 3 restoration project and 3 ecological studies for Lake Panasoffkee for a total of approximately 1,744 acres of restored wetlands.

## 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 recognized 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 identified strategies to improve and protect water quality, which were aimed at reducing internal and external sources of nutrients. Additionally, the 2001 SWIM Plan included projects to restore hydrology and habitat in the Brooker Creek watershed.

The Lake Tarpon SWIM Plan is being updated which began with a kick-off meeting held in January 2020 with Pinellas County. Then, two technical stakeholders' meetings were convened in 2020 to present results of water quality status and trends and the pollutant loading model. In early 2021, Pinellas County submitted a petition to FDEP to propose Site Specific Alternative Criteria in place of the Numeric Nutrient Criteria FDEP adopted for the Lake. The District has been coordinating with FDEP and the County to ensure that the SWIM plan supports data with regards to site specific criteria, prior to moving forward with a public meeting on the SWIM Plan.

Summarizing 1989-2021, the SWIM Program and its cooperators have completed 5 restoration projects, 4 water quality projects, and 8 ecological studies for Lake Tarpon for a total of approximately 33 acres of restored habitats.

## Lake Thonotosassa

Lake Thonotosassa is the largest natural lake in Hillsborough County. 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 Hillsborough County during future cooperative funding cycles. 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.

After the most recent assessments in 2014 verified the lake was impaired for nutrients, a Total Maximum Daily Loads (TMDLs) was developed by the Florida Department of Environmental Protection (FDEP) with participation of District staff. Following guidance from the U.S. Environmental Protection Agency, the TMDL for total nitrogen and total phosphorous was completed in 2019.

Summarizing 1989-2021, 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.

## 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 exhibits 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 the 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 1989-2021, the SWIM Program and its cooperators have completed 12 water quality projects, 1 natural systems restoration project, and 4 ecological studies for Winter Haven Chain of Lakes.

The following projects were either ongoing or completed in 2021:

**Lake Lulu Watershed Protection** - A feasibility study to identify opportunities to improve water quality, provide flood protection, and restore natural systems in the Lake Lulu watershed, which is one of the Winter Haven Chain of Lakes, a SWIM priority water body. During 2021, the data collection, compilation, & analysis were ongoing.

**South Lake Conine Watershed Restoration** - Construction of approximately 34 acres of wetlands along Lake Conine in Winter Haven. The City will be required to convey a conservation easement over the project area to the District. In 2021, construction was completed, and the conservation easement was in progress.

**Winter Haven Ridge Implementation of Stormwater BMPs** - The City of Winter Haven completed the design and permitting of low impact design BMPs to treat approximately 4.5 acres of stormwater runoff in the Winter Haven Ridge area. Construction is expected to begin in 2022.

## 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 were either ongoing or completed in 2021:

**Beach Street Stormwater System Improvements** - This is a cooperatively funded project with the City of New Port Richey. This project includes design, permitting and construction of stormwater improvement BMPs to treat runoff and improve water quality discharging to the Pithlachascotee River in New Port Richey. The project is ready to bid; however, COVID has affected funding. The City is currently exploring additional funding sources.

**Pasture Reserve** - The design, permitting, and construction of restored uplands and wetlands, including cypress strands, marsh, mixed forested wetlands, and pine flatwoods, in the Green Swamp Area of Critical State Concern. During 2021, the 90% construction plans were completed.

## Appendix A: Maps