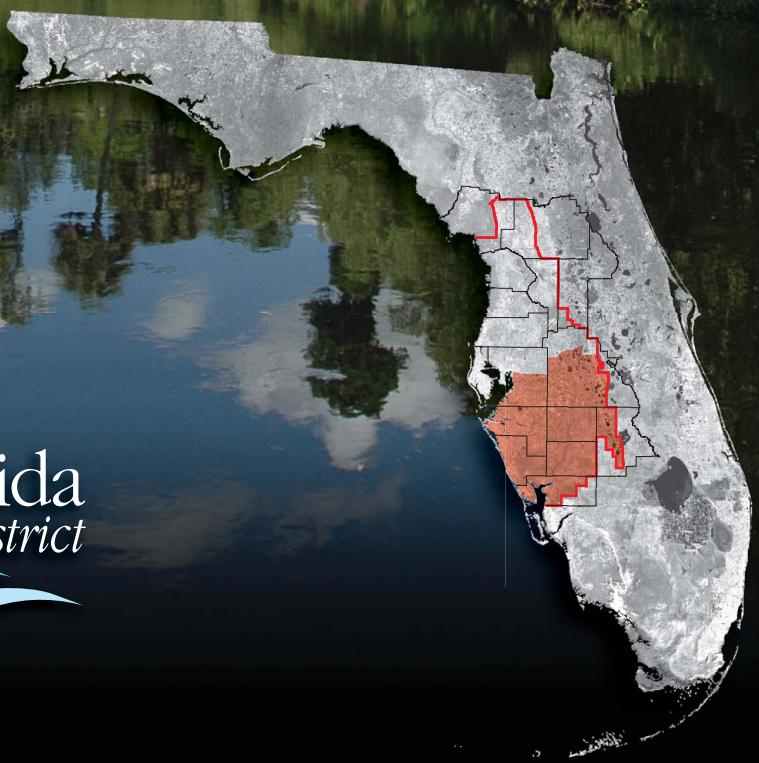
SOUTHERN WATER USE CAUTION AREA RECOVERY STRATEGY

FIVE-YEAR ASSESSMENT FOR FY2012-2016



Southwest Florida
Water Management District

APRIL 2018
FINAL REPORT

Southern Water Use Caution Area Recovery Strategy
Five-Year Assessment, FY2012-2016

April 2018

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Section I
Introduction

The Southern Water Use Caution Area (SWUCA) encompasses an area of approximately 5,100 square miles, including all or part of eight counties in the southern portion of the Southwest Florida Water Management District (District). The SWUCA Recovery Strategy (Recovery Strategy) was adopted in 2006 to address declines in aquifer levels, exceeding 50 feet in some areas, from groundwater withdrawals. These declines contributed to saltwater intrusion along the coast, reduced flows in the upper Peace River and lower lake levels in Polk and Highlands counties. Additionally, an area of about 708 square miles located along the coast of southern Hillsborough, Manatee and northwestern Sarasota counties, where the concern for saltwater intrusion was greatest, was designated as the Most Impacted Area (MIA).

The Recovery Strategy has four major goals to achieve by the year 2025. These are as follows:

1. Restore minimum levels to priority lakes in the Ridge area
2. Restore minimum flows to the upper Peace River
3. Reduce the rate of saltwater intrusion in coastal Hillsborough, Manatee and Sarasota counties by achieving the proposed minimum aquifer level for saltwater intrusion. When achieved, future efforts should seek further reductions in the rate of saltwater intrusion and the ultimate stabilization of the saltwater-freshwater interface
4. Ensure there are sufficient water supplies for all existing and projected reasonable-beneficial uses

Six major elements were identified for accomplishing the referenced goals. These elements appear below:

1. Development of a regional water supply plan
2. Use of existing rules
3. Enhancements to existing rules
4. Provide financial incentives for conservation and development of alternative supplies
5. Development and implementation of water resource development projects to aid in reestablishing minimum flows to rivers and enhance recharge
6. Resource monitoring, reporting and cumulative impact analysis

District regional water supply planning and minimum flows and levels (MFLs) assessments are the primary tools for ensuring water resource sustainability in the SWUCA. The regional water supply plan (RWSP) quantifies the water needs for existing and projected reasonable-beneficial uses for at least 20 years and identifies potential water supply source options. The RWSP is updated and approved every five years. Water supply planning for Polk County is also addressed in the Central Florida Water Initiative (CFWI) RWSP, which includes areas in the South Florida and St. Johns River water management districts. The District Governing Board (Board) approved both RWSPs in November 2015. Minimum flows and levels identify the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. If the existing flow or level of a water body is below, or is projected to fall below, the applicable minimum flow or level within 20 years, a recovery or prevention strategy must be implemented as part of the regional water supply plan. MFLs are helpful for the

sustainability evaluation. The District had adopted MFLs for 41 priority water bodies in the SWUCA as of October 2017.

Rule 40D-80.074, Florida Administrative Code, states that the Recovery Strategy, taken as a whole, is intended to achieve recovery to the established MFLs as soon as practicable. The rule also calls for periodic reporting on the Recovery Strategy's progress and, if periodic assessments do not indicate progress, the Board will revise the Recovery Strategy, as appropriate, to achieve progress. The previous Assessment covered fiscal years 2007 through 2011. That Assessment reported SWUCA groundwater levels as generally stable, with increasing levels in the north and decreasing levels in some southern areas. In 2011, the MIA aquifer level was 0.7 feet below the adopted saltwater intrusion minimum aquifer level (SWIMAL). Annual rainfall over much of the basin was characterized as below the long-term average. The Assessment described the saltwater interface as continuing to move inland. This movement was expected since the strategy's goal is to reduce the rate of movement by achieving the SWIMAL. Of the 41 established MFLs for water bodies, 21 were met and 20 were not met. Additionally, groundwater demands had declined over the past 10 years. This decline was primarily attributed to the implementation of alternative water supply, water use and water conservation initiatives.

The previous Assessment also included a Board-approved stakeholder outreach effort to identify other options for the MIA and the Ridge Lakes areas of the SWUCA. Four meetings were held in 2015 in each of those areas. Meeting participants represented all the major water use groups along with a variety of environmental organizations, state agencies and other interested parties. For the MIA, six options were identified to help meet the SWIMAL goal. The Board voted to support five options (see below) and directed staff to gather more information on the exploration of aquifer recharge and aquifer storage and recovery. There was also subsequent approval of an increase to the District's cost share to 75 percent for Facilitating Agricultural Resource Management Systems (FARMS) projects in the MIA for a period of three years. This action was to encourage participation in the program.

MIA Options:
1. Continue monitoring
2. Update analytical tools
3. Promote water conservation initiatives
4. Expand FARMS
5. Expand beneficial reuse

For the Ridge Lakes, three options were identified. The Board supported all three options.

Ridge Lakes Options:
1. Continue monitoring
2. Reevaluate established minimum lake levels
3. Evaluate options for individual lakes

This Recovery Strategy update serves as both the annual report for 2017 and the second five-year assessment, covering 2012 through 2016. The update evaluates and assesses the recovery in terms of trends in the resource, in permitted and used water quantities, and in the development of projects and initiatives to address issues within the SWUCA. The update also provides the information necessary to determine progress in achieving recovery and protection goals and allows the District to revise its approach if necessary to respond to changes in resource conditions and issues.

Section II
Hydrologic Conditions Update

The District uses its extensive hydrologic monitoring network to monitor resource conditions to measure progress toward recovery. Primary resource monitoring includes long-term groundwater levels and surface water levels and flows; coastal groundwater quality; estimated and permitted groundwater use; and the status of MFL water bodies. The locations and the annual average groundwater levels from six "sentinel" long-term Upper Floridan aquifer monitoring wells are shown in Figures 2-1 and 2-2, respectively. These wells enable observation of recovery progress through a comparison of recent to historical water level trends. The water level histories for each well are similar with respect to their general patterns of rise and decline. The levels respond to both local and regional effects. The dissimilarity in levels among the wells is primarily due to well location but can also be attributed to local factors such as rainfall and withdrawals. Regional effects are produced by the interaction of the many pumping wells withdrawing water from the confined, highly transmissive Upper Floridan aquifer in the region. Over the long-term, water levels have increased in the six sentinel wells since the mid-1970s. Since the previous Assessment, groundwater levels have continued to increase in the sentinel wells.

Figure 2-1. Boundaries for Southern Water Use Caution Area (SWUCA), Most Impacted Area (MIA), and Central Florida Water Initiative (CFWI), and SWUCA MIA Sentinel Wells

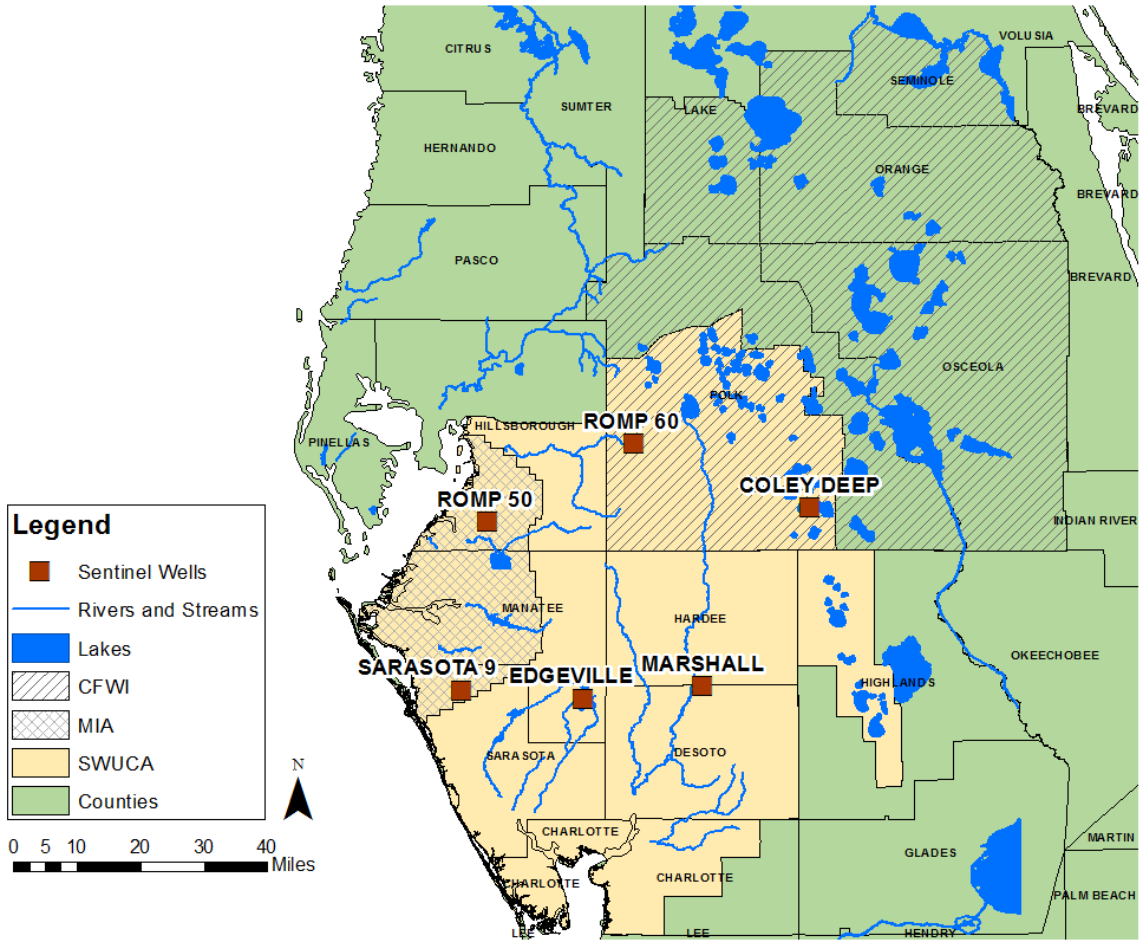
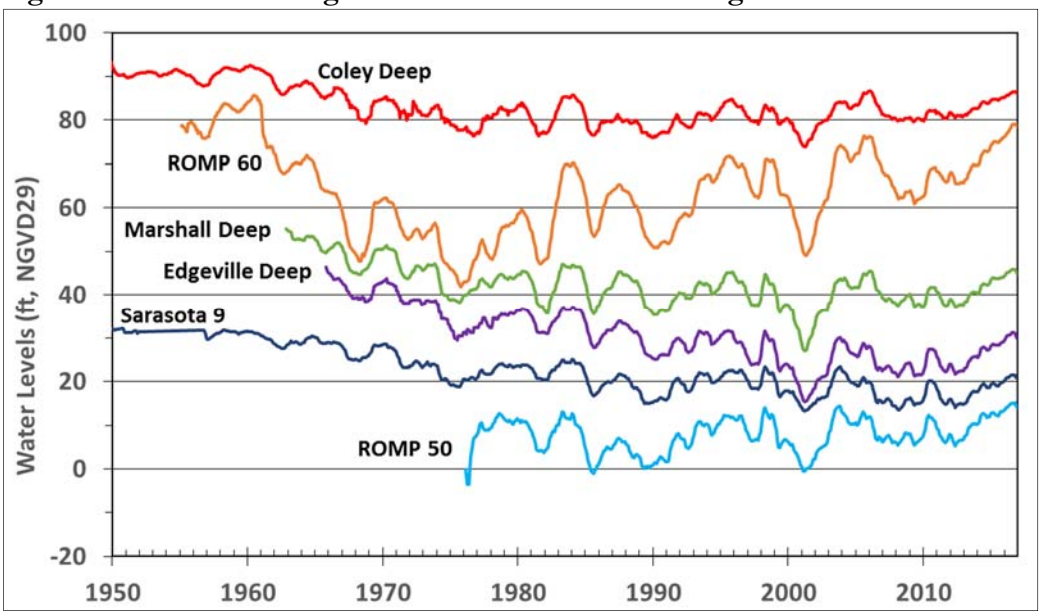
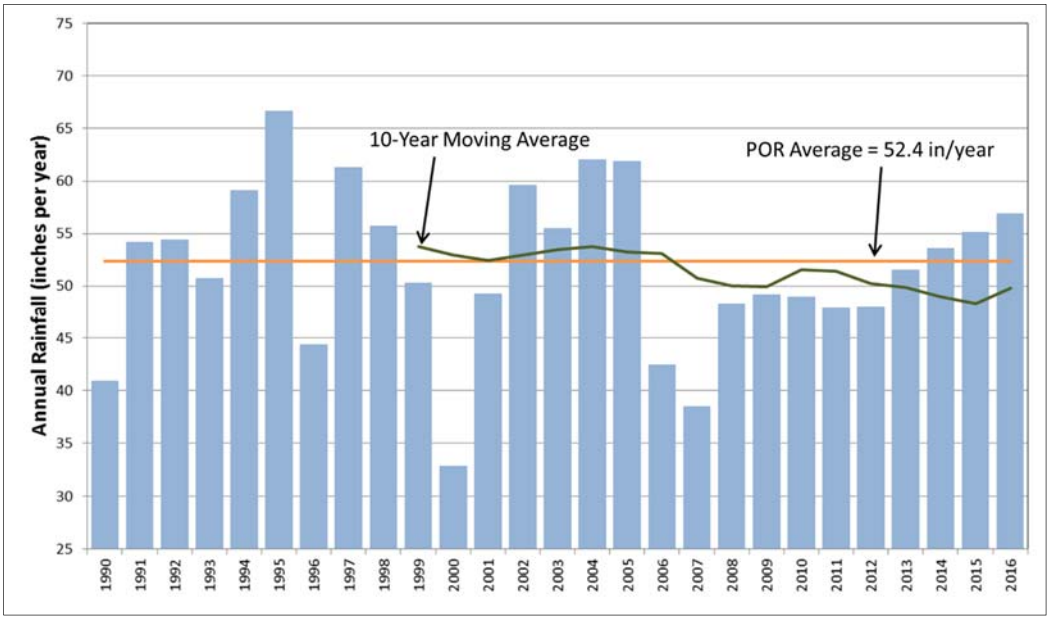


Figure 2-2. SWUCA Long-term Groundwater Monitoring Sites



Water level fluctuations in the SWUCA basin are principally in response to changes in rainfall/recharge and pumping, and to some extent drainage alterations. Variations in rainfall directly affect lake levels and river flows and can affect Upper Floridan aquifer water levels both directly and indirectly. The indirect effect is that low rainfall results in higher groundwater withdrawal amounts (lower groundwater levels) and high rainfall results in lower groundwater withdrawal amounts (higher groundwater levels). Since 2007, the 10-year moving average of rainfall has been below the period of record average of 52.4 inches per year, which began in 1915 (Figure 2-3). Currently, the 10-year moving average is 49.8 inches, which is 2.6 inches below the period of record average. Additionally, annual average rainfall in the SWUCA has only been above average seven times since 2000.

Figure 2-3. SWUCA Annual Average Rainfall and 10-Year Moving Average

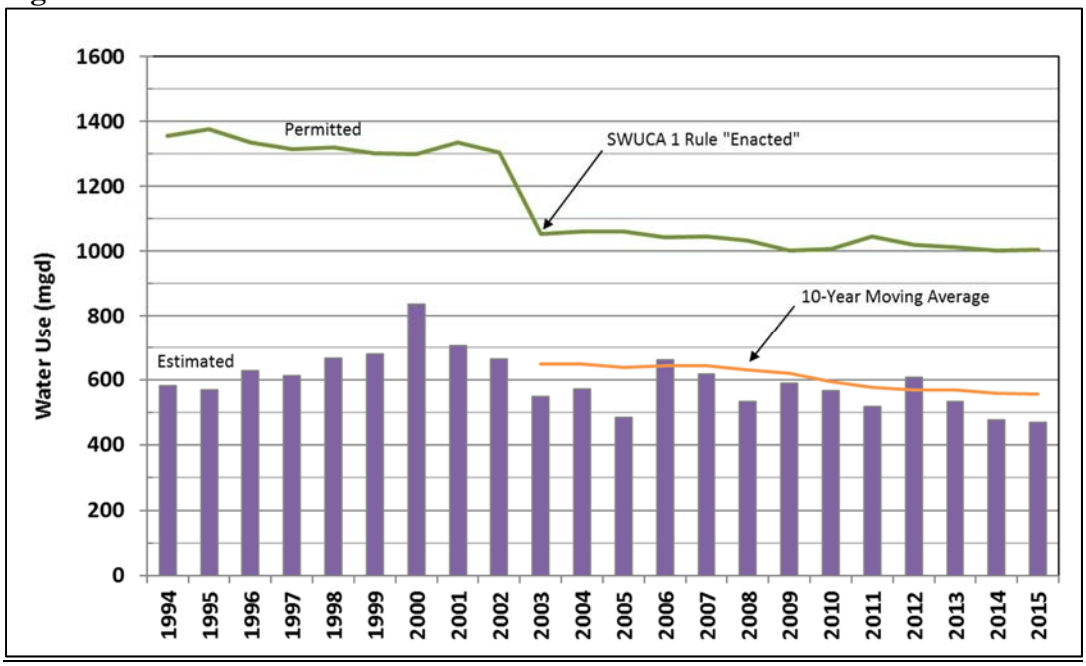


Historical groundwater withdrawals in the SWUCA increased significantly from the mid-1900s to the 1980s and have since stabilized. Though the Recovery Strategy does not strictly limit groundwater withdrawals, the District previously estimated it would be necessary to reduce total pumping over time from 650 mgd (about 580 mgd from the Upper Floridan aquifer) to about 600 mgd (about 540 mgd from the Upper Floridan aquifer) to meet the adopted SWIMAL in the MIA of the SWUCA (SWFWMD, 2006). While year to year changes can be quite large in response to variations in rainfall, long-term total pumping, as indicated by the 10-year moving average, has been below the 600 mgd benchmark since 2010 (Figure 2-4). This is the result of considerable efforts by the District and water users in the basin to implement conservation measures and implement alternative water supply projects, as well as changes in water use activities.

In addition to monitoring changes in actual groundwater use, the District monitors changes in permitted withdrawals. Adjustments were made to permitted amounts for many irrigation uses in 2003 as part of the implementation of the SWUCA I rules. Since then, permitted groundwater withdrawals in the basin have been generally stable. Of particular interest to long-term management of water levels is that actual groundwater use is about 50 to 60 percent of total permitted groundwater use. Because most permits include elements of future growth, it is expected that actual use would be less than permitted use. However, this difference represents the potential for actual groundwater use to increase, and it is important to monitor trends in the difference as a means of projecting future resource trends and potential problems with the District's recovery efforts. Public supply and agricultural users, the two largest use groups, have average pumped-to-permitted ratios of about 66 percent and 51 percent, respectively, for the period 1994 through 2015.

Though the District's management efforts have resulted in stabilization of historical groundwater withdrawals and even some reduction, the total water use in the basin has increased. Much of this additional water use has been met through development of alternative water sources, including reclaimed water and surface water. Development of these sources has been the result of efforts by water users in the SWUCA basin working closely with the District.

Figure 2-4. Total Historical and Permitted Groundwater Use in the SWUCA



Section III
Goal 1: Restore Minimum Levels to Priority Lakes in the Ridge Area

Florida law (Section 373.042, F.S.) requires the water management districts to establish MFLs to identify the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. In the early 2000s, the District proposed minimum levels on eight lakes on the Lake Wales Ridge. Because most of levels were not being met, as required by Florida law (Section 373.0421, F.S.), the District initiated development of a Recovery Strategy to achieve these MFLs. To date, MFLs have been adopted on 28 lakes in the SWUCA. One minimum level priority water body (Lake Hancock) has been adopted since the previous Assessment. This section presents the current lake level status relative to the adopted MFLs, the projects and efforts to restore lake levels, the progress made towards achieving the goal by 2025 and the recommendations for future efforts.

Lake Level Status

There are 12 lakes meeting minimum levels, whereas 16 are not being met (Table 3-1). The addition of Lake Hancock, which is meeting the minimum level, is the only change between the current Assessment and the prior Assessment. Additionally, the District's five Upper Floridan aquifer regulatory wells are used to measure the water level recovery in the Lake Wales Ridge area. These monitoring well levels are used as regional water level indicators. If these regulatory levels are met, water use permit applications are presumed to not cause cumulative aquifer impacts in the lakes area and new permits may be allowed as long as the withdrawals meet all rule criteria, including not impacting those water bodies (lakes, rivers and springs) failing to meet their adopted MFLs. If these water body levels are not met, permits for withdrawals can only be authorized if a "Net Benefit" (as defined in Water Use Permit Applicants Handbook, Part B, SWFWMD 2015) occurs. The locations of the Lake Wales Ridge regulatory level wells and adopted lake MFLs are shown in Figure 3-1. An additional figure showing lake locations and current status as of 2016 is included in Appendix 3. Currently, the Lake Wales Ridge regulatory levels are being met and are exceeded by 0.9 feet (Figure 3-2).

Lake Recovery Efforts and Projects

The SWUCA Recovery Strategy Five-Year Assessment for FY2007-2011 (Assessment) determined that additional options above and beyond those identified in the Recovery Strategy would be necessary to achieve recovery of MFLs in the Ridge Lakes area of the SWUCA. At the direction of the Governing Board, District staff conducted stakeholder outreach efforts to identify additional options to achieve Ridge Lake recovery. The three options identified by the outreach effort and approved by the Governing Board to help meet the minimum levels goals in the Ridge Lakes area are:

1. Enhance and continue monitoring
2. Reevaluate established minimum lake levels
3. Evaluate and develop recovery options for individual lakes

Parallel to our District lake recovery efforts is the Central Florida Water Initiative (CFWI) effort. This activity may affect the future management of water resources in the SWUCA. CFWI is a cooperative effort among the St. Johns River, South Florida and Southwest Florida water management districts, the Florida Department of Environmental Protection (DEP), the Florida Department of Agriculture and Consumer Services (DACS), and public water supply utilities to assess groundwater availability in the Central Florida area and ensure the region's water needs are met while protecting the water and related resources. The area encompasses all of Orange, Osceola, Polk and Seminole counties and portions of Lake County. This is an area where the districts have previously determined through water supply planning efforts that groundwater availability is limited over the 20-year planning horizon. The effort will result in a common approach to be used by the districts to allocate groundwater and includes

Table 3-1. Lake MFLs

Lake	County	Meeting Y/N	Reevaluated	Estimated Feet Below MFL		Closer to MFL
				2011	2016	
Clinch	Polk	Y				
*Hancock	Polk	Y				
Placid	Highlands	Y				
Lee	Polk	Y				
June-in-Winter	Highlands	Y				
Dinner	Polk	Y				
Crystal	Polk	Y				
Mabel	Polk	Y				
Venus	Polk	Y				
Parker	Polk	Y				
Annie	Polk	Y				
Wimauma	Hillsborough	Y				
**Bonnie	Polk	N		0.6	1.2	-0.6
Starr	Polk	N	Y	0.8	1.1	-0.3
North Wales	Polk	N		1.3	0.9	0.4
Denton	Highlands	N		3.9	3.4	0.5
Anoka	Highlands	N		0.9	0.4	0.5
Tulane	Highlands	N		4.6	4.1	0.5
Angelo	Highlands	N		4.1	3.6	0.5
Verona	Highlands	N		6.0	5.4	0.6
Little Jackson	Highlands	N	Y	1.3	0.3	1.0
Jackson	Highlands	N	Y	1.5	0.3	1.2
Wailes	Polk	N	Y	3.4	1.5	1.9
Eagle	Polk	N	Y	3.3	1.1	2.2
Crooked	Polk	N	Y	2.6	0.3	2.3
Letta	Highlands	N	Y	3.7	0.9	2.8
Lotela	Highlands	N	Y	4.5	0.9	3.6
McLeod	Polk	N	Y	5.2	0.5	4.7
OVERALL AVERAGE RECOVERY						**1.5**

* Established after 2011

** Lake data issues

Figure 3-1. MFL Lake Status and Location and Regulatory Well Locations

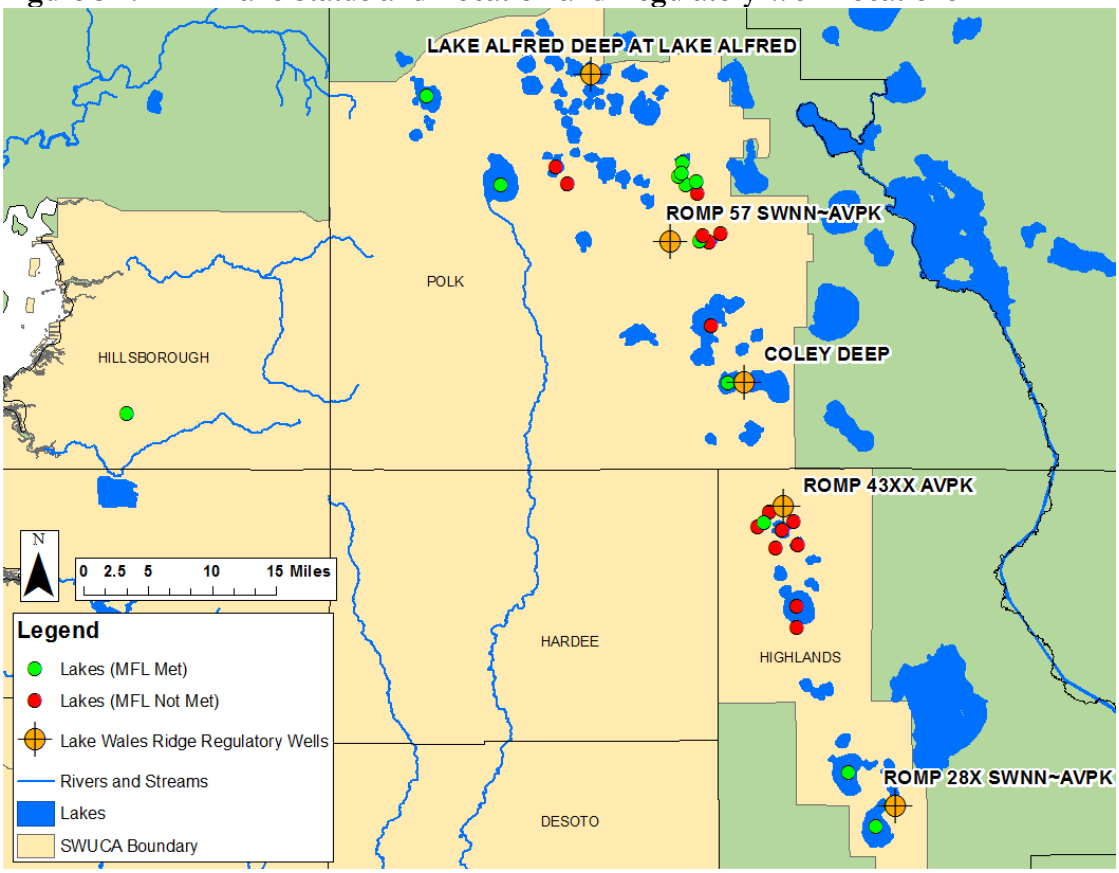
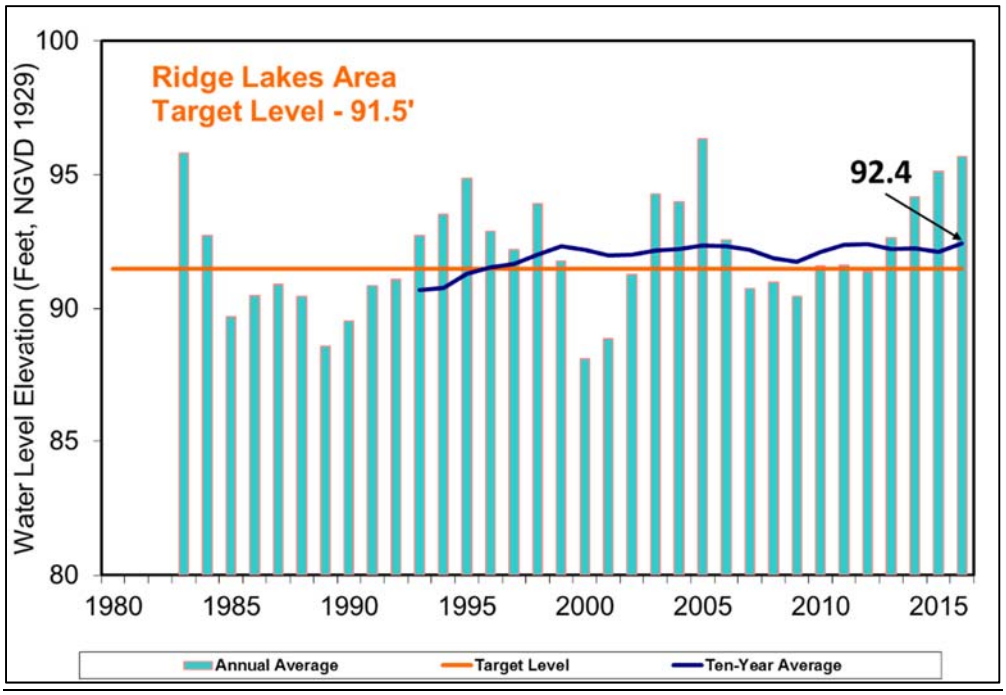


Figure 3-2. Lake Wales Ridge Regulatory Well Target Levels



development of water supply solutions and regulations. A decision-making process has been established including an Executive Steering Committee consisting of one Governing Board member from each district, senior level staff representatives from DEP and DACS, and a public water supply utilities representative. In November 2015, respective governing boards of the three water management districts approved the 2015 CFWI Regional Water Supply Plan (RWSP), Volumes I and II with their associated appendices. These documents are available at cfwiwater.com. The 2020 RWSP is currently under development, as is a conservation implementation strategy.

As the CFWI is being developed, the District continues to work on the three options identified by the outreach effort and approved by the Governing Board to help meet the minimum levels goals in the Ridge Lakes Area.

Option One: Monitoring

Data collection within the SWUCA is essential to the accurate establishment of minimum lake levels and to assess the status of the Ridge Lakes and the effects of various factors on those lake levels. The data needed include water levels and quality, rainfall, and groundwater withdrawals. The Ridge Lakes are located in Polk and Highlands counties and are mostly within the CFWI area. The CFWI Data, Monitoring, and Investigative Team (DMIT) is a technical team that is responsible for data collection and data storage within the CFWI area. The DMIT Work Plan Update for FY2016-2020 includes the construction and data collection for monitoring equipment needed to assess or establish MFLs at all current and proposed MFL waterbodies within the CFWI. Construction of monitoring equipment at the MFL sites within the CFWI will be completed by FY2020.

Option Two: Minimum Lake Levels Reevaluation

Reevaluating minimum levels on lakes is being done on specific lakes that had MFLs established using an older methodology. As of 2016, the District reevaluated established minimum levels on seven Ridge Lakes. Additionally, one lake has newly established minimum levels that have been approved by the District Governing Board. The MFLs for these eight lakes were based on the most updated methods available for establishing MFLs. This ensures the best available information is used prior to implementing recovery projects.

Option Three: Individual Lake Recovery Projects

Due to the numerous individual water use permits and their dispersed nature, lake level recovery projects need to be local in nature and generally would consist of conservation, structure modifications (inflow/outflow), drainage system restoration, back-plugging of canals, augmentation, and relocation or replacement of adjacent groundwater withdrawals. Hence, management plans to evaluate available recovery options for Ridge Lakes will be completed for individual lakes rather than relying on a regional approach. There are four individual lake projects under investigation and, based on the results of those projects, additional efforts are proposed to develop new projects for the remaining lakes with MFLs not being met.

The first project is a District-funded study, in coordination with the City of Lake Wales and Florida's Natural Growers. This is ongoing and will identify potential options to recover Lake Wailes. Once options are identified, the District and stakeholders will choose and implement an agreed-upon option. The District will fund a similar study to identify potential options to recover Eagle Lake and Lake McLeod. The study is anticipated to begin in FY2018.

The next project is the Lake Jackson Watershed Hydrology Investigation project. This is an ongoing Cooperative Funding Initiative (CFI) project between the District and Highlands County. The primary objectives of this project are to better understand the water budget of Lake Jackson and Little Lake

Jackson, locate physical causes of its low water level, and collect the data and develop alternatives required to optimize recovery resources and efforts. A background review and recommendations report has been completed. The next phase of the project will be to implement data collection as described in the background review and recommendation report and begin monitoring the hydrology within the watershed followed by watershed hydrology modeling. A final report is anticipated to be completed by 2022.

The third project is a CFI project with Haines City to evaluate options to recharge reclaimed water to the surficial aquifer near Lake Eva. The project is a feasibility study that will provide data to evaluate potential sites, components, costs and benefits of reclaimed water recharge options to assist in meeting Lake Eva Minimum Lake Levels (MLL).

The fourth project is the initial phase of the Lake Lotela Pilot Augmentation Project feasibility study. This initial phase developed a numerical model to evaluate lake augmentation rates or groundwater reductions within the basin necessary to achieve the MLL. The study estimated an augmentation rate of 0.4 mgd or a 37% reduction in groundwater withdrawals would be necessary to meet the MLL. The long-term goal of the project is to construct a pilot augmentation and monitoring system to more fully evaluate the feasibility of augmentation to increase surface water levels in Lake Lotela, an 800-acre lake in northern Highlands County. The Upper Floridan aquifer was determined to be a suitable potential source for augmentation water for this lake; however, it is not deemed to be a regional solution to the low lake levels due to the magnitude of withdrawals that would be required to augment all lakes in the SWUCA that are below adopted minimum levels. Identification of projects to augment the lake and/or reduce groundwater withdrawals in the area is the next project step. Moving forward with any local application of Upper Floridan aquifer lake augmentation would require balancing this use of Upper Floridan aquifer water with the needs for water supplies in the region.

There are other recovery options in the very early stages of being evaluated by the District. One is an outreach effort led by the District's FARMS Program. Currently, the District is identifying agricultural permits within the Lake Starr area. The District will evaluate the permits and identify ones that could be eligible for the Mini FARMS Program. This effort could potentially assist Lake Starr in meeting its MFL.

While not an individual lake recovery project, the District is funding research to reduce nutrients in highly treated reclaimed water to produce another source of water for lake recovery projects. If effective, another potential project option to recover lake levels via recharge of reclaimed water through rapid infiltration basins (RIBs) located near lakes may be possible. One challenge to this approach is potential increased nutrient loading to the lake from the reclaimed water. Evaluation of Nitrogen Leaching from Reclaimed Water Applied to Lawns, Sprayfields, and Rapid Infiltration Basins (B403) is a FY2016 Institute of Food and Agricultural Sciences (IFAS) research project that will compare Total Nitrogen (N) and Total Phosphorus (P) leaching differences between three typical reclaimed water applications; RIBs, lawns, and sprayfields. A major component of this evaluation will be testing several denitrification materials that have shown to be effective in reducing N and P in other applications (stormwater, septic, groundwater). Denitrification materials have not yet been used in RIBs. By determining whether denitrification zones effectively reduce N loading from reclaimed water, RIBs can be renovated to include a denitrification zone which may greatly enhance the denitrification component of the RIB design and, in turn, could increase water quality in the water recharging the aquifer or nearby lakes. This would be critical in meeting water quality requirements within nearby surface water bodies that are affected by RIB recharge. Several denitrification zone materials will be evaluated during this experiment, including saw dust, limestone, and biochar. The final report will provide recommendations as to future RIB design, their potential impact on water quality, and a summary of N and P leaching from RIBs, lawns and sprayfields.

Lake Restoration Progress

The goal to achieve MLL continues to be a challenge, but progress is being made. Since the prior Assessment, Lake Hancock, which was established after 2011, is the only change in the current Assessment. Progress has also been made on the other lakes not meeting their MFLs. The 16 lakes currently not meeting their MFLs now are on average 1.5 feet closer to their levels than during the Assessment as shown in Table 3-1. Four lakes (Crooked, Letta, Lotela, Eagle, and McLeod) are closer to meeting their respective MLL by two feet or more as a result of minimum level reevaluation and/or recent reductions in groundwater use. These improvements may be partially due to recent increases in rainfall and corresponding reductions in groundwater withdrawals; however, conservation and FARMS projects, as well as other efforts, have also contributed to reductions in groundwater use and the improved lake levels. Monitoring efforts continue to improve, and MFL reevaluations of scheduled SWUCA lakes have been completed. The District's outreach efforts have led to the initiation of individual lake restoration projects for several lakes. Some of these projects are in the alternative identification and evaluation phase with selection and design still to follow. The options to relocate withdrawals further from the lakes, complete wells deeper in the aquifer and augment lakes are all being considered. Developing local solutions for each lake will require District resources and focus. The agricultural community has shown an interest in helping but is struggling with citrus greening and other issues. The IFAS research project on nitrogen leaching discussed previously may provide another option for augmentation of lakes with reclaimed water recharged through RIBs near the lake.

Recommendations

Implementation of the options developed through the previous outreach effort and approved by the Governing Board should continue along with continuing to promote conservation projects and alternative water supplies through the Cooperative Funding Initiative and the FARMS and Mini FARMS Programs. Specific recommendations for each of the approved options are:

Enhance and continue monitoring

Complete the construction of monitoring equipment at the MFL sites within the CFWI consistent with the DMIT Work Plan Update for FY2016-2020.

Reevaluate established minimum lake levels

Schedule and complete future reevaluations of minimum lake levels as new and improved analysis methods are developed.

Evaluate and develop recovery options for individual lakes

- Complete the lake level recovery project evaluations for lakes Wailes, Eagle, McLeod and Lotela and implement if feasible.
- Continue to support the Lake Jackson Watershed Hydrology project to identify potential reasons for low water levels in Lake Jackson and Little Lake Jackson.
- Continue to support the Haines City Lake Eva project, including implementation if the evaluation demonstrates that there are feasible options for meeting lake levels.
- Continue to support the IFAS research project on nitrogen leaching.
- Conduct additional stakeholder outreach with each individual lake recovery project to improve the potential to develop successful projects.
- Monitor the project impacts and use the results of these projects to develop additional individual lake level recovery projects for other lakes not meeting their MLLs.

Section IV
Goal 2: Restore Minimum Flows to the Upper Peace River

Within the SWUCA, the District adopted minimum flows for segments on five different rivers and one spring group, for a total of 12 minimum flow sites. The Peace River was evaluated in three segments; the upper (with minimum flows established at three gages in the upper segment), middle and lower. The Alafia River and Myakka River were both evaluated in two segments each. The Braden River and the Dona Bay/Shakett Creek were both evaluated in one segment each. Through calendar year 2016, minimum flows were met except at two sites in the upper Peace River segment. The following discussion is focused on the status of achieving Goal 2, Restore Minimum Flows to the Upper Peace River.

Upper Peace River Minimum Flow Restoration

Figure 4-1 depicts the locations of all five rivers and the springs group within the SWUCA, five regulatory wells, and three flow gages in the upper Peace River. Figures 4-2, 4-3 and 4-4 compare data from the recorded flows through 2016 to the minimum flow at each of the three gages used to evaluate restoration progress. At this time, only Minimum Low Flows are established for the upper Peace River with mid- and high-minimum flows expected to be established in the future. The Minimum Low Flow is achieved if flow is greater than the Minimum Low Flow specified by gage at least 95 percent of the days, or 350 days, of a calendar year for three consecutive years. Once the Minimum Low Flow has been achieved for three consecutive years, Minimum Low Flow is not met when the measured flow rate is below the Minimum Low Flow for two out of ten years commencing the year after achievement. The SWUCA goal to restore Minimum Flows to the upper Peace River will be achieved when all three gages meet the criteria described above.

Figure 4-1. SWUCA Minimum Flow Locations and Peace River Regulatory Wells and Gages

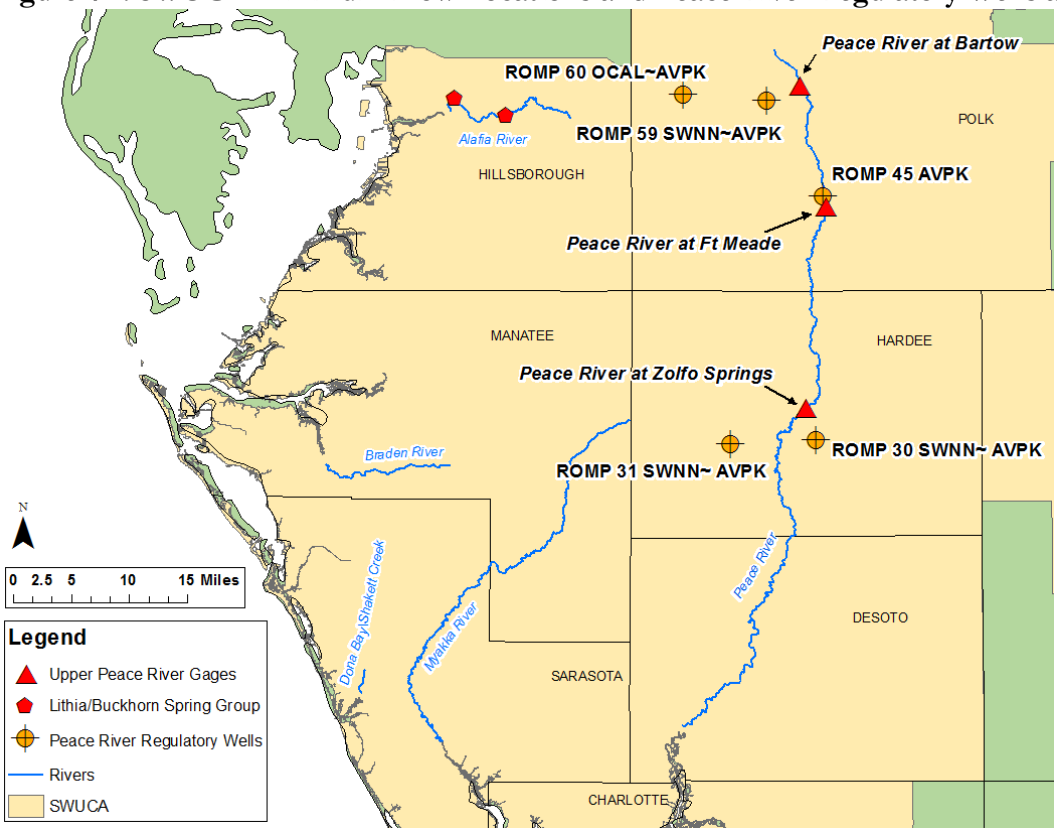


Figure 4- 2. Upper Peace at Bartow

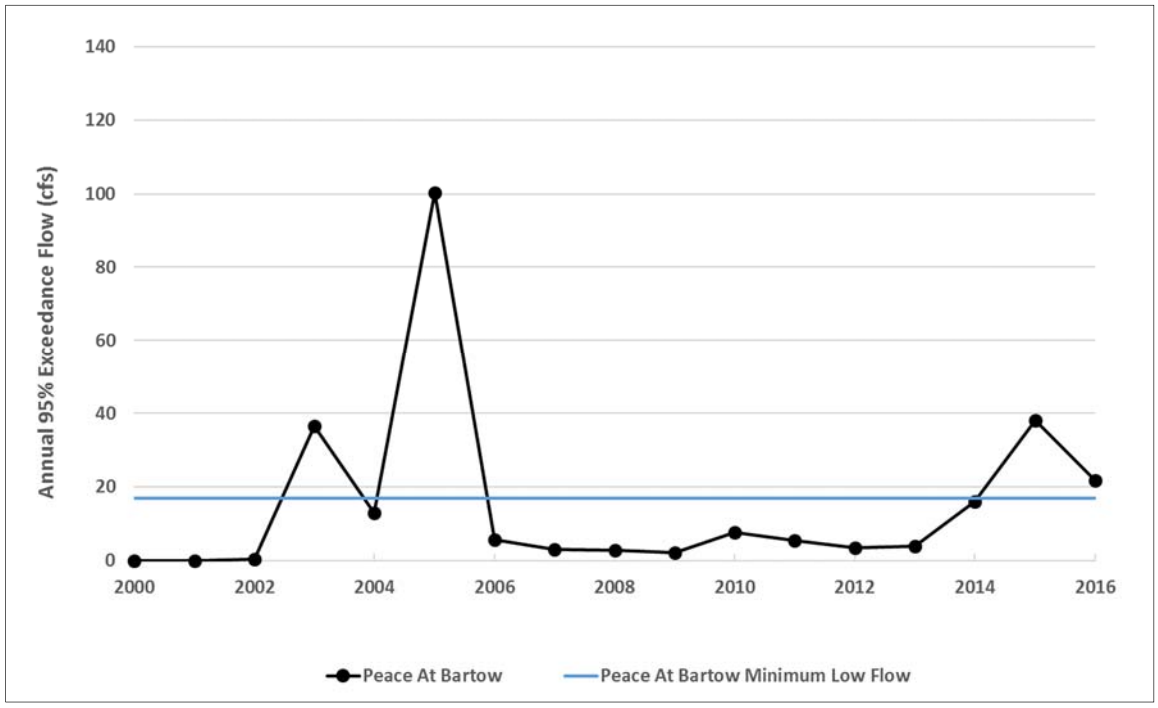


Figure 4-3. Upper Peace at Fort Meade

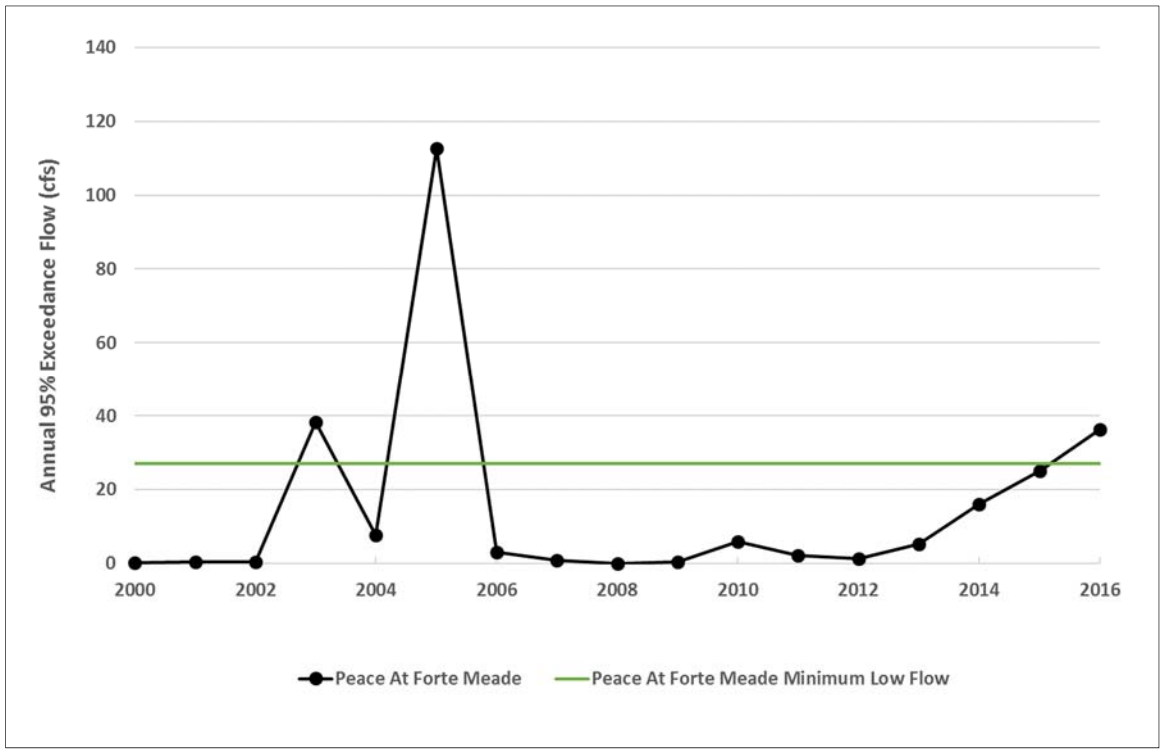
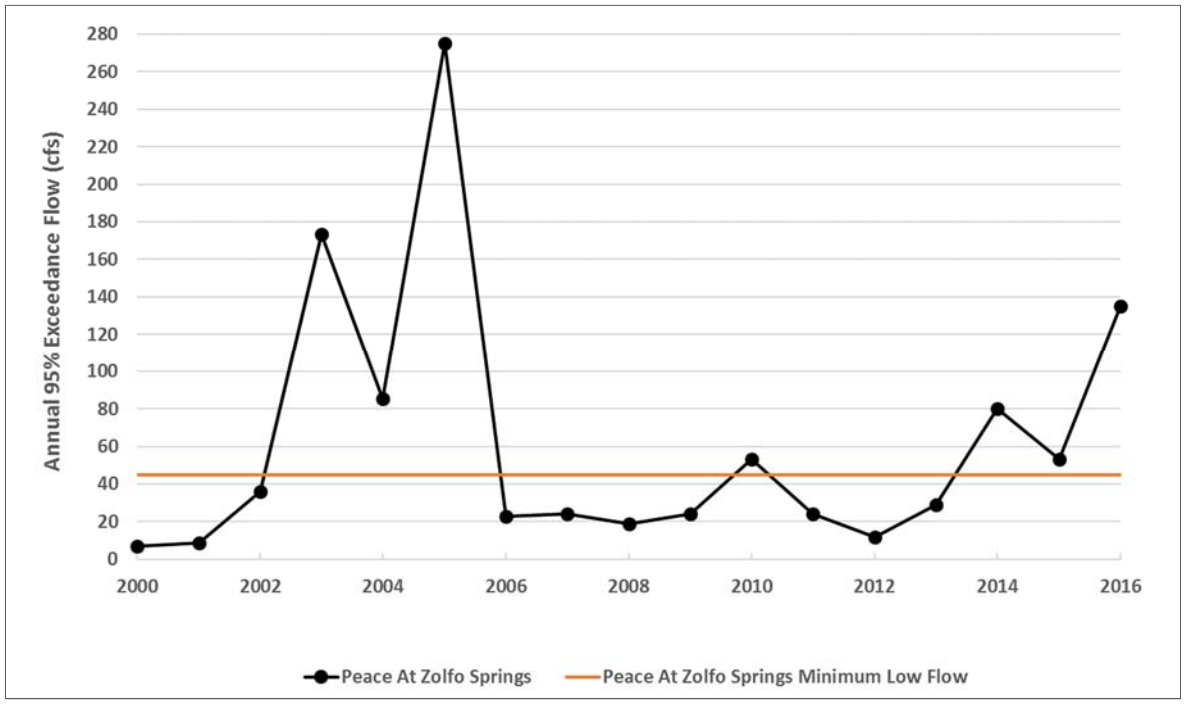


Figure 4-4. Upper Peace at Zolfo Springs



The graphs illustrate the progress made toward Goal 2. Flow at the Bartow gage exceeded the minimum flow for two consecutive years (2015 – 2016); flow at the Fort Meade gage exceeded the minimum flow in 2016; and flow at the Zolfo Springs gage exceeded the minimum flow for three consecutive years (2014 – 2016). For 2006 through 2013, flow at one of the gages was above its minimum flow for one year. While there has been improvement, because only one of the three gages achieved three consecutive years above its minimum flow, the goal to restore minimum flows to the upper Peace River is not achieved.

In addition to these MFLs, the District's five Upper Floridan aquifer regulatory wells are used to measure the water level recovery in the upper Peace River basin area. These monitoring well levels are used as regional water level indicators. Like the Lake Wales Ridge regulatory levels, if these regulatory levels are met, water use permit applications are presumed to not cause cumulative impacts and new permits may be allowed if the withdrawals meet all rule criteria, including not impacting those water bodies failing to meet their adopted MFLs. If these levels are not met, permits for withdrawals can only be authorized if a "Net Benefit" occurs. The upper Peace River basin Upper Floridan aquifer regulatory levels are currently being met. Figure 4-5 shows the Peace River aquifer levels through 2016.

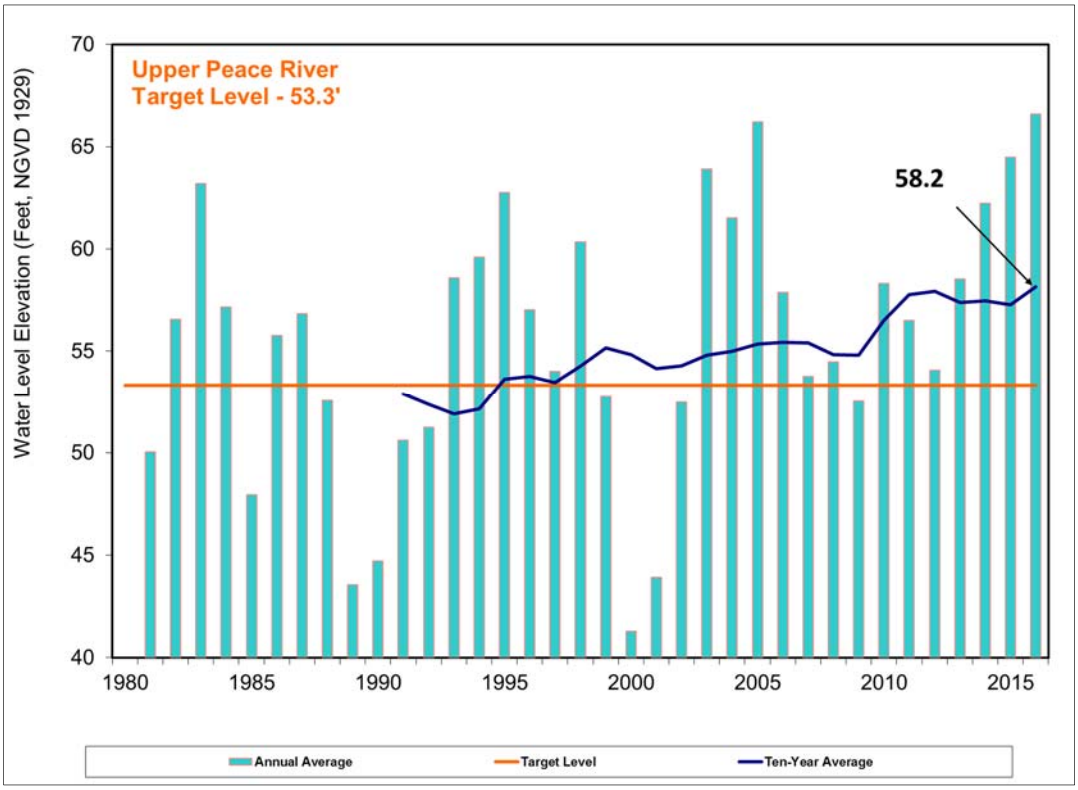
Upper Peace River Restoration Efforts and Projects

These projects include those addressing the extensive drainage and surficial alteration of land features in the Peace River watershed. The projects for this watershed seek to restore historically lost lake and floodplain storage to aid in reestablishing minimum flows to rivers and enhancing recharge.

Lake Hancock Lake Level Modification and Ecosystem Restoration Project

This restoration project will aid in reestablishing perennial flow to the upper Peace River. The project design raises the control elevation of Lake Hancock, a 4,500-acre lake in the headwaters of the Peace River watershed, from 98.7 feet NGVD up to a target elevation of 100.0 feet NGVD for water storage,

Figure 4-5. Upper Peace River Regulatory Wells



and then slowly releases the water during the dry season to help meet the low-flow requirements in the upper Peace River. Currently the upper Peace River, from Bartow to Zolfo Springs, exceeds the minimum flows approximately 70 percent of the time. It is anticipated that this project will increase the time the upper Peace River meets or exceeds the minimum flows to approximately 89 percent. The District acquired approximately 8,337 acres around the lake to support the project. All construction activities necessary to implement the project were completed in June 2015. The system became operational in the fall of 2015. The District anticipates a three- to five-year testing phase to develop operation guidance protocols for various hydrologic conditions to achieve expected MFL benefits in concert with the Lake Hancock Outfall Treatment system.

Lake Hancock Outfall Treatment Project

The purpose of this project is to improve the quality of water discharging from Lake Hancock into South Saddle Creek, the Peace River and ultimately, Charlotte Harbor. The project involved construction of a 1,000-acre treatment wetland to improve water quality leaving the lake. The primary goal of the project is to reduce nitrogen loads by 27 percent annually in discharges from the lake to the upper Peace River and ultimately Charlotte Harbor, an estuary of national significance and a Surface Water Improvement and Management (SWIM) Program priority water body. Construction of the treatment system began in September 2011 and was completed in June 2014. Operation since this time has focused on vegetation establishment to promote growth of a dense stand of emergent wetland vegetation. The District anticipates an approximately five-year testing phase to develop operation guidance protocols for various hydrologic conditions to achieve the water quality objectives in concert with the MFL objectives of the Lake Level Modification project.

Upper Peace River Resource Development Project

This project involved the investigation of resource restoration and development opportunities in the upper Peace River watershed that could contribute to recovery of minimum flows. Several initiatives have been conducted as part of this project, including an evaluation of watershed conditions and a study that determined the reconnection of closed basins and areas hydrologically severed through anthropogenic watershed changes would not significantly affect minimum flows. In addition, a feasibility evaluation for an above-ground reservoir and associated facilities was completed, as well as the identification of a potential site and negotiations for its acquisition. A cost benefit analysis was performed and the decision was made not to pursue land acquisition and construction of the reservoir. The District is taking an adaptive management approach to improve minimum flows in the upper Peace River. Ongoing projects would be monitored for several years after completion to determine whether additional projects are needed to meet the minimum flow requirements in the upper Peace River.

Peace Creek Canal Watershed Management Project

The District has identified the upper Peace River watershed as experiencing significant land alterations and extensive groundwater withdrawals resulting in declines in Upper Floridan aquifer levels and upper Peace River flows. The District has completed a Watershed Management Plan to assist local governments with identifying projects that restore historic basin storage, improve water quality, provide flood protection benefits and improve natural systems. The plan provides watershed model simulations that can be used to evaluate the capacity of the watershed to protect, enhance, and restore water quality and natural systems, while achieving flood protection. The plan has been submitted to FEMA and was incorporated in the flood insurance rate map for Polk County that went effective on December 22, 2016.

Streamflow Losses through Karst Features in the Upper Peace River

This project focused on the portion of the Peace River from Bartow to Homeland and was conducted in two phases: the first phase assessed the hydrologic connections (i.e., karst openings or sinkholes) between the river and underlying aquifers; and the second phase investigated the feasibility of constructing low flow restriction barriers around these connections to maintain flow in the river and help meet established Minimum Low Flows. The first phase of the project was initiated in FY2002 by the United States Geological Survey (USGS) and completed in 2008. A final report, entitled *Hydrologic Conditions that Influence Streamflow Losses in a Karst Region of the Upper Peace River, Florida* was published in 2009. The second phase was completed with the issuance of a final report by AMEC-BCI Inc. in March 2011. The study determined that berming or covering over smaller karst features to reduce streamflow losses was feasible. The final report included preliminary design and cost estimates to complete the work. The District's intent is to implement and monitor the Lake Hancock Lake Level Modification and Ecosystem Restoration Project for several years to see whether that project alone will allow the upper Peace River minimum flows to be met. If not, the sink-berm project would be considered along with other options to help achieve full recovery.

Upper Peace River Restoration Progress

The Lake Hancock Lake Level Modification and Ecosystem Restoration Project, and the associated Outfall Treatment Project, were completed by June 2015. Operation and monitoring of the system began in the fall of 2015 and diversions from Lake Hancock to augment low flow on the upper Peace River began in December 2015 and continued through 2016. Diversions averaged approximately 25 cfs during the drier parts of the year and helped keep river flows above Minimum Low Flow at all three gages in 2016. The District anticipates continuing with a three- to five-year testing phase to develop operation guidance protocols for various hydrologic conditions to help achieve Minimum Low Flows while improving water quality discharging from the lake.

Recommendations

As of 2016, Goal 2, Restore Minimum Flows to the upper Peace River, has not been achieved. The Lake Hancock project should help achieve significant improvement of minimum flows for the upper Peace River. The District is taking an adaptive management approach and will monitor the completed Lake Hancock projects for several years after completion to determine whether additional projects are needed to meet the minimum flow requirements in the upper Peace River. A few more years of operation and monitoring are necessary to verify if it can achieve the goal. At this time additional projects are not considered necessary and are not being recommended.

Section V
Goal 3: Reduce the Rate of Saltwater Intrusion

Declines in aquifer levels have contributed to saltwater intrusion along the coast. The Recovery Strategy addresses this issue by proposing to reduce the rate of saltwater intrusion in coastal Hillsborough, Manatee and Sarasota counties by achieving the proposed minimum aquifer level for saltwater intrusion. When achieved, future efforts should seek further reductions in the rate of saltwater intrusion and the ultimate stabilization of the saltwater-freshwater interface

The Recovery Strategy recognizes that water level recovery is a long-term effort. Based on work conducted by the District in the early 2000s to assess wells at risk to saltwater intrusion, it was determined that if total pumping was maintained at 600 million gallons per day (mgd), about 104 wells pumping an estimated 12 million gallons per day (mgd) (permitted for 17.4 mgd) were potentially at risk over the next 50 years. The District studies determined that saltwater intrusion was a long-term problem but, that efforts taken "today" would ". . . make it easier for future generations to ultimately halt the inland movement of saltwater intrusion through advances in technology . . . " (SWFWMD, 2006). Though flows and levels are expected to vary from year to year, the long-term goal is that declining trends would first stabilize and then reverse, achieving recovery to minimum flows and levels by 2025.

Saltwater Intrusion Status

Monitoring of coastal groundwater quality shows that the saltwater interface is continuing to move inland. This is expected, since saltwater intrusion is directly related to lowered groundwater levels and will continue to move landward even after recovery to the SWIMAL is achieved. The goal of the strategy is to slow the rate of landward movement. Once the SWIMAL is achieved, the District will decide what additional steps should be implemented to further slow and possibly halt the rate of movement. To provide improved estimates of the rate of movement, the District is continuing to refine the coastal monitoring network by strategically adding wells to collect data in areas of greatest groundwater quality change. The additional information along with ongoing development of a solute transport groundwater model will improve the District's ability to distinguish between local variability and regional intrusion.

The SWIMAL represents the 10-year water level average (1990 through 1999) of ten Upper Floridan aquifer monitoring wells (Figure 5-1) from within or adjacent to the MIA. The resulting minimum level over the surface of the MIA is 13.1 feet (NGVD29). Reductions in actual water use have occurred within the MIA and the aquifer levels are within 0.5 ft. of the SWIMAL. Figure 5-2 depicts the average groundwater level for the ten monitoring wells for each year starting in 1999 to 2016 along with the five-county ten-year moving rainfall moving average. Rainfall deceased from an average of 54 inches in 1999 to 50 inches in 2009, and the water level declined from 13.1 feet in 1999 to 11.4 feet in 2009. From 2009 to 2011 rainfall increased to 51 inches and the aquifer level responded by increasing to 12.3 feet in 2011. The aquifer level has rebounded to 12.6 feet in 2016 with the recent wet conditions and the reductions in water use that has occurred.

Figure 5-1. SWIMAL Well Locations

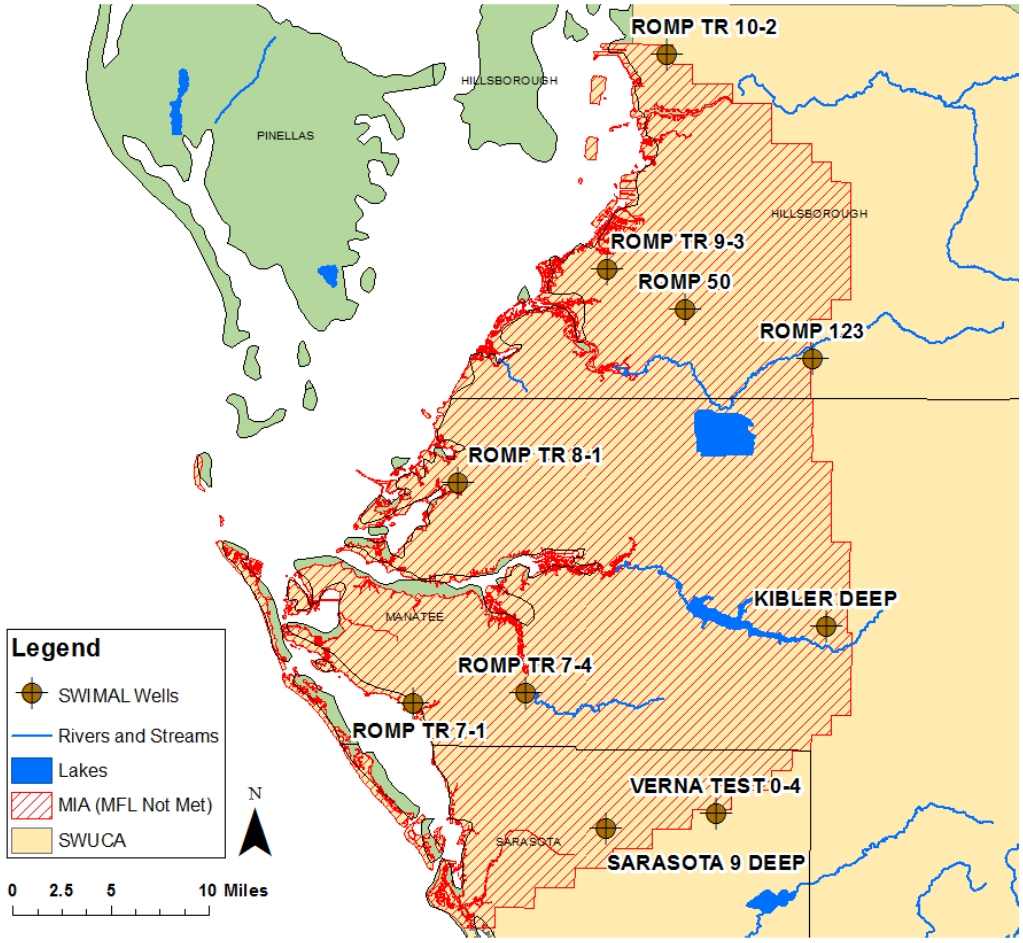
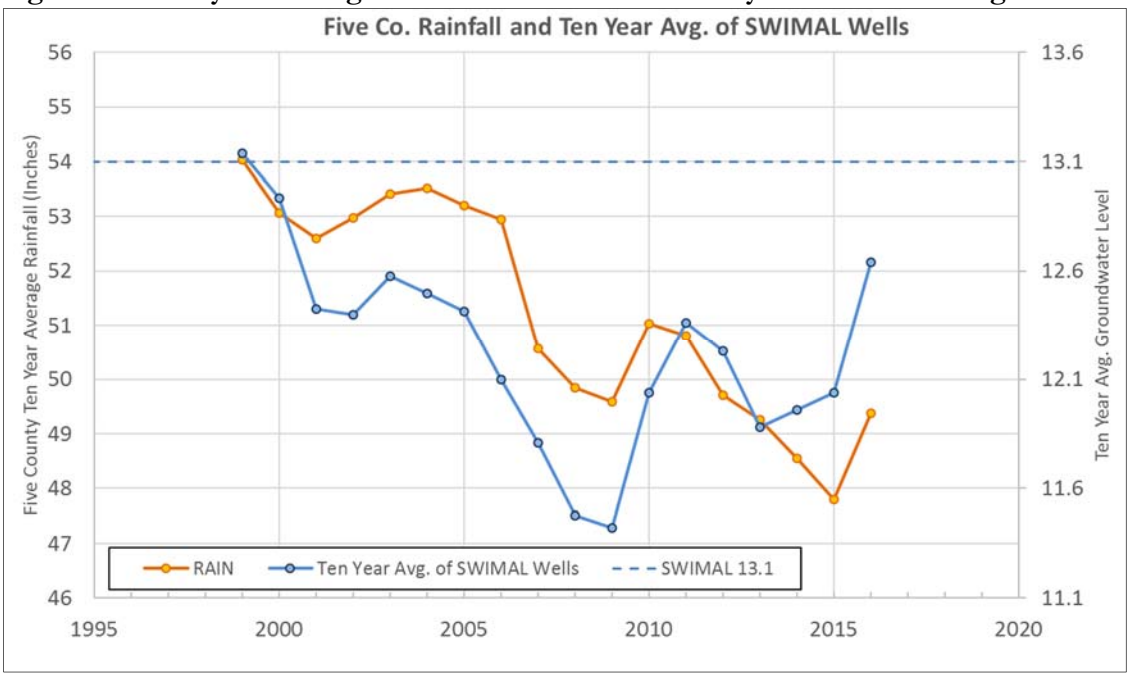


Figure 5-2. Ten-year Average of SWIMAL Wells and Ten-year Rainfall Average



Projects and Efforts to Manage Saltwater Intrusion

Reduction of groundwater withdrawals and direct aquifer recharge are two effective options available to recover aquifer levels manage the rate of saltwater intrusion. Reduction of withdrawals is occurring through the implementation of conservation, alternative water supply projects and the SWUCA rules. The geologic nature of the MIA of the SWUCA requires direct aquifer recharge projects to replenish the aquifer to slow the rate of saltwater intrusion. Several issues impeding development of direct aquifer recharge have been addressed by the District through research and pilot projects. The District continues to support the investigation and implementation of aquifer recharge opportunities as a means to store excess flows to augment water supplies and mitigate impacts of groundwater withdrawals. Since the early 1980s, the District has worked with local governments and utilities to implement Aquifer Storage and Recovery (ASR) projects. Perseverance in developing these ASR projects has led to many technological and regulatory solutions making development of direct recharge projects possible now.

Southern Hillsborough County Aquifer Recharge Project (SHARP)

The District is cooperatively funding Hillsborough County's reclaimed water direct aquifer recharge pilot project using reclaimed water along the coast in southern Hillsborough County. This project has been recharging the aquifer at rates up to 1.5 mgd since 2016. The total recharge volume is approaching 2.0 billion gallons.

Southern Hillsborough County Aquifer Recharge Expansion (SHARE) Project

The County is using the lessons learned from the SHARP project to add six wells. Information from the SHARP pilot study is being used to justify the locations of the new recharge wells further inland where it is expected that they can accomplish more benefit without unintended adverse impacts to the aquifer. The District is currently anticipating funding third-party review of the project and first year construction activities. The project buildout over the next three to five years could result in up to seven recharge wells and associated monitoring well system with a total recharge flow of up to 14 mgd. Eventual long-term recharge quantities will depend on possible use of the SHARE and SHARP wells and the associated reclaimed water for indirect or direct potable reuse.

Flatford Swamp Hydrologic Restoration Project

The District also has a recharge project initiative at the Flatford Swamp in Manatee County to recharge the Upper Floridan aquifer with partially treated surface water. This is a pilot project to determine the feasibility of using minimally treated surface water to recharge the aquifer and provide recovery to assist in the effort to raise groundwater levels and reduce the rate of salt water intrusion. The project would intercept excess water in tributaries, prior to it entering the swamp, and then transport the water to a well to recharge the Upper Floridan aquifer in the Avon Park formation. Long-term average streamflow in the upper Myakka River watershed has increased over the past several decades due to a combination of factors including agricultural irrigation and related practices, residential development, and drainage alterations. The increased streamflow has affected the hydrology of Flatford Swamp. Capturing this excess water for aquifer recharge would improve both aquifer recovery and the swamp hydrology. Drilling of an initial test well is scheduled for completion in late 2018. After drilling, operational testing is estimated at two years. This project is significant, because advances in both the knowledge of the biological and chemical changes that occur after injection allows for a permitting pathway for a low-cost operation and maintenance project. If successful, the project has the potential to recharge up to 10 mgd at buildout.

City of Bradenton Aquifer Protection Recharge Project

The City proposes to construct one Aquifer Protection Recharge well capable of recharging highly treated reclaimed water to the Avon Park High Permeability Zone of the Upper Floridan aquifer (UFA). The recharge system will be located at the City's Wastewater Treatment Facility. The project's goal is to

provide for a rise in the elevation of the potentiometric surface of the UFA. The project's benefits include: expanding the use of reclaimed water to assist in restoring declining water level elevations within the MIA of the SWUCA; facilitating a substantial increase in groundwater quality through freshening; introducing an inland barrier reducing the potential of further saltwater intrusion; and reducing nutrient loading to the Manatee River. A feasibility study has been performed by the City's consultant, and it concludes that the recharge system is feasible. The City submitted an FDEP Underground Injection Control (UIC) permit application in 2017 and responded to a request for additional information in early 2018. Upon receipt of the UIC construction permit, the City will begin system preliminary design and permitting to at least a 30 percent design level and participate in a District-led third-party review. Upon favorable review including District Governing Board approval, the next steps include final engineering, construction, testing and obtaining a FDEP UIC operational permit.

Underground Injection Control Work Group

Key to the development of these new direct recharge approaches is effective communication with FDEP and other regulatory agencies. The District recognizes the importance of this and has established an ASR and recharge workgroup consisting of water management districts, FDEP and municipalities. The group meets on a quarterly basis. One outcome of this interaction has been the recognition of the importance of SWUCA recovery being factored into the permit evaluation of each recharge and ASR project. This collective effort to find solutions together has since led to the investigation of the Flatford Swamp Hydrologic Restoration project.

Progress towards Reducing the Rate of Saltwater Intrusion

Reductions in actual water use have occurred within the MIA and the aquifer levels are within 0.5 ft. of the SWIMAL. Evaluation of the positive impacts from the buildout of the Flatford Swamp Hydrologic Restoration project suggest that the project will be capable of potentially achieving the SWIMAL. While the project is in its early phases of development and is establishing new science and techniques for recharge of partially treated surface water, it shows a lot of promise. The project is anticipated to be particularly effective in achieving the SWIMAL when considered in concert with other possible recharge projects such as SHARP, SHARE, and the City of Bradenton Aquifer Protection Recharge project.

Recommendations

At this time, it is recommended to continue expanding the coastal monitoring network to obtain data that can be used to develop a reliable salt-water intrusion model. Continue modeling and analysis of the benefits of aquifer recharge. Proceed with implementation of aquifer recharge projects to provide the projected recharge need of approximately 10 mgd in the MIA to meet the SWIMAL. Efforts include developing recharge through the Flatford Swamp Hydrologic Restoration project and evaluating support of other recharge projects such as SHARP, SHARE, and the City of Bradenton Aquifer Protection Recharge project. Additionally, it is recommended to continue conservation efforts through the FARMS Program, regulation, and development of AWS.

Section VI
Goal 4: Ensure Sufficient Water Supplies

Projects and initiatives discussed in this section show that considerable progress has been made toward the goal of ensuring sufficient water supplies to meet current and projected demands within the SWUCA. Of specific note is the progress made in reducing reliance on groundwater resources, a critical requirement in addressing the goal of meeting the SWIMAL and reducing the rate of saltwater intrusion within the Upper Floridan aquifer. As represented by Figure 6-1, increased reclaimed water use, along with agricultural and urban conservation measures, have been key in meeting water use demands within the SWUCA while offsetting the need for development of additional groundwater quantities. Capitalizing on additional available reclaimed water opportunities and conservation measures, coupled with expanded development of surface water sources will help further reduce reliance on groundwater in the SWUCA.

Status - Present and Future Demand

Public Supply

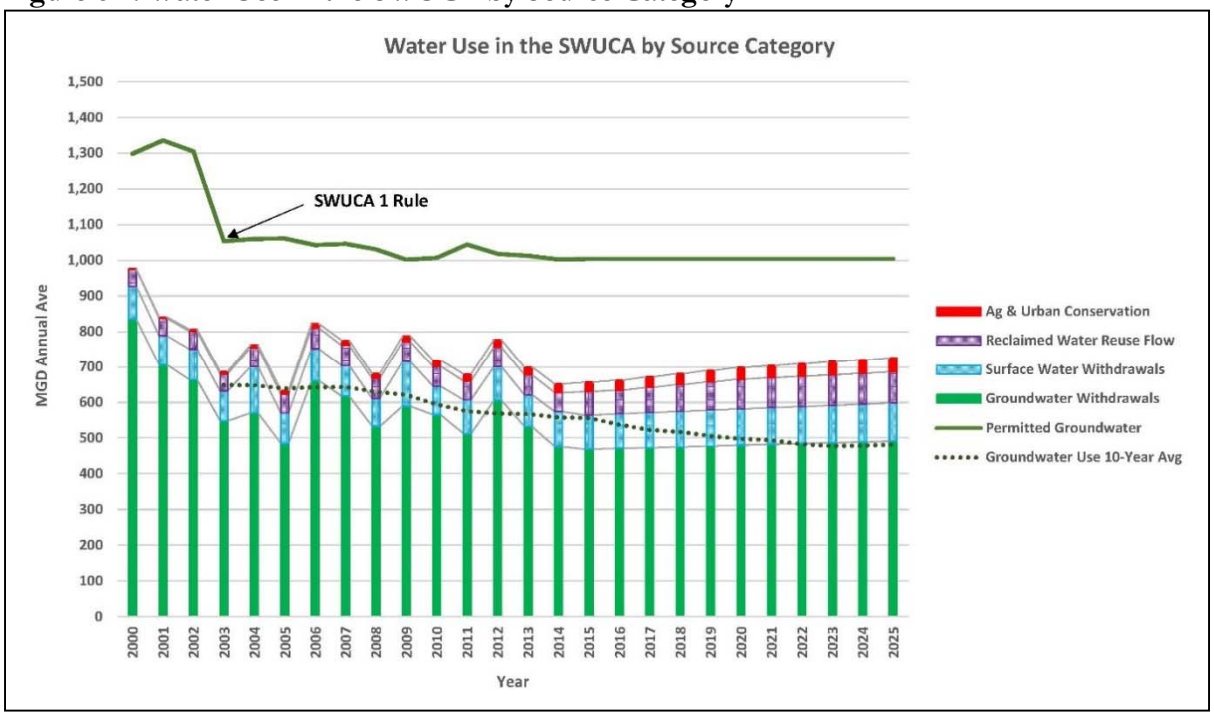
The Recovery Strategy originally predicted public supply water use within the SWUCA to be 281.5 mgd by 2015, however, the 2015 Estimated Water Use Report shows that public supply use was only 227.6 mgd.[1] Net public supply water use in Charlotte, Hardee, Highlands, Polk, and Sarasota counties has decreased since the 2000 base year used in the Recovery Strategy. This less-than-expected water use is attributable to several factors, including increased reclaimed water use, reduced per capita water use achieved by conservation initiatives, and expanded availability of surface water sources. Similar to the less-than-expected water use in 2015, the 2025 demand is expected to be less than originally anticipated in the 2006 Recovery Strategy. A comparison of the 2006 Recovery Strategy's projected 2025 public supply demands and the currently projected demands through 2025 are depicted in Table 6-1.

Table 6-1. Projected Public Supply Demands Increases for the Period 2015 to 2025: Comparison of Increased Demands from the 2006 Recovery Strategy to 2015 RWSP Demands (mgd)

COUNTY	2006 Strategy – Increased Demands for the period 2015-2025	2015 RWSP – Increased Demands for the period 2015-2025
Charlotte (SWUCA)	6.2	1.7
DeSoto	1.1	0.1
Hardee	0.4	0.04
Highlands	2.9	1.1
Hillsborough (SWUCA)	19.9	12.8
Manatee	14.1	6.8
Polk (SWUCA)	19.7	12.3
Sarasota	12.2	4.2
TOTALS	76.5	39.04
Projections include demand for domestic self-supply and irrigation. The original average increase is derived from 2006 RWSP Table 4-7. The updated average is derived from 2015 RWSP Appendix 3-3 Tables 3, 5, 6, 8, 9, 12, 16, and 17.		

[1] *The totals include surface and groundwater, 2015 EWUR Domestic Self Supply quantities and RWSP additional irrigation quantities for consistency with original Recovery Strategy methodology.*

Figure 6-1. Water Use in the SWUCA by Source Category



Water use projections within the SWUCA for 2015 to 2025 are based on demand increases, as published in the District's 2015 RWSP (Appendix 3-3). Increases through 2025 were reevaluated for this update based on utility-level demand projections developed for the 2015 RWSP. The public supply demand in the SWUCA is projected to increase by 39.04 mgd from 2015 to 2025. The public supply demands and existing permitted quantities available to meet these demands are discussed below by planning region and summarized by county in Table 6-2. Included in Appendix 1 of this document is a comparison of permitted public supply quantities and reported water use to the projected demand increases on a per utility basis.

A. Southern Region

The Southern Region consists of Charlotte, DeSoto, Manatee, and Sarasota counties. These counties have a regionally unified approach to developing and distributing water supplies through the Peace River Manasota Regional Water Supply Authority (PRMRWSA). When completed, the PRMRWSA regional integrated loop system will enhance the ability to distribute permitted surplus water supplies within the region. The Recovery Strategy predicted the region's public supply water use would increase by 36.1 mgd from 2001 to 2015, however, water use has increased by only 14.7 mgd over this period.

The Southern Region's public supply demand is projected to increase by 12.8 mgd by 2025. Domestic self-supply accounts for 2.4 mgd of this increase with the remainder to be met by currently permitted utility quantities. The PRMRWSA plans to develop an additional 5 mgd water supply by 2025 to maintain a surplus for its customers to meet peak demands.

B. Heartland Region

The Heartland Region consists of Polk, Hardee, and Highlands counties. The county water systems are not as interconnected as in the Southern Region, although the recently formed Polk Regional Water Cooperative (PRWC) is planning to develop regional distribution system interconnects to distribute new alternative water supplies to participating member utilities. The Recovery Strategy predicted that the

Table 6-2. Projected Increase in Public Supply Water Demands through 2025 (mgd)

COUNTY	Estimated Average Demand Increase[1]	Demand Increase to be met by Domestic Wells[2]	Increase met by existing permits[3]			Remaining Increase to be met[4]
			UF	Surface	Other	
Charlotte	1.7	0.2	0.03	1.2	0.24	0.0
DeSoto	0.1	0.1	0.01	0.1	0.02	0.0
Hardee	0.04	0.03	0.01	0	0	0.0
Highlands	1.1	0.5	0.6	0	0.01	0.0
Hillsborough (SWUCA)	12.8	0.6	7.2	6.0	0.01	0.0
Manatee	6.8	0.4	2.5	4.0	0	0.0
Polk (SWUCA)	12.3	1.3	11.6	0	0	0.4
Sarasota	4.2	1.7	0.4	1.4	0.7	0.0
TOTALS	39.04	4.83	22.35	12.7	0.98	0.4

[1]The average public supply increase matches Table 6-1.
[2]The domestic self-supply increase is derived from 2015 RWSP Appendix 3-3 and includes Additional Irrigation Quantities.
[3]Based on the permitted but unused quantities identified for utilities in Appendix 1. "Other" includes groundwater from surficial and intermediate aquifers.
[4]The remaining increase not met by self-supply or permitted quantities.

region's average water use would increase by 26.6 mgd from 2001 to 2015; however, public supply use in Polk County decreased by 4.9 mgd by 2015. Public supply water use in Hardee and Highlands counties decreased by a combined 2.0 mgd from 2000 to 2015.

Public supply use in Polk County is projected to increase by 12.3 mgd by 2025. Based on its 2015 water use, currently permitted utility quantities in Polk County are sufficient to meet 2025 demands in all service areas except the City of Lake Alfred and Haines City. Each of these communities has an estimated deficit of approximately 0.2 mgd; however, these deficits can be managed through available conservation and reclaimed water supply options. While permitted quantities appear to meet most demands to 2025, the cumulative impact of all utilities using their permitted allocations may be affect achievement of the SWIMAL and MFLs. Alternative water supply investigations have been initiated by the PRWC to meet future demands and prevent cumulative groundwater use from further straining natural resources.

Public supply use in Highlands County is projected to increase 1.1 mgd by 2025. Domestic self-supply accounts for 0.5 mgd of the increase and 0.6 mgd of the demand would be met with existing permitted quantities. Potential offsets from conservation and reclaimed water projects could extend the viability of currently permitted quantities over the long term. Additionally, future interconnections developed in Polk County could extend through Highlands County along the US-27 corridor. Public supply water use is projected to increase 0.04 mgd in Hardee County by 2025. Domestic self-supply accounts for 0.03 mgd of this demand, with the remainder to be met by existing permitted quantities.

C. Hillsborough County Portion in SWUCA

The Recovery Strategy anticipated that public supply demands in the portion of Hillsborough County within the SWUCA could increase by 14.2 mgd from 2001 through 2015. The actual increase for this

period was 15.3 mgd, however 12.2 mgd was acquired from new alternative water sources, specifically the Alafia River sources developed by Tampa Bay Water.

Water use in the SWUCA portion of Hillsborough County is projected to increase 12.8 mgd by 2025, with domestic self-supply use accounting for 0.6 mgd. Hillsborough County Utilities is the primary consolidated utility for the county and accounts for 12.3 mgd of the projected demand increase. The utility is a wholesale customer of Tampa Bay Water, the regional water authority for the Tampa Bay region. Tampa Bay Water operates the South-Central Wellfield, which is situated in the SWUCA portion of the county and permitted for 24.1 mgd of public supply. The wellfield is a cost-efficient source and is currently used near capacity, leaving minimal reserves for future demands identified in the SWUCA portion of the county. A redistribution of supply from other sources operated by Tampa Bay Water, along with conservation and reclaimed water aquifer recharge offsets, would allow the Hillsborough County Utilities' demands to be met.

Agriculture

During the second half of the last century, agricultural water use increased substantially, becoming and remaining the dominant water use sector in the SWUCA. Based on projections from the 2015 RWSP, agricultural water use is expected to further increase by approximately 10.0 mgd (Table 6-3) by 2025. Since 2000, a period of record drought, the estimated groundwater withdrawn for agricultural irrigation in the SWUCA has remained relatively stable. Previously anticipated major reductions in agricultural water use due to transitions of agricultural land for other purposes, such as residential development, has occurred to a lesser extent than originally predicted, and agriculture continues to be a vibrant segment of the region's economy. It should be noted, however, that while acreage may remain in agriculture, the type of agriculture on a particular farm may change to a different crop type with different water needs. Specifically, there has been a trend of former citrus land converting to strawberry acreage in remote areas of Desoto, Manatee and Charlotte counties, resulting in an increase in water use per acre on these farms.

Reductions in agricultural water use can be realized through improved irrigation and other Best Management Practices (BMPs) strongly encouraged by the District and other agencies including the Florida Department of Agriculture and Consumer Services (FDACS), Institute of Food and Agricultural Sciences (IFAS), Natural Resource Conservation Service (NRCS), and Soil and Water Conservation Districts. Projects associated with BMPs that could be credited with agricultural water use reductions include the mobile irrigation lab to evaluate soils and irrigation systems, localized weather stations to accurately evaluate irrigation needs, and the back-plugging of wells to protect aquifers and improve the quality of water used for irrigation.

Phosphate Mining, Industrial and Power Generation

Based on projections from the 2015 RWSP, water use for industry and mining is expected to increase by 3.8 mgd in the SWUCA. Groundwater use for phosphate mining and production, which peaked at more than 300 mgd in the 1970s, has declined dramatically to about 50 mgd in recent years since the industry began to store and recycle water. However, phosphate deposits proposed for future mining are located south of the historical mining areas in Polk County. These deposits are generally located deeper and in areas of higher clay content, which could potentially result in a greater water quantity needed per amount of ore extracted.

Overall water use for other industrial uses and power generation are projected to remain stable or slightly increase in the SWUCA through 2025. Power generation water use is projected to increase by 1.84 mgd, but reclaimed water sources may meet most of the increase. Tampa Electric (TECO) is using reclaimed water from Lakeland, Mulberry, and Polk County in place of groundwater sources for current (up to 10 mgd) and future (up to 17 mgd) expansions of its Polk Power Station facility. Other power plants within

the SWUCA using reclaimed water include the TECO Big Bend facility in southern Hillsborough County, as well as the Lakeland Electric, Duke Hines Energy Complex and Calpine Auburndale Peaking Energy Center facilities in Polk County.

Recreational and Aesthetic Use

The projected water use for recreational and aesthetic uses in the SWUCA increases through 2025 by 7.8 mgd during average conditions. Much of this increase is for golf course irrigation that could utilize reclaimed water, captured storm water and other alternatives. Fourteen of the District's fifteen cooperatively funded reclaimed water supply projects that are currently under construction within the SWUCA would have a positive effect on reducing potable water use for recreation and aesthetic irrigation uses in the SWUCA.

Changes in Water Use Associated with Land Use Changes

The Recovery Strategy originally predicted that land use transitions within the SWUCA would result in significant savings. These savings were to have occurred either through displacement of nonresidential land uses by urban/suburban land uses in areas where alternative supplies were available, or through Net Benefit savings of transitioning agricultural groundwater uses to public supply. However, due to economic conditions and housing market decline, land use transition has not occurred at the scale and rate previously predicted and their contribution to water savings are expected to be limited through 2025.

Reductions Needed to Achieve Saltwater Intrusion Minimum Aquifer Levels

The 2006 Recovery Strategy estimated that long-term average annual withdrawals from the Upper Floridan aquifer needed to be reduced by 50 mgd in the SWUCA to meet the saltwater intrusion minimum aquifer level, or less if reductions occurred within or near the MIA. Reduction of withdrawals from the Upper Floridan aquifer would also enhance restoration efforts for the upper Peace River and Ridge area lakes, although water resource restoration projects are still necessary to achieve minimum flows and levels for those water bodies. Cumulative recovery strategy efforts appear to have generally stabilized aquifer levels in the MIA, but the recovery of impacted MFL waterbodies is still necessary. Factors influencing the quantity of withdrawals that might need to be reduced include the amount of growth that will occur through existing water use permits authorizing groundwater withdrawals, potential recovery projects that might be implemented, and reductions that may be achieved through land use transitions.

Summary of Total Water Use

The updated water use changes for all categories from 2015 through 2025 are shown in Table 6-3. This table indicates increases are expected in all water use categories. The table also incorporates an additional 15.0 mgd needed within the MIA to meet the saltwater intrusion minimum aquifer levels. The total projected increase from 2015 to 2025 is 75.7 mgd to meet the saltwater intrusion minimum aquifer level and to provide sufficient supplies for projected increases in water use. Environmental restoration needs account for approximately one-fifth of this projected demand (specifically within the MIA), but may actually be greater (up to 50 mgd) for the SWUCA as a whole. Although some of this additional use may be offset by conservation, land use changes or other means, changes in water use may occur at different points in time and in different locations. It is therefore inappropriate to assume decreases or increases in one area or point in time would be equally offset by changes in other areas at other times.

Table 6-3. Summary of projected water use for all categories in the SWUCA to 2025 (mgd)

USE TYPE OR NEED	2015 – 2025 Increase
Additional Quantities Needed within the MIA to Meet Saltwater Intrusion Minimum Aquifer Levels[1]	**Up To 15.0**
Public Supply[2]	**39.04**
Agriculture[3]	**10.0**
Industry and Mining[4]	**3.8**
Recreational and Aesthetic[5]	**7.8**
TOTALS	**75.64**

[1]From 2015 RWSP Chapter 3, Section 5, of respective volumes
[2]From Table 6-1 of this document
[3]From 2015 RWSP Tables 3-2 of respective volumes
[4]From 2015 RWSP Tables 3-3 of respective volumes
[5]From 2015 RWSP Tables 3-4 of respective volumes

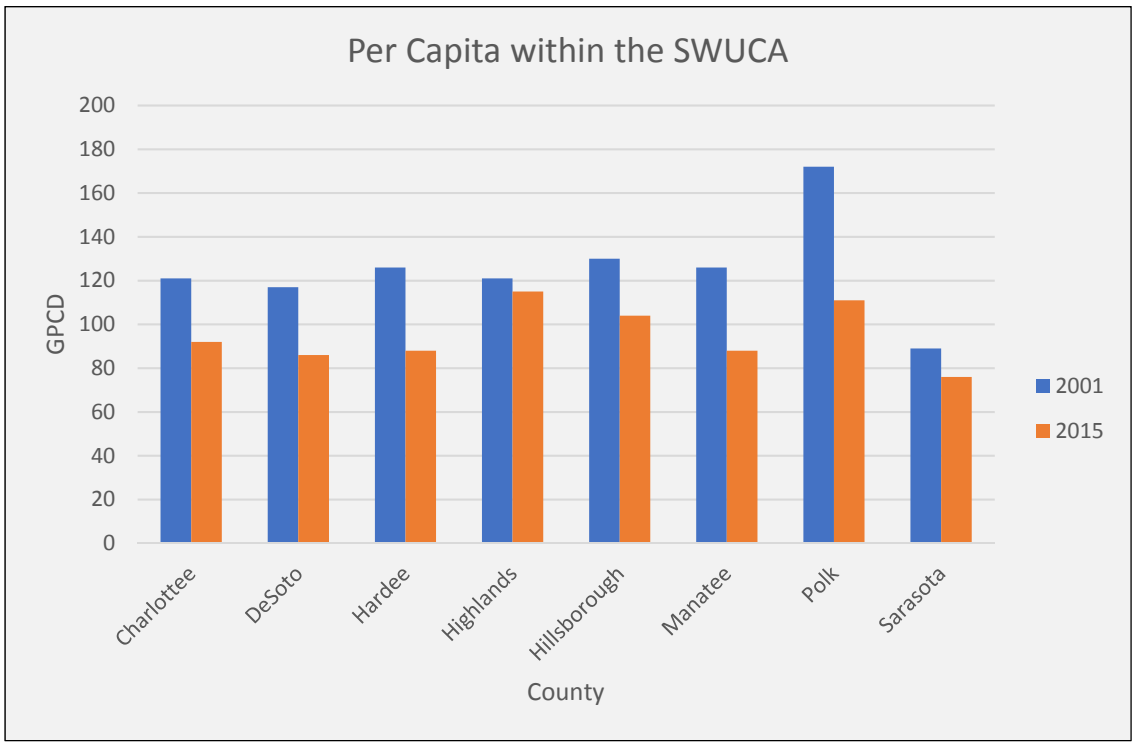
Water Supply Projects

Following is a summary of how demand increases are being met through a variety of conservation and alternative water source development efforts. Water conservation involves the planning, design, and implementation of activities that reduce the amount of water consumed for a given task. The efficient use of all water results in increased availability of resources to help meet consumptive and ecological needs. Total potential savings of up to 116 mgd (surface and ground water) have been identified through the year 2025 attributable to conservation and reclaimed water (up to 87.03 mgd use and 70.71 mgd offsets) projects within the SWUCA. Some activities that can provide substantial positive benefits, such as Net Benefit projects, redistribution of withdrawals, plugging of free-flowing wells, aquifer recharge projects, educational outreach, and other similar efforts, are difficult to quantify. Also provided are alternative potable water supply sources identified through the RWSP planning process. Alternative sources are costlier and more challenging to develop than conservation efforts and are therefore not the first option but are available for water users unable to meet demands solely through conservation. Identified alternative sources include regional interconnections, seasonal storage of surface water, storm water, and membrane treatment of available brackish groundwater resources.

A. Public Supply, Industrial, Commercial and Institutional Demand Management

The District has a comprehensive demand management program in place in the SWUCA that has been effective at reducing water demand for public supply, industrial, recreational, and agricultural uses. The District generally employs a combination of three approaches to water conservation: education, water use permitting and water shortage rules, and technical and financial assistance. The District also participates in research to address the measurement of water savings and investigate new methods of demand management. The District has cooperatively funded conservation programs focusing on residential, industrial, commercial, and institutional water use since 1991. These efforts have cumulatively resulted in significant reductions in per capita water use within the SWUCA as represented in Figure 6-2.

Figure 6-2. Per Capita Water Use within the SWUCA



For FY2000-2011, the District completed 29 water conservation projects within the SWUCA, resulting in a total savings of 1.15 mgd, while 14 water conservation projects, with a total savings of 0.51 mgd, were completed FY2012-2016 (Table 6-4). Three District-funded research projects were also completed during these periods.

Table 6-4. District Cooperatively Funded Conservation Projects

	Number of Projects	Estimated Savings (mgd)	District Costs (million $)
FY2000 - FY2011	**29**	**1.15**	**1.10**
FY2012 – FY2016	**14**	**0.51**	**1.28**
Total	**43**	**1.66**	**2.38**

This total of 43 conservation projects funded from FY2000-2016 resulted in an estimated/projected water conservation savings of 1.66 mgd at a total District cost of $2.38 million and total project costs of $4.74 million. In addition, the total spent on research projects for Public Water Supply (PWS) conservation is $2.3 million.

The District routinely offers technical assistance to water utilities in developing regional and local conservation programs. This includes District assistance on utility water audits to give utilities perspective on their individual water loss. Also, free leak detection services are provided by District staff. For years 2012-2016, nine leak detection surveys have been conducted in the SWUCA that are estimated to have provided 0.16 mgd in water savings. Previous conservation models predicted that quantifiable projects such as plumbing retrofits and irrigation system improvements could potentially offset 5.3 mgd in the Southern Region, 14.8 mgd in the Heartland Region, and 1.5 mgd in the SWUCA portion of

Hillsborough County. These types of projects are cost efficient and an effective method of meeting future water demands.

B. Agricultural Demand Management

The District has numerous ongoing agricultural demand management initiatives designed to increase the water use efficiency of agricultural operations. The Shell, Prairie and Joshua Creeks (SPJC) initiative has a focus on water quality and quantity issues. The Upper Myakka River Watershed (UMRW) initiative requires using excess surface water and reducing overall groundwater use to reduce water discharge to Flatford Swamp. The Dover/Plant City Water Use Caution Area (DPCWUCA) focus is to reduce the impacts from groundwater pumping used for crop establishment and crop protection (frost/freeze protection). The MIA also focuses on water conservation and the use of alternative water supplies.

The District funds technology and BMP research for farming irrigation and management to enhance agricultural water use efficiency. The Institute of Food and Agricultural Sciences at the University of Florida conducts much of the research on methods and technologies to enhance water use efficiency. The results are published and available to everyone who may benefit, including growers and other water management districts. The District also has an agreement with the U.S. Department of Agriculture-Natural Resources Conservation Service for an agricultural irrigation efficiency evaluation project using a Mobile Irrigation Laboratory (MIL).

Appendix 2, Table A2-2 lists the agricultural demand management projects, and Appendix 2, Table A2-3 lists agricultural research projects funded partially or completely by the District from 2012 through 2016. Additional details on the District's agricultural programs follow.

1. Facilitating Agricultural Resource Management Systems Program

The FARMS Program is an agricultural cost-share reimbursement program, developed by the District and FDACS. The program incentivizes the implementation of production-scale agricultural BMPs that provide water resource benefits. Since the initiation of FARMS in FY2003 through FY2016, the District has approved 136 projects within the SWUCA. To date, 125 projects are operational offsetting 19.5 mgd. Total project cost was $56.8 million with the District contributing $34 million. During the FY2012-2016 assessment period, the District approved 50 projects and provided $16.8 million in funding for 8.859 mgd in projected offsets. The annual number of FARMS projects, and associated funding, has increased over the years and is expected to continue to be a major contributor to addressing water supply issues within the SWUCA.

Shell, Prairie and Joshua Creek

FARMS initiatives in the SPJC watersheds, located in Charlotte and DeSoto counties, are designed to help growers reduce groundwater withdrawals by increasing the water use efficiency of their operations and replacing groundwater with surface water, while at the same time reducing agricultural impacts to surface water features. The use of surface water features for irrigation reduces adverse water quality impacts to natural surface water systems by replacing high salinity groundwater applications, reducing the potential for high salinity runoff in the watershed. The majority of the FARMS projects in the SPJC involve the use of surface water reservoirs for irrigation. Water conservation projects implemented through the FARMS Program are a key component of addressing the water quality and quantity issues. Through FY2016, 52 projects have been approved with 49 operational projects having offset 8.2 mgd of highly mineralized groundwater. The 52 projects received approximately $14 million in funding from the FARMS Program. During the FY2012-2016 assessment period, 15 projects were approved in the SPJC watersheds, representing an estimated offset of 2.8 mgd. These 15 projects received approximately $6.3 million from the FARMS Program.

Upper Myakka River Watershed

The Upper Myakka River Watershed and Flatford Swamp have also been affected by agricultural runoff. The use of groundwater for irrigation and the subsequent runoff to the watershed increased the flow of the river and extended the hydroperiod of the swamp, negatively impacting the habitats of the natural flora and fauna. The FARMS Program has helped to reduce groundwater use in this watershed primarily through the implementation of tailwater recovery. To date, eight projects have been approved and are operational, offsetting 3 mgd. These eight projects received approximately $4.5 million in funding from the FARMS Program. During the FY2012-2016 assessment period, one project was approved in the UMRW, representing an estimated offset of 551,000 gpd. This project received approximately $668,600 from the FARMS Program.

Dover/Plant City Water Use Caution Area

For more than 40 years farmers in the DPCWUCA, which partially overlaps the SWUCA, have pumped groundwater when temperatures drop near freezing to protect commodities such as strawberries, blueberries, citrus, nurseries, and aquaculture. Most of the frost/freeze protection systems are turned on at nearly the same time, which places tremendous strain on the aquifer resulting in lowered groundwater levels, impacts to residential wells, and increased sinkhole formation. The 11-day freeze event in January 2010 affected approximately 750 residential wells and more than 140 sinkholes were reported. Other significant freeze events resulting in well failures and sinkholes occurred three times between 2000 and 2010. The District has responded by developing and adopting a plan to significantly reduce impacts from groundwater pumping during future freeze events. The plan includes use of the FARMS Program to implement projects that reduce reliance on groundwater for freeze protection. To date, 22 projects have been approved and 21 are operational. These projects are projected to offset 41 mgd per freeze event.

Most Impacted Area

The MIA is an area of about 700 square miles located along southern Hillsborough, Manatee and northwestern Sarasota counties specifically affected by groundwater withdrawals within the SWUCA. To date, 12 projects have been approved with nine operational projects having offset 2.5 mgd. These 12 projects received approximately $3.4 million in funding from the FARMS Program. During the FY2012-2016 assessment period, there were five projects approved, representing an estimated offset of 1.9 mgd. These five projects received approximately $2.1 million in funding from the FARMS Program.

2. Mini-FARMS Program

The Mini-FARMS Program is a partnership between FDACS and the District. Mini-FARMS is a cost share program that assists agricultural operations of 100 acres or less to conserve water and protect water quality within the District's 16 counties. The program promotes agricultural water quality and water quantity BMPs and overall water resource benefits by providing an incentive for enrollment in the FDACS-adopted agricultural BMPs program. Under the Mini-FARMS Program guidelines, the District will reimburse growers 75 percent of their project costs up to $5,000 per project. The District has funded 59 Mini-FARMS projects within the SWUCA to date at a total project cost of approximately $365,500 with a reimbursement of approximately $235,500.

3. Well Plugging Programs

The District's Quality of Water Improvement Program (QWIP) is an extensive well plugging program that addresses free-flowing, improperly constructed, deteriorated or abandoned artesian wells. Many of these wells have inadequate or deteriorated casings and expose different aquifers of varying water quality to one another. Such wells can contaminate higher quality groundwater supplies or have uncontrolled water flows resulting in a significant waste of water. This program provides funding

assistance to landowners to plug abandoned and deteriorating artesian wells on their property and is available throughout the SWUCA.

The FARMS well back-plugging program, another agricultural initiative, assists operations by improving the water quality of their wells. Routine use of highly mineralized water often requires frequent supplementary irrigation to overcome the effects of reduced osmosis in root structure due to higher salinity and to flush salt buildup in the soil. The program also improves surface water resources used for public supply. The City of Punta Gorda surface water reservoir receives water from the SPJC watersheds and has been impacted by the contributions of poor-quality water from agricultural irrigation runoff. Water quality in the reservoir has improved significantly since the initiation of the back-plugging efforts. Growers also experience several advantages from back-plugging wells including elevated crop yields from reduced salts, decreased soil-water requirements and pumping costs, and reduced corrosion and fouling of irrigation equipment.

Seventy-nine wells have been back-plugged in the SWUCA overall through FY2016, with 58 of these wells located in the SPJC priority watersheds. Analytical results for samples collected from the back-plugged wells have averaged a 60 percent reduction in chloride levels in rehabilitated wells, while retaining an average 78 percent of well volume yield.

4. Mobile Irrigation Laboratory

The Mobile Irrigation Laboratory (MIL) is a cooperative project, started in 1987, between the USDA-NRCS and the District. The MIL evaluates agricultural irrigation system efficiencies on a voluntary basis and helps with new technology awareness. The District uses the MIL as a tool to assist growers in reducing their water use. The water savings realized from MIL evaluations can be significant per project and regionally benefits the watersheds. The MIL has evaluated over 1,300 systems since the project began, and the agricultural community has given a great deal of positive feedback concerning its usefulness. The District and the growers depend on the MIL's availability, familiarity, and expertise to provide a beneficial service that is very valuable to both parties. The MIL project contract has been approved through 2019 and is funded at $50,000 per year. In 2006, a Privately Outsourced Mobile Irrigation Laboratory (PrOMIL) was introduced to assist growers with water use over pumpage compliance scenarios and to help with the high demand and lengthy waiting list for MIL assistance. Currently, the PrOMIL is funded for $50,000 annually and the private consultant operator for the program is annually selected through a Request for Bid process. In 2015 the Center Pivot Mobile Irrigation Lab (CPMIL) was added as an option specifically to address the unique evaluation requirements of center pivot systems. The original focus was on the northern counties where center pivot systems are common place, but after further study it was found that approximately 40 percent of center pivot systems are located in southern counties. Consequently, the CPMIL covers all 16 counties of the district. The CPMIL is funded at $25,000 annually on a purchase order basis. These three programs now act in concert to help improve irrigation efficiencies and regulatory compliance through the District.

C. Reclaimed Water Projects

Simply defined, reclaimed water is highly treated wastewater that helps in meeting reasonable-beneficial needs. Objectives of the District's reclaimed water initiative in the SWUCA are to expand its use for residential landscape irrigation, golf courses, crops, aquifer recharge and natural system enhancement, and industrial uses such as cooling and processing, to reduce use of potable water for non-potable purposes. One way to increase reclaimed water use is to store reclaimed water seasonal high flow, which is typically disposed of in the wet season, in reservoirs or Aquifer Storage and Recovery (ASR) systems for use in the dry season. The District works with public and private sector cooperators to develop various components, such as transmission and distribution lines, storage tanks and ponds, recharge

systems and ASR systems. Use of meters and volume-based rate structures are encouraged through the cooperator agreements to further conserve reclaimed water.

The District has assisted in funding numerous cooperative reclaimed water projects, typically up to 50 percent of the total project costs. For FY2007-2016, the District assisted in funding 44 reclaimed water projects in the SWUCA achieving approximately 27.10 mgd in offsets. Table 6-5 lists the number of reclaimed water projects, flows and associated offsets in the SWUCA for the FY2007-2011 and FY2012-2016 time periods. The 27 reclaimed water projects funded over the current assessment period would offset approximately 22.8 mgd of traditional supplies at a District cost of $52.4 million, and a total cost of approximately $179.4 million or about $8 million per mgd. Total cost includes groundwater recharge and indirect potable reuse study projects.

Table 6-5. District Cooperatively Funded Reclaimed Water Projects

	Number of Projects	Estimated Offset (mgd)	Total Costs (million $)	District Costs (million $)
FY2007 - FY2011	**17**	**4.29**	**27.74**	**37.27**
FY2012 – FY2016	**27**	**22.80**	**179.38**	**52.47**
Total	**44**	**27.10**	**207.12**	**89.74**

There is a wide variation in the cost to develop reclaimed water projects due to the unique characteristics of each project, including the type of infrastructure constructed and the nature of the end user. Utilities have an extensive reclaimed water infrastructure network within District boundaries and the growth of this infrastructure will continue with future development. As of 2016, there was 66.49 mgd of reclaimed water utilized within the SWUCA, which has the potential to increase by 20.54 mgd to 87.03 mgd by 2025 (Figure 6-3).

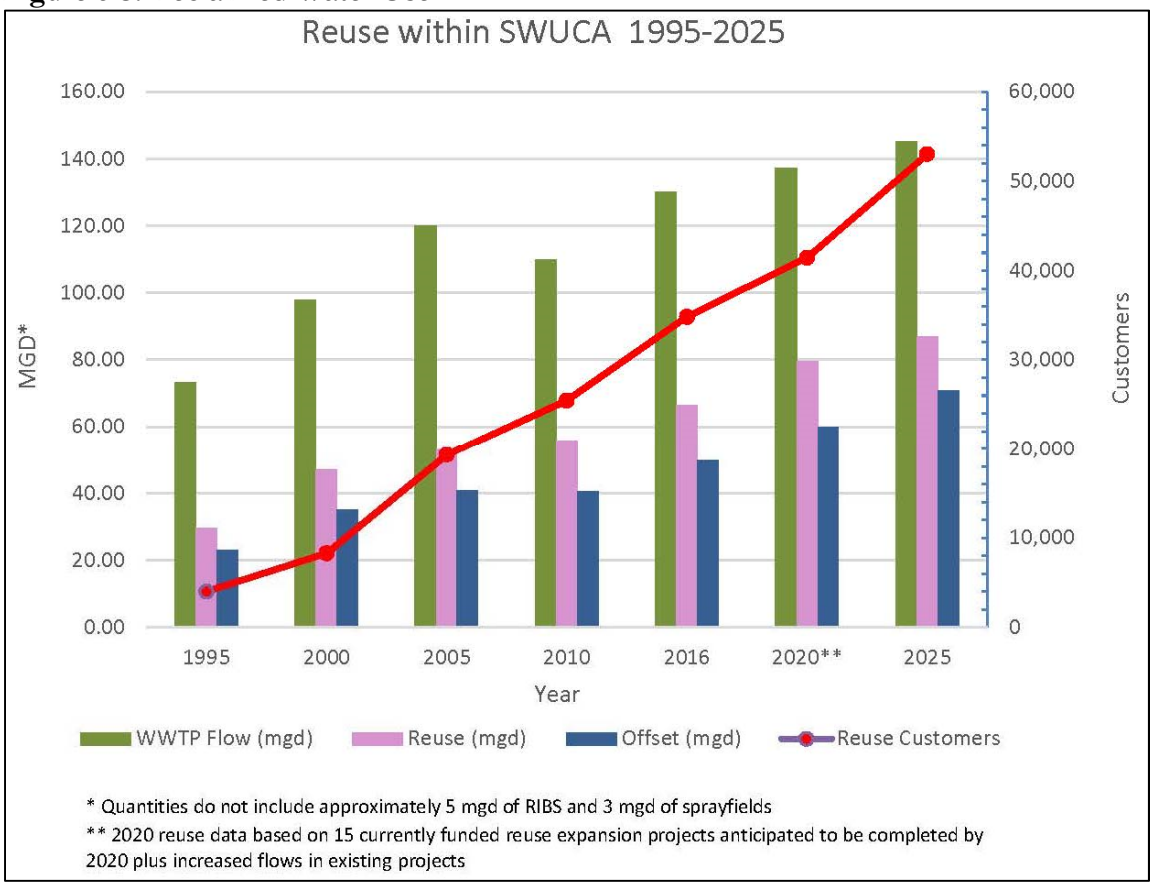
D. Impact of Public Land Acquisition Program

The District acquires and manages land for a variety of water resource management purposes. During the previous assessment period, the District acquired 19,407 acres of property within the SWUCA with water use permits totaling 103,300 gpd of groundwater withdrawals. These groundwater quantities were retired as a result of the acquisitions, aiding in aquifer recovery. Acquisition activities for the current assessment period were significantly reduced, with only one 37-acre property purchased in the SWUCA. No water use permits were associated with this property. Several properties totaling 178 acres were also sold as surplus during this assessment period, however, additional groundwater use resulting from this surplus is projected to be negligible. The Recovery Strategy originally estimated 10 mgd of actual groundwater use could be retired through public land acquisition by 2025, however, due to a variety of factors limiting additional land acquisition, it is anticipated future reductions in groundwater withdrawals associated with this activity will be limited.

E. Additional Use of the Surficial and Intermediate Aquifers

More than 85 percent of historical groundwater supplies in the SWUCA are derived from the Upper Floridan aquifer. These withdrawals have resulted in the water resource impacts that led to development of the Recovery Strategy. It is possible that in some areas of the SWUCA groundwater supplies could be further optimized by additional withdrawals from the surficial and intermediate aquifers. While small diameter, low-yield wells could be completed into the surficial aquifer in almost any location within the District, there clearly are more favorable areas such as in thick sands along the Lake Wales Ridge, and the shell beds of Charlotte, southern DeSoto, and Sarasota counties. The yields associated with these aquifers would generally be low, except in a few areas. Groundwater associated with lawn watering needs

Figure 6-3. Reclaimed Water Use



and domestic-self supply use is most likely to be derived from the surficial and intermediate aquifers. In addition, some recreational use (golf course irrigation or landscape irrigation) could be derived from these aquifers. Including quantities for lawn watering, domestic self-supply, and recreation, 23.33 mgd of additional demand over the next 20 years can be met from surficial and intermediate aquifer sources.

F. Potential Sources of New Water Supply

Since implementation of the SWUCA Recovery Strategy through FY2016, the District has invested approximately $90.3 million in new alternative water supplies in the SWUCA. For FY2000-2016, the District has completed 11 SWUCA water supply development projects including feasibility studies, pilot testing, and planning; regional water supply interconnections; and new treatment and reservoir facilities. The new treatment and reservoir facilities have resulted in an additional 39.5 mgd, developed at a District cost of approximately $66 million. Also funded for this period are plans and studies necessary for the future development of projects. District assistance for planning and feasibility projects helps to alleviate the financial drain on water suppliers that do not receive a direct revenue benefit from these efforts.

It is projected that the Heartland Region will require the next large investment in regional water supply infrastructure. Utilities in Polk County anticipate the need for regional systems and additional sources by 2025 to assure reliability of service. The District has initiated an investigation of the Lower Floridan aquifer within Polk County to determine its viability as a resource. The PRWC was formed in 2016 and includes 16 member-governments participating in a regional approach to water supply development. The PRWC initiated three projects in 2017 to test and design new Alternative Water Supply (AWS) sources for its members: The West Polk County Aquifer Deep Wells, the Southeast Polk County Wellfield, and

the Peace Creek Integrated Water Supply Project. Both wellfield projects include exploratory drilling and testing of the Lower Floridan aquifer, design and pilot testing of brackish groundwater treatment systems, and regional transmission systems to deliver water supplies to participating municipalities.

The PRMRWSA has identified a variety of large-scale surface water and brackish groundwater options available to meet its future needs. Demand projections through 2025 could be met in the region with existing supplies and the integrated loop system, although the Authority intends to develop an additional 4 mgd of AWS by 2025 to maintain a 15 percent regional reserve. The PRMRWSA is currently pilot testing a pretreatment system for its ASR wells. The injection water is currently treated to potable standards at the Peace River WTF, and a separate pretreatment system may free up the existing capacity previously used for the ASR system. The development of the PRMRWSA Regional Integrated Loop System also continues with some segments completed, some in construction, and others under design. The Regional Integrated Loop System will distribute AWS further north in Sarasota County and interconnect Punta Gorda's Shell Creek WTP with DeSoto County Utilities and the regional system.

The SWUCA portion of Hillsborough County has the resources of Tampa Bay Water (TBW) to assist with new supplies. There are several options TBW is exploring in or near the SWUCA portion of Hillsborough County. Project concepts under consideration are surface water expansion, reclaimed water augmentation, aquifer recharge with withdrawal, and expansion of the seawater desalination with reclaimed water or additional seawater. Currently TBW is updating their Long-term Master Water Plan. The proposed plan estimates additional new supplies will be needed around 2028.

G. Water Resource Development Projects

Several of the District-initiated projects to assist the Recovery Strategy as described herein are classified as Water Resource Development (WRD) projects. WRD is defined under Section 373.019, F.S., as regional management strategies and programs to protect and manage water resources, including major public works for flood control, water storage, groundwater recharge augmentation, and related technical assistance to local governments and utilities. WRD "projects" are more narrowly categorized as regional projects designed to create an identifiable, quantifiable supply of water for existing and/or future reasonable beneficial uses. The District's WRD projects include hydrogeologic investigations of the Lower Floridan aquifer at three strategic locations in Polk County to determine whether the water quality, productivity and geologic confinement are suitable for the development as a new water source. The numerous FARMS projects described in Section IV-B are classified as WRD projects and include the Mini-FARMS Program, Well Back-Plugging Program, and Meter Accuracy Support.

Some of the projects discussed in Section V are WRD projects that are expected to enhance the quantity of water available for beneficial use, and some could provide additional water supply. The prior completed phases of the Lake Hancock and Upper Peace River projects were categorized as WRD projects in the District budgets, which enhanced their eligibility for State and Federal funding assistance. Through the Aquifer Recharge at Flatford Swamp for SWIMAL Recovery and Natural Systems Improvement project, the District is investigating ways to reduce altered hydroperiods in a manner that could potentially recharge approximately 10 mgd to the Upper Floridan aquifer.

Net Benefits

Net Benefit activities associated with recharge projects can serve a major role in solving resource issues in the SWUCA. Several of the District's Water Resource Development projects could result in a Net Benefit in terms of reducing impacts from Upper Floridan aquifer withdrawals. If successful, aquifer recharge projects could be used to create new water supplies, while still providing a Net Benefit to the aquifer. Quantified offsets are not provided because of the difficulties involved in predicting feasibility, when and where they will occur, and how much Net Benefit would be provided.

Water Supply Progress

The projects and initiatives highlighted in this section provide considerable progress toward the goal of ensuring sufficient water supplies to meet projected demands within the SWUCA. These efforts will continue to 2025 and beyond. Of note, however, is the projected growth within permitted quantities, especially those that rely totally or predominantly on groundwater withdrawals, to meet projected 2025 water supply demands in the SWUCA.

While the Recovery Strategy anticipated growth within existing permit quantities to meet future water use demands, this approach results in an additional 22.35 mgd of groundwater withdrawals by 2025. Polk, Hillsborough and Manatee counties are the areas of greatest additional groundwater withdrawal and use through 2025. With a continued need to reduce groundwater withdrawals in the SWUCA for recovery purposes, those additional groundwater withdrawals related to growth within permitted quantities should be closely monitored to ensure they do not cause unintended consequences.

Of further note, the projected additional growth within permitted quantities may not provide as much yield as expected, since many utilities prefer to retain a certain level of reserve capacity for reliability, drought conditions, and future growth. For example, the PRMRWSA phases its source development based on maintaining a 15 percent reserve for its customers, and Tampa Bay Water aims to retain a 40 mgd reserve capacity above its customer projections. Utilities seeking to better manage demand or develop additional sources over the planning period could be eligible for District project funding assistance.

Recommendations

- Continue support of regional water supply entities and regional water supply development initiatives.
- Continue conservation efforts through the FARMS Program, regulation, outreach efforts such as Florida water Star, and the development of AWS projects, such as increased reclaimed water use including direct and indirect potable reuse, that reduce reliance on traditional groundwater sources.
- Prioritize AWS projects that replace the need for the identified 22.35 mgd of additional growth within existing permitted UFA quantities.
- Complete planned LFA investigation.
- Maintain participation in the CFWI.
- Continue regional water supply planning.

Section VII
Regulatory Component

Section VII addresses how the District's regulations contribute to meeting the four SWUCA goals defined in this Recovery Strategy. The regulatory component included: rule amendments for the adoption of MFLs; applying appropriate existing rule language from the former Highlands Ridge and Eastern Tampa Bay Water Use Caution Areas throughout the SWUCA; and adding new rule enhancements. These rule changes included enhancement of public supply conservation (per capita) requirements; implementation of restrictions on new groundwater withdrawals that would impact MFL water bodies; an analysis of proposed groundwater quantities for WUPs to determine if the withdrawals would cause cumulative impacts by adversely impacting median levels experienced during the 1990s in the areas surrounding the upper Peace River in Polk County and MFL lakes in the Highlands Ridge; and adoption of Net Benefit options for permittees seeking new or increased quantities in impacted areas. The Recovery Strategy's regulatory component has contributed to the consistent progress made to date in the SWUCA. It has also assisted in the achievement of the District's stated principles of significantly contributing to resource management and recovery while protecting the investments of existing legal users and allowing for economic expansion and new economic opportunities.

A major accomplishment of the adopted regulatory enhancements is the additional flexibility for permit applicants while ensuring the continued resource management and recovery. The implementation of per capita and utility reporting requirements, the requirement of wholesale public supply permits and site-specific conservation plans for industrial, mining and recreational uses, and the implementation of an irrigation drought credit system have resulted in more consistency in permitting and enhancing the District's ability to assess success in the achievement of its conservation goals. The enhancements also result in additional conservation measures, further reliance on alternative water supplies where economically, technically and environmentally feasible, and a net benefit to the environment when land use changes result in a change in use type associated with a WUP. Other requirements, such as requiring more permittees to report metered water use (in conjunction with their actual activities), limiting application rates for irrigation use to average conditions while allowing credits to use more water during drought conditions, and requiring water audits and more comprehensive annual reports for public supply permittees have allowed for better tracking of progress toward the conservation goals. In addition, the implementation of Net Benefit options adopted pursuant to the Recovery Strategy has allowed some water use permit applicants to secure new or additional quantities, while reducing impacts to the environment. This has been particularly beneficial near the MIA.

The Recovery Strategy's rule amendments have provided the framework necessary to help achieve the marked improvement in the SWUCA. No additional rulemaking is necessary specific to the SWUCA at this time other than MFL assessments or re-evaluations for water bodies on the District's MFL Priority List. The existing regulatory framework, however, would be reevaluated as part of the next assessment of the Recovery Strategy, and updates to the Regional Water Supply Plan and Strategic Plan.

While the SWUCA rules are not changing, Polk County is within the Central Florida Water Initiative (CFWI) and the southern part of the County is in the SWUCA. The Florida Department of Environmental Protection has initiated rulemaking for the Central Florida Water Initiative. FDEP is developing the rules along with the District, the South Florida Water Management District, the St. Johns River Water Management District, the Florida Department of Agriculture and Consumer Services, and associated stakeholders. The CFWI rules, when adopted, will only affect that portion of Polk County outside of the SWUCA.

Section VIII
Financial Component

Section VIII provides an overview of mechanisms available to generate the necessary funds to implement the alternative water supply projects, water resource development projects and demand management initiatives proposed by the District and its cooperators to fully implement the SWUCA Recovery Strategy. The potential funding sources include those that can be generated from FY2018-2019 through FY2024-2025.

The primary funding mechanism is the District's CFI. The Governing Board through its regional subcommittees jointly participates with local governments and other entities to ensure proper development, use and protection of the regional water resources of the District. The CFI is a matching grant program where projects are cost-shared up to 50 percent by the District with public or private cooperators. Any state and federal funds received for the projects are applied directly against the project costs, with both parties benefitting equally. The CFI has been highly successful. Since 1988, the program has resulted in a combined investment (District and its cooperators) of over $3 billion for the region's water resources, addressing the District's four areas of responsibility: water supply, natural systems, flood protection and water quality.

Although a majority of the projects to meet the water resource needs of the region are funded cooperatively, funds are also allocated each year for District Initiative projects. Two significant ongoing projects in the SWUCA, which are solely funded by the District, are the Flatford Swamp Hydrologic Restoration and the Hydrogeological Investigation of the Lower Floridan Aquifer projects.

Since FY2012-2013, the District has funded on average approximately $51 million annually for the CFI. With the Governing Board's direction for continued investment in these vital projects to protect the region's water resource needs, $357 million could be generated by the District from FY2018-2019 through FY2024-2025, consistent with and based on the District's long-range funding plan. It is important to note that this funding represents funds that would be generated from ad valorem tax dollars. This does not include state or federal funds, which the District and its partners continue to seek.

With Governing Board approval through the annual budget process, some portion of the $357 million in funding could potentially be committed for the large-scale water supply and resource development projects in the SWUCA as identified in Appendix 2, Table A2-6. The funding necessary from the District's CFI for these projects from FY2018-2019 through FY2024-2025 is $221 million, with an additional $16 million for the two District Initiative projects mentioned above for a total of $237 million. It is estimated these projects will provide a total of 43 mgd through 2025 to meet projected Public Supply demands of approximately 39 mgd.

With the $357 million in potential funding, in addition to any state and federal contributions, the District would have sufficient resources available to fund the water supply and resource development projects necessary to fully implement the SWUCA Recovery Strategy by 2025.

Section IX
Conclusion

The District continues to make progress toward recovery, but challenges remain to achieve it by 2025. Recovery will ultimately be achieved through a combination of maintaining existing withdrawals at or below current levels and implementing WRD projects designed to augment or preserve levels and flows.

The following are major conclusions from this five-year assessment:

1. Groundwater levels in the SWUCA have generally been stable with increasing levels in the north and decreasing levels in some southern areas. Since the previous Assessment, groundwater levels have continued to increase in the six sentinel wells used to monitor recovery progress.

2. From 2006 through 2013, the annual rainfall over much of the basin was mostly below the long-term average. Since 2007, the 10-year moving average of rainfall has also been below the long-term average. For 2014 through 2016, however, annual rainfall was above the long-term average. This recent rainfall trend is reflected in increases in surface water levels and flows experienced throughout the basin.

3. Monitoring results show the saltwater interface continues to move inland, but the goal to reduce the rate of saltwater intrusion through achieving the SWIMAL is showing promise. Reductions in actual water use have occurred within the MIA and aquifer levels are within 0.5 feet of the SWIMAL. These levels were within 0.7 feet of the SWIMAL in the current Assessment.

    a) The District has continued to expand its coastal monitoring network in areas with the greatest change in water quality. This includes filling gaps in the aquifer water quality network in the MIA to enable collection of additional data to help assess regional/local influences on the movement of the interface.

    b) The benefits of aquifer recharge have been investigated for the MIA and the results are encouraging. Based on preliminary analysis, it appears that Upper Floridan aquifer recharge on the order of 10 mgd in the MIA would be sufficient to meet the SWIMAL. The District is currently involved in four aquifer recharge investigations (e.g., SHARP, SHARE, City of Bradenton Aquifer Protection Recharge Well, and the Flatford Swamp Hydrologic Restoration Project) in the MIA.

    Effective communication with DEP and other regulators is key to the development of these new direct recharge approaches. The District recognizes this and, as a result, has established an ASR and recharge workgroup consisting of water management districts, DEP and municipalities. One outcome of this has been the consideration of the SWUCA recovery in permit evaluations for each recharge and ASR project.

4. The 10-year moving average for groundwater withdrawals has gradually declined to 557 mgd (about 90 percent from the Upper Floridan aquifer) as of 2015. This compares to an average withdrawal of 649 mgd in 2003. However, for public supply and agricultural users, actual groundwater withdrawal quantities are about 66 and 51 percent, respectively, of quantities permitted for groundwater withdrawal. Since it is possible that actual groundwater withdrawals could grow into permitted amounts, it is important that the District continue to monitor the relationship between permitted and actual used quantities and continue its efforts to reduce both quantities.

5. MFLs have been established on 41 water bodies. This includes the reevaluation of minimum levels on six Ridge Lakes. Of the 41 water bodies, 21 are being met and 20 are not being met.

6. Overall, groundwater demands have declined over the past years. This is attributed to development of alternative water supply projects, changes in water use activities and implementation of conservation in the area. The projected total water demand is expected to increase by 76 mgd from 2015 to 2025. This is needed to meet projected increases in water use and to meet the SWIMAL. Although some of this additional use may be offset by land use transitions, changes in water use may occur at different points in time and in different locations. Increased reclaimed water and agricultural and urban conservation measures have been key in helping to meet water demands. The projected increased demand can be met through several means including:

    a) Total potential savings up to 116 mgd (i.e., surface and ground water) have been identified through the year 2025, attributable to conservation and reclaimed water projects within the District. Some activities that provide substantial positive benefits are difficult to quantify, such as Net Benefit projects, redistribution of withdrawals, plugging of free-flowing wells, aquifer recharge projects, educational outreach and other similar efforts. Also provided are alternative potable water supply sources identified through the RWSP planning process. Identified alternative sources include interconnections, the seasonal storage of surface water sources, storm water and membrane treatment of available brackish groundwater resources.

    b) Notable water supply accomplishments for the assessment period include assistance with the creation of the PRWC for the regional development of water supply. The PRWC initiated three projects to test and design new AWS sources for its members in 2017. The District has also commenced Lower Floridan aquifer investigations. In addition, the District approved the CFWI Regional Water Supply Plan in November 2015.

7. Success in meeting the upper Peace River's minimum flows is closely tied to the Lake Hancock Lake Level Modification and Ecosystem Restoration project. This project was completed June 2015 and is currently being monitored. The District anticipates a three- to five-year monitoring phase to develop operational guidance protocols for various hydrologic conditions to achieve expected MFL benefits in concert with the Lake Hancock outfall treatment system. With the completion and operation of the Lake Hancock project, the District is taking an adaptive management approach to improve minimum flows in the upper Peace River. The Lake Hancock project will be monitored for several more years to determine whether additional projects are needed to meet the minimum flow requirements in the upper Peace River.

8. Demand management is critical to maintaining groundwater withdrawals at or below current levels. The District has a comprehensive demand management program in place in the SWUCA that has been effective at reducing water demand for public supply, industrial, recreational and agricultural uses. The District employs a combination of three approaches to water conservation: education, water use permitting and water shortage rules, and technical and financial assistance. The District also participates in research to address the measurement of water savings and investigate new methods of demand management. These efforts have cumulatively resulted in significant reductions in per capita water use within the SWUCA. A review of potential funding sources indicated funding would be available to meet project needs identified through the year 2025. Demand management projects completed, ongoing, or planned during the FY2012-2016 period include:

    a. A total of public supply, commercial, and institutional initiatives resulting in approximately 1 mgd of quantifiable water conservation at a District cost of $3.6 million. Conservation modeling

suggests quantifiable projects could potentially offset 21.6 mgd. Significant reductions in per capita water use can be attributable to non-quantifiable water conservation initiatives.

b. The District assisted in 27 reclaimed water projects being funded between FY2012 and FY2016. These projects are projected to offset 22.8 mgd of traditional supplies at a total cost of $179.4 million. By 2025 these reuse projects and growth of existing projects will result in total reuse of 87.03 mgd and total reuse offsets within the SWUCA of 70.71 mgd.

c. During the assessment period, the District has allocated funding for 50 FARMS projects implemented by growers in the SWUCA at a District cost of $16.8 million for a projected 8.859 mgd offset of groundwater withdrawals. Since FARMS's inception through FY2016, $34 million was allocated for 136 FARMS projects in the SWUCA for a total estimated offset of 25 mgd.

d. The District invested $90.3 million for 19 new alternative water supply projects, generating 27.5 mgd of new supply capacity. Six future large-scale alternative water supply and water resource project options have been identified for development as needed. The project options represent 56 mgd of future quantities at a combined total cost of $719 million. There are also several large ecosystem/restoration projects in various stages of development or implementation.

Based on these conclusions, the following future steps are recommended to continue to progress towards the SWUCA goals:

Goal 1 - Restore minimum levels to priority lakes

1. Implementation of options developed through previous outreach efforts and approved by the Governing Board should continue along with development of conservation projects and alternative water supplies through the CFI and the FARMS Programs.
2. Enhance and continue monitoring.
3. Schedule and complete future reevaluations of minimum lake levels as new and improved analysis methods are developed.
4. Complete the lake level recovery project evaluations for lakes Wailes, Eagle, McLeod and Lotela and implement if feasible.
5. Continue to support the Lake Jackson Watershed Hydrology project to identify potential reasons for low water levels in Lake Jackson and Little Lake Jackson.
6. Continue to support the Haines City Lake Eva project, including implementation if the evaluation demonstrates that there are feasible options for meeting lake levels.
7. Continue to support the IFAS research project on nitrogen leaching.
8. Conduct additional stakeholder outreach with each individual lake recovery project to improve the potential to develop successful projects.
9. Monitor lake recovery project impacts and use the results of these projects to develop additional individual lake level recovery projects for other lakes not meeting their MLLs.

Goal 2- Restore minimum levels in the upper Peace River by 2025

1. Continue with an adaptive management approach using the Lake Hancock project for several more years.
2. Develop operational guidance protocols.
3. Assess whether additional recovery options are needed.

Goal 3 - Reduce rate of saltwater intrusion by 2025

1. Continue to expand the coastal monitoring network and use the data to develop a reliable salt-water intrusion model.
2. Continue modeling and analysis of the benefits of aquifer recharge and implementation of aquifer recharge projects to provide the projected recharge need of approximately 10 mgd in the MIA to meet the SWIMAL. The District is currently involved in four aquifer recharge investigations (SHARP, SHARE, City of Bradenton Aquifer Protection Recharge Well and the Flatford Swamp Hydrologic Restoration Project) in the MIA.
3. Continue conservation efforts through the FARMS Program, regulation, and development of AWS.

Goal 4 – Ensure sufficient water supplies

1. Continue support of regional water supply entities and regional water supply development initiatives.
2. Continue conservation efforts through the FARMS Program, regulation, and development of AWS such as increased reclaimed water use including direct and indirect potable reuse.
3. Complete planned LFA investigation.
4. Prioritize AWS projects that replace the need for the identified 22.35 mgd of additional growth within existing permitted UFA quantities.
5. Maintain participation in the CFWI.
6. Continue regional water supply planning.

Section X
Bibliography

BCI Engineers & Scientists, Inc., January 2005. Lake Hancock Lake Level Modification Preliminary Evaluation Final Report. Consultant report submitted to the Southwest Florida Water management District, Brooksville, FL.

Ferguson, J. F., Bilby, J., White, B. and Wills, K., November 17, 2015. 2014 Estimated Water Use Report. Southwest Florida Water Management District, Brooksville, FL.

Ferguson, J. F., Bilby, J. and Gonzalez, Y., November 17, 2014. 2013 Estimated Water Use Report. Southwest Florida Water Management District, Brooksville, FL.

Ferguson, J. F., Fugate, M., and Pearson, R., November 15, 2017. 2016 Estimated Water Use Report. Southwest Florida Water Management District, Brooksville, FL.

Ferguson, J. F., Fugate, M., White, B. and Wills, K., November 30, 2016. 2015 Estimated Water Use Report. Southwest Florida Water Management District, Brooksville, FL.

Ferguson, J. F. and Gonzalez, Y., April 9, 2013. 2012 Estimated Water Use Report. Southwest Florida Water Management District, Brooksville, FL.

Jackson, M. C. and Albritton, B., April 9, 2013. 2011 Estimated Water Use Report. Southwest Florida Water Management District, Brooksville, FL.

Mallams, J. L., Barcelo, M. D. and Neasman, T. November 2013. Southern Water Use Caution Area Recovery Strategy, Five-Year Assessment for FY2007-2011.

Mallams, J. L., Barcelo, M. D. and Neasman, T. November 2013. Southern Water Use Caution Area Recovery Strategy, Five-Year Assessment for FY2007-2011: Updated June 2015 with the MIA and Ridge Lakes Stakeholder Outreach Response and Results.

Metz, P.A., and Lewelling, B.R., 2009, Hydrologic Conditions that Influence Streamflow Losses in a Karst Region of the Upper Peace River, Polk County, Florida: U.S. Geological Survey Scientific Investigations Report 2009-5140. United States Geological Survey, Reston, VA.

Southwest Florida Water Management District, March 2006. Southern Water Use Caution Area Recovery Strategy. Southwest Florida Water Management District, Brooksville, FL.
Southwest Florida Water Management District, November 2015. Southwest Florida Water Management District Regional Water Supply Plan. Brooksville FL.

Southwest Florida Water Management District, October 2015. Water Use Permit Applicant's Handbook, Part B. Southwest Florida Water Management District, Brooksville, FL.

Appendix 1
Public Supply Permitted Quantities and 2015 Withdrawals in the SWUCA

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WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2015 Annual Ave Withdrawals (mgd) [4]	2015 Annual Ave Daily Use (mgd) [5]	2015 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
CHARLOTTE COUNTY										
Gasparilla Island Water Assoc	718	GW S.I	1.538	88.3%	1.359	1.359	1.374	1.098	0.261	0.082
City of Punta Gorda	871	SW	8.088	90.6%	7.328	7.328	5.065	4.513	2.814	0.144
Charlotte Harbor Water Assoc	1512	GW I	0.712	93.1%	0.663	0.663	0.435	0.329	0.334	0.065
Charlotte Co BOCC	3522	GW I	3.172	89.0%	2.823	2.823	0.552	0.436	2.387	0.092
Charlotte Co B0CC [8, 9]	7104	SW	0.000	96.2%	0.000	16.100	0.000	9.971	6.129	1.001
Island Harbor Beach Club (Knight Island)	Cancelled		0.000					0.000	0.000	0.013
Sum of Large Utilities			**13.510**		**12.172**	**28.272**		**16.347**	**11.925**	**1.397**
Homeowners of Alligator Park	8626	GW F	0.055	97.0%	0.0534	0.0534		0.0160	0.037	0.000
El Jobean Water Association	99913	Import	0.000					0.0000	0.000	0.004
Riverwood Development	99916	Import	0.000					0.0000	0.000	0.026
Small Utilities (<0.1 mgd permitted)			**0.055**		**0.053**	**0.053**		**0.016**	**0.037**	**0.030**
Charlotte County Total			**13.565**		**12.225**	**28.325**		**16.363**	**11.962**	**1.427**
Groundwater Total			5.477					1.879	3.018	
Floridan Groundwater Total			0.055					0.016	0.037	
Surface Water Total			8.088					14.484	8.944	
2025 Projected PS Needs by Utility										1.427
2025 Projected DSS and AI Needs										0.239
2025 Projected PS Needs inc. DSS and AI										1.666
DESOTO COUNTY										
City of Arcadia	4725	GW I	1.117	97.0%	1.083	1.083	0.749	0.858	0.225	0.015
PRMRWSA Peace River WTF [9]	10420	SW	34.855	100.0%	34.855	0.155	32.433	0.000	0.155	0.000
DeSoto County Utilities [8,9]	20457	SW	0.000	94.0%	0.000	0.675	0.000	0.505	0.170	0.010
Sum of Large Utilities			**35.972**		**35.938**	**1.913**		**1.363**	**0.550**	**0.025**
Cross Creek of Arcadia LLC	3318	GW F	0.001	97.0%	0.001	0.001		0.000	0.001	0.000
Desoto Village LLC	6483	GW F	0.027	97.0%	0.026	0.026		0.012	0.014	0.000
Small Utilities (<0.1 mgd permitted)			**0.028**		**0.027**	**0.027**		**0.012**	**0.015**	**0.000**
DeSoto County Total			**36.000**		**35.966**	**1.941**		**1.375**	**0.565**	**0.025**
Groundwater Total			1.145					0.870	0.240	
Floridan Groundwater Total			0.028					0.012	0.015	
Surface Water Total			0.000					0.505	0.325	
2025 Projected PS Needs by Utility										0.025
2025 Projected DSS and AI Needs										0.106
2025 Projected PS Needs inc. DSS and AI										0.131
HARDEE COUNTY										
City of Bowling Green	30	GW F	0.386	97.0%	0.374	0.374	0.206	0.204	0.170	0.000
City of Wauchula	4461	GW F	1.237	92.0%	1.138	1.138	0.650	0.638	0.500	0.005
Town of Zolfo Springs	7658	GW F	0.175	96.0%	0.168	0.168	0.143	0.143	0.025	0.000
Hardee County BOCC	13026	GW F	0.439	95.0%	0.417	0.417	0.110	0.107	0.310	0.001
Sum of Large Utilities			**2.237**		**2.097**	**2.097**		**1.093**	**1.004**	**0.006**
Orange Blossom RV Park Inc	2402	GW F	0.025	97.0%	0.024	0.024		0.021	0.003	0.000

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2015 Annual Ave Withdrawals (mgd) [4]	2015 Annual Ave Daily Use (mgd) [5]	2015 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
MHC Peace River, LLC	7022	GW I	0.026	97.0%	0.025	0.025		0.022	0.003	0.000
Florida S K P Co-Op Inc	11087	GW I	0.006	97.0%	0.006	0.006		0.005	0.001	0.000
Torrey Oaks Homeowners Association	11180	GW F	0.017	97.0%	0.016	0.016		0.015	0.001	0.000
Wayne C & Doris F Rickert	11352	GW F	0.059	97.0%	0.057	0.057		0.021	0.036	0.000
FINR II, Inc	11858	GW F	0.421	97.0%	0.408	0.408		0.179	0.229	0.000
Small Utilities (<0.1 mgd permitted)			**0.554**		**0.537**	**0.537**		**0.263**	**0.274**	**0.000**
Hardee County Total			**2.791**		**2.634**	**2.634**		**1.356**	**1.279**	**0.006**
Groundwater Total			2.791					1.356	1.279	
Floridan Groundwater Total			2.759					1.329	1.275	
Surface Water Total			0					0	0	
2025 Projected PS Needs by Utility										0.006
2025 Projected DSS and AI Needs										0.033
2025 Projected PS Needs inc. DSS and AI										0.039
HIGHLANDS COUNTY										
HC Waterworks	4167	GW F	0.255	97.0%	0.247	0.247	0.179	0.172	0.076	0.005
City of Sebring	4492	GW F	5.712	97.0%	5.541	5.541	3.191	3.191	2.350	0.286
Lake Placid Holding	4980	GW F	0.406	80.0%	0.325	0.325	0.294	0.294	0.031	0.029
Town of Lake Placid	5270	GW F	0.807	90.0%	0.726	0.726	0.586	0.586	0.140	0.030
City of Avon Park	6029	GW F	2.372	94.0%	2.230	2.230	1.765	1.742	0.488	0.040
Town of Lake Placid	4980	GW F	0.406	97.0%	0.394	0.394	0.294	0.294	0.100	0.005
Buttonwood Bay Utilities	7139	GW F	0.203	83.0%	0.168	0.168	0.149	0.145	0.024	0.000
Country Club Util. Inc	7704	GW F	0.183	97.0%	0.178	0.178	0.168	0.168	0.009	0.009
LP Utilities Corp	9490	GW F	0.150	80.0%	0.120	0.120	0.050	0.050	0.070	0.000
Sun N Lake of Sebring	13099	GW F	1.104	97.0%	1.071	1.071	0.639	0.623	0.447	0.219
Sum of Large Utilities			**11.598**		**10.999**	**10.999**		**7.264**	**3.735**	**0.623**
Regular Baptist Fellowship Inc	4670	GW F	0.046	97.0%	0.045	0.045		0.020	0.025	0.000
Health Care Properties	4790	GW I	0.003	97.0%	0.003	0.003		0.003	0.000	0.000
HC Waterworks, Inc	6456	GW F	0.057	97.0%	0.055	0.055		0.033	0.022	0.000
Lake Bonnet Village Cooperative Inc	6804	GW F	0.052	97.0%	0.050	0.050		0.022	0.028	0.000
Highlands County School Board	9144	GW I	0.006	97.0%	0.006	0.006		0.003	0.003	0.005
Anthony L Ritenour & Laura B Ritenour	10926	GW F	0.005	97.0%	0.005	0.005		0.004	0.001	0.000
Lloyd W. Schrader Trust	10930	GW F	0.005	97.0%	0.005	0.005		0.005	0.000	0.000
R & T Management Gp	11601	GW F	0.040	97.0%	0.039	0.039		0.017	0.022	0.000
Wayne Rickert	12846	GW F	0.088	97.0%	0.085	0.085		0.056	0.029	0.000
Lake Park Village Condo Assoc	13272	GW F	0.005	97.0%	0.005	0.005		0.004	0.001	0.000
Silver Lake Utilities Inc	13367	GW I	0.017	97.0%	0.016	0.016		0.015	0.001	0.000
The Churches of Christ in Christian Union	20470	GW F	0.035	97.0%	0.034	0.034		0.026	0.008	0.000
Small Utilities (<0.1 mgd permitted)			**0.359**		**0.348**	**0.348**		**0.208**	**0.140**	**0.005**
Highlands County Total			**11.957**		**11.348**	**11.348**		**7.472**	**3.875**	**0.628**
Groundwater Total			11.957					7.472	3.875	
Floridan Groundwater Total			11.931					7.451	3.871	

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2015 Annual Ave Withdrawals (mgd) [4]	2015 Annual Ave Daily Use (mgd) [5]	2015 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
Surface Water Total			0					0	0	
2025 Projected PS Needs by Utility										0.628
2025 Projected DSS and AI Needs										0.508
2025 Projected PS Needs inc DSS and AI										1.136
HILLSBOROUGH COUNTY										
Tampa Bay Water (S-C Hillsborough) [10]	4352	GW F	24.100	97.0%	23.377	23.377	18.822	18.822	4.555	0.000
Cax Riverside LLC	7637	GW F	0.514	97.0%	0.499	0.499	0.602	0.602	0.000	0.000
Tampa Bay Water (BUD Well Field) [10]	11732	GW F	6.000	97.0%	5.820	5.820	3.284	3.284	2.536	0.000
Tampa Bay Water (Alafia River) [11]	11794	SW	18.700	97.0%	18.139	18.139	12.181	12.181	5.958	0.000
Hillsborough County Utilities [8]	20141	Wholesale	0.000	97.0%	0.000	67.243	0.022	54.926	0.000	12.317
Tampa Bay Water (Desal Plant) [11]	n/a	SEA	25.000	75.0%	25.000	25.000	1.130	1.130	23.870	0.000
Sum of Large Utilities			**74.314**		**72.835**	**140.078**		**90.945**	**36.919**	**12.317**
Park Village HOA	1	GW F	0.006	97.0%	0.006	0.006		0.005	0.001	0.000
Bloomfield	245	GW I	0.024	97.0%	0.023	0.023		0.021	0.002	0.000
Balm Estates	990	Expired						0.000	0.000	0.000
Little Manatee Isles MHP	2888	Cancelled						0.000	0.000	0.000
Valrico Hills	3704	Cancelled						0.000	0.000	0.000
Wilder Corporation	4757	GW F	0.065	97.0%	0.063	0.058		0.052	0.006	0.000
Hillsborough County BOCC Sun City	8440	GW F	0.060	97.0%	0.058	0.009		0.000	0.009	0.000
Berry Bay Farms at Jaymar Inc.	8469	GW F	0.009	97.0%	0.009	0.027		0.004	0.023	0.000
Florida Department of Transportation	8501	GW F	0.028	97.0%	0.027	0.027		0.016	0.011	0.000
Bloomfield - St. Pete Properties, LLC	8579	GW I	0.020	97.0%	0.019	0.019		0.017	0.002	0.000
Hillsborough Co School Board	8722	GW F	0.015	97.0%	0.015	0.015		0.013	0.002	0.000
Florida Acecapaders, Inc	10066	GW F	0.022	97.0%	0.021	0.021		0.007	0.014	0.000
Farmland Reserve	10817	Modified	0.000	97.0%	0.000	0.000		0.000	0.000	0.000
Florida Dept Of Juvenile Justice	10977	GW F	0.005	97.0%	0.005	0.005		0.000	0.005	0.000
Hometown Little Manatee, LLC	12513	GW F	0.042	97.0%	0.041	0.041		0.036	0.005	0.000
Hideaway Partners, LLLP	12621	GW F	0.022	97.0%	0.021	0.021		0.010	0.011	0.000
Small Utilities (<0.1 mgd permitted)11			**0.318**		**0.308**	**0.273**		**0.181**	**0.092**	**0.000**
Hillsborough County (SWUCA total)			**74.632**		**73.143**	**140.350**		**91.126**	**37.010**	**12.317**
Groundwater Total			30.932					22.889	7.183	
Floridan Groundwater Total			30.823					22.799	7.172	
Surface Water Total			18.700					12.181	5.958	
2025 Projected PS Needs by Utility										12.317
2025 Projected DSS and AI Needs										0.647
2025 Projected PS Needs inc. DSS and AI										12.964
MANATEE COUNTY										
City of Bradenton [8]	6392	SW	6.950	97.3%	6.762	7.262	5.753	6.112	1.150	0.077
Longboat Key [8]	10963	SW	0.000	97.0%	0.000	2.500	0.000	1.626	0.874	0.050
City of Palmetto [8]	12443	GW F	0.000	85.7%	0.000	2.000	0.000	1.383	0.617	0.056
MCU - Mosaic Wellfield	7345	GW F	1.960							

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2015 Annual Ave Withdrawals (mgd) [4]	2015 Annual Ave Daily Use (mgd) [5]	2015 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
MCU - Lake Manatee	13343	SW	34.900							
MCU - East Wellfield	13343	GW F	19.936							
MCU - Consolidated totals			56.796	93.7%	53.218	48.218	39.521	31.461	16.757	6.224
Sum of Large Utilities			**63.746**	**95.6%**	**59.980**	**59.980**	**45.274**	**40.582**	**19.398**	**6.407**
Lazy Acres LLC	13154	GW F	0.003	97.0%	0.003	0.003		0.002	0.001	0.000
ERS Sarasota LLC	20235	GW I	0.003	97.0%	0.003	0.003		0.003	0.000	0.000
Small Utilities (<0.1 mgd permitted)			**0.006**		**0.006**	**0.006**		**0.005**	**0.001**	**0.000**
Manatee County Total			**63.752**		**59.986**	**59.986**		**40.587**	**19.399**	**6.407**
Groundwater Total			21.902					13.517	7.078	
Floridan Groundwater Total			21.899					13.514	7.078	
Surface Water Total			41.850					27.070	12.321	
2025 Projected PS Needs by Utility										6.407
2025 Projected DSS and AI Needs										0.413
2025 Projected PS Needs inc. DSS and AI										6.820
POLK COUNTY										
City of Bartow	341	GW F	7.900	94.6%	7.471	7.471	2.945	2.435	5.036	0.605
City of Fort Meade	645	GW F	0.760	90.2%	0.685	0.685	0.515	0.496	0.189	0.062
Lake Region Mobile Home Owners Inc	1616	GW F	0.163	97.0%	0.158	0.158	0.074	0.074	0.084	0.000
Four Lakes Golf Club	1625	GW F	0.406	94.8%	0.385	0.385	0.303	0.298	0.087	0.000
Town of Lake Hamilton	2332	GW F	0.381	97.0%	0.370	0.370	0.349	0.345	0.025	0.003
Orchid Springs Dev Corp	3415	GW F	0.115	98.1%	0.113	0.113	0.067	0.067	0.046	0.001
Crooked Lake Park Water Co	4005	GW F	0.302	97.4%	0.294	0.294	0.232	0.215	0.079	0.078
City of Winter Haven	4607	GW F	14.060	90.4%	12.717	12.717	9.238	9.001	3.716	1.912
City of Lake Wales	4658	GW F	3.903	90.8%	3.545	3.545	2.414	2.410	1.135	0.586
City of Lakeland	4912	GW F	35.030	91.5%	32.035	31.525	20.652	20.147	11.378	2.822
Grenelefe Resort LLC	5251	GW F	1.235	99.3%	1.226	1.226	1.133	1.123	0.103	0.010
City of Frostproof	5870	GW F	0.870	90.1%	0.784	0.784	0.372	0.372	0.412	0.019
Town of Dundee Public Works Dept	5893	GW F	0.918	94.9%	0.871	0.871	0.542	0.542	0.329	0.126
City of Mulberry	6124	GW F	0.807	77.1%	0.623	0.623	0.389	0.389	0.234	0.000
Saddlebag Lake Owners Assoc Inc	6174	GW F	0.117	97.0%	0.113	0.113	0.086	0.086	0.027	0.000
Polk Co BOCC NWRUSA	6505	GW F	5.700	95.7%	5.455	5.664	2.363	2.491	3.173	1.372
Polk Co BOCC SWRUSA	6506	GW F	7.000	96.2%	6.734	6.791	3.150	3.113	3.678	1.205
Polk Co BOCC	6507	GW F	2.003	92.9%	1.861	1.861	1.023	1.003	0.858	0.217
Polk Co BOCC	6508	GW F	1.367	92.6%	1.266	1.266	0.551	0.542	0.724	0.048
City of Lake Alfred	6624	GW F	1.303	81.0%	1.056	1.056	1.034	1.023	0.033	0.204
City of Eagle Lake	6920	GW F	0.662	65.7%	0.435	0.435	0.332	0.316	0.119	0.109
City of Auburndale	7119	GW F	7.036	94.3%	6.636	6.637	4.556	4.556	2.081	0.743
CHC VII Ltd Century Realty Fund	7187	GW F	0.429	95.7%	0.411	0.411	0.225	0.225	0.186	0.018
Carefree RV of Winter Haven Inc	7328	GW F	0.131	99.6%	0.130	0.130	0.079	0.079	0.051	0.002
Polk Co BOCC ERUSA	8054	GW F	1.373	77.0%	1.057	1.057	0.442	0.435	0.622	0.388
S V Utilities Ltd	8344	GW F	0.212	94.7%	0.201	0.201	0.106	0.104	0.097	0.000

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2015 Annual Ave Withdrawals (mgd) [4]	2015 Annual Ave Daily Use (mgd) [5]	2015 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
City of Haines City	8522	GW F	5.921	88.1%	5.215	5.215	4.588	4.350	0.865	1.089
Plantation Landings Ltd	8753	GW F	0.111	90.6%	0.101	0.101	0.047	0.047	0.054	0.001
Sweetwater Community Inc	8967	GW F	0.146	97.0%	0.142	0.142	0.121	0.121	0.021	0.000
Alafia Preserve & Eagle Ridge LLC	12964	GW F	0.000	97.0%	0.000	0.000	0.000	0.000	0.000	0.000
SUM OF LARGE UTILITIES			**100.361**		**92.089**	**91.846**		**56.405**	**35.441**	**11.620**
Charles Poston	1554	GW F	0.008	97.0%	0.008	0.008		0.007	0.001	0.000
Alturas Utilities, LLC	2083	GW F	0.023	97.0%	0.022	0.022		0.020	0.002	0.000
School Board of Polk County	2092	GW F	0.005	97.0%	0.005	0.005		0.004	0.001	0.000
Sweetwater East Investment Co	2449	GW F	0.059	97.0%	0.057	0.057		0.043	0.014	0.000
Polk County BOCC	2656	GW F	0.002	97.0%	0.002	0.002		0.002	0.000	0.000
Blessings Inc	3045	GW F	0.004	97.0%	0.004	0.004		0.003	0.001	0.000
Alturas Utilities, LLC	3214	GW F	0.058	97.0%	0.056	0.056		0.036	0.020	0.000
GCIW-Callawalk, LLC	4176	GW F	0.073	97.0%	0.071	0.071		0.049	0.022	0.000
YES Communities/Spring Hill Estates	4441	GW F	0.075	97.0%	0.073	0.073		0.054	0.019	0.000
Valhalla Homeowners Assoc Inc	4479	GW F	0.036	97.0%	0.035	0.035		0.031	0.004	0.000
James E Andrews	5868	GW F	0.075	97.0%	0.073	0.073		0.046	0.027	0.000
North Pointe HOA of Auburndale	6023	GW F	0.027	97.0%	0.026	0.026		0.023	0.003	0.000
United Mc LLC	6105	GW F	0.008	97.0%	0.008	0.008		0.007	0.001	0.000
Robert D Conerly	6106	GW F	0.002	97.0%	0.002	0.002		0.001	0.001	0.000
Lucerne Lakeside Village, LLC	6119	GW F	0.024	97.0%	0.023	0.023		0.021	0.002	0.000
Lakeside Ranch Investment Corp	6152	GW F	0.033	97.0%	0.032	0.032		0.026	0.006	0.000
Frostproof Gospel Church Inc	6157	GW F	0.026	97.0%	0.025	0.025		0.018	0.007	0.000
Whispering Pines of Frostproof, LLC	6208	GW F	0.037	97.0%	0.036	0.036		0.020	0.016	0.000
La Casa De Lake Wales Association Inc	6308	GW F	0.026	97.0%	0.025	0.025		0.011	0.014	0.000
Twin Fountains Club Inc	6314	GW F	0.041	97.0%	0.040	0.040		0.035	0.005	0.000
Christmas Tree Trailer Park Inc	6495	GW F	0.035	97.0%	0.034	0.034		0.015	0.019	0.000
John G. Wood Revocable Trust	6597	GW F	0.089	97.0%	0.086	0.086		0.077	0.009	0.000
Circle F Dude Ranch & FL Rock Ind	6625	GW F	0.006	97.0%	0.006	0.006		0.003	0.003	0.000
Keen Sales Rentals & Utilities Inc	6679	GW F	0.017	97.0%	0.016	0.016		0.015	0.001	0.000
Hidden Cove Ltd	6893	GW F	0.025	97.0%	0.024	0.024		0.022	0.002	0.000
Tevalo, Inc	7172	GW F	0.028	97.0%	0.027	0.027		0.025	0.002	0.000
Camp Inn Associates LLC	7315	GW F	0.079	97.0%	0.077	0.077		0.027	0.050	0.000
Lakemont Ridge LLC	7557	GW F	0.055	97.0%	0.053	0.053		0.019	0.034	0.000
Peace Creek RV Park, LLC	7610	GW F	0.022	97.0%	0.021	0.021		0.019	0.002	0.000
Polk County - Waste Resource Mgmt	7614	GW F	0.000	97.0%	0.000	0.000		0.000	0.000	0.000
Florida Governmental Utility Authority	7653	GW F	0.072	97.0%	0.070	0.070		0.048	0.022	0.000
Orange Acres Ranch	7703	GW F	0.070	97.0%	0.068	0.068		0.038	0.030	0.000
Sterlingwood LLC	8370	GW F	0.008	97.0%	0.008	0.008		0.007	0.001	0.000
Woodland Lakes Mobile Home Community	8536	GW F	0.051	97.0%	0.049	0.049		0.044	0.005	0.000
Good Life Resort Inc	8684	GW F	0.060	97.0%	0.058	0.058		0.020	0.038	0.000
Pinecrest Utilities, LLC	9128	GW F	0.074	97.0%	0.072	0.072		0.042	0.030	0.000

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2015 Annual Ave Withdrawals (mgd) [4]	2015 Annual Ave Daily Use (mgd) [5]	2015 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
S P R V Limited	9557	GW F	0.077	97.0%	0.075	0.075		0.045	0.030	0.000
Keen Sales, Rentals and Utilities, Inc	9569	GW F	0.011	97.0%	0.011	0.011		0.008	0.003	0.000
Village of Highland Park	9807	GW F	0.062	97.0%	0.060	0.060		0.021	0.039	0.000
Van Lakes HOA	9835	GW F	0.038	97.0%	0.037	0.037		0.028	0.009	0.000
Agcy For Comm Treatment Services Inc	10564	GW F	0.004	97.0%	0.004	0.004		0.003	0.001	0.000
H Haywood & Judy Johnson	11085	GW F	0.001	97.0%	0.001	0.001		0.000	0.001	0.000
Dept Of Environmental Protection	11470	GW F	0.001	97.0%	0.001	0.001		0.001	0.000	0.000
First Baptist Hilltop Church Inc	11744	GW F	0.001	97.0%	0.001	0.001		0.001	0.000	0.000
Action Ministries Inc	12421	GW F	0.002	97.0%	0.002	0.002		0.001	0.001	0.000
Holiday Travel Park H I Resorts Inc	12899	GW F	0.019	97.0%	0.018	0.018		0.000	0.018	0.000
Alafia Preserve & Eagle Ridge (Mulberry)	12964	GW F	1.542	97.0%	1.496	1.496		0.000	1.496	0.000
New Beginning Church of God	13140	GW F	0.004	97.0%	0.004	0.004		0.004	0.000	0.000
West Villas Inc	13167	GW F	0.099	97.0%	0.096	0.096		0.000	0.096	0.000
Small Utilities (<0.1 mgd permitted)			**3.194**		**3.098**	**3.098**		**0.990**	**2.108**	**0.000**
Polk County Total			**103.555**		**95.188**	**94.945**		**57.395**	**37.550**	**11.620**
Groundwater Total			103.555					57.395	37.550	
Floridan Groundwater Total			103.555					57.395	37.550	
Surface Water Total			0.000					0.000	0.000	
2025 Projected PS Needs by Utility										11.620
2025 Projected DSS and AI Needs										1.270
2025 Projected PS Needs inc. DSS and AI										12.890
SARASOTA COUNTY										
City of North Port [8,9]	2923	SW	7.100	95.9%	6.809	9.674	1.287	2.900	6.774	1.406
City of Sarasota (WUP 4318)	4318	GW F	6.000							
City of Sarasota (WUP 10224)	10224		6.000							
City of Sarasota (WUP 10225)	10225		0.043							
City of Sarasota Consolidated Total [8]			12.043	93.9%	11.308	13.010	7.825	6.215	6.795	0.099
Englewood Water District [12]	4866	GW I	5.360	97.9%	5.245	5.245	3.426	2.456	2.789	0.093
City of Venice	5393	GW I	6.864	95.1%	6.528	6.528	4.323	2.197	4.331	0.117
Camelot Communities (GW/RO)	5807	GW I	0.390	100.0%	0.390	0.390	0.330	0.306	0.084	0.000
Sarasota County Utilities [8,9,13]	8836	GW F,I	13.737	90.2%	12.398	27.458	2.966	18.387	9.071	0.808
PRMRWSA Supplemental [13]	12926	GW F,I	7.000	80.0%	5.600	5.600	0.000	0.000	5.600	0.000
Sum of Large Utilities			**64.537**		**48.279**	**67.906**		**32.461**	**35.445**	**2.523**
Jerome & Fredrick Ellis	5456	GW I	0.025	97.0%	0.0490	0.0490		0.0060	0.0430	0.0000
Small Utilities (<0.1 mgd permitted)			**0.025**		**0.049**	**0.049**		**0.006**	**0.043**	**0.000**
Sarasota County Totals			**64.562**		**48.328**	**67.955**		**32.467**	**35.488**	**2.523**
Groundwater Total			48.119					23.352	31.814	
Floridan Groundwater Total			13.465					6.619	12.077	
Surface Water Total			4.400					9.115	3.674	
2025 Projected PS Needs by Utility										2.523
2025 Projected DSS and AI Needs										1.672

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2015 Annual Ave Withdrawals (mgd) [4]	2015 Annual Ave Daily Use (mgd) [5]	2015 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
2025 Projected PS Needs inc DSS and AI										4.195
SWUCA										
SWUCA Totals			**370.8**		**338.8**	**407.5**		**248.1**	**147.1**	**35.0**
Groundwater Total			225.9					128.7	92.0	
Floridan Groundwater Total			184.5					109.1	69.1	
Surface Water Total			73.0					63.4	31.2	
2025 Projected PS Needs by Utility										35.0
2025 Projected DSS and AI Needs										4.9
2025 Projected PS Needs inc. DSS and AI										39.8

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Appendix 2

Water Conservation, Agriculture Demand Management and Research, Reclaimed Water and Water Supply and Resource Development Projects within the SWUCA

Table A2-1. Conservation Projects for Public Supply, Industrial, Commercial and Institutional Demand Management: Completed, Ongoing or Planned FY2012-2016

PROJECTS	FY2012-FY2016 District Budget[1]	Cooperator Funding	Total Project Costs	Est. Water Conserved (mgd)
Polk County Landscape and Irrigation Evaluation, Phase 1 (N363)	$19,842	$19,842	$39,684	0.035
Venice Toilet Replacement, Phase 1 (N412)	$29,658	$29,658	$59,316	0.004
Venice Toilet Rebate and Retrofit Project, Phase 2 (N423)	$24,973	$24,973	$49,946	0.004
Manatee County Toilet Rebate Program, Phase 6 (N443)	$108,750	$108,750	$217,500	0.031
DeSoto County Hull Avenue Water Main Improvements Project (N530)	$449,395	$149,800	$599,195	0.127
Venice Toilet Rebate and Retrofit Project, Phase 3 (N568)	$42,750	$42,750	$85,500	0.016
Manatee County Toilet Rebate Program, Phase 7 (N571)	$113,250	$113,250	$226,500	0.032
Polk County Utilities Landscape and Irrigation Evaluation Program, Phase 2 (N613)	$22,085	$22,085	$44,170	0.032
Manatee County Toilet Rebate Program, Phase 8 (N623)	$112,860	$112,895	$225,755	0.029
Venice Toilet Rebate and Retrofit Project, Phase 4 (N625)	$42,750	$42,750	$85,500	0.016
North Port Water Distribution System Looping (N680)	$163,579	$163,579	$327,158	0.027
Polk County Landscape and Irrigation Evaluation Program (N714)	$27,500	$27,500	$55,000	0.028
Polk County Customer Portal Pilot Project (N716)	$10,000	$10,000	$20,000	0.090
Manatee County Toilet Rebate Project, Phase 9 (N725)	$113,250	$113,250	$226,500	0.033
Total	**$1,280,642**	**$981,082**	**$2,261,724**	**0.504**

[1] "FY2012-FY2016 District Budget" is the project's funding as allocated within the District adopted annual budgets. Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.

Table A2-2. Agricultural Demand Management Projects: Completed, Ongoing or Planned FY2012-2016

PROJECTS	FY2012-FY2016 District Budget[1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
Bright Hour Trust (H567)	$582,672	$305,000	$887,672	.187
Orange-Co, LP - Phases 2 and 3 and Amendment (H606)	$737,912	$267,564	$1,005,476	.629
Blossom Grove Phases 1-3 (H615)	$663,075	$221,025	$884,100	.375
Jones Potato Farm - Phases 2 and 3 (H640)	$769,448	$221,552	$991,000	1.336
Sunshine Foliage World (H645)	$72,000	$24,000	$96,000	.145
Loop Farms, LLC - Flowers Road (H647)	$381,850	$381,850	$763,700	.192
Peace Valley Groves (H648)	$243,330	$92,500	$335,830	.072
Charlotte 650 (H649)	$151,000	$137,000	$288,000	.130
Maassen Blueberries (H651)	$53,246	$17,748	$70,994	.013
J.R. Paul Properties, Inc. - Doe Hill Citrus (H656)	$128,000	$287,130	$415,130	.160
DeSoto Land Investment, LLC (H657)	$548,900	$401,860	$950,760	.185
The Doc Applications, Inc. (H659)	$32,500	$32,500	$65,000	.014
CFI USA, Inc - Venus Grove Phase 2 (H662)	$215,000	$105,000	$320,000	.090
Five Star Family Growers (H664)	$200,000	$200,000	$400,000	.090
Arcadia JV Citrus, LLC (H665)	$200,200	$101,000	$301,200	.070
Layline Land, LLC (H668)	$668,623	$314,240	$982,683	.551
Luna Berry Farms, LLC (H671)	$266,980	$109,480	$376,460	.112
FLM, Inc. - Prairie River Ranch - Phase 3 (H673)	$225,000	$322,000	$547,000	.173
Flint Properties II, LLC and Trust (H674)	$151,507	$191,912	$333,419	.205
Ben Hill Griffin, Inc. Section 16 & 17 Grove (H689)	$183,212	$183,212	$366,424	.160
Orange & Blue Groves, Inc. (H691)	$12,500	$12,500	$25,000	.113
Twenty-Twenty Groves, Inc. - Charlie Creek (H692)	$199,800	$199,800	$399,600	.178
Hancock Groves - Phase 4 (H693)	$199,500	$95,900	$295,400	.087
CFI USA, Inc. - Venus Grove - Phase 3 (H694)	$93,500	$93,500	$187,000	.030
Twenty-Twenty Groves, Inc. - Phase 2 (H696)	$1,615,823	$1,615,823	$3,231,646	.710
Duggal Farm (H698)	$131,876	$72,434	$204,310	.040
Sweetwater Preserve, LLC (H702)	$281,500	$281,500	$563,000	.185
Premier Citrus, LLC - North & South Groves (H703)	$1,120,701	$528,000	$1,648,701	.260
Charlotte 650, LLC - Phase 2 (H704)	$427,000	$160,000	$587,000	.131
Chapman Family Partnership, LLLP (H708)	$530,000	$176,666	$706,666	.379
Subtotal	**$11,086,655**	**$7,152,696**	**$18,229,171**	**7.002**

[1] "FY2012-FY2016 District Budget" is the project's funding as allocated within the District adopted annual budgets. Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.

Table A2-2. Agricultural Demand Management Projects: Completed, Ongoing or Planned FY2012-2016

PROJECTS	FY2012-FY2016 District Budget[1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
Baum, LLC (H710)	$193,425	$64,475	$257,900	.037
Sweetwater Preserve, LLC - Phase 2 (H711)	$231,886	$408,674	$640,560	.176
Premier Citrus, LLC - Sun Pure Groves (H713)	$796,350	$265,650	$1,062,000	.164
Orange-Co, LP JWCD Pump Automation (H714)	$196,200	$90,800	$287,000	.070
Premier Citrus - County Line Grove (H720)	$439,900	$220,100	$660,000	.140
Premier Citrus - Bay Grove (H721)	$355,600	$141,400	$497,000	.078
Varner Groves (H722)	$161,600	$291,000	$452,600	.108
Windmill Farms - Phase 2 (H723)	$205,400	$205,400	$410,800	.043
Alico - Crossing Grove (H726)	$84,600	$45,400	$130,000	.026
Wayne Moss - Halls Branch Farm (H727)	$200,100	$200,100	$400,200	.082
4F LLC Gator Farm (H728)	$150,000	$50,000	$200,000	.040
Alico - Polk County (H729)	$54,800	$54,800	$109,600	.020
Tamiami Citrus - 64 Grove (H730)	$655,000	$655,000	$1,310,000	.180
Madmac Property Holdings, LLC (H733)	$10,556	$10,556	$21,112	.011
BH Griffin - C&S Grove - Phase 2 (H735)	$617,390	$205,796	$823,186	.350
FLM, Inc - Blossom Grove Phase 4 (H737)	$426,282	$280,850	$707,132	.125
M & V, LLC (H738)	$545,200	$181,733	$726,933	.099
Chapman Family Partnership - Phase 2 (H739)	$113,250	$37,750	$151,000	.040
Ocean Breeze Properties, LLC (H740)	$32,064	$10,688	$42,752	.010
Hinton Family LLC (H742)	$252,897	$84,299	$337,196	.058
Subtotal	**$5,722,500**	**$3,504,471**	**$9,226,971**	**1.857**
Total	**$16,809,155**	**$10,657,167**	**$27,456,142**	**8.859**

[1] "FY2012-FY2016 District Budget" is the project's funding as allocated within the District adopted annual budgets. Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.

Table A2-3. Agricultural Demand Research Projects (IFAS): Board Approved FY2012–2016

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	Crop
Citrus Irrigation Soil Moisture Sensors (B296)	$150,000	N/A	$150,000	Citrus
Evaluation of Bed Geometry for Water Conservation on Drip Irrigated Tomatoes in Southwest Florida (B297)	$200,000	N/A	$200,000	Tomato
Alternative to Freeze Protection Practices for Blueberries (B299)	$72,500	N/A	$72,500	Blueberries
Determination of Irrigation Requirements for Peaches (B401)	$197,625	N/A	$197,625	Peaches
Exploring the Feasibility of Converting Seepage to Center Pivot Irrigation for Commercial Potatoes (B298)	$204,000	N/A	$204,000	Potatoes
Reduction of Water Use for Citrus Cold Protection (B287)	$16,500	N/A	$16,500	Citrus
Irrigation Scheduling to Address Water Demand of Greening-Infected Citrus Trees (B402)	$96,000	N/A	$96,000	Citrus
Managing Forests for Increased Regional Water Availability (P102)	$101,661	N/A	$101,661	Trees
Eliminating Sprinkler Irrigation Use in Strawberry Transplant Establishment (B405)	$167,000	N/A	$167,000	Strawberry
Evaluating Fertigation with Center Pivot Irrigation for Water Conservation on Commercial Potato Production (B406)	$400,000	N/A	$400,000	Potatoes
Evaluation of Nitrogen Leaching from Reclaimed Water Applied to Lawns, Spray Fields, and Rapid Infiltration Basins (B403)	$294,000	N/A	$294,000	Turf
New Practical Method for Managing Irrigation in Container Nurseries (B404)	$165,310	N/A	$165,310	Nursery
Florida Automated Weather Network - Data Dissemination and Education (B136)	$450,000	$2,059,416	$2,059,416	All
Total	**$2,514,596**	**$2,059,416**	**$4,574,012**	

[1] "FY2012-FY2016 District Budget" is the project's funding as allocated within the District adopted annual budgets. Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.

Table A2-4. Reclaimed Water Projects: Completed, Ongoing or Planned FY2012-2016

PROJECTS	FY2012-FY2016 District Budget[1]	Cooperator Funding	Total Project Costs	At Build-Out	
				Additional Water Supply (mgd)	Traditional Supplies Offset (mgd)
Sarasota County RW Master Plan (N381)	$100,000	$100,000	$200,000	Study	Study
Avon Park Reuse Master Plan (N455)	$18,750	$6,250	$25,000	Study	Study
South Hillsborough Area Recharge Project (SHARP) (N287)	$12,750	$1,382,500	$2,765,000	Study	Study
Polk County Groundwater Recharge Investigation (N304)	$188,874	$377,748	$755,496	Study	Study
Winter Haven Reuse: Aquifer Recharge/MFL Recovery (N739)	$175,000	$175,000	$350,000	Study	Study
TECO Reclaimed Water Interconnects to Lakeland/ Polk County/Mulberry (H076)	$21,581,056	$47,757,705	$96,960,725	10.0	10.0
Charlotte County Regional RW Expansion Phase 2 (H085)	$585,450	$1,314,550	$2,800,000	TBD	TBD
Manatee County 2nd of Four MARS 10MG RW Storage Tanks SW-2 (H093)	$2,658,555	$3,270,730	$7,179,284	Storage	Storage
North Port RW Transmission Main, Phase 1 (N277)	$1,750,500	$2,049,500	$3,800,000	1.30	0.80
Riverwood CDD Interconnect to Charlotte Co. System and Storage (N327)	$125,000	$350,000	$700,000	0.66	0.45
Lake Wales Country Club Reuse (N335)	$282,167	$564,333	$846,500	0.35	0.26
Braden River Utilities/ Bradenton RW (N336)	$7,000,000	$7,000,000	$14,000,000	5.00	5.00
Winter Haven #3 RW Interconnect, Storage and Pumping Project (N339)	$2,750,000	$6,716,000	$9,466,000	0.30	0.15
Subtotal	**$37,228,102**	**$71,064,316**	**$139,848,005**	**17.61**	**16.66**

[1] "FY2012-FY2016 District Budget" is the project's funding as allocated within the District adopted annual budgets. Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.

Table A2-4. Reclaimed Water Projects: Completed, Ongoing or Planned FY2012-2016

PROJECTS	FY2012-FY2016 District Budget[1]	Cooperator Funding	Total Project Costs	At Build-Out	
				Additional Water Supply (mgd)	Traditional Supplies Offset (mgd)
Manatee County Meadows RW Transmission (N344)	$234,858	$130,753	$261,506	0.07	0.04
Riverwood CDD RW Expansion (N346)	$304,000	$304,000	$608,000	0.13	0.10
Braden River Utilities Lakewood Ranch/BRU-Sarasota RW Interconnect (N355)	$750,000	$750,000	$1,500,000	2.00	2.00
Venice RW Storage Tank (N452)	$1,625,000	$1,625,000	$3,250,000	Storage	Storage
Manatee County Regional 10 MG Storage Tank and Pump Stations SE-3 (N488)	$4,408,747	$4,408,747	$8,817,494	Storage	Storage
Venice RW Filtration System Construction (N512)	$780,000	$780,000	$1,560,000	Storage	Storage
Auburndale Polytechnic RW Storage/Transmission (N536)	$1,500,000	$1,500,000	$3,000,000	1.50	1.13
Charlotte County RW Expansion – Phase 3 (N556)	$2,337,750	$4,715,000	$9,430,000	2.23	1.67
Hillsborough County/Plant City/Tampa/Temple Terrace RW Recharge Feasibility (N601)	$162,500	$162,500	$325,000	Study	Study
Venice RW Interconnect Feasibility Study w/Sarasota County (N604)	$25,000	$25,000	$50,000	Study	Study
North Port RW Transmission Main – Phase 3 (N667)	$410,270	$660,000	$1,320,000	0.36	0.22
Bradenton RW Pumping Station Capacity Expansion (N692)	$332,000	$332,000	$664,000	Pumping	Pumping
Braden River Utilities RW Transmission Line (N711)	$1,075,000	$2,300,000	$4,600,000	1.00	1.00
Palmetto 1.2 MGD Dry Season RW ASR System (L608)	$1,298,112	$1,959,112	$4,146,224	Storage	Storage
Subtotal	**$15,243,237**	**$19,652,112**	**$39,532,224**	**7.29**	**6.16**
Total	**$52,471,339**	**$90,716,428**	**$179,380,229**	**24.9**	**22.82**

[1] "FY2012-FY2016 District Budget" is the project's funding as allocated within the District adopted annual budgets. Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.

Table A2-5. Water Supply Projects: Completed, Ongoing or Planned FY2012-2016

PROJECTS	FY2012-FY2016 District Budget[1]	Cooperator Funding	Total Project Costs	Supply (mgd)
Polk County Regional Water Supply Plan Entity (N447)	$100,000	$150,000	$250,000	Planning
Polk County Regional Entity Implementation Agreement (N448)	$89,000	$139,000	$228,000	Planning
PRMRWSA Integrated Regional Water Supply Master Plan Update (N493)	$175,000	$175,000	$350,000	Planning
Charlotte County Utilities Burnt Store Brackish GW Well Field Study (N605)	$172,500	$227,500	$400,000	Study
Central Florida Water Initiative (P289)	$163,420	$0	$163,4200	Planning
USGS Flatford Swamp Surface Water Stage and Flow Monitoring (B092)	$547,500	$0	$547,500	Data Collection
SWUCA/MIA Saltwater Intrusion Model (P623)	$600,000	$0	$600,000	Study
SWUCA/Ridge Lakes Water Budget Models (P624)	$150,000	$0	$150,000	Study
Ridge Lakes Recovery Options/CFWI (P629)	$500,000	$0	$500,000	Study
WMDs/PRMRWSA ASR Pretreatment Investigations (H046)	$200,000	$0	$2,000,000	Study
Hydrogeologic Investigation of the Lower Floridan Aquifer in Polk County (P280)	$2,000,000	$0	$2,000,000	Study
Lake Hancock Design, Permit and Mitigation to Raise Lake (H008)	$0	$0	$6,392,514	16.20
Lake Hancock Outfall Structure P-11 Replacement to Raise Lake (H009)	$0	$0	$5,411,393	See H008
MIA Recharge SWIMAL Recovery at Flatford Swamp (H089)	$263,382	$0	$263,382	Study
Lake Jackson Watershed Hydrology Investigation (N554)	$120,487	$0	$400,000	Study
PRMRWSA Peace River Treatment Capacity Expansion Phase 1 (N671)	$750,000	$2,250,000	$3,000,000	3.00
PRMRWSA Regional Loop Phase 2 (H051)	$332,923	$6,713,008	$13,426,017	Pipeline
PRMRWSA Regional Loop Phase 3A (H052)	$67,697	$19,258,638	$33,000,000	Pipeline
Totals	**$6,349,366**	**$28,913,146**	**$70,553,006**	**19.2**

[1] "FY2012-FY2016 District Budget" is the project's funding as allocated within the District adopted annual budgets. Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.

Table A2-6. Proposed Large-scale Water Supply and Water Resource Development Projects and Project Cost (in million dollars) – FY 2019-2025

PROJECTS	Entity Responsible for Implementation	Total Project Cost (million $)	District Eligible Cost FY2019-2025 (million $)	Total Quantities (mgd)	Quantities FY2019-2025 (mgd)
City of Bradenton Aquifer Protection Recharge (N842)	Bradenton	$5.0	$2.5	5.0	5.0
Bradenton River Utilities ASR Feasibility (N912)	Braden River Utilities	$6.35	$3.0	4.0	4.0
Punta Gorda Brackish RO Facility (N780)	Punta Gorda	$32.2	$6.6	4.0	4.0
South Hillsborough Aquifer Recharge Expansion (SHARE) – Phase 1 (N855)	Hillsborough County	$10.0	$5.0	4.0	4.0
PRMRWSA Regional Integrated Loop System – Phase 3B (N823)	PRMRWSA	$16.7	$6.9	N/A	N/A
PRMRWSA Partially Treated Water ASR (N854)	PRMRWSA	$7.8	$3.8	3.0	3.0
PRWC Polk Southeast Wellfield (N905) [1]	PRWC	$340.0	$114.1	30.0	10.0
PRWC West Polk LFA Wells (N882) [1]	PRWC	$157.5	$33.5	15.0	5.0
PRWC Peace Creek Integrated Water Supply Plan (N882) [1]	PRWC	$120.89	$0.51	10.0	0.0
Flatford Swamp Hydrologic Restoration (H089) [1] [2]	SWFWMD	$36.0	$14.0	10.0	4.0
Hydrogeological Investigation of the LFA (P280) [1] [2]	SWFWMD	$12.0	$2.0	N/A	N/A
PRMRWSA Regional Integrated Loop System – Multiple Phases [1]	PRMRWSA	$66.4	$32.4	N/A	N/A
PRMRWSA Surface Water Treatment Plant Expansion [1]	PRMRWSA	$13.8	$6.9	4.0	4.0
PRMRWSA ASR Expansion [1]	PRMRWSA	$15.0	$5.88	TBD	TBD
Totals		**$839.64**	**$237.09**	**89.0**	**43.0**

[1] Projects not anticipated to be fully completed by 2025.

[2] District Initiative project.

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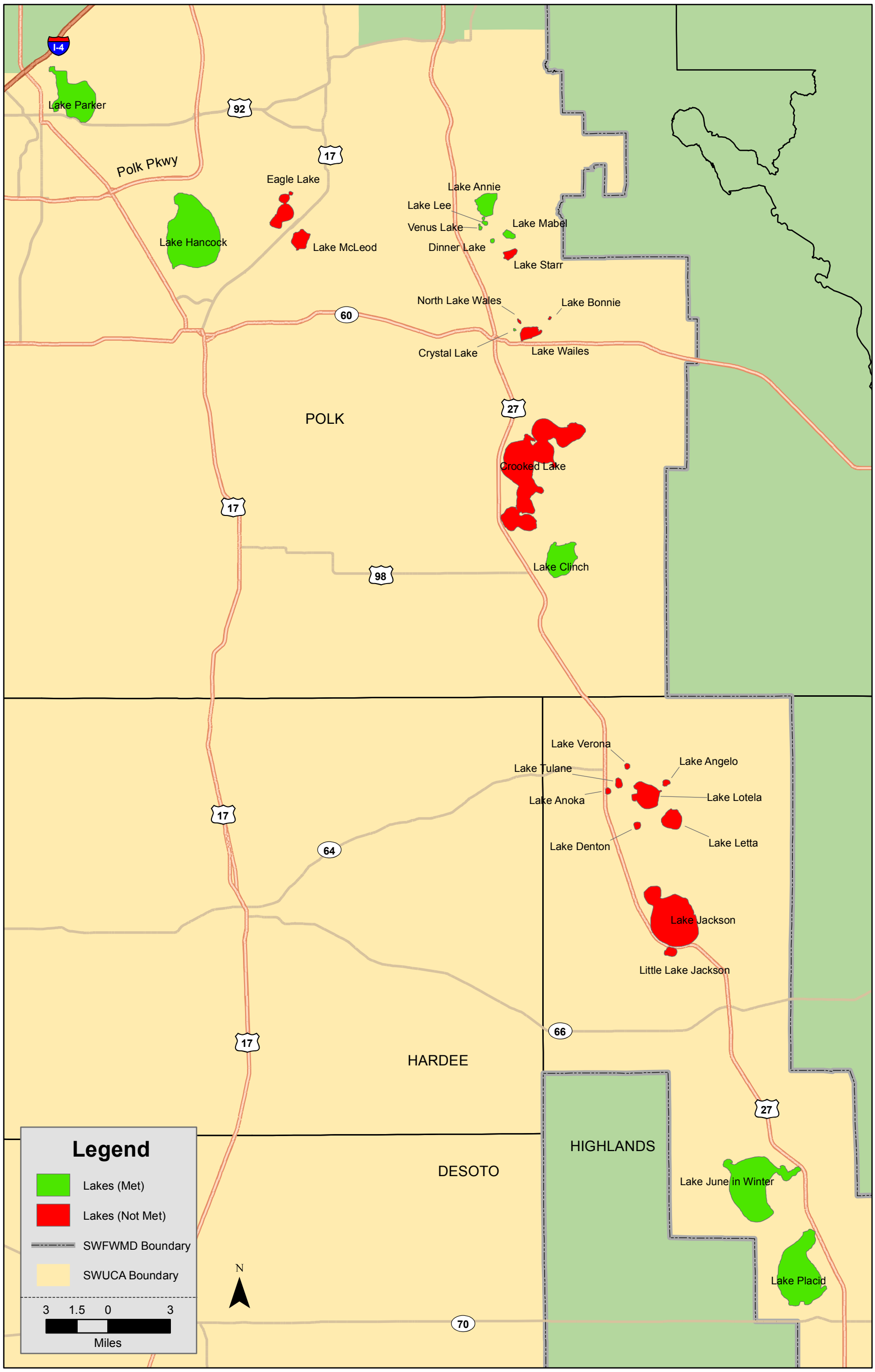
Appendix 3

Maps

MFL Lake Status and Location Map



Appendix 4

Subject Matter Expert Recommendations

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SME Subject: SWUCA Five-Year Assessment (2011-2016)

SME Team: Mike Hancock, Luke LeMond, Ron Basso

Date: February 12, 2018

There are three areas where MFLs were evaluated to assess overall recovery within the SWUCA: Minimum Lake Levels along Lake Wales Ridge/Northern Polk County, Minimum Low flows in the Upper Peace River, and Saltwater Intrusion Minimum Aquifer Levels in the Most Impacted Area (MIA). The SWUCA recovery plan indicates progress needs to be demonstrated toward recovery for each 5-year assessment and that MFLs should be met from all regions by 2025.

Overall Opinion: The scientific analysis supports the conclusions of the SWUCA 5-year assessment in that staff is seeing improving hydrologic conditions within the MIA, Upper Peace River, and Lake Wales Ridge areas of the SWUCA. This was demonstrated by increasing water level elevations in the UFA within the Most Impacted Area, Upper Peace (UP), and Lake Wales Ridge (LWR) regions based on their sentinel wells. Both the UP and LWR regions were well above their regional target levels while the Saltwater Intrusion Minimum Aquifer Levels (SWIMAL) were still 0.5 feet below the 10-yr average of 13.1 Ft NGVD29 in the MIA (but improving). For the SWIMAL UFA water levels, the 2016 10-yr average water level was higher than any 10-year level from 2001-2015.

Regional Points:

Lake Wales Ridge/Northern Polk County

The SME team agreed with staff's assessment that 12 out of 28 minimum lake levels (MLLS) are now being met within the LWR-Northern Polk County region with improvement toward the minimum lake levels on average of 0.7 feet for the 16 lakes not meeting their MLL from 2015 to 2016. There are spatially localized patterns of lakes not being met with a cluster of seven lakes near Avon Park and three lakes near Lake Wales (out of 16 total). Seven MLLs were reevaluated since the last 5-yr assessment. Four of 7 resulted in substantially lower MLLs.

Technical issues to be addressed:

1. While the regional UFA water levels averaged from the sentinel wells in the LWR are now 0.9 feet above the target level of 91.5 feet NGVD29 and have been above since the mid-1990s – why are there not more MLLS being met? The regional target level was established as initial screening criteria for allowance of additional water use permits if there are no impacts to established MFLS by an individual application. But more importantly, there also could be spatial variation in pumping and hydrogeology that may be leading to localized "hot spots" of impact. Additional work to verify this would be to map spatial distribution of pumping around a certain radius of each MLL or cluster of lakes in addition to mapping spatial distribution of rainfall from radar-estimated data. This could help identify if localized pumping and/or low rainfall is affecting lakes not making their MLLs. Another quick look would be to see if the individual sentinel well water levels closest to the MLLs not being met are anomalously lower than others within the region.

2. Ridge lakes generally have more natural fluctuation than lakes within the Tampa Bay wellfield region where minimum lake level methodology and standards were originally developed. For example, lakes along the southern Brooksville Ridge have about twice the range of natural fluctuation than Northern Tampa Bay lakes – and these lakes are "perched" well above the UFA and not impacted by groundwater withdrawals. The development of MLL methodology for ridge lakes with deep water table conditions, internally-drained areas with little runoff, and more xeric land cover is a needed

addition to the MLL rule methodology. Due to the larger natural fluctuation range expected with these lakes – it would be expected that more ridge lakes would meet their criteria under this methodology. *This should be a staff priority for future work over the next 3 years.*

3. District staff has worked to reevaluate MFL lakes throughout the District, using current methodologies not available at the original time of establishment. Staff should continue to reevaluate MFL lakes in the SWUCA, prioritizing lakes that have been established for 10 years or more. Note that staff is already prioritizing the reevaluation of such lakes in the NTBWUCA as part of preparations for the conclusion of the current recovery plan in that area in 2020.

Upper Peace Region

The SME team agreed with staff's assessment that it is too early to fully evaluate the efficacy of the Lake Hancock augmentation project to meet the minimum low flows on the Upper Peace River – although low flow has improved with augmentation from the Lake. Only one year of operational history was available under the assessment window of 2011-2016. The SME team believes at least five to 10 years of operational history under a variety of climatic regimes is needed to fully evaluate the status of minimum low flows in the upper river. Regional water levels within the UFA are rising and stand at 58.2 feet NGVD29 or almost five feet above the target level of 53.3 feet NGVD29. The 10-year average water level from the sentinel wells have been above the target level since the mid-1990s.

Technical issues to be addressed: None.

Most Impacted Area

The SME team agreed that the SWIMAL was still 0.5 feet below the 10-yr average of 13.1 feet NGVD29 in the MIA but that water levels were improving. Staff pointed out that the SWIMAL of 13.1 Ft NGVD established from 1990-1999 was under a wetter rainfall regime than the last 17 years and that overall groundwater withdrawals in the SWUCA have declined since 2003. In 2003, SWUCA 10-yr average groundwater withdrawals were about 650 mgd and have fallen to approximately 560 mgd in 2015.

Technical issues to be addressed:

1. While trends in rainfall and groundwater withdrawals in the SWUCA are downward over the last 10-15 years, this situation should be confirmed within the MIA by examining actual groundwater use since 1992 and radar-rainfall since 1995.
2. The 10 wells used to establish the SWIMAL may not be adequate to fully characterizing hydrologic conditions within the MIA – there are large spatial gaps and some wells appear to be heavily influenced by local pumping. It is a recommendation to explore adding additional monitor wells in the future to evaluate spatial bias in the sentinel network.
3. This assessment focuses on changes in lake levels, upper peace low flows, and UFA water levels in regions of the SWUCA. Over the next five years, prior to 2025, *it is recommended that the SWIMAL level be reevaluated when the new regional saltwater intrusion model is completed with a full review of water quality, rainfall, pumping, and water level data over the last 30 years.* Changes in MAL methodology or status assessment procedures should also be considered to better isolate changes in UFA water levels due to withdrawal related impacts and more comprehensively determine overall water level change within the MIA. The 1990-1999 SWIMAL levels were established during a wetter rainfall regime and as a result, the MAL is not being met even though groundwater withdrawals in the SWUCA have declined since the 1990s. This approach would be consistent with methodology used to account for natural variability due to rainfall at all other MFLs within the District. It is recommended that the District establish a working group principally within the Resource Evaluation Section to accomplish this task.

Review Conclusion: The scientific analysis clearly provides evidence of improving water levels within LWR lakes, Upper Peace low flows, and the UFA in all three regions of the SWUCA, so no changes to the current recovery strategy are necessary at this time. The resource evaluation demonstrates improvement toward the goal of meeting all MFLs within the SWUCA by 2025. Some minor technical work is recommended over the next month to prepare for possible questions from the Governing Board or public. Three major recommendations from the SME team include accelerating the internal process to establish new MLL methodology for ridge lakes, continuing to reevaluate older MLLs in the SWUCA through improved methods not previously available, and reevaluating the SWIMALs in 5 years to assess possible spatial bias in UFA water levels and update projected saltwater interface movement when a new solute transport model is developed.