Southern Water Use Caution Area Recovery Strategy

Five-Year Assessment for FY2017-2021

Southwest Florida
Water Management District

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Final Report

Southern Water Use Caution Area Recovery Strategy
Five-Year Assessment, FY2017-2021

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Section I
Introduction

The Southern Water Use Caution Area (SWUCA) of the Southwest Florida Water Management District (District) encompasses an area of approximately 5,100 square miles, including all of Charlotte, DeSoto, Hardee, Highlands, Manatee and Sarasota counties and parts of Hillsborough and Polk counties. The SWUCA Recovery Strategy (Recovery Strategy) described in SWFWMD (2006) was adopted into the District's Recovery and Prevention Strategies for Minimum Flows and Levels rules (Chapter 40D-80, Florida Administrative Code or F.A.C.) in 2006 and became effective on January 1, 2007. The Recovery Strategy was necessary, as minimum flows and minimum water levels (MFLs) for the upper Floridan aquifer in a coastal portion of the SWUCA, eight lakes in Highlands and Polk counties, and three segments of the upper Peace River in Hardee and Polk counties that were concurrently adopted into the District's Water Levels and Rates of Flow rules (Chapter 40D-8, F.A.C.) were not being met.

Minimum flows and levels identify the limit or water level at which further withdrawals would be significantly harmful to the water resources or ecology of the area (Section 373.042, Florida Statutes). 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 adopted by rule and implemented as part of the regional water supply plan to achieve recovery to the established minimum flow or minimum water level as soon as practicable or prevent the existing flow or water level from falling below the established minimum flow or minimum water level.

Long-term declines in aquifer levels within the SWUCA, exceeding 50 feet in some areas, have occurred as a result of groundwater withdrawals. These declines contributed to saltwater intrusion along the western coast of Florida, reduced flows in the upper Peace River and low lake levels in the Ridge Lakes area, i.e., on the Lake Wales Ridge and adjacent areas within Polk and Highlands counties. Additionally, about 708 square miles of the coastal portions of southern Hillsborough, Manatee and northwestern Sarasota counties, where concern for saltwater intrusion was greatest, was designated as the Most Impacted Area (MIA) within the SWUCA. The Recovery Strategy was developed to address MFLs in these areas that were not being met, to achieve recovery to the established MFLs as soon as practicable.

The District employs a variety of programs and initiatives for ensuring water resource sustainability in the SWUCA. These include the District's regional water supply planning, support of alternative water supply and conservation projects, and the establishment and implementation of MFLs and necessary recovery and prevention strategies. Additional mechanisms include regulatory activities and projects, including the associated water use permitting and reporting. The District's Regional Water Supply Plan (RWSP) quantifies 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, including the portion within the District, is also addressed in the Central Florida Water Initiative (CFWI) RWSP, which is also applicable to areas in the South Florida and St. Johns River water management districts. The CFWI is a cooperative effort among the three districts, the Florida Department of Environmental Protection (DEP), the Florida Department of Agriculture and Consumer Services (FDACS), and public water supply utilities to identify sustainable quantities of groundwater sources available for water supplies in the CFWI area and ensure water needs are met while protecting the water and related resources. The current versions of the District (SWFWMD 2020a) and CFWI (2020) RWSPs include the Recovery Strategy, as required by the Florida Statutes. Through September 2022 (the end of the District's fiscal year 2022), MFLs had been adopted for 46 water bodies in the SWUCA, including 32 lakes, 12 river segments, 1 spring group, and the upper Floridan aquifer in the MIA. Adoption of the Recovery Strategy in 2006 was associated with substantial

changes to the District's Consumptive Use of Water rules (Chapter 40D-2, F.A.C.). These combined with conservation requirements and projects implemented ensure water resource and water supply sustainability and promote MFLs recovery in the SWUCA.

The Recovery Strategy has four major goals to achieve by the year 2025:

1. Restore minimum levels to priority lakes in the Ridge Lakes 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—once 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

There were six major elements identified for accomplishing the referenced goals:

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

The Recovery Strategy rule requires periodic reporting on the Recovery Strategy's progress and, if periodic assessments do not indicate progress, the Governing Board is to revise the Recovery Strategy, as appropriate, to achieve progress. The District has previously completed annual assessments, and five-year assessments of strategy progress during fiscal years 2007 through 2011 and fiscal years 2012 through 2016.

The first five-year assessment, for Fiscal Years 2007 through 2011 (Mallams et al. 2013), indicated SWUCA groundwater levels were generally stable, with increasing levels in the north and decreasing levels in some southern areas. In 2011, the Upper Floridan aquifer level in the MIA was 0.7 feet below the adopted saltwater intrusion minimum aquifer level (SWIMAL) for the region. Annual rainfall over much of the basin was characterized as below the long-term average. 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 reporting and water conservation initiatives.

A 2015 update to the first five-year assessment (Mallams et al. 2015) included a Governing Board-approved stakeholder outreach effort to identify other recovery options for the MIA and the Ridge Lakes areas of the SWUCA. Four meetings were held in each of the two areas in 2015. Meeting participants represented all 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 achieve the SWIMAL. The Governing 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. To encourage

participation in the District's Facilitating Agricultural Resource Management Systems (FARMS) program, the Governing Board also approved an increase from 50% to 75% for the District's cost share of FARMS projects in the MIA for a period of three years.

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 Governing Board supported all three options.

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

The second five-year assessment, fiscal years 2012-2016 (Marchand et al. 2018), indicated groundwater demands in the SWUCA had declined during the preceding 10 years. The decline was primarily attributed to the implementation of alternative water supply, water use and water conservation initiatives. Interestingly, annual rainfall during the assessed 2012-2016 period over much of the SWUCA was lower than the long-term average. Groundwater levels in the SWUCA generally exhibited stability, although increased levels were identified in the north and decreased levels were noted in some southern areas outside of the sentinel wells. Increased water levels were observed in all six sentinel wells from 2012-2016. Along the central, coastal portion of the SWUCA, the Upper Floridan aquifer level in the MIA was 0.5 feet below the saltwater intrusion minimum aquifer level (SWIMAL) established for the area in 2016. The continued inland movement of the saltwater interface was noted, which was not an unexpected finding, given that the Recovery Strategy goal is to reduce the rate of this movement by achieving the SWIMAL. At the end of the 2012-2016 assessment period, 21 of the 41 MFLs established in the SWUCA were met and 20 were not being achieved (Marchand et al. 2018).

An important conclusion of the five-year assessment for fiscal years 2012-2016 was that the District continues to make progress toward recovery, but challenges remain to achieving full recovery by 2025.

The District has recently conducted a third five-year Recovery Strategy assessment that addresses progress achieved from fiscal year 2017-2021. Results from this assessment are summarized in this document, which also serves as an annual assessment for 2021. Trends in water resources, permitted and used water quantities, and the development of projects and initiatives that address issues within the SWUCA are described. This information provides a basis for assessing Recovery Strategy progress, and if progress is not indicated, may be used to support revision of the Recovery Strategy to achieve progress.

Section II
Hydrologic Conditions Update

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 in the SWUCA through comparison of recent and 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. Since 1976, water levels in Coley Deep increased by 6.4 feet. This was a slow, steady increase observed from the mid to late '70s through the latest data collection period. Water levels in ROMP 60 increased by 24.1 feet over that same period. This increase in water levels was also a steady increase from the late '70s forward. It is noteworthy that both of these wells are used to monitor the northeastern portion of the SWUCA.

The other sentinel wells, Marshall Deep, Edgeville Deep, Sarasota 9, and ROMP 50, all increased by 6.9, 2.5, 3.3, and 8.9 feet respectively between 1989 and 2021. For most of these wells, the lowest consistent water levels were measured in the late 1980s to early 1990s where they remained until the early 2000s. Water levels have generally increased since 2002. Edgeville Deep, however, did not reach a minimum consistent water level until approximately 2009.

Marshall Deep, Edgeville Deep, and Sarasota 9 all have similar water level patterns. As shown in Figure 2-1, these wells monitor the southern portion of the SWUCA. All three wells had sharp increases and decreases in water levels from 2002 to approximately 2010 but maintained a roughly unchanged mean water level through that time. Since 2010, all three of those wells have been measured with slightly increasing water levels.

During the 2017-2021 assessment period, groundwater levels fluctuated by as much as 29.3 feet in the Edgeville Deep well. The minimum fluctuation observed was 13.1 feet in Coley Deep. Despite the large fluctuations in water levels through that 5-year period, the mean water level through 2017 was very close to the mean water levels measured through 2021. All wells measured a slight increase in water levels when the mean water level through 2017 was compared to the mean water level through 2021. The Coley Deep well had the smallest increase at 0.6 feet. ROMP 50 had the largest increase at 5.5 feet. The overall mean increase between all sentinel wells was 3.5 feet through that 5-year period.

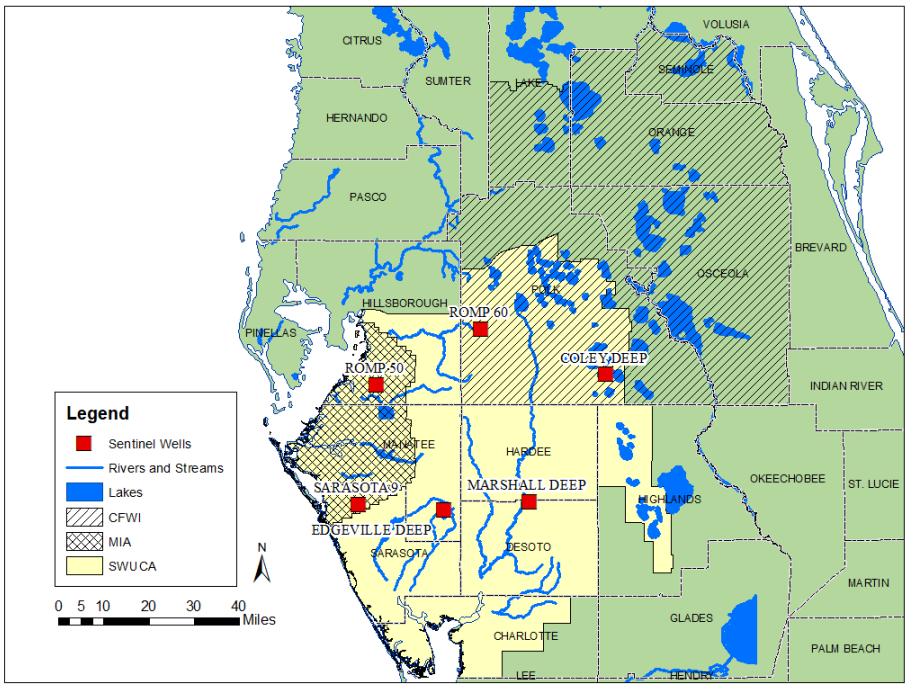

Figure 2-1. Southern Water Use Caution Area (SWUCA), Most Impacted Area (MIA), Central Florida Water Initiative (CFWI) area, and locations of six Upper Floridan aquifer monitoring wells.

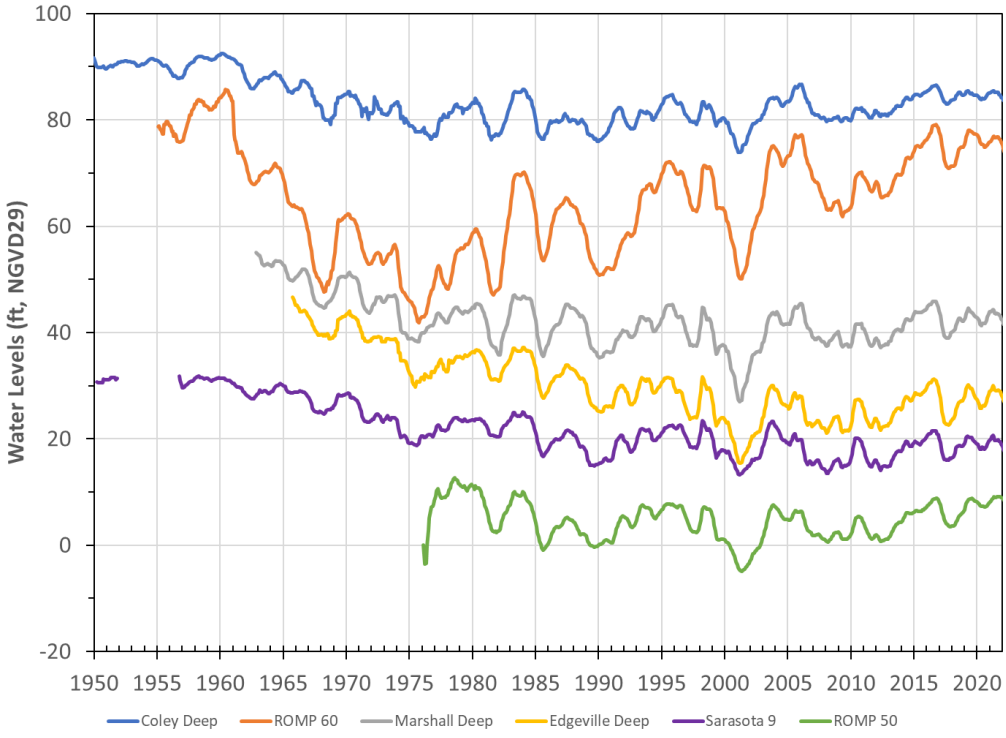

Figure 2-2. Long-term SWUCA groundwater monitoring sites.

Water levels in the SWUCA principally fluctuate 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). From 2007 to 2019, the 10-year moving average of rainfall was below the period of record (beginning in 1915) average of 52.4 inches per year (Figure 2-3). Currently, the 10-year moving average is 52.6 inches, which is 0.2 inch above the period of record average. Annual average rainfall in the SWUCA has been above average 10 times since 2000.

Historical groundwater withdrawals in the SWUCA increased significantly from the mid-1900s to the 1980s, approximately doubling during that period as shown in Figure 2-4 and have since stabilized. Though the Recovery Strategy does not strictly limit groundwater withdrawals, the District previously determined it would be necessary to reduce total pumping over time from 650 mgd (with about 580 mgd of this total from the Upper Floridan aquifer) to about 600 mgd (or about 540 mgd from the Upper Floridan aquifer) to meet the SWIMAL established for the SWUCA MIA (SWFWMD 2006). While year-to-year changes can be quite large in response to rainfall variation, long-term total groundwater pumping in the SWUCA has been below the 600 mgd benchmark since 2010 (Figure 2-4) as indicated by the 10-year moving average of estimated groundwater use, with ~90% of this use associated with Upper Floridan aquifer pumping. By 2020, the 10-year moving average was approaching 500 mgd for the first time since the early 1970s. This trend in groundwater use occurred as a result of implementation of conservation measures and alternative water supply projects by the District and water users within the basin.

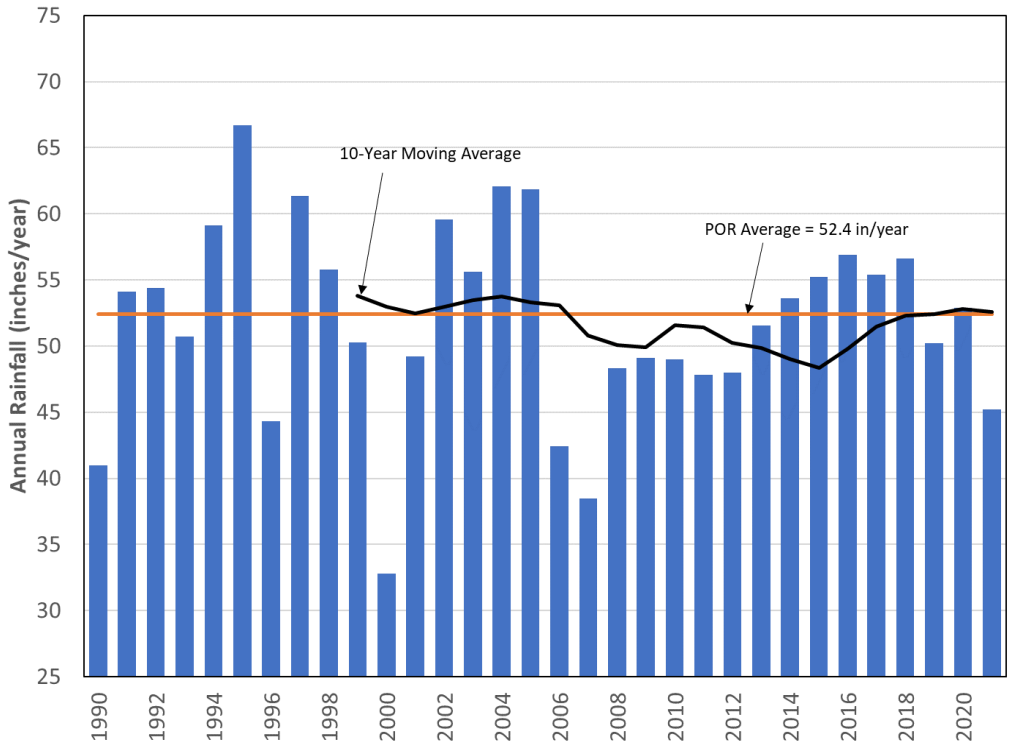

Figure 2-3. Annual average and 10-year moving average SWUCA rainfall from 1990 through 2021, and period of record (POR) average based on 1915 through 2021 rainfall.

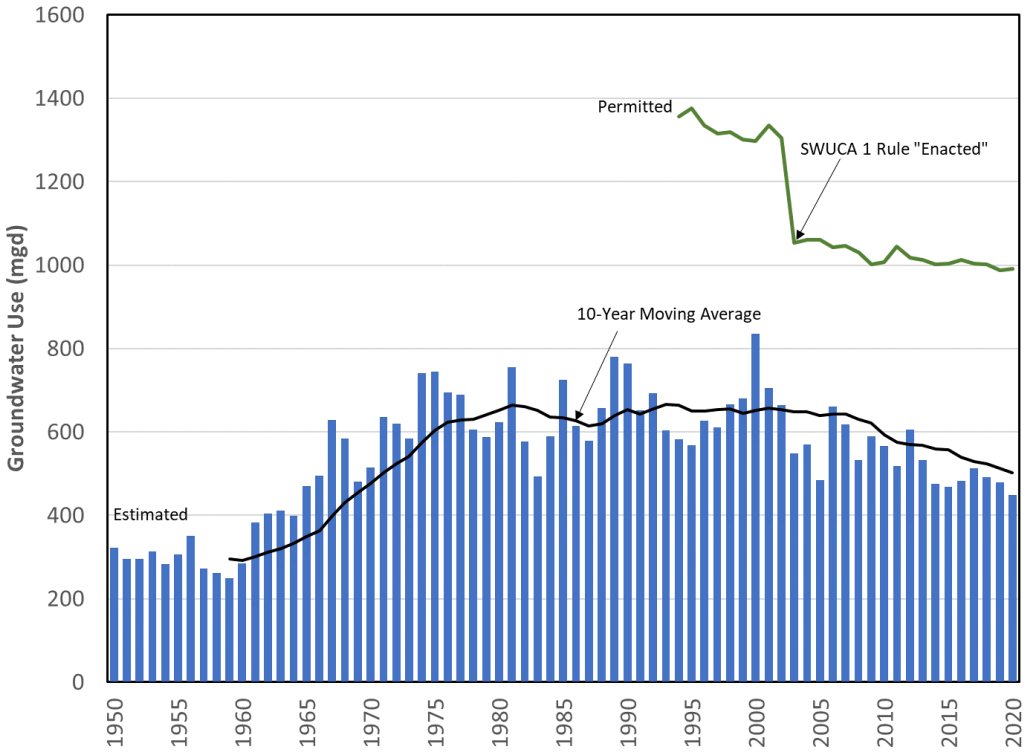

Figure 2-4. Estimated historical and permitted groundwater use in the SWUCA.

In addition to monitoring changes in actual groundwater use, the District monitors changes in permitted withdrawal quantities and accordingly adjusts its rules to best manage water resources. For example, in 1994, the District initiated rulemaking to modify its water use permitting rules to address water resources in the SWUCA (SWFWMD 1998). The main objectives of the proposed rules, which in their ultimate adopted form are referred to as the SWUCA 1 rules, were to (1) significantly slow saltwater intrusion into the confined Upper Floridan aquifer along the coast, (2) stabilize lake levels in Polk and Highlands counties and (3) limit regulatory impacts on the region's economy and existing legal users. The principal intent of the rules was to establish a minimum aquifer level (MAL) and to allow renewal of existing permits, while gradually reducing permitted quantities to recover aquifer levels to the minimum level. Several parties filed objections to parts of the rule and an administrative hearing was conducted. In March 1997, the District received a Final Order for the administrative hearing that upheld the MAL, the science used to establish it, and the phasing in of conservation. However, in October 1997, the multiple parties, including the District, appealed the proposed rules. The minimum aquifer level was withdrawn because parts of the rule linked the level to the provisions for reallocation of permitted quantities and preferential treatment of existing users over new permit applications, both of which were ruled to be invalid.

Adjustments were made to permitted amounts for many irrigation uses in 2003 as part of the eventual implementation of the SWUCA I rules in 2003, which specifically addressed conservation, alternative use, and water use permitting. These changes were followed by adoption of MFLs for several SWUCA water bodies, the Recovery Strategy, and associated consumptive use permitting rules for the SWUCA in 2006. Since 2006, permitted groundwater withdrawals in the SWUCA have slightly decreased from 1,043 mgd to 991 mgd in 2020. Of particular interest to long-term management of water levels is that groundwater use is about 50-60 percent of total permitted groundwater quantities for the region. For example, agricultural users and public supply, the two largest use groups, have average pumped-to-permitted ratios of about 50 percent and 65 percent, respectively, for the period 1994 through 2020. 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 differences in trends as a means of projecting future resource needs and potential problems with the District's recovery efforts.

Total water use in the SWUCA has increased, although efforts of District management and the regulated community have resulted in stabilization of historical groundwater withdrawals, and even some reduction. 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 occurred through substantial collaboration between water users in the SWUCA and the District.

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

Section 373.042 of the Florida Statutes requires the DEP or 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 water levels for eight lakes on the Lake Wales Ridge. Because most of the levels were not being met, the District initiated development of a recovery strategy to achieve these MFLs. The originally proposed MFLs for the SWUCA lakes were adopted into District rules in 2006 concurrent with the adoption of the Recovery Strategy.

Since that time, the District has continued to adopt MFLs for additional lakes within the SWUCA, reevaluate and as necessary revise existing lake MFLs, and annually assess the status of these MFLs. This report section includes the current status of all SWUCA lakes with adopted MFLs, progress made towards achieving recovery of these MFLs by 2025, a summary of lake recovery efforts, projects, MFLs reevaluation efforts, and recommendations for future work.

Minimum Lake Level Status and Recovery Progress

At of the end of fiscal year 2022, there were 32 lakes in the SWUCA with adopted MFLs. These established MFLs include those adopted for four lakes (Aurora, Damon, Easy, and Eva) in 2018 that were not discussed in the previous (Marchand et al. 2018) five-year Recovery Strategy assessment. In addition, MFLs for two SWUCA lakes (Parker and Wimauma) have been reevaluated and revised since the last assessment was completed.

The goal of achieving all established lake MFLs in the SWUCA continues to be a challenge, but significant progress is being made. Based on the 2022 MFLs status assessment, which used hydrologic data collected through 2021, minimum levels were met at 23 of the 32 (72%) SWUCA lakes with MFLs and not met at 9 (28%) of the lakes (Table 3-1, Figure 3-1). These results are indicative of improving lake-level conditions. For example, in the first five-year Recovery Strategy assessment (Mallams et al. 2013), which addressed the period through fiscal year 2011, 11 of the 27 (41%) SWUCA lakes with MFLs adopted at that time were determined to be met and 59% were not met. Similarly, as part of the second five-year assessment, 12 of the 28 (43%) SWUCA lake MFLs were reported as met in 2016, with 57% reported as not being met (Marchand et al. 2018). Differences in MFLs status among assessment periods may also be attributed, in part, to reevaluation efforts that have led to revision of MFLs for 12 of the 32 SWUCA lakes with currently established MFLs, revised approaches for assessing MFLs status, and recent increases in rainfall and corresponding reductions in groundwater withdrawals. However, conservation and FARMS projects, as well as other efforts, have also contributed to groundwater use reductions and improved lake levels.

Improved conditions are also evident through comparison of temporal differences in median lake water levels at the nine SWUCA lakes where MFLs are not currently being met. For example, the median water level at eight of the nine lakes was 2.5 or more feet (range: 2.5 to 3.7 feet) higher, i.e., closer to meeting the established Minimum Lake Level at the end of 2021 as compared to the median water level at the end of 2011 (Table 3-1), the end-date of the period addressed in the first five-year Recovery Strategy assessment. Water levels at one lake (Bonnie) exhibited variable change through time, a response which may be related to the relatively shallow nature of the basin.

Table 3-1. Status of SWUCA Lake MFLs in 2022 (based on hydrologic data collected through 2021), and for those lakes where the MFLs are not met, the difference (in feet) between the long-term median lake water level and the Minimum Lake Level for each lake in 2011, 2016 and 2021, and the difference between long-term median lake water levels in 2011 and 2021.

Lake	County	Status	Reevaluated	Estimated Feet Below Minimum Lake Level			Difference in Feet, 2011 to 2021
				2011	2016	2021	
Angelo	Highlands	Not Met	No	4.1	3.6	1.6	2.5
Denton	Highlands	Not Met	No	3.9	3.4	0.7	3.2
Letta	Highlands	Not Met	Yes	3.7	0.9	0.2	3.5
Tulane	Highlands	Not Met	No	4.6	4.1	2.1	2.5
Verona	Highlands	Not Met	No	6.0	5.4	2.4	3.6
Anoka	Highlands	Met	No	-	-	-	-
Damon [a]	Highlands	Met	No	-	-	-	-
Lotela	Highlands	Met	Yes	-	-	-	-
Little Jackson	Highlands	Met	Yes	-	-	-	-
Jackson	Highlands	Met	Yes	-	-	-	-
June-in-Winter	Highlands	Met	No	-	-	-	-
Placid	Highlands	Met	No	-	-	-	-
Aurora [a]	Polk	Not Met	No	-	-	0.3	-
Bonnie [b]	Polk	Not Met	No	0.6	1.2	1.1	-0.5
Eagle	Polk	Not Met	Yes	3.3	1.1	0.6	2.7
Eva [a]	Polk	Not Met	No	-	-	1.2	-
Annie	Polk	Met	No	-	-	-	-
Clinch	Polk	Met	Yes	-	-	-	-
Crooked	Polk	Met	Yes	-	-	-	-
Crystal	Polk	Met	No	-	-	-	-
Dinner	Polk	Met	No	-	-	-	-
Easy [a]	Polk	Met	No	-	-	-	-
Hancock	Polk	Met	No	-	-	-	-
Lee	Polk	Met	No	-	-	-	-
Mabel	Polk	Met	No	-	-	-	-
McLeod	Polk	Met	Yes	-	-	-	-
North Wales	Polk	Met	No	-	-	-	-
Parker [c]	Polk	Met	Yes	-	-	-	-
Starr	Polk	Met	Yes	-	-	-	-
Venus	Polk	Met	No	-	-	-	-
Wailes	Polk	Met	Yes	-	-	-	-
Wimauma [c]	Hillsborough	Met	Yes	-	-	-	-

[a] Lake MFLs newly established since the previous five-year Recovery Strategy assessment

[b] Lake data issues

[c] Lake MFLs reevaluated and revised since the previous five-year Recovery Strategy assessment

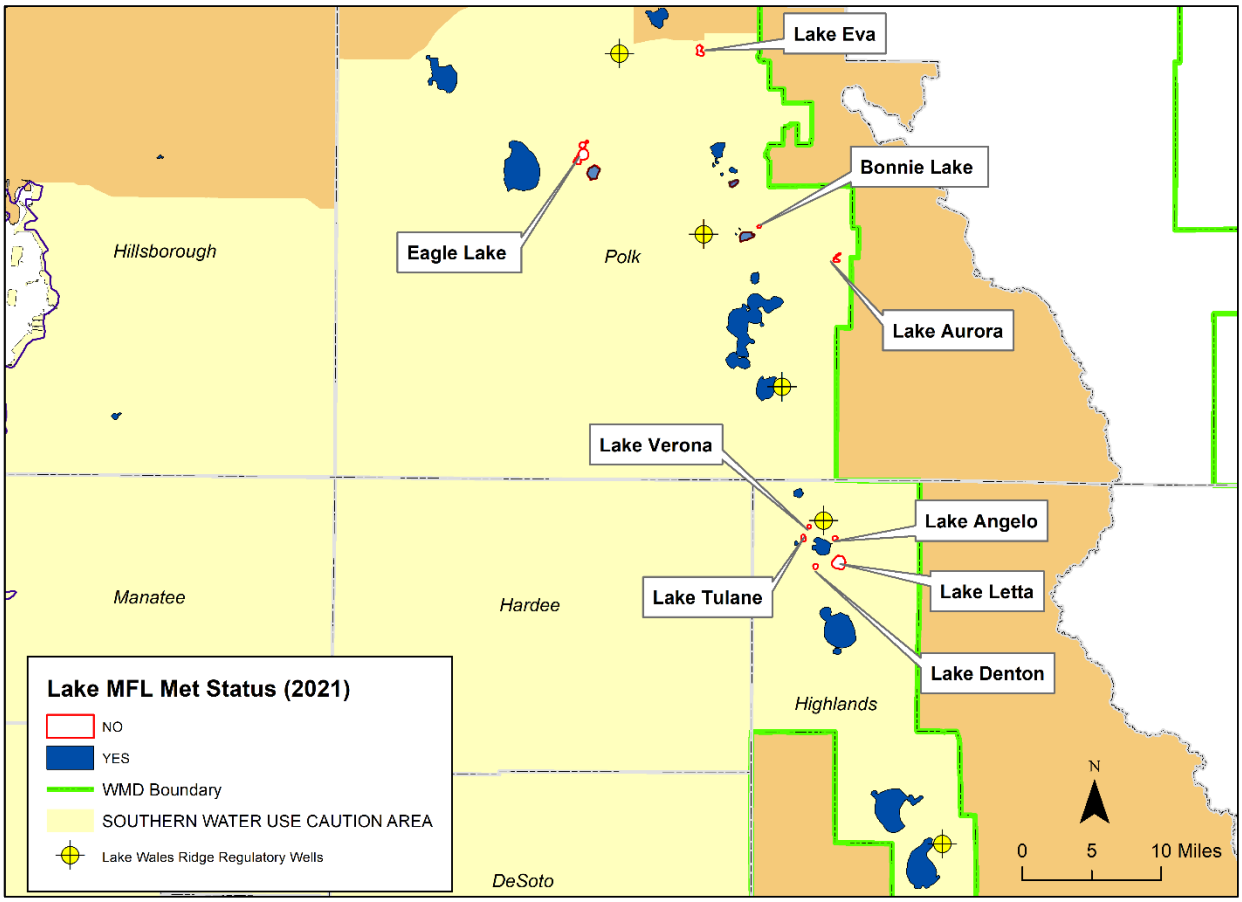

Figure 3-1. Lake MFLs status for the SWUCA in 2022, based on hydrologic data collected through 2021, and location of five Lake Wales Ridge regulatory wells.

In addition to the lake water level evaluations used for annually assessing the status of SWUCA lake MFLs, Upper Floridan aquifer regulatory wells are used to determine whether a proposed withdrawal will impact groundwater levels below Ridge Lakes (i.e., lakes in the Lake Wales Ridge and adjacent areas). As described in the District's Water Use Permit Applicants Handbook, Part B (SWFWMD 2020c) included in the District's Consumptive Use of Water rules (Chapter 40D-2, F.A.C.), the 10-year moving average water level for the area, which is currently based on the monthly average water level at five Lake Wales Ridge Regulatory Wells, is compared with a regulatory target level of 91.5 feet above NGVD29 that represents the median of the 10-year moving average monthly water level for the Ridge Lakes area from 1990 through 1999. If the 10-year moving average level is above the regulatory target level, water use permit applications are presumed to not cumulatively impact lakes within the area and new permits may be issued 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 conditions are not met, permits for new withdrawals can only be authorized if an applicant proposes to implement a "Net Benefit" (as defined in SWFWMD 2020c) to the resource.

The 10-year moving average water level for these wells (locations are shown in Figure 3-1) has been above the target level of 91.5 ft above NGVD since 1996 and values for the six most recent moving 10-year periods have exhibited a steady increase. As of 2021, the 10-year moving average water level for Lake Wales Ridge Regulatory Wells is 2.7 feet above the regulatory target level (Figure 3-2).

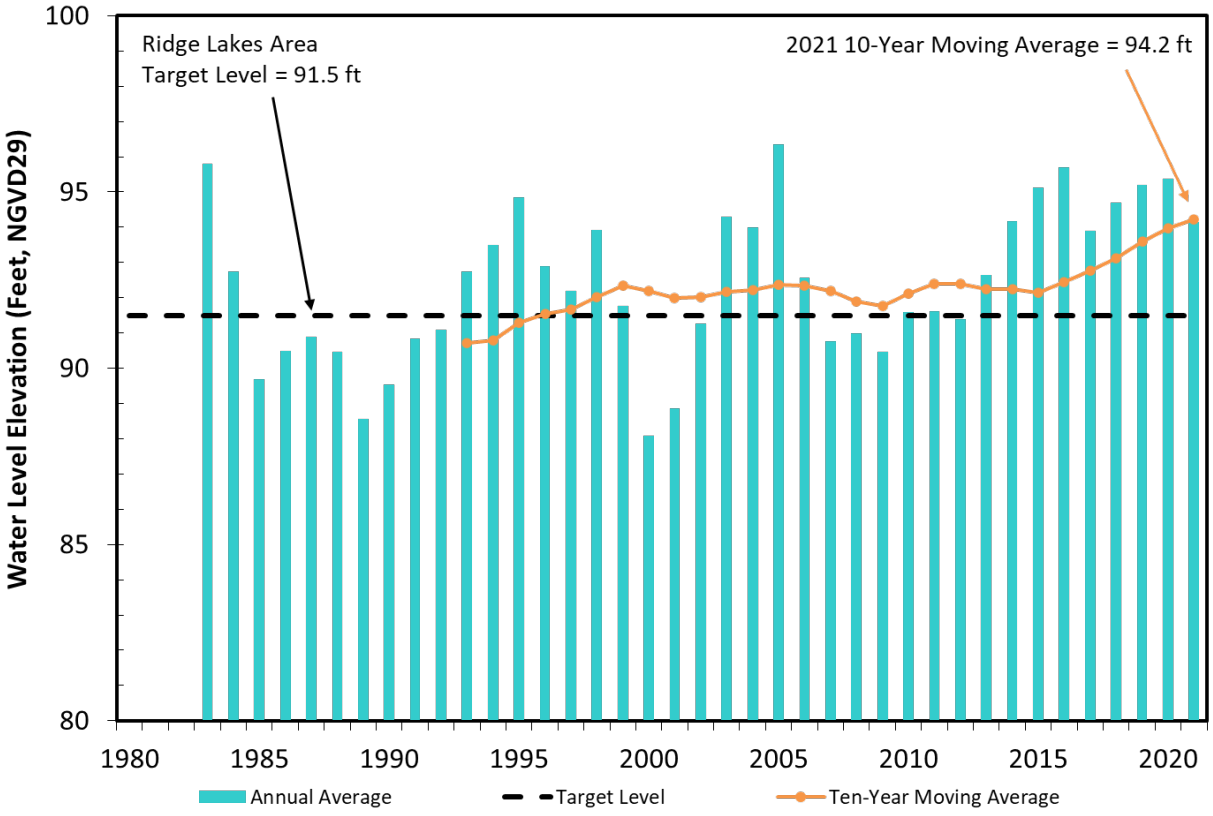

Figure 3-2. Upper Floridan aquifer water levels and the regulatory target level for the aquifer in the Ridge Lakes area based on five Lake Wales Ridge regulatory wells.

Lake Recovery Efforts, Projects and MFLs Reevaluations

The five-year assessment of the Recovery Strategy for FY2007-2011 (Mallams et al. 2013) indicated that additional options beyond those identified in the 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. Based on these efforts, the District updated its assessment for FY2007-2011 (Mallams et al. 2015) to include stakeholder input and responses. 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

The District's lake recovery efforts for the SWUCA have been concurrent with complementary efforts associated with the CFWI. As noted in the introductory section of this document, the CFWI is a cooperative effort among the St. Johns River, South Florida and Southwest Florida water management districts, DEP, FDACS, and public water supply utilities to address water resource and supply issues in the region of central Florida where the boundaries of the three water management districts abut.

In November 2020, the governing boards of the three water management districts approved the second CFWI regional water supply plan (RWSP)(CFWI 2020a). Additionally, a water conservation implementation strategy (CFWI 2019) was approved by the CFWI steering committee. These documents

are available at cfwiwater.com. The 2025 RWSP for the CFWI is under development. In addition to these resource planning efforts, the legislature required DEP to establish a single set of rules for the three water management districts within the CFWI area to ensure the region's current and future water needs are met while protecting the water resources and natural systems. The DEP initiated rulemaking in 2016, and the proposed rules were published in 2020. The rules became effective June 21, 2021, and are codified at Chapter 62-41.300-305, F.A.C.

As the CFWI continues to progress, the District continues to work on the three Recovery Strategy options identified by the District's outreach effort and approved by the Governing Board to help meet the minimum levels goals in the Ridge Lakes Area.

Option One: Monitoring

The Ridge Lakes within the SWUCA are located in Polk and Highlands counties. Data collection for these sites and other portions of the SWUCA is essential to understanding the effect of various factors on lake water levels and the establishment and assessment of minimum levels. Necessary data includes water level records and water quality information, rainfall records, and reported or estimated groundwater and surface water withdrawal quantities and rates. The District maintains an extensive hydrologic data collection network that includes many sites within Polk and Highlands counties and other areas of the SWUCA. For instance, the District actively monitors 594 wells, 218 lake locations, and 102 river and stream monitoring points in the SWUCA. As part of the CFWI effort, the District contributes to the CFWI Data, Monitoring, and Investigative Team (DMIT), a technical team responsible for data collection and data storage within the CFWI area, which includes all of Polk County. The DMIT Work Plan Update for FY2021-2025 includes the monitor well construction and data collection monitoring equipment needed to assess or establish MFLs at all current and proposed MFL waterbodies within the CFWI. Installation of monitoring equipment at the MFL sites within the CFWI will be completed by FY2025.

Option Two: Minimum Lake Levels Reevaluation

Reevaluation of minimum lake levels has been completed for 12 SWUCA lakes and is being continued for specific lakes that had MFLs established using older methodologies. Many of these older minimum lake levels were based on a standard developed for lakes in a mesic setting, but most lakes with MFLs in the SWUCA occur in a more xeric setting, i.e., in generally drier landscapes, and exhibit hydrologic characteristics such as larger water level fluctuations that can differ substantially from lakes in more mesic settings. In 2021, the District modified its minimum lake level rules to remove older prescriptive methodologies, allowing the District to implement methodological improvements. In 2022, the District proposed a new xeric minimum lake level methodology that was supported by independent, scientific peer review. Additionally, modeling techniques for minimum lake levels have been refined. As a result of these actions, 11 SWUCA lakes are included on the 2022 MFL Priority List and Schedule for reevaluation. In addition, four lakes have newly established minimum levels that have been approved by the District Governing Board since the 2016 assessment. Collectively, these activities will ensure the best available information is used for MFLs development and assessment as well as determinations regarding the need for recovery strategy projects and activities.

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 may include conservation measures, structure modifications (inflow/outflow), drainage system restoration, back-plugging of canals, lake augmentation, and relocation or replacement of adjacent groundwater withdrawals. Management plans to evaluate available recovery options for Ridge Lakes will therefore be completed for individual lakes rather than relying on a regional approach.

Many such projects have been investigated over the past several years. For instance, options to recover Lake Wailes were explored by the District and several stakeholders. Difficulties in developing a recovery strategy that satisfied all stakeholders led to an agreement to put that particular project on hold until the ongoing reevaluation of the lake's MFLs could be completed. It is worth noting, that based on the 2022 MFLs status assessment, which used hydrologic data collected through 2021, the MFLs for Lake Wailes are being met.

Another evaluated project was a joint project (Cooperative Funding Initiative) between the District and Highlands County to help restore the Lake Jackson watershed. Completed project tasks included an initial background review and generation of a report that provides recommendations for moving forward. The project was ready to proceed into a data collection phase when the county decided to withdraw from the funding agreement. The cancellation of the agreement was approved by the District's Governing Board in 2020. Currently, the MFLs established for Lake Jackson are being met.

A third evaluated project involves Lake Lotela. Numerical modeling was performed by the District to evaluate impacts that may occur in association with direct lake augmentation or reduced groundwater use in the lake vicinity. The District has been unable to identify viable sources of water for direct recharge to the lake and has similarly not found an acceptable path forward for reducing groundwater withdrawals in the vicinity of the lake, as modeled in the investigation. Currently, the MFLs established for Lake Lotela are being met.

A lake project currently under review as a Cooperative Funding Initiative with Haines City involves using reclaimed water for recharge of the surficial aquifer near Lake Eva. A feasibility study has been completed for the project and the District is reviewing the 30% design plans for construction. The project will build two RIBS units to apply reuse water directly to the surficial aquifer. The project is expected to assist in meeting the MFLs established for Lake Eva.

The need for additional lake recovery or enhancement projects will be determined after the District completes MFLs reevaluations in 2025. Hydrologic conditions have continued to improve through this latest 5-year assessment and 11 Lake Wales Ridge MFL lakes are currently scheduled for reevaluation over the next three years.

Recommendations

Implementation of the options developed through the previous outreach effort and approved by the Governing Board should continue, as should efforts to promote conservation projects and alternative water supplies through the Cooperative Funding Initiative and the District's Facilitated Agricultural Resource Management Systems (FARMS), Mini FARMS, and Water Incentives Supporting Efficiency (WISE) programs. Specific recommendations for each of the approved options are:

Option One: Enhance and continue monitoring

- Complete the construction of monitor wells and collect data at MFLs sites within the CFWI, consistent with the DMIT Work Plan Update for FY2021-2025.

Option Two: Reevaluate established minimum lake levels

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

Option Three: Evaluate and develop recovery options for individual lakes

- Continue to support implementation of the Haines City Lake Eva project,
- Monitor project impacts and determine whether any additional recovery projects are necessary after completion of planned lake MFL reevaluations.

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

Within the SWUCA, the District has adopted minimum flows for seven freshwater river segments, five estuarine river segments, and one spring group, for a total of 13 minimum flows established within the SWUCA (Figure 4-1). Through calendar year 2021, all these MFLs were met.

Based on the emphasis of the need for recovery of the upper Peace River in the Recovery Strategy, the remainder of this section is focused on the status of achieving Goal 2, Restore Minimum Low Flows to the upper Peace River.

Upper Peace River Minimum Flow Status and Recovery Progress

The MFLs established for the upper Peace River are Minimum Low Flows. These Minimum Low Flows are annual 95 percent exceedance flows of 45 cfs at Zolfo Springs, 27 cfs at Ft. Meade and 17 cfs at Bartow. The Minimum Low Flow for each of these river segments is achieved if the flow is greater than the Minimum Low Flow specified for the site at least 95 percent of the days, i.e., 347 days or more of a calendar year for three consecutive years. Once the Minimum Low Flow for a river segment has been achieved for three consecutive years, it is deemed not met when the measured flow rate is below the Minimum Low Flow for two out of 10 years commencing the year after achievement.

The Minimum Low Flows for the three upper Peace River segments were all first met in 2020, i.e., they were achieved for the three consecutive years from 2018 through 2020, and continued to be met in 2021 (Figures 4-3 through 4-5). These flow improvements can be attributed to implementation of the Lake Hancock Lake Level Modification and Ecosystem Restoration Project, which became operational in 2016, and adoption of a reservation in 2020 (for water stored in the lake and released to lower Saddle Creek, which forms the Peace River at its confluence with the Peace Creek Canal). The project, which raised the structure on Lake Hancock to store additional surface water during the rainy season for discharge primarily during the dry season contributed to flows exceeding the Minimum Low Flow for all three upper river segments for five out of six years from 2016-2021 (Table 4-1). Only during the dry spring of 2017, when Polk County received only 8.1 inches of rainfall from November 2016 through May 2017, was the Minimum Low Flow not met at least 95 percent of the days at the three upper Peace River sites.

While Goal 2 of the Recovery Strategy has been achieved for two years in a row (2020 and 2021), the District will continue to monitor hydrologic conditions in Lake Hancock and the upper Peace River. The District will look for opportunities to better manage and optimize augmentation of the upper river through refinements to the Lake Hancock Lake Level Modification project operational schedule with the goal of continued achievement of the upper river MFLs.

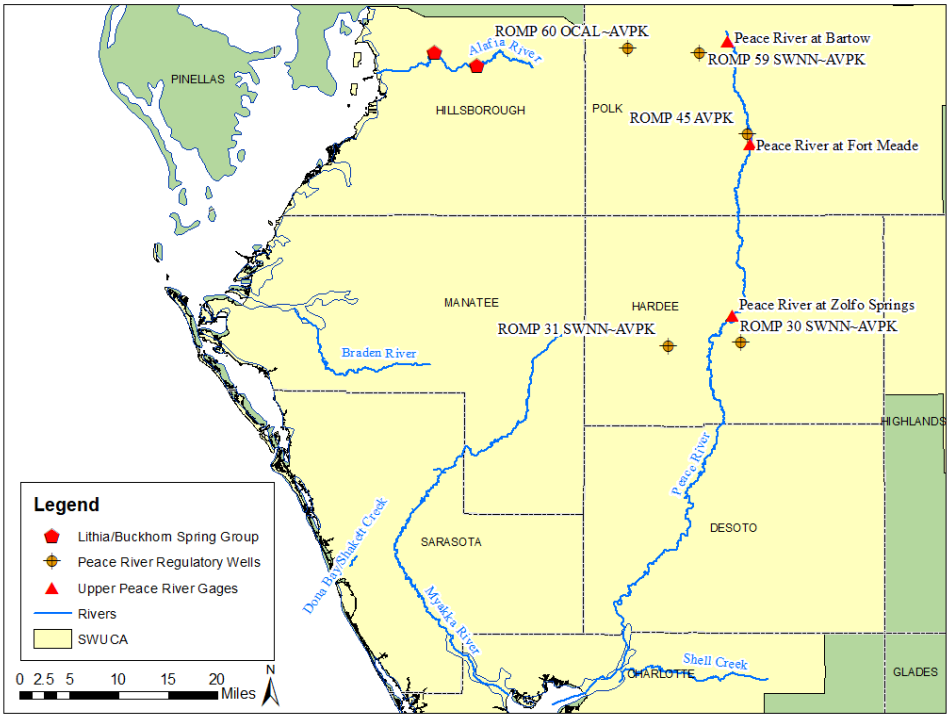

Figure 4-1. Rivers in the SWUCA with adopted minimum flows, gage sites for the upper Peace River minimum flows, and Peace River regulatory wells.

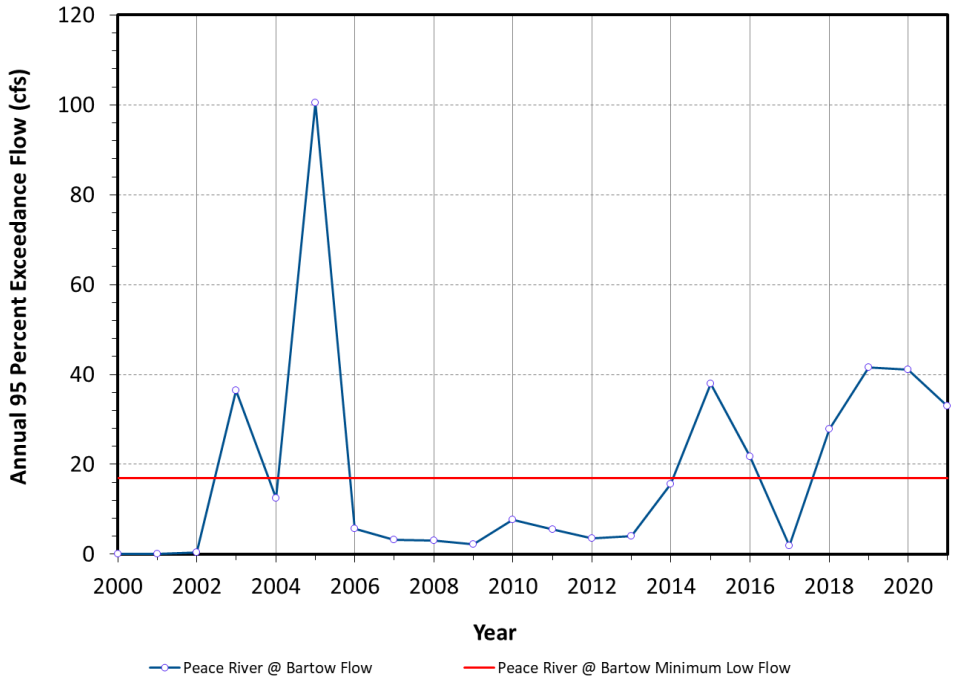

Figure 4-2. Peace River at Bartow annual 95 percent exceedance flow (2000-2021) and Minimum Low Flow.

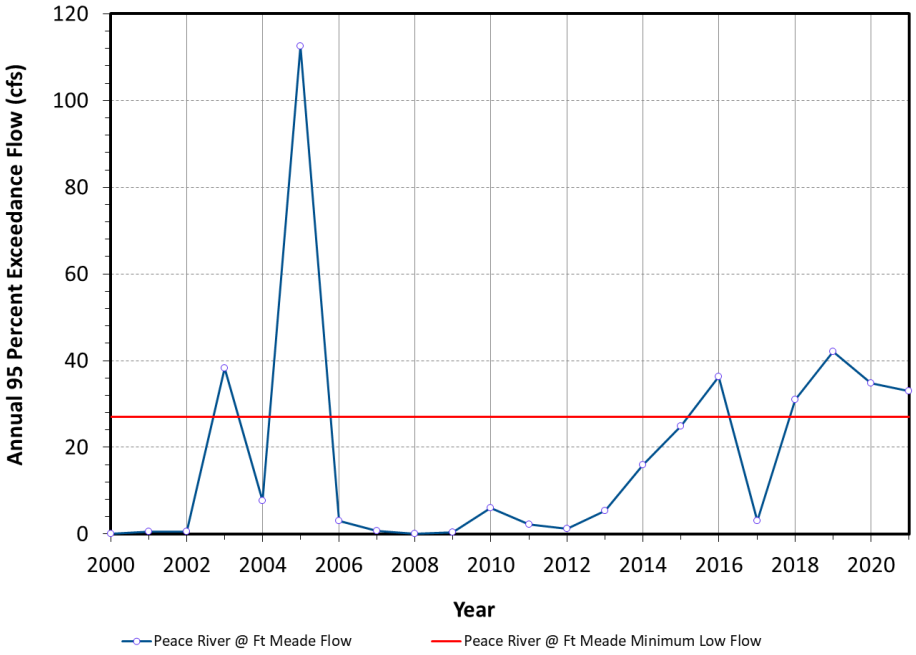

Figure 4-3. Peace River at Fort Meade annual 95 percent exceedance flow (2000-2021) and Minimum Low Flow.

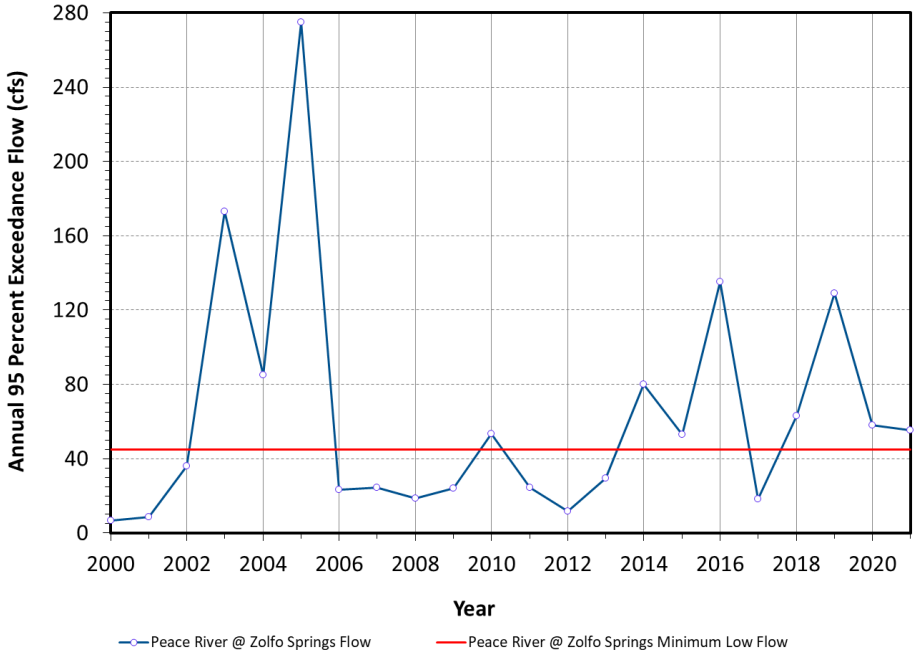

Figure 4-4. Peace River at Zolfo Springs annual 95 percent exceedance flow (2000-2021) and Minimum Low Flow.

Table 4-1. Minimum Low Flow status in the upper Peace River from 2016-2021.

Year	Number of Days Minimum Low Flow Rate Not Equaled or Exceeded		
	Peace River at Bartow	Peace River at Ft Meade	Peace River at Zolfo Springs
2016	9	0	0
2017	**47**	**35**	**41**
2018	0	0	7
2019	0	0	0
2020	0	0	0
2021	0	0	0

Note: Bolded Minimum Low Flow not met (18 days allowed per year)

In addition to the assessment of MFLs established for the upper Peace River, five Upper Floridan aquifer regulatory wells (see Figure 4-1) are used by the District to determine whether a proposed withdrawal will impact groundwater levels below the upper Peace River. Water levels in these monitoring wells are averaged each year for use as regional water level indicators. An Upper Peace River Regulatory Well target level of 53.3 feet above NGVD29, is based on the average 10-year water level for the wells from 1990-1999. Like the Lake Wales Ridge Regulatory Well levels, if the current 10-year moving average water level for this group of wells is above the target level, 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 the target level is not met, permits for new withdrawals can only be authorized if a "Net Benefit" occurs to the water resource.

The Upper Peace River Regulatory Wells water level has been above the target level since 1995 and has exhibited a steady increase over the last three decades. As of 2021, the Upper Peace River Regulatory Well level is being met, is at its highest level in 30 years, and is exceeded by 10.6 feet. Figure 4-5 shows the aquifer water levels at the regulatory wells through 2021.

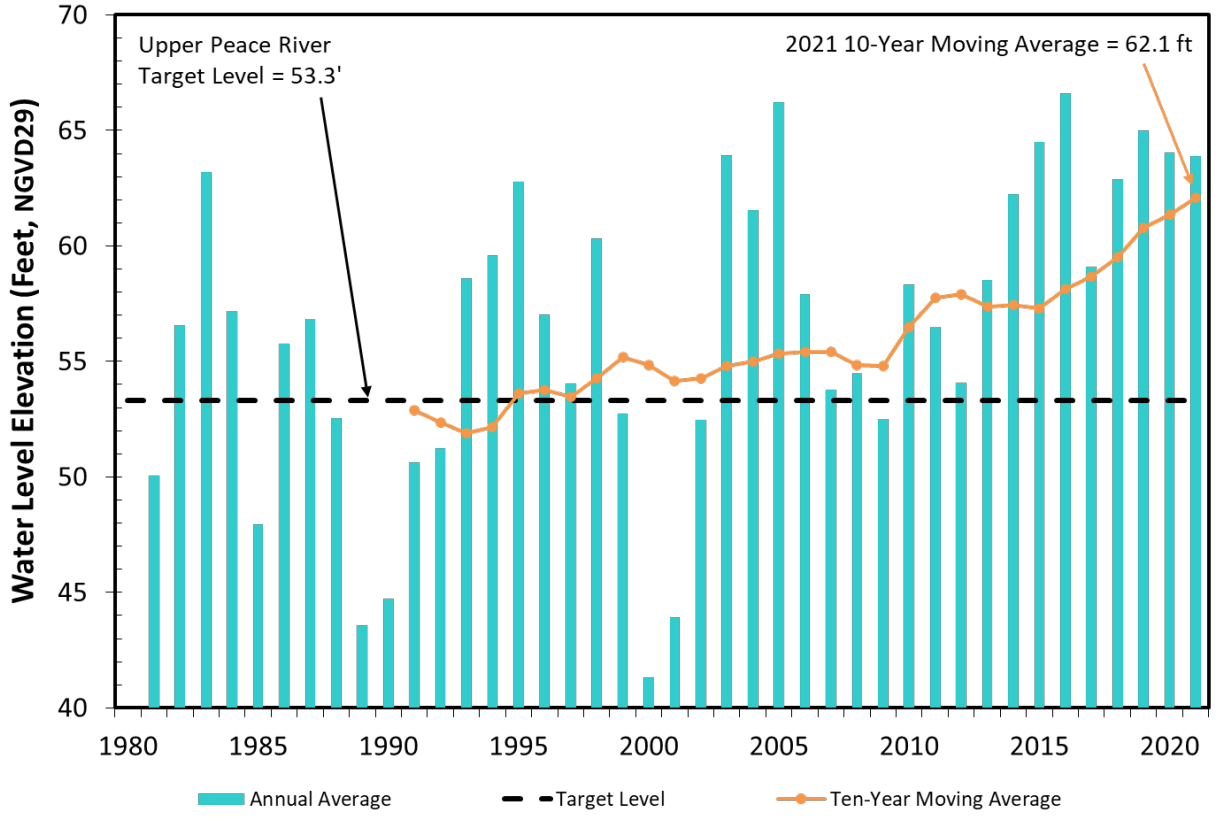

Figure 4-5. Upper Floridan aquifer water levels and the regulatory target level for the aquifer in the Peace River area based on five wells in the upper Peace River area.

Upper Peace River Recovery Efforts, Projects and MFLs/Reservation Reevaluations

Several projects for the Peace River watershed seek to restore historically lost lake and floodplain storage to aid in reestablishing minimum flows to the upper Peace River and enhancing recharge. In support of river recovery, the District has also adopted a water reservation for water stored in Lake Hancock and released to Lower Saddle Creek, a major tributary of the upper Peace River. These efforts and plans for future evaluations are summarized below.

Lake Hancock Lake Level Modification and Ecosystem Restoration Project

This project raised 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, and subsequent release during the dry season to help meet Minimum Low Flows established for the upper Peace River. In support of the project, the District acquired approximately 8,337 acres around the lake and construction necessary for project implementation was completed in June 2015. The system became operational in the fall of 2015 and was fully implemented in January 2016.

As a result of this project and improved rainfall conditions the last six years, the Minimum Low Flow rates have been achieved for 5 of 6 years from 2016-2021 (see Table 4-1). Annual average augmentation quantities from Lake Hancock to the upper river have gradually increased, ranging from less than 5 cfs per year from 2016-2019, 9.1 cfs in 2020, and 15.9 cfs in 2021 (Figure 4-6). The District will continue to evaluate and refine operational management of the Lake Hancock Lake Level project to maximize future opportunities to meet the minimum low flow criteria for the upper Peace River. A decision whether the

Lake Hancock project alone is all that's necessary to meet the minimum low flows on the upper Peace River will continue to be evaluated. In addition, minimum low flow criteria will be reevaluated in 2025 when mid and high minimum flows are established for the upper river.

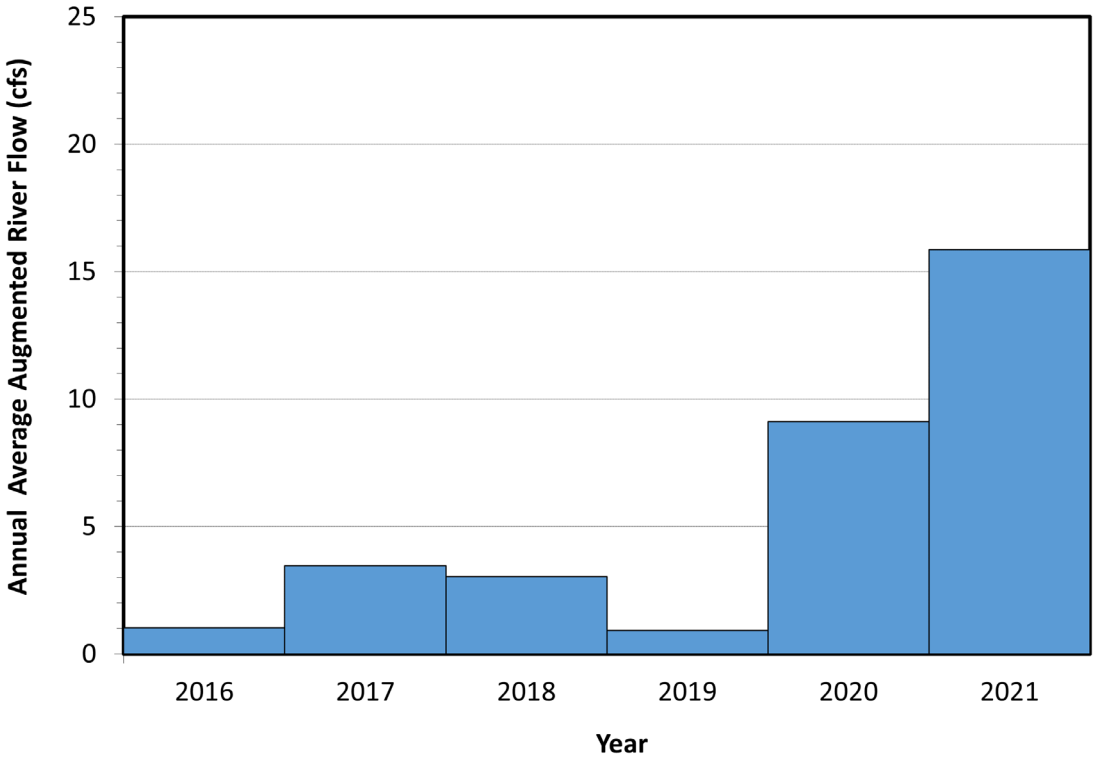

Figure 4-6. Average annual augmentation quantities from Lake Hancock to the upper Peace River from 2016-2021.

Lake Hancock/Lower Saddle Creek Reservation

Following completion and initial implementation of the Lake Hancock Lake Level Modification and Ecosystem Restoration Project, the District developed a proposed reservation for water stored in Lake Hancock for subsequent release to Lower Saddle Creek, and conveyance to the upper Peace River. A water budget modeling assessment (SWFWMD 2020b), which was supported by independent, scientific peer review, indicated the proposed reservation would substantially improve achievement of MFLs established for the upper Peace River while protecting existing permitted withdrawals from the lower portion of the river. Based on these findings, the Lake Hancock/Lower Saddle Creek reservation was adopted into the District's Consumptive Use of Water rules (Chapter 40D-2, F.A.C.) in 2020.

Lake Hancock Outfall Treatment Project

The purpose of this project is to improve the quality of water discharging from Lake Hancock into lower Saddle Creek, the Peace River and ultimately, Charlotte Harbor, a Surface Water Improvement and Management (SWIM) Program water body and estuary of national significance. The project involved construction of a 1,000-acre treatment wetland to reduce nitrogen loads in discharges from the lake by 27 percent annually. 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 is concluding a testing phase to develop operation guidance protocols for various hydrologic conditions to achieve the water quality objectives in concert with the MFLs 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 MFLs recovery. Several initiatives have been conducted as part of this project, including an evaluation of watershed conditions (Ardaman and Associates 2006, SWFWMD 2009). A feasibility evaluation was also conducted for an above-ground reservoir and associated facilities (HDR Engineering, Inc. 2008), 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. The Lake Hancock project will continue to be monitored 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 significant land alterations and extensive groundwater withdrawals that have resulted in declines in Upper Floridan aquifer levels and upper Peace River flows (SWFWMD 2002, SWFWMD 2006). The District's Governing Board approved a Watershed Management Plan for Peace Creek in 2013 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 became effective December 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 (Metz and Llewelling 2009); 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 (AMEC & BCI Engineers & Scientists, Inc. 2011). The second project phase determined that berming or covering over smaller karst features to reduce streamflow losses was feasible and included preliminary design and cost estimates for these efforts. Currently the District is implementing and monitoring the Lake Hancock Lake Level Modification and Ecosystem Restoration Project and MFLs status in the upper river to determine whether that project alone will be sufficient for achieving the MFLs. If not, the sink-berm project could be considered along with other options to help achieve full recovery.

Upper Peace River MFLs and Lake Hancock/Lower Saddle Creek Reservation Reevaluations

The MFLs established for the upper Peace River in 2006 included only Minimum Low Flows to focus on returning perennial flow conditions to the river. At that time, the District recognized that multiple minimum flows are often necessary for maintaining a full flow regime that benefit riverine functions and ecological communities. However, the District was originally unable to develop MFLs to address medium and high flow conditions for the upper Peace River due to a lack of understanding regarding factors that affect flows in these ranges.

Since adoption of the current upper river MFLs, the District has supported development of the Peace River Integrated Model (PRIM) (HydroGeoLogic, Inc. 2011, 2012), the East Central Florida Transient

(ECFT) and East-Central Florida Transient Expanded (ECFTX) groundwater model (CFWI 2014, 2020b, 2022) and other investigations (e.g., Jones, Edmunds & Associates, Inc. 2005, PBS&J 2007, Knochenmus 2014, Wharton 2007).

Based on development and use of these models and investigation results, the District has scheduled completion of a reevaluation of the upper Peace River MFLs in 2025 and anticipates development of MFLs that address the full hydrologic regime of the upper river. Concurrent with the MFLs reevaluation the District plans to reevaluate the reservation established for water stored in Lake Hancock and released to lower Saddle Creek for continued recovery of MFLs in the upper Peace River. Data collection and analyses to support these efforts are ongoing and include development of new modeling tools for assessing river hydraulics, and flow-related habitat inundation patterns and changes.

Recommendations

Currently, Goal 2 of the Recovery Strategy, the restoration of minimum flows to the upper Peace River, has been achieved. The District is, however, taking an adaptive management approach to continued recovery of the upper river MFLs and will:

- Annually monitor the status of the upper Peace River MFLs.
- Continue operation and monitoring for the Lake Hancock Lake Level Modification project to verify that it can consistently be used to achieve the goal and determine whether additional projects are needed to continue to meet the upper river MFLs. At this time, additional projects are not considered necessary and are not being recommended.
- Continue operation and monitoring for the Lake Hancock Outfall Treatment Project to achieve water quality objectives for the Peace River watershed in concert with the MFLs objectives of the Lake Level Modification project.
- Complete the reevaluation of MFLs established for the upper Peace River by 2025.

Section V
Goal 3: Reduce the Rate of Saltwater Intrusion

A Saltwater Intrusion Minimum Aquifer Level (SWIMAL) was established for the MIA of the SWUCA in 2006 when the Recovery Strategy was adopted. The SWIMAL was established because long-term decline in aquifer water levels in the SWUCA 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 adopted SWIMAL. When achieved, future efforts may 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 and regional saltwater interface movement is a long-term process. 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 determined that saltwater intrusion was a long-term problem but that current efforts 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 expectation was that declining trends in aquifer levels that lead to saltwater intrusion would first stabilize and then reverse, achieving recovery to minimum flows and levels by 2025. This expectation or goal has largely been achieved, as described in this current 5-year Recovery Strategy assessment.

Saltwater Intrusion Minimum Aquifer Level Status and Recovery Progress

Monitoring of coastal groundwater quality shows that the saltwater interface is continuing to move inland in the MIA. This is expected since regional saltwater intrusion is directly related to long-term lowered groundwater levels and will continue to move landward even after recovery to the SWIMAL is achieved. The goal of the Recovery Strategy is to slow the rate of landward movement. Once the SWIMAL is achieved, the District will decide if additional steps should be implemented to further slow the rate of intrusion.

To develop improved estimates of the rate of movement, the District is continuing to refine its coastal monitoring network by strategically adding wells to collect data in areas of greatest groundwater quality change. This additional information, along with ongoing development of a saltwater intrusion model (i.e., a solute transport groundwater model) will improve the District's ability to distinguish between local variability and regional saltwater intrusion.

The SWIMAL represents the weighted average of the 1990-1999 water level from 10 Upper Floridan aquifer monitoring wells located within or adjacent to the MIA (Figure 5-1). The resulting minimum level over the surface of the MIA is 13.1 feet NGVD29. The SWIMAL is achieved if the 10-year moving annual average water level for the set of wells has fluctuated at or above the minimum level for a minimum of five consecutive years. Once the minimum level is achieved, the minimum level is no longer met when the 10-year moving annual average water level falls below the minimum level for more than two consecutive years.

Figure 5-2 depicts the average groundwater level for the 10 monitoring wells for each year starting in 1999 to 2021. The 2021 10-year average Upper Floridan aquifer water levels are now 1.3 ft. above the SWIMAL due to groundwater use in the MIA declining more than 20 percent since the 1990s (Figure 5-3) and improved rainfall conditions over the last decade. The aquifer water level generally declined from

the early-2000s through 2012 due to lower-than-average rainfall compared to the 1990s. As rainfall conditions improved and groundwater withdrawals continued to decline post-2012, the aquifer water level gradually increased.

The 13.1 ft elevation associated with the SWIMAL level was first equaled in 2018, and aquifer water levels have continued increasing through 2021, thereby meeting or exceeding the target elevation for four consecutive years. Given current hydrologic trends in 2022 and the exclusion of the relatively dry year (2012) from the moving 10-year average water level that will be calculated in 2023 using data collected through 2022, it is anticipated that the SWIMAL will have been met for five years in a row and the SWIMAL will be achieved for the first time.

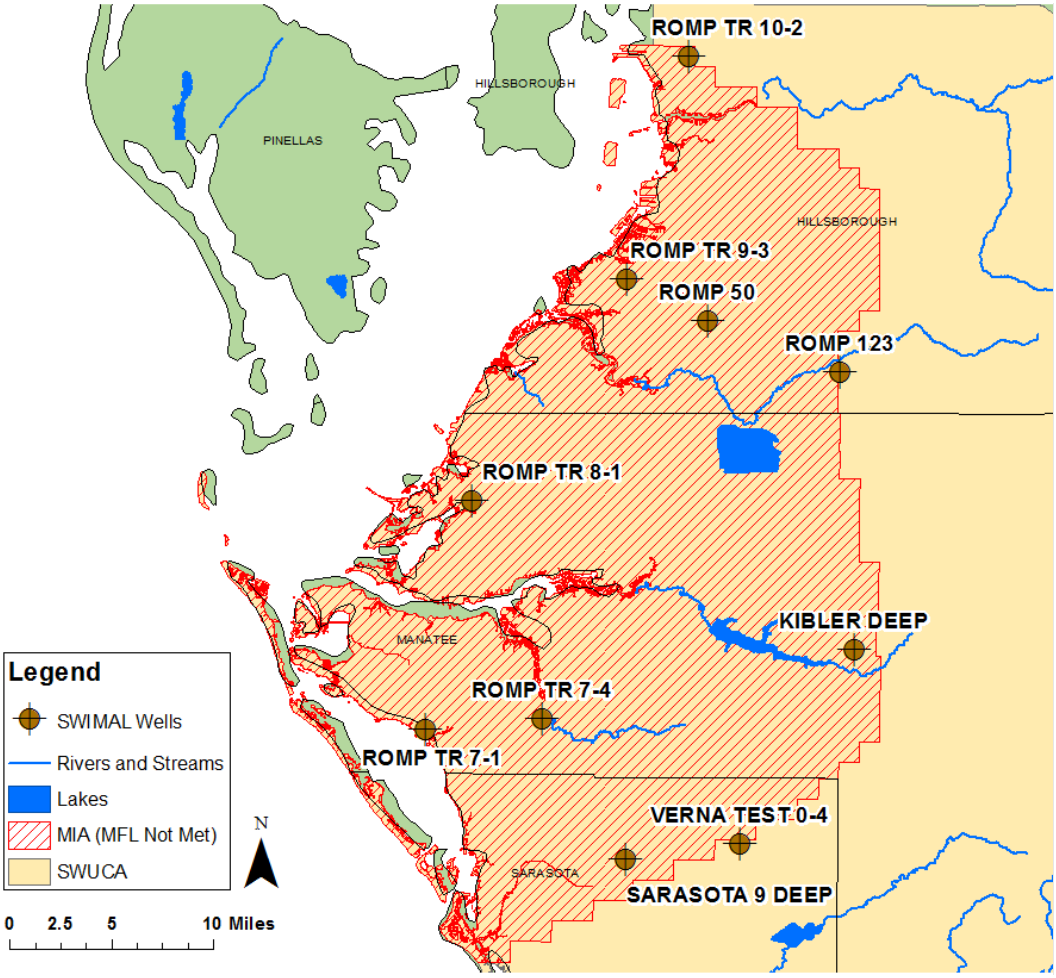

Figure 5-1. SWUCA SWIMAL wells.

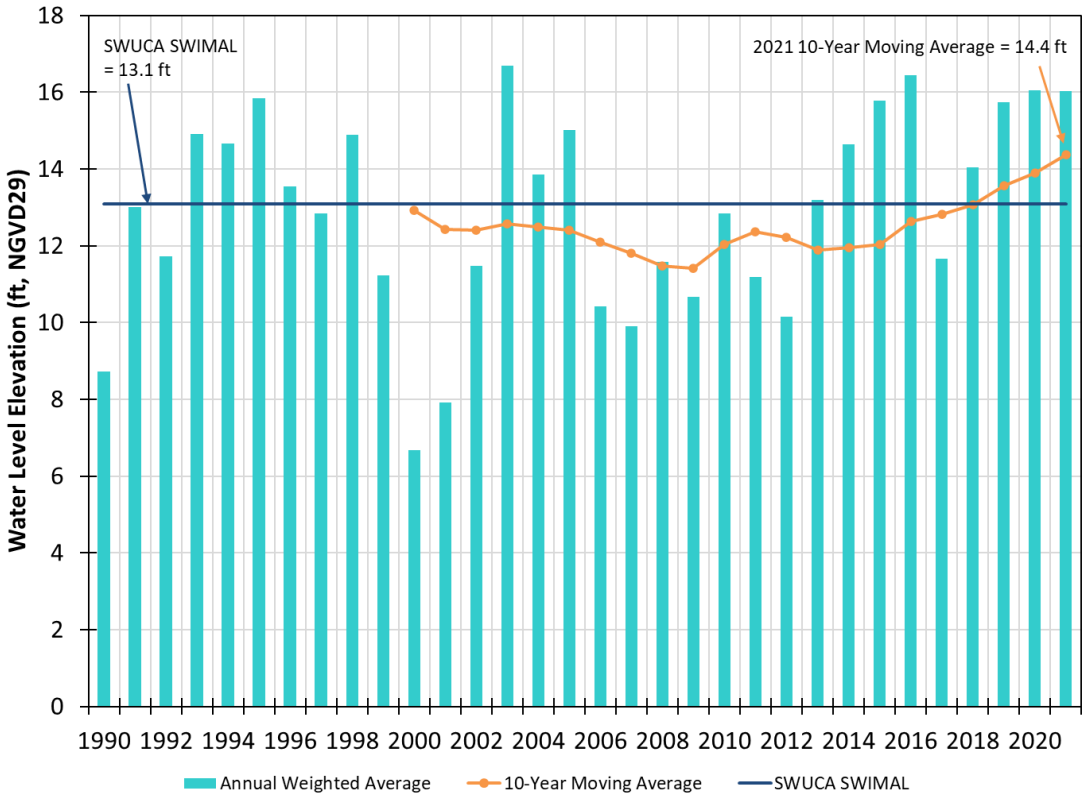

Figure 5-2. SWUCA SWIMAL well water levels and SWIMAL elevation.

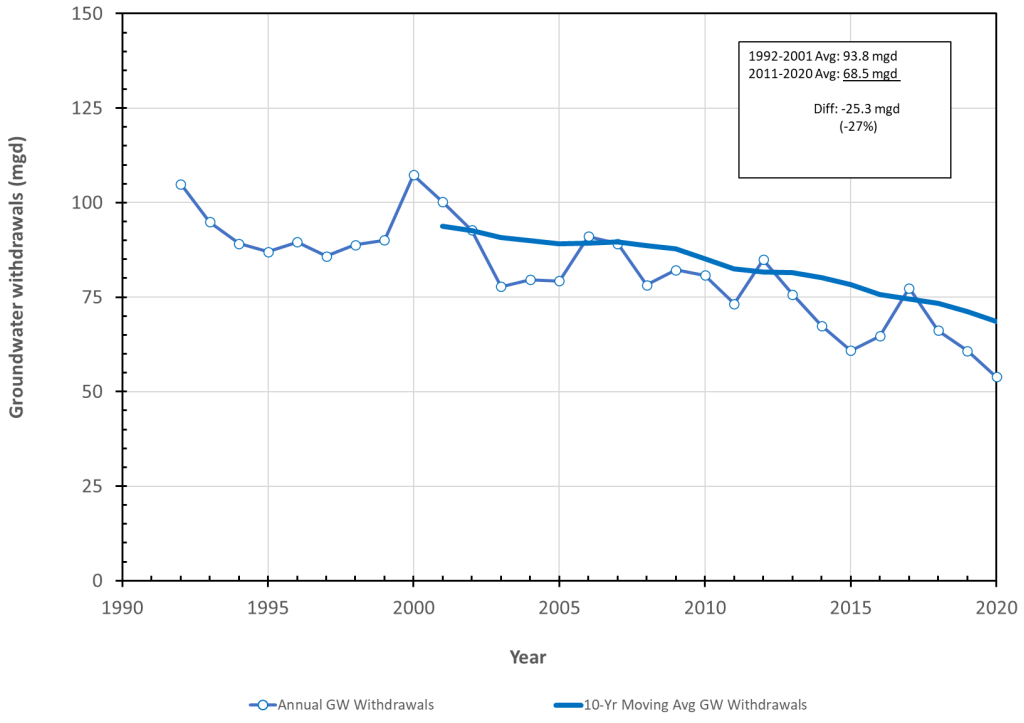

Figure 5-3. Groundwater use in the SWUCA MIA from 1992 through 2020.

Projects and Efforts to Manage Saltwater Intrusion

Reduction of groundwater withdrawals and direct aquifer recharge are two effective options available to recover aquifer levels for managing the rate of saltwater intrusion. Reduction of withdrawals is occurring through implementation of conservation, alternative water supply projects, FARMs program, and the District's Consumptive Use of Water rules for the SWUCA. The well-confined nature of the Upper Floridan aquifer within the SWUCA MIA requires direct aquifer recharge projects to replenish the aquifer to slow the rate of saltwater intrusion, i.e., projects that involve direct-injection of water rather than passive infiltration from the land surface. 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 for storing 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 several Aquifer Storage and Recovery (ASR) projects. The recharge phase of ASR projects has required numerous technological advancements and regulatory solutions. Those advancements and solutions, developed over many years, have made the current application of direct recharge projects possible.

Southern Hillsborough County Aquifer Recharge Project (SHARP)

The District is cooperatively funding Hillsborough County's direct aquifer recharge pilot project using reclaimed water along the coast in southwest Hillsborough County. At full buildout, this project may serve to reduce the rate of saltwater intrusion and provide a net benefit to the resource that may yield available, new groundwater quantities in south-central Hillsborough County. This project has been recharging the aquifer at rates averaging over two mgd since 2016 (Daigle and Townsel 2020). The total recharge volume has exceeded six billion gallons. Two additional wells were added in 2021 under Phase 2 of the work. Well RW-2 has been recharging over two mgd under a testing permit issued by DEP. Well RW-4 is anticipated to begin testing in 2023. Hillsborough County plans to add four wells in the future for a total recharge rate of 10-12 mgd by 2027. Eventual long-term recharge quantities will depend on permitting of all future SHARP wells by DEP and the associated reclaimed water quantities available for indirect or direct potable reuse.

Aquifer Recharge at Flatford Swamp Project

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 could benefit aquifer levels in the MIA and reduce the rate of saltwater intrusion.

The District has a recharge project initiative at the Flatford Swamp in Manatee County to recharge the Upper Floridan aquifer with surface water treated to meet primary drinking water standards. The project will determine the feasibility of using excess surface water from Flatford Swamp to recharge the aquifer and provide recovery to assist in the effort to raise groundwater levels and reduce the rate of saltwater intrusion in the MIA. The project would intercept excess water in the Myakka Tributary, 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.

Drilling of an initial test well for the project was completed in 2019. The well and surface facilities are currently in the start-up and testing phase and the District is working to meet the pre-requisite conditions outlined by DEP prior to full-scale operational testing. If successful, the project has the potential to recharge up to 10 mgd at full buildout.

Progress towards Reducing the Rate of Saltwater Intrusion

Groundwater use reductions of about 20 percent since the 1990s have occurred within the MIA and as of 2021, the 10-year moving average level of the Upper Floridan aquifer is 1.3 ft above the SWIMAL. The year 2021 marks the fourth year in a row that the SWIMAL has been equaled or exceeded. The level must be equaled or exceeded for five years in a row to be met. It is anticipated that the SWIMAL will be met in the 2022 annual MFL assessment. Evaluation of the positive impacts from the buildout of the SHARP and Aquifer Recharge at Flatford Swamp project suggest that these projects could support further increases in Upper Floridan aquifer water levels and reduce the rate of saltwater intrusion in the future. These projects will also provide additional confidence that the SWIMAL continues to be met in the future. They may also provide a net benefit for limited new groundwater use in the area. While these projects are in their early phases of development, they're establishing new science and techniques for recharge of treated reclaimed water and surface water within or near the MIA of the SWUCA.

Recommendations

Continuing progress toward Goal 3 of the Recovery Strategy, to reduce the rate of saltwater intrusion in coastal Hillsborough, Manatee and Sarasota counties by achieving the SWIMAL, will be supported by the District through the following recommendations:

- Continue expansion of the coastal monitoring network to obtain data that can be used to increase resource monitoring and support development of a new MIA salt-water intrusion model.
- Continue support for aquifer recharge projects in the area where saltwater intrusion is ongoing within the SWUCA.
- Continue conservation efforts through the FARMS Program, regulation, and funding development of alternative water supply (AWS) projects.

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 the water use demands of population growth 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 307.3 mgd by 2020, however, the 2020 Estimated Water Use Report shows that public supply use was only 251.2 mgd.[1] 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, improved rainfall conditions over the past several years, and expanded availability of surface water sources. Similar to the less-than-expected water use in 2020, the 2025 public supply demands within the SWUCA are expected to be slightly 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 water demand increases for the period 2020-2025: Comparison of increased demands from the 2006 Recovery Strategy and the 2020 RWSP demands (mgd).

COUNTY	Increased Demands for the period 2020-2025	
	2006 Strategy	2020 RWSP
Charlotte	1.9	1.19
DeSoto	0.3	0.06
Hardee	0.1	0.01
Highlands	0.9	0.43
Hillsborough (SWUCA)	7.3	7.40
Manatee	4.2	3.90
Polk (SWUCA)	5.8	5.39
Sarasota	3.6	2.02
TOTALS	24.1	20.40

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 2020 RWSP Appendix 3-3 Tables 3, 5, 6, 8, 9, 12, 16, and 17.

[1] *The totals include 2020 EWUR surface and groundwater (224.3 mgd), Domestic Self Supply quantities (9.3 mgd) and RWSP additional irrigation quantities (17.6 mgd) for consistency with original Recovery Strategy methodology.*

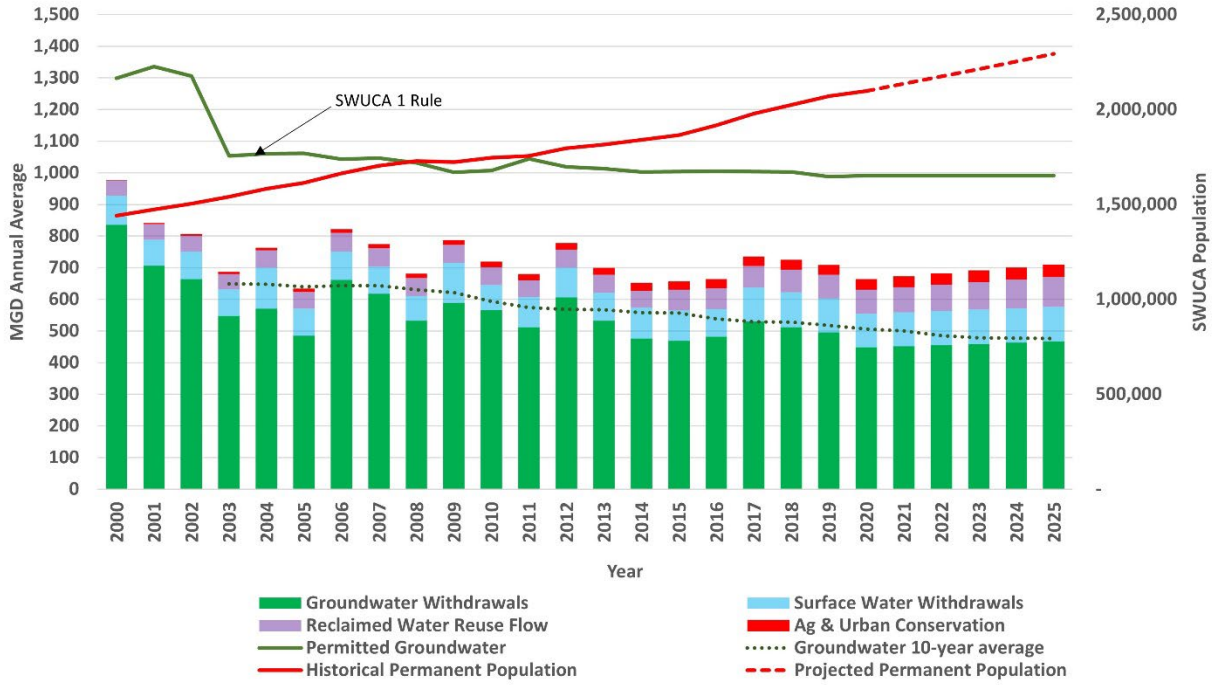

Figure 6-1. Water use in the SWUCA by source category.

Water use projections within the SWUCA for 2020-2025 are based on the demand increases published in the District's 2020 RWSP (Appendix 3-3). Increases through 2025 were reevaluated for this update based on utility-level demand projections. The public supply demand in the SWUCA is projected to increase by 20.4 mgd from 2020 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). The PRMRWSA's regional integrated loop system enhances the ability to distribute permitted surplus water supplies between Charlotte, DeSoto, and Sarasota counties within the region, and planned expansions will interconnect with Manatee County.

Through 2025, the Southern Region's public supply demand is projected to increase by 7.2 mgd. Domestic self-supply accounts for 1.2 mgd of this increase with the remainder to be met by currently permitted utility quantities. Existing permits and treatment capacities exist that can meet the demand. The PRMRWSA is planning to develop additional alternative water supplies and expansions to the Regional Integrated Loop System to keep pace with future demands.

Table 6-2. Projected increase in Public Supply water demands from 2020-2025 (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	1.19	0.20	0.03	0.88	0.08	0.00
DeSoto	0.06	0.05	0	0.01	0.01	0.00
Hardee	0.01	0	0.01	0	0	0.00
Highlands	0.43	0.22	0.20	0	0.01	0.00
Hillsborough (SWUCA)	7.4	1.72	0.18	2.80	2.70	0.00
Manatee	3.9	0.21	1.69	2.00	0	0.00
Polk (SWUCA)	5.39	0.37	5.02	0	0	0.00
Sarasota	2.02	0.74	0.06	0.85	0.37	0.00
TOTALS	20.40	3.52	7.19	6.54	3.17	0.00

[1]The average public supply increase matches Table 6-1.

[2]The domestic self-supply increase is derived from 2020 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. For Hillsborough it includes imports from outside SWUCA region.

[4]The remaining increase not met by self-supply or permitted quantities.

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 Polk Regional Water Cooperative (PRWC) is developing regional distribution system interconnects to distribute new alternative water supplies to participating member utilities. Through 2025, the Heartland Region's public supply demands are projected to increase by 5.4 mgd, with domestic self-supply accounting for 0.6 mgd of this increase. Based on the region's 2020 water use, currently permitted utility quantities are sufficient to meet 2025 demands. However, utility permits in Polk County will have their groundwater allocations held to their currently permitted groundwater quantities or their 2025 demand estimates as part of the new CFWI consumptive use permitting rules. While permitted quantities appear to meet most demands to 2025, the cumulative impact of all utilities using their permitted allocations may affect achievement of the SWIMAL and other MFLs. The PRWC is developing alternative water supply projects that will provide additional supplies shortly after 2025. These alternative water supply projects and conservation efforts initiated by the PRWC will help meet future demands and prevent cumulative groundwater use from further straining natural resources.

C. Hillsborough County Portion in SWUCA

Hillsborough County Utilities is the primary consolidated utility for the county and is a wholesale customer of Tampa Bay Water, the regional 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. Through 2025, public supply water demands in the SWUCA portion of Hillsborough County are projected to increase by 7.4 mgd by 2025, with domestic self-supply accounting for 1.72 mgd of this increase. The South-Central Wellfield is currently nearing its permitted capacity, leaving minimal reserves for future demands identified in the SWUCA portion of the county. Tampa Bay Water's sources outside of the SWUCA, along with

conservation and reclaimed water aquifer recharge offsets, are anticipated to be sufficient to meet Hillsborough County Utilities' demands within the SWUCA. Tampa Bay Water's alternative sources include the Alafia River intake (which was developed since the commencement of the Recovery Strategy), additional surface water intake capacity from the Tampa Bypass Canal which may include transfers from the Hillsborough River, and the Seawater Desalination Facility near Apollo Beach. Tampa Bay Water and Hillsborough County Utilities are developing new regional interconnects to transmit the additional supply to southern Hillsborough.

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 2020 RWSP, agricultural water use is expected to further increase by approximately 3.9 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. 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 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 program 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 2020 RWSP, water use for industry and mining within the SWUCA is expected to increase by approximately 0.47 mgd by 2025. 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 quantity of ore extracted.

Overall water use for other industrial uses and power generation are projected to remain stable or increase only slightly in the SWUCA through 2025. Power generation water use is projected to increase by 0.29 mgd, with the use of reclaimed water sources, continued construction of solar power facilities, and declining use of coal being contributing factors in meeting or offsetting most of the increase. There are six power plants within the SWUCA using reclaimed water including the TECO Big Bend facility in southern Hillsborough County, and the TECO Polk Power, Lakeland Electric McIntosh & Larsen facilities, Duke Hines Energy Complex, and Calpine Auburndale Peaking Energy Center in Polk County. The increasing use of natural gas (replacing coal as a fuel source) is anticipated to result in a reduction in water demands at facilities due to reduced scrubber demands.

Landscape and Recreation

The projected water use for landscape and recreation uses in the SWUCA increases through 2025 by 1.8 mgd during average conditions. Much of this increase is for golf course irrigation that could utilize reclaimed water, captured stormwater and other alternatives. Advances in irrigation technology, namely electronic rotors and integrated weather-based control, have allowed the golf industry to become more efficient in their water use. Similarly, irrigation design, incorporation of drought tolerant landscaping, and new technology within other use groups like HOA common areas have evolved in recent years and resulted in more water efficient landscapes. Seven of the District's 10 cooperatively-funded reclaimed water supply projects that were co-funded between FY2017 and FY2021 within the SWUCA would have a positive effect on reducing potable water use for landscape and recreation irrigation uses.

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 water 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, 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 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 SWIMAL, 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 Lakes. 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 2020-2025 are shown in Table 6-3. This table indicates increases are expected in all water use categories. The total projected increase from 2020to 2025 is 18.8 mgd to provide sufficient supplies for projected increases in water use. 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 2020-2025 (mgd).

USE TYPE OR NEED	2020 – 2025 Increase
Public Supply[1]	20.4
Agriculture[2]	-3.9
Industry and Mining[3]	0.5
Landscape and Recreation[4]	1.8
TOTALS	18.8

[1]From Table 6-1 of this document
[2]From 2020 RWSP Appendix 3-1, Page 11
[3]From 2020 RWSP Appendix 3-2, Table 7
[4]From 2020 RWSP Appendix 3-4, Table A-5

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 for conservation and reclaimed water within the SWUCA for the period 2020-2025 is approximately 25 mgd (surface and groundwater). Historical quantities for various project types are found in the sections below. 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, stormwater, and membrane treatment of available brackish groundwater resources.

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 major drivers for reducing per capita are tiered rate structures, passive conservation from national plumbing fixture standards, source substitution to bring usage off the potable supply, and utility-led conservation programs. These efforts and others have cumulatively resulted in significant reductions in per capita water use within the SWUCA as represented in Figure 6-2.

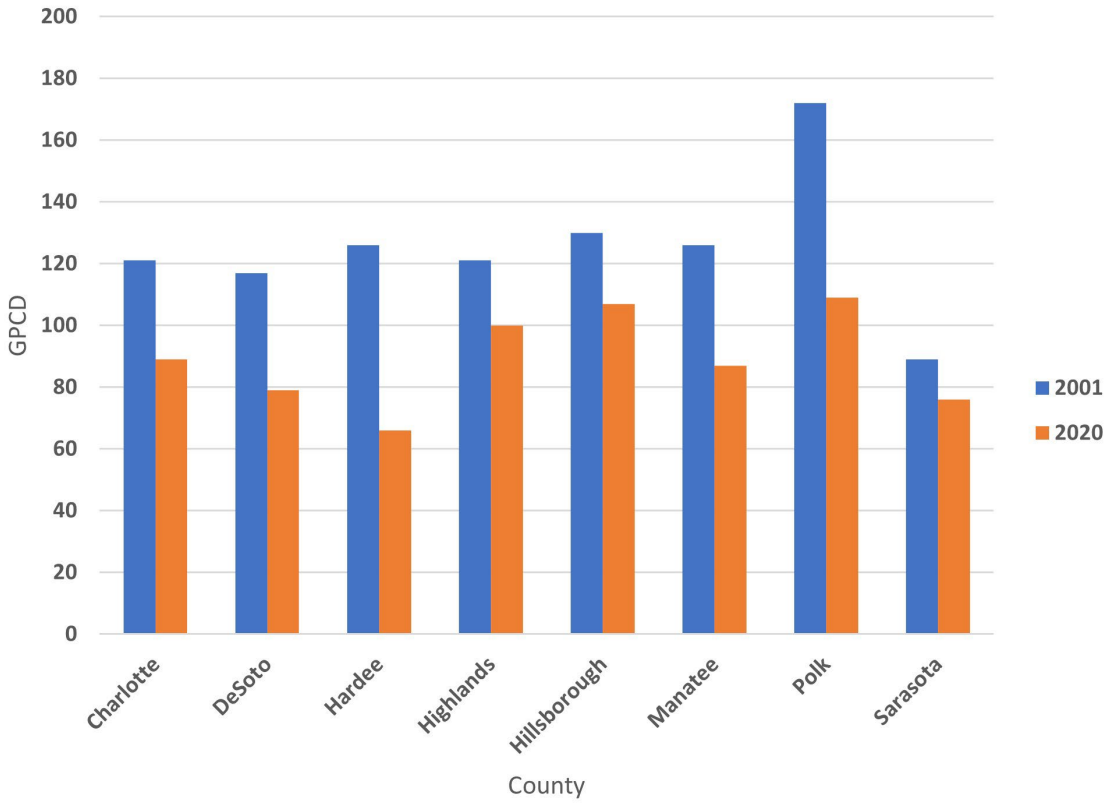

Figure 6-2. Per capita water use within the SWUCA.

For FY2017-FY2021, the District funded 32 water conservation projects through the CFI program within the SWUCA, which is anticipated to result in a total savings of 2.0 mgd and a District cost of up to $5.6 million (Table 6-4). Two District-funded research projects were also initiated during this period.

Table 6-4. District Cooperatively Funded (CFI) conservation projects.

	Number of Projects	Estimated Savings (mgd)	District Costs (million $)
FY2000-FY2011	29	1.2	1.1
FY2012-FY2016	14	0.5	1.3
FY017-FY2021	32	2.0	5.6
Total	75	3.7	8.0

This total of 75 conservation projects funded from FY2000-2021 resulted in an estimated/projected water conservation savings of 3.7 mgd at a total District cost of $8 million and total project costs of $11.2 million. In addition, the total spent on research projects for Public Water Supply (PWS) conservation is $2.4 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 2017-2021, nine leak detection surveys have been conducted in the SWUCA that are estimated to have provided 0.3 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.

The Florida Water Star (FWS) program is a voluntary water conservation certification program for new residential and commercial construction. The program encourages water efficiency in appliances, plumbing fixtures, irrigation systems, and landscapes, as well as water quality benefits from best management practices in landscapes. The program was developed by the St. Johns River Water Management District in 2006 and became a statewide program in 2012. Through the CFI, the District currently offers FWS rebates in select communities in partnership with local utilities. In addition to rebates, the District has worked with 13 Polk County municipalities to incorporate FWS certification and criteria into local building codes, resulting in estimated water savings of approximately 300 million gallons per year.

The WISE Program was launched by the District in FY2019 to promote water conservation with non-agricultural water users. It is a cost share reimbursement program that provides up to 50% of project costs up to $20,000 per project. A wide variety of water users are eligible for the program including but not limited to golf courses, hotels, schools, local governments, apartment complexes, and HOAs. For years FY2019-FY2021, the program has allocated $115,914 to 11 projects within the SWUCA. Estimated water savings is 0.1 mgd.

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 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 (USDA-NRCS) 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 2017-2021. 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 FY2021, the District has approved 179 projects within the SWUCA. To date, 164 projects are

operational offsetting 23.2 mgd. Total project cost was $71.0 million with the District contributing $40.3 million. During the FY2017-2021 assessment period, the District approved 46 projects and provided $10.5 million in funding for 3.8 mgd in projected offsets. The annual number of FARMS projects, and associated funding, has been consistent over the years and is expected to continue to be a major contributor to addressing water supply issues within the SWUCA.

a) 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 and 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 FY2021, 81 projects have been approved with 71 operational projects having offset 12.5 mgd of highly mineralized groundwater. The 81 projects received approximately $20.2 million in funding from the FARMS Program. During the FY2017-2021 assessment period, 23 projects were approved in the SPJC watersheds, representing an estimated offset of 2.1 mgd. These 23 projects received approximately $5.8 million from the FARMS Program.

b) 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, 11 projects have been approved and 10 are operational, offsetting 3.1 mgd. These 11 projects received approximately $4.3 million in funding from the FARMS Program. During the FY2017-2021 assessment period, three projects were approved in the UMRW, representing an estimated offset of 324,000 gpd. These projects received approximately $797,800 from the FARMS Program.

c) 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, 23 projects have been approved and 21 are operational. These projects are projected to offset 42.3 mgd per freeze event.

d) 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, 16 projects have been approved with 16 operational projects having offset 2.7 mgd. These 16 projects received approximately $4.4 million in funding from the FARMS Program. During the FY2017-2021 assessment period, there were six projects approved, representing an estimated offset of 0.5 mgd. These six projects received approximately $1.4 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 $8,000 per project. The District has funded 163 Mini-FARMS projects within the SWUCA to date at a total project cost of approximately $1.13 million with the District reimbursing approximately $980,800. These projects will have an estimated groundwater reduction of 837,000 gpd.

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.

There have been 78 wells back-plugged in the SWUCA overall through FY2021, with 63 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 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 2024 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. These two programs now act in concert to help improve irrigation efficiencies and regulatory compliance through the District.

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, watering schedule restrictions 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 FY2007-2021, the District assisted in funding 62 reclaimed water projects in the SWUCA achieving approximately 40.3 mgd in offsets at build-out. Table 6-5 lists the number of reclaimed water projects, flows and associated offsets in the SWUCA for the FY2007-2011, FY2012-2016 and FY2017-FY2021 time periods. The 18 reclaimed water projects funded over the current assessment period would offset approximately 13.2 mgd of traditional supplies at a District cost of $32.5 million, and a total cost of approximately $65.8 million or about $5 million per mgd. Total cost includes groundwater recharge and direct 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	4.3	27.7	37.3
FY2012-FY2016	27	22.8	179.4	52.5
FY2017-FY2021	18	13.2	65.8	32.5
Total	62	40.3	272.9	122.3

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 2020, there was 76.5 mgd of reclaimed

water utilized within the SWUCA, which has the potential to increase by approximately 17 mgd to 93.5 mgd by 2025 (Figure 6-3).

Impact of Public Land Acquisition Program

The District acquires fee and less than fee interest in lands for preservation and restoration of natural systems, water quality enhancement, structural and natural flood control, recharge potential, potable water supply and water conveyance. To date, the District has approximately 150,000 acres of land within the SWUCA. During the current assessment period the District and the Department of State Lands intend to partner on acquisitions of approximately 16,000 acres to further protect lands in the SWUCA and to meet core missions. The District will continue to evaluate lands for potential acquisitions in line with statutes, policies, and procedures, which includes consideration of the benefits to the SWUCA.

Additional Use of the Surficial and Intermediate Aquifers

Approximately 90 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 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, 23.3 mgd of additional demand over the next 20 years can be met from surficial and intermediate aquifer sources.

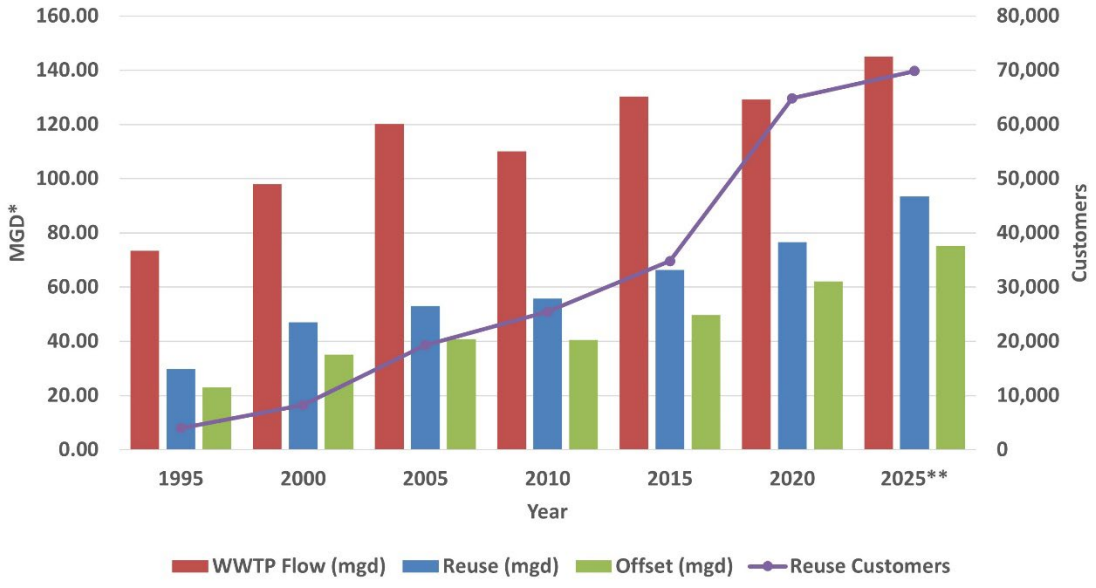

Figure 6-3. Reclaimed water use.

Potential Sources of New Water Supply

Since implementation of the Recovery Strategy through FY2021, the District has invested approximately $184.3 million in new alternative water supply projects within the SWUCA. For FY2017-2021, the District funded 27 alternative water supply development projects, including feasibility studies, pilot testing, and planning for: regional water supply interconnections; brackish groundwater wellfields; aquifer storage and recovery; and treatment and reservoir facility expansions. 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.

The PRWC is currently in the process of developing regional AWS sources and transmission systems by 2027 to assure reliability of water supply service for its members. The PRWC was formed in 2016 and includes 16 member-governments participating in a regional approach to water supply development. Two projects are currently under development by the PRWC to provide new AWS sources for its members: the West Polk Wellfield and the Southeast Polk Wellfield. Both projects include exploratory drilling and testing of the Lower Floridan aquifer, design and pilot testing of brackish groundwater treatment systems, and construction of regional transmission systems to deliver water supplies to participating PRWC members.

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 can 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 recently completed its Reservoir No. 3 Feasibility and Siting study and is moving forward with preliminary design, which when complete and combined with the proposed expansion of the Peace River Water Treatment Facility, would yield an additional 15-18 mgd in capacity. The PRMRWSA also continues to pursue pilot testing of a pretreatment system for its ASR wells that could free up existing treatment capacity currently 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. Completed segments of the Regional Integrated Loop System include those extending northward in Sarasota County and interconnection of Punta Gorda's Shell Creek Water Treatment Plant with DeSoto County Utilities and the regional system.

The SWUCA portion of Hillsborough County has the resources of Tampa Bay Water to assist with new supplies. The Long-term Master Water Plan completed in 2018 identified the need for development of additional new water supplies by 2028, with several options to be explored in or near the SWUCA portion of Hillsborough County. Project concepts included surface water expansion, reclaimed water augmentation, aquifer recharge with withdrawal, and expansion of seawater desalination with reclaimed water or additional seawater. Currently, Tampa Bay Water is developing their Southern Hillsborough County Transmission Expansion project to meet increased water demands related to significant growth in that area. Update of the Long-term Master Water Plan will be completed in late 2023.

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 of the Florida Statutes., 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. Through the Aquifer Recharge at Flatford Swamp project, capturing excess water for aquifer recharge could benefit aquifer levels in the MIA and reduce the rate of saltwater intrusion.

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 Goal 4 of the Recovery Strategy, 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 could result in an additional 7.19 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, Mini-FARMS, CFI, and WISE Programs, 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 address future growth in water demands or offset the use of Upper Floridan aquifer sources.

- Continue active participation in the CFWI.
- Continue regional water supply planning, including development of the 2025 District and CFWI Regional Water Supply Plans.

Section VII
Regulatory Component

Section VII addresses how the District's regulations contribute to meeting the four SWUCA goals defined in this Recovery Strategy. These four goals include achieving minimum flows in the Upper Peace River, meeting minimum lake levels in the Ridge Lakes area, i.e., the Lake Wales Ridge and adjacent areas, implementation of the saltwater intrusion minimum aquifer level and to ensure the water supply needs are met for both future demands and beneficial uses. The regulatory component includes: rule amendments for the adoption of 46 MFLs for priority water bodies; applying appropriate and consistent 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 including acquiring utility data that aids in mitigating demand through the promotion of efficient use of water by existing and future users; implementation of restrictions on new groundwater withdrawals that would negatively impact MFL water bodies; a drawdown analysis of proposed groundwater quantities for water use permits 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 Ridge Lakes; and the adoption of Net Benefit options for all 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 new economic expansion and 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 that apply conservation requirements to users that import potable water from another local provider and site-specific conservation plans for industrial, mining, agricultural 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. The total net benefit for land use changes must be at least 10 percent. Other requirements, such as requiring more permittees to report monthly 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, requiring water audits and production meter accuracy testing and calibration and more comprehensive annual reports for public supply permittees have allowed for better tracking of progress toward the conservation and recovery 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 reevaluations 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 CFWI and the southern part of the county is in the SWUCA. DEP has adopted rules for the CFWI area, effective June 21, 2021. DEP developed the rules in cooperation with the District, the South Florida Water Management District, the St. Johns River Water Management District, FDACS, and associated stakeholders. The CFWI rules adopt and incorporate by reference SWUCA in its entirety. Certain other District rules and provisions of the District's Water Use Permit Applicants Handbook, Part B, are also adopted and incorporated by reference for the purpose of application within SWUCA. Other District rules and handbook provisions not adopted and incorporated by reference for the purpose of application within SWUCA are superseded by the CFWI rules. CFWI rules also apply when there is no conflicting District rule or handbook provision.

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 FY2021-2022 through FY2024-2025.

The primary funding mechanism is the District's CFI. The Governing Board 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. The CFI has been highly successful. Since 1988, the program has resulted in a combined investment (District and its cooperators) of approximately $3.8 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 developed 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 Aquifer Recharge at Flatford Swamp and the Hydrogeological Investigation of the Lower Floridan Aquifer projects.

The District's long-range funding plan is driven by the Governing Board's direction for continued investment in these vital projects to protect and provide for the region's water resource needs. The plan shows, with Governing Board approval through the annual budget process, a significant amount of funding is anticipated to be required for the large-scale water supply and resource development projects in the SWUCA as identified in Appendix 2, Table A2-6. The funding necessary for these projects from FY2021-2022 through FY2024-2025 is $184 million. On average, the District has funded approximately $50 million annually for the CFI. It is important to note that this funding represents funds that would be generated from ad valorem tax dollars or use of District project reserves. Since FY2019-2020, the state has increased its appropriations to the water management districts through DEP for alternative water supply development. Although the District does not assume state or federal funds will be provided when developing its long-range funding plan, the District and its cooperators continue to seek these funding sources. It is estimated that the noted projects will provide a total of up to 50.1 mgd at buildout to meet projected public supply demands within the SWUCA.

The District has prioritized CFI funding for alternative water supply projects, with over $600 million for projects located in the SWUCA.

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 groundwater withdrawals at or below current levels and implementing WRD projects designed to augment or preserve water levels and flows.

The following are major conclusions from this five-year assessment, which address the period from fiscal year 2017 through fiscal year 2021:

1. The groundwater levels in the six sentinel wells used to monitor recovery progress in the MIA have remained stable since the previous five-year assessment, showing only slight increases over the period. Target well water levels in the Upper Peace River and Lake Wales Ridge areas are the highest they've been in 30 years.

2. From 2006-2013, the annual rainfall over much of the SWUCA was mostly below the long-term average. From 2007-2019, the 10-year moving average of rainfall has also been below the long-term average. In 2021, however, 10-year moving average of annual rainfall was near the long-term average. This recent improved 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 in coastal portions of southern Hillsborough, Manatee and northwestern Sarasota counties, but the goal to reduce the rate of saltwater intrusion through achieving the SWIMAL is almost met. Reductions of actual water use of approximately 20 percent have occurred within the MIA since the 1990s and aquifer levels are now 1.3 feet above the SWIMAL. These levels have been at or above the SWIMAL for four years in a row. It is very likely that the SWIMAL will be deemed met (the SWIMAL elevation must be equaled or exceeded for five consecutive years) for the first time in 2023, when a status assessment based on hydrologic data collected through 2022 is completed.

    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 and support development of a new saltwater intrusion model for the region.

    b) The benefits of aquifer recharge have been investigated for the MIA and the results are encouraging. Based on preliminary analysis, it appears that additional Upper Floridan aquifer recharge on the order of up to 22 mgd in the MIA will assist in the continued increases in aquifer water levels that will help to maintain achievement of the SWIMAL and possibly provide net benefits for limited new groundwater use. The District is currently involved in two aquifer recharge investigations (i.e., SHARP and the Aquifer Recharge at Flatford Swamp 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 near 500 mgd (about 90 percent from the Upper Floridan aquifer) as of 2020. This compares to an average withdrawal of 649 mgd in 2003. However, for public supply and agricultural users, actual groundwater withdrawal quantities are about 65 and 50 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 for 46 water bodies within the SWUCA. This includes the addition of four lakes where MFLs have been established and two lakes where MFLs were reevaluated and revised since the previous five-year recovery assessment. Based on hydrologic information collected through 2021, 36 MFLs were met and 10 were not met. Minimum flows and levels that were met included those established for 23 lakes, all 12 river segments, including the three segments of the Upper Peace River, and the single spring group with an established MFLs. Minimum levels established for 9 SWUCA lakes and the SWIMAL were not being met.

6. Overall, groundwater demands have declined over the past years. This is attributed to the development of alternative water supply projects, increased use of reclaimed water, changes in water use activities, improved rainfall conditions, and implementation of conservation in the area. Projected total water demand is expected to increase by 18.8 mgd from 2020 to 2025. 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 25 mgd (i.e., surface and groundwater) 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 the preliminary design of the PRWC's Southeast and West Polk Wellfields, which utilize brackish groundwater from the Lower Floridan aquifer for regional water supply. Funding for the final design and construction of these projects was approved by the District and PRWC members in 2020. The District has also continued Lower Floridan aquifer investigations. In addition, the District updated both the District and CFWI Regional Water Supply Plans in 2020.

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 became fully operational in early 2016 and is currently being monitored. The District continues to refine operational guidance protocols for various hydrologic conditions to achieve expected MFLs benefits in concert with the Lake Hancock outfall treatment system. With the completion and operation of the Lake Hancock project, and adoption of a reservation for water stored in the lake and released to lower Saddle Creek in 2020 for delivery to the upper Peace River, the District is taking an adaptive management approach to MFLs recovery for the upper Peace River. The Lake Hancock project will continue to be monitored to determine whether additional projects are needed to meet the minimum flow

requirements for the upper Peace River. In addition, the District has scheduled the reevaluation of the upper Peace River MFLs and the reservation established for Lake Hancock/Lower Saddle Creek in 2025.

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 and others 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 FY2017-2021 period include:

    a. The District allocated funding for 32 water conservation projects through the CFI program within the SWUCA, which is anticipated to result in a total savings of 2.05 mgd and a District cost of up to $5.6 million. Significant reductions in per capita water use can be attributable to non-quantifiable water conservation initiatives.

    b. The District assisted in 18 reclaimed water projects being funded between FY2017 and FY2021. These projects are projected to offset 13.2 mgd of traditional supplies at a total cost of $65.8 million. By 2025 these reuse projects and growth of existing projects will result in total reuse of 93.5 mgd and total reuse offsets within the SWUCA of 75.2 mgd.

    c. During the assessment period, the District has allocated funding for 52 FARMS projects implemented by growers in the SWUCA at a District cost of $11.9 million for a projected 4.0 mgd offset of groundwater withdrawals. Since FARMS's inception through FY2021, $40.3 million was allocated for 179 FARMS projects in the SWUCA for a total estimated offset of 28.6 mgd.

    d. The District invested $87.6 million for 27 new or ongoing projects in support of alternative water supply development, including resource investigations, feasibility studies, and treatment, storage, pumping and transmission facility expansions generating 4 mgd of initial new supply capacity. Sixteen future large-scale alternative water supply and water resource projects have been identified or are under development, representing 59 mgd of future quantities at a combined total cost of $1.45 billion.

Based on these conclusions, the following future steps are recommended for continued 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 SWUCA lake MFL as new and improved analysis methods are developed.

4. Complete the construction of monitoring equipment at MFLs sites within the CFWI, consistent with the DMIT Work Plan Update for FY2021-2025.
5. Monitor project impacts and determine whether any additional recovery projects are necessary after completion of planned lake MFL reevaluations.
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.

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

1. Continue the adaptive management approach by operation and monitoring the Lake Hancock Lake Level Modification project to verify that it can consistently achieve minimum flow requirements and determine whether additional recovery projects are needed.
2. Continue to refine operational guidance protocols.
3. Annually monitor the status of the upper Peace River MFLs.
4. Continue operation and monitoring for the Lake Hancock Outfall Treatment Project to achieve water quality objectives for the Peace River watershed in concert with the MFLs objectives of the Lake Level Modification project.
5. Complete the reevaluation of MFLs established for the upper Peace River and the reservation established for Lake Hancock/Lower Saddle Creek by 2025.

Goal 3 – Reduce rate of saltwater intrusion by 2025

1. Continue expansion of the coastal monitoring network to obtain data that can be used to increase resource monitoring and support development of a new MIA salt-water intrusion model.
2. Continue support for aquifer recharge projects, such as Flatford and SHARP, in the area where saltwater intrusion is ongoing within the SWUCA.
3. Continue conservation efforts through the FARMS Program, regulation, and funding development of alternative water supply (AWS) projects.

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, Mini-FARMS, CFI, and WISE Programs, 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.
3. Prioritize AWS projects that address future growth in water demands or offset the use of Upper Floridan aquifer sources.
4. Maintain participation in the CFWI.
5. Continue regional water supply planning, including development of the 2025 District and CFWI Regional Water Supply Plans.

Section X

Bibliography

AMEC-BCI Engineers & Scientists, Inc. 2011. Peace River Karst – Low Flow Preservation Devices Feasibility Study and Preliminary Design Alternative Recommendations. Prepared for Southwest Florida Water Management District, Brooksville, FL.

Ardaman and Associates, Inc. 2006. Upper Peace River Watershed Management Program (H024) Work Order No. 4: MFL Recovery Alternative I: Feasibility of Alternatives for Minimum Flow Recovery on the Upper Peace River Using CS-11 as a Flow Recovery Storage Area. Prepared for Southwest Florida Water Management District, Brooksville, FL.

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

Central Florida Water Initiative (CFWI). 2014. East-Central Florida Transient (ECFT) Model Documentation in Support of the 2014 Draft CFWI Regional Water Supply Plan, August 29, 2014. Prepared by the CFWI Hydrologic Analysis Team (HAT). South Florida Water Management District, West Palm Beach, FL, Southwest Florida Water Management District, Brooksville, FL, and St. Johns River Water Management District, Palatka, FL.

Central Florida Water Initiative (CFWI). 2019. Central Florida Water Initiative Conservation Implementation Strategy, October 2019. Prepared by the CFWI Conservation Team. South Florida Water Management District, West Palm Beach, FL, Southwest Florida Water Management District, Brooksville, FL, and St. Johns River Water Management District, Palatka, FL.

Central Florida Water Initiative (CFWI). 2020a. Final 2020 Central Florida Water Initiative Regional Water Supply Plan, Planning Document, December 2020. South Florida Water Management District, West Palm Beach, FL, Southwest Florida Water Management District, Brooksville, FL, and St. Johns River Water Management District, Palatka, FL.

Central Florida Water Initiative (CFWI). 2020b. Model Documentation Report East-Central Florida Transient Expanded (ECFTX) Model, February 2020. Prepared by the CFWI Hydrologic Analysis Team (HAT). South Florida Water Management District, West Palm Beach, FL, Southwest Florida Water Management District, Brooksville, FL, and St. Johns River Water Management District, Palatka, FL.

Central Florida Water Initiative (CFWI). 2022. East-Central Florida Transient Expanded (ECFTX) V2.0 Model Report, March 2022. Prepared by the CFWI Hydrologic Analysis Team (HAT). South Florida Water Management District, West Palm Beach, FL, Southwest Florida Water Management District, Brooksville, FL, and St. Johns River Water Management District, Palatka, FL.

Daigle, D. and Townsel, M. 2020. North Hillsborough Aquifer Recharge Project Expands Saltwater Intrusion Barrier. Florida Water Resources Journal, Volume 71 Number 2. (p. 58-63).

Ferguson, J.F., 2017, Southwest Florida Water Management District, 2016 Estimated Water Use Report: Southwest Florida Water Management District, 232 p.

Ferguson, J.F., 2018, Southwest Florida Water Management District, 2017 Estimated Water Use Report: Southwest Florida Water Management District, 235 p.

Ferguson, J. F., Hampton, C; 2019, Southwest Florida Water Management District, 2018 Estimated Water Use Report: Southwest Florida Water Management District, 236 p.

Ferguson, J. F., Hampton, C; 2020, Southwest Florida Water Management District, 2019 Estimated Water Use Report: Southwest Florida Water Management District, 236 p.

Ferguson, J. F., Hampton, C; 2020, Southwest Florida Water Management District, 2020 Estimated Water Use Report: Southwest Florida Water Management District, 240 p.

HydroGeoLogic, Inc. 2011. Peace River Integrated Modeling Project (PRIM), Final Report, Phase IV; Basin-Wide Model, May 2011. Reston, VA.

HydroGeoLogic, Inc. 2012. Peace River Integrated Modeling Project (PRIM), Final Report, Phase V; Predictive Model Simulations, January 2012. Reston, VA.

Jones, Edmunds & Associates, Inc. 2005. Peace River Phase 1 Pre-development Mapping Project, Project # B163, June 2005. Gainesville, FL.

Knochenmus, L.A. 2014. Streamflow Losses through Karst Features in the Upper Peace River Hydrologic Area, Polk County, Florida, May 2002 to May 2003, June 2014. U.S. Geological Survey Fact Sheet 102-03. Tampa, Florida.

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

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

Marchand, J.P. McBride, T., Ellison, D., Patterson, J, Neasman, T. and Quinn, J. 2018. Southern Water Use Caution Area Recovery Strategy Five-year Assessment for FY2012-2016, April 2018. Southwest Florida Water Management District, Brooksville, FL

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.

PBS&J. 2007. Final Report for the Peace River Cumulative Impact Study, January 2007. Tampa, FL

Southwest Florida Water Management District. 1998. Southern Water Use Caution Area Information Report, April 1998. Southwest Florida Water Management District, Brooksville, FL.

Southwest Florida Water Management District. 2001. The Peace River Comprehensive Watershed Management Plan (Plan). Volume One. Brooksville, Florida.

Southwest Florida Water Management District. 2002. Upper Peace River: An Analysis of Minimum Flows and Levels – Draft. Brooksville, Florida.

Southwest Florida Water Management District. 2006. Southern Water Use Caution Area Recovery Strategy, March 2006. Southwest Florida Water Management District, Brooksville, FL.

Southwest Florida Water Management District. 2009. Upper Peace River Projects Summary, June 2009. Southwest Florida Water Management District, Brooksville, FL.

Southwest Florida Water Management District. 2020a. 2020 Regional Water Supply Plan, November 2020. Brooksville, FL.

Southwest Florida Water Management District. 2020b. Water Budget Evaluation for a Proposed Reservation for Lake Hancock and Lower Saddle Creek in Polk County, Florida, February 2020, Final. Brooksville, FL.

Southwest Florida Water Management District. 2020c. Water Use Permit Applicant's Handbook, Part B., September 2015, Revised – January 2020. Southwest Florida Water Management District, Brooksville, FL.

Wharton, B.R. 2007. Predevelopment Surface Water Features and Land Cover in Six Drainage Sub-Basins of the Peace River Watershed, Final Report, August 2007. HDR Engineering, Inc., Tampa, FL.

Appendix 1
Public Supply Permitted Quantities and 2020 Withdrawals in the SWUCA

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	2020 Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2020 Annual Ave Withdrawals (mgd) [4]	2020 Annual Ave Daily Use (mgd) [5]	2020 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
CHARLOTTE COUNTY										
Gasparilla Island Water Assoc	718	GW S.I	1.538	76.1%	1.170	1.170	1.392	1.060	0.110	0.010
City of Punta Gorda	871	SW	8.088	87.4%	7.069	7.069	6.376	5.303	1.766	0.203
Charlotte Harbor Water Assoc	1512	GW I	0.910	78.3%	0.713	0.713	0.524	0.410	0.303	0.039
Charlotte Co BOCC	3522	GW I	3.172	79.0%	2.506	2.506	0.589	0.465	2.041	0.044
Charlotte Co B0CC [8]	7104	SW	0.000	96.2%	0.000	16.100	0.000	10.148	5.952	0.676
Sum of Large Utilities			**13.708**		**11.458**	**27.558**	**8.881**	**17.386**	**10.172**	**0.972**
Homeowners of Alligator Park	8626	GW F	0.055	97.0%	0.053	0.053	0.021	0.020	0.033	0.000
El Jobean Water Association [11]	99913	Import	0			0.153	0.153	0.153	0.000	0.003
Riverwood Development [11]	99916	Import	0			0.268	0.268	0.268	0.000	0.012
Small Utilities (<0.1 mgd permitted)			**0.055**		**0.053**	**0.474**	**0.442**	**0.441**	**0.033**	**0.015**
Charlotte County Total			**13.763**		**11.511**	**28.032**	**9.323**	**17.827**	**10.205**	**0.987**
Groundwater Total			5.675					1.955	2.487	
Floridan Groundwater Total			0.055					0.020	0.033	
Surface Water Total			8.088					15.451	7.718	
2025 Projected PS Needs by Utility										0.987
2025 Projected DSS Needs										0.053
2025 Projected AI Needs										0.147
2025 Projected PS Needs inc. DSS and AI										**1.187**
DESOTO COUNTY										
City of Arcadia	4725	GW I	1.093	97.0%	1.060	1.060	0.773	0.828	0.232	0.005
PRMRWSA Peace River WTF [8]	10420	SW	80.000	93.8%	51.000	16.300	34.245	0.000	16.300	0.000
DeSoto County Utilities [8]	20457	Import	0.000			0.675	0.000	0.475	0.200	0.007
Sum of Large Utilities			**81.093**		**52.060**	**18.035**	**35.018**	**1.303**	**16.732**	**0.012**
Cross Creek of Arcadia LLC	3318	GW F	0.060	97.0%	0.058	0.058	0.046	0.045	0.014	0.000
Desoto Village LLC	6483	GW F	0.016	97.0%	0.016	0.016	0.007	0.007	0.009	0.000

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	2020 Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2020 Annual Ave Withdrawals (mgd) [4]	2020 Annual Ave Daily Use (mgd) [5]	2020 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
Small Utilities (<0.1 mgd permitted)			**0.076**		**0.074**	**0.074**	**0.053**	**0.051**	**0.022**	**0.000**
DeSoto County Total			**81.169**		**52.134**	**18.109**	**35.071**	**1.354**	**16.755**	**0.012**
Groundwater Total			1.169					0.879	0.255	
Floridan Groundwater Total			0.076					0.051	0.022	
Surface Water Total			80.000					0.000	16.300	
2025 Projected PS Needs by Utility										0.012
2025 Projected DSS Needs										0.046
2025 Projected AI Needs										0.002
2025 Projected PS Needs inc. DSS and AI										**0.060**
HARDEE COUNTY										
City of Bowling Green	30	GW F	0.287	94.9%	0.272	0.272	0.209	0.199	0.073	0.001
City of Wauchula	4461	GW F	0.782	98.1%	0.767	0.767	0.637	0.625	0.142	0.001
Town of Zolfo Springs	7658	GW F	0.175	97.1%	0.170	0.170	0.140	0.136	0.034	0.000
Hardee County BOCC	13026	GW F	0.439	95.3%	0.418	0.418	0.137	0.131	0.287	0.001
Sum of Large Utilities			**1.683**		**1.628**	**1.628**	**1.123**	**1.091**	**0.537**	**0.003**
Orange Blossom RV Park Inc	2402	GW F	0.025	97.0%	0.024	0.024	0.023	0.022	0.002	0.000
MHC Peace River, LLC	7022	GW I	0.026	97.0%	0.025	0.025	0.023	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	0.005	0.001	0.000
Torrey Oaks Homeowners Association	11180	GW F	0.010	97.0%	0.010	0.010	0.009	0.009	0.001	0.000
Small Utilities (<0.1 mgd permitted)			**0.067**		**0.065**	**0.065**	**0.060**	**0.058**	**0.007**	**0.000**
Hardee County Total			**1.750**		**1.693**	**1.693**	**1.183**	**1.149**	**0.544**	**0.003**
Groundwater Total			1.750					1.149	0.544	
Floridan Groundwater Total			1.718					1.122	0.540	
Surface Water Total			0.000					0.000	0.000	
2025 Projected PS Needs by Utility										0.003
2025 Projected DSS Needs										0.004
2025 Projected AI Needs										0.000
2025 Projected PS Needs inc. DSS and AI										**0.007**

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	2020 Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2020 Annual Ave Withdrawals (mgd) [4]	2020 Annual Ave Daily Use (mgd) [5]	2020 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
HIGHLANDS COUNTY										
HC Waterworks	4167	GW F	0.155	98.0%	0.152	0.152	0.115	0.113	0.039	0.003
City of Sebring	4492	GW F	5.811	99.0%	5.753	5.753	3.953	3.914	1.839	0.109
Lake Placid Holding	4980	GW F	0.406	99.0%	0.402	0.402	0.327	0.324	0.078	0.009
Town of Lake Placid	5270	GW F	0.807	99.3%	0.801	0.801	0.682	0.678	0.123	0.013
City of Avon Park	6029	GW F	2.372	96.8%	2.296	2.296	2.120	2.051	0.245	0.029
Buttonwood Bay Utilities	7139	GW F	0.193	98.9%	0.191	0.191	0.193	0.191	0.000	0.000
Sun N Lake of Sebring	13099	GW F	1.104	94.8%	1.047	1.047	0.716	0.679	0.368	0.043
Sum of Large Utilities			**10.848**	**6.858**	**10.642**	**10.642**	**8.106**	**7.950**	**2.692**	**0.206**
Regular Baptist Fellowship Inc	4670	GW F	0.027	97.0%	0.026	0.026	0.012	0.012	0.015	0.000
HC Waterworks, Inc	6456	GW F	0.057	97.0%	0.055	0.055	0.022	0.021	0.034	0.000
Lake Bonnet Village Cooperative Inc	6804	GW F	0.052	97.0%	0.050	0.050	0.020	0.019	0.031	0.000
Anthony L Ritenour & Laura B Ritenour	10926	GW F	0.005	97.0%	0.005	0.005	0.004	0.004	0.001	0.000
Lloyd W. Schrader Trust	10930	GW F	0.005	97.0%	0.005	0.005	0.005	0.005	0.000	0.000
Sunshine RV Resort	11601	GW F	0.031	97.0%	0.030	0.030	0.014	0.014	0.016	0.000
Tropical Harbor MHE	12846	GW F	0.119	97.0%	0.115	0.115	0.116	0.113	0.000	0.000
Lake Park Village Condo Assoc	13272	GW F	0.002	97.0%	0.002	0.002	0.002	0.002	0.000	0.000
Silver Lake Utilities Inc	13367	GW I	0.007	97.0%	0.007	0.007	0.006	0.006	0.001	0.000
Orange Blossom Park	20470	GW F	0.035	97.0%	0.034	0.034	0.027	0.026	0.008	0.000
Small Utilities (<0.1 mgd permitted)			**0.340**		**0.330**	**0.330**	**0.228**	**0.221**	**0.106**	**0.000**
Highlands County Total			**11.188**		**10.971**	**10.971**	**8.334**	**8.171**	**2.797**	**0.206**
Groundwater Total			11.188					8.171	2.797	
Floridan Groundwater Total			11.181					8.165	2.796	
Surface Water Total			0.000					0.000	0.000	
2025 Projected PS Needs by Utility										0.206
2025 Projected DSS Needs										0.091
2025 Projected AI Needs										0.130
2025 Projected PS Needs inc DSS and AI										**0.427**

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	2020 Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2020 Annual Ave Withdrawals (mgd) [4]	2020 Annual Ave Daily Use (mgd) [5]	2020 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
HILLSBOROUGH COUNTY										
Tampa Bay Water (S-C Hillsborough) [9]	4352	GW F	24.100	97.0%	23.377	23.377	23.220	0.000	0.157	0.000
Cax Riverside LLC	7637	GW F	0.222	99.0%	0.220	0.220	0.544	0.538	0.000	0.000
Tampa Bay Water (BUD Well Field) [9]	11732	GW F	6.000	97.0%	5.820	5.820	5.900	0.000	0.000	0.000
Tampa Bay Water (Alafia River) [10]	11794	SW	18.700	97.0%	18.139	18.139	15.333	0.000	2.806	0.000
Hillsborough County Utilities [11]	20141	Import	0.000			73.425	0.000	72.691	0.000	5.679
Tampa Bay Water (Desal Plant) [10]	n/a	SEA	25.000		17.100	17.100	8.420	0.000	8.680	0.000
Sum of Large Utilities			**74.022**		**64.656**	**138.081**	**53.417**	**73.229**	**11.643**	**5.679**
Park Village HOA	1	GW F	0.006	97.0%	0.006	0.006	0.005	0.005	0.001	0.000
Bloomfield	245	GW I	0.024	97.0%	0.023	0.023	0.022	0.021	0.002	0.000
Berry Bay Farms at Jaymar Inc.	8469	GW F	0.009	97.0%	0.009	0.009	0.004	0.004	0.005	0.000
Neptune Mobile Village	8579	GW I	0.020	97.0%	0.019	0.019	0.018	0.017	0.002	0.000
Hometown Little Manatee, LLC	12513	GW F	0.042	97.0%	0.041	0.041	0.038	0.037	0.004	0.000
Hideaway Partners, LLLP	12621	GW F	0.022	97.0%	0.021	0.021	0.010	0.010	0.012	0.000
Small Utilities (<0.1 mgd permitted)11			**0.123**		**0.119**	**0.119**	**0.097**	**0.094**	**0.025**	**0.000**
Hillsborough County (SWUCA total)			**74.145**		**64.775**	**138.200**	**53.514**	**73.323**	**11.668**	**5.679**
Groundwater Total			30.445					0.632	0.182	
Floridan Groundwater Total			30.401					0.593	0.178	
Surface Water Total			18.700					0.000	2.806	
2025 Projected PS Needs by Utility										5.679
2025 Projected DSS Needs										1.631
2025 Projected AI Needs										0.091
2025 Projected PS Needs inc. DSS and AI										**7.401**
MANATEE COUNTY										
City of Bradenton	6392	SW	6.950	97.3%	6.762	6.762	6.198	6.125	0.637	0.094
Longboat Key [11]	10963	Import	0.000		0.000	2.500	0.000	1.875	0.625	0.028
City of Palmetto [11]	12443	Import	0.000		0.000	2.000	0.000	1.458	0.542	0.144
MCU - Mosaic Wellfield	*7345*	*GW F*	*1.960*				*1.661*	*1.583*	*0.299*	

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	2020 Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2020 Annual Ave Withdrawals (mgd) [4]	2020 Annual Ave Daily Use (mgd) [5]	2020 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
MCU - Lake Manatee	*13343*	*SW*	*34.900*				*30.049*	*28.637*	*4.851*	
MCU - East Wellfield	*13343*	*GW F*	*19.936*				*13.926*	*13.271*	*6.010*	
MCU - Consolidated totals (from above)			56.796	95.3%	54.127	49.627	45.636	40.158	9.468	3.420
Sum of Large Utilities			**63.746**		**60.889**	**60.889**	**51.834**	**49.616**	**11.273**	**3.686**
Lazy Acres LLC	13154	GW F	0.003	97.0%	0.003	0.003	0.002	0.002	0.001	0.000
ERS Sarasota LLC	20235	GW I	0.003	97.0%	0.003	0.003	0.003	0.003	0.000	0.000
Small Utilities (<0.1 mgd permitted)			**0.006**		**0.006**	**0.006**	**0.005**	**0.005**	**0.001**	**0.000**
Manatee County Total			**63.752**		**60.895**	**60.895**	**51.839**	**49.621**	**11.274**	**3.686**
Groundwater Total			21.902					14.859	6.310	
Floridan Groundwater Total			21.899					14.856	6.310	
Surface Water Total			41.850					34.762	5.488	
2025 Projected PS Needs by Utility										3.686
2025 Projected DSS Needs										0.040
2025 Projected AI Needs										0.174
2025 Projected PS Needs inc. DSS and AI										3.900
POLK COUNTY										
City of Bartow	341	GW F	7.900	90.9%	7.181	7.181	3.131	2.847	4.334	0.220
City of Fort Meade	645	GW F	0.760	100.0%	0.760	0.760	0.563	0.563	0.197	0.030
Lake Region Mobile Home Owners Inc	1616	GW F	0.108	97.0%	0.105	0.105	0.092	0.089	0.016	0.010
Four Lakes Golf Club	1625	GW F	0.391	99.0%	0.387	0.387	0.368	0.364	0.023	0.000
Town of Lake Hamilton	2332	GW F	0.381	99.0%	0.377	0.377	0.297	0.294	0.083	0.020
Orchid Springs Dev Corp	3415	GW F	0.095	97.0%	0.092	0.092	0.069	0.067	0.025	0.000
Crooked Lake Park Water Co	4005	GW F	0.302	93.1%	0.281	0.281	0.261	0.243	0.038	0.020
City of Winter Haven	4607	GW F	14.060	99.0%	13.919	13.919	10.139	10.039	3.880	0.690
City of Lake Wales	4658	GW F	3.903	99.0%	3.864	3.864	2.711	2.684	1.180	0.270
City of Lakeland	4912	GW F	35.030	99.8%	34.960	34.960	22.635	22.263	12.697	1.350
Grenelefe Resort LLC	5251	GW F	0.963	99.8%	0.961	0.961	0.934	0.933	0.028	0.000
City of Frostproof	5870	GW F	0.870	99.0%	0.861	0.861	0.108	0.107	0.754	0.020

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Town of Dundee Public Works Dept	5893	GW F	0.918	99.0%	0.909	0.909	0.781	0.773	0.136	0.080
City of Mulberry	6124	GW F	0.807	98.4%	0.794	0.794	0.410	0.403	0.391	0.030
Saddlebag Lake Owners Assoc Inc	6174	GW F	0.117	100.0%	0.117	0.117	0.097	0.097	0.020	0.000
Polk Co BOCC NWRUSA	6505	GW F	5.700	98.9%	5.637	5.637	2.745	2.872	2.765	0.300
Polk Co BOCC SWRUSA	6506	GW F	7.000	98.6%	6.902	6.902	3.544	3.495	3.407	0.330
Polk Co BOCC CRUSA	6507	GW F	2.003	98.7%	1.977	1.977	1.201	1.186	0.791	0.100
Polk Co BOCC SERUSA	6508	GW F	1.367	98.5%	1.346	1.346	0.640	0.631	0.715	0.020
City of Lake Alfred	6624	GW F	1.303	100.0%	1.303	1.303	0.883	0.883	0.420	0.120
City of Eagle Lake	6920	GW F	0.662	96.2%	0.637	0.637	0.469	0.451	0.186	0.080
City of Auburndale	7119	GW F	7.036	100.0%	7.036	7.036	5.386	5.386	1.650	0.450
CHC VII Ltd Century Realty Fund	7187	GW F	0.284	99.0%	0.281	0.281	0.215	0.213	0.068	0.000
Carefree RV of Winter Haven Inc	7328	GW F	0.131	100.0%	0.131	0.131	0.109	0.109	0.022	0.000
Polk Co BOCC ERUSA	8054	GW F	1.373	98.3%	1.350	1.350	0.500	0.491	0.859	0.090
S V Utilities Ltd	8344	GW F	0.212	99.0%	0.210	0.210	0.128	0.127	0.083	0.000
City of Haines City	8522	GW F	5.921	99.9%	5.915	5.915	5.310	5.025	0.890	0.700
Sweetwater Community Inc	8967	GW F	0.141	100.0%	0.141	0.141	0.112	0.112	0.029	0.000
Alafia Preserve & Eagle Ridge LLC	12964	GW F	1.542	97.0%	1.496	1.496	0.000	0.000	1.496	0.090
SUM OF LARGE UTILITIES			**101.280**		**99.931**	**99.931**	**63.838**	**62.747**	**37.184**	**5.020**
Charles Poston	1554	GW F	0.008	97.0%	0.008	0.008	0.007	0.007	0.001	0.000
Alturas Utilities, LLC	2083	GW F	0.023	97.0%	0.022	0.022	0.021	0.020	0.002	0.000
Sweetwater East Investment Co	2449	GW F	0.073	97.0%	0.071	0.071	0.060	0.058	0.013	0.000
Polk County BOCC	2656	GW F	0.002	97.0%	0.002	0.002	0.002	0.002	0.000	0.000
Alturas Utilities, LLC	3214	GW F	0.058	97.0%	0.056	0.056	0.041	0.040	0.016	0.000
YES Communities/Spring Hill Estates	4441	GW F	0.075	97.0%	0.073	0.073	0.060	0.058	0.015	0.000
North Pointe HOA of Auburndale	6023	GW F	0.027	97.0%	0.026	0.026	0.025	0.024	0.002	0.000
United Mc LLC	6105	GW F	0.008	97.0%	0.008	0.008	0.008	0.008	0.000	0.000
Lakeside Ranch Investment Corp	6152	GW F	0.033	97.0%	0.032	0.032	0.015	0.015	0.017	0.000
Frostproof Gospel Church Inc	6157	GW F	0.026	97.0%	0.025	0.025	0.019	0.018	0.007	0.000

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Whispering Pines of Frostproof, LLC	6208	GW F	0.037	97.0%	0.036	0.036	0.023	0.022	0.014	0.000
La Casa De Lake Wales Association Inc	6308	GW F	0.025	97.0%	0.024	0.024	0.011	0.011	0.014	0.000
Twin Fountains Club Inc	6314	GW F	0.063	97.0%	0.061	0.061	0.041	0.040	0.021	0.000
Christmas Tree Trailer Park Inc	6495	GW F	0.035	97.0%	0.034	0.034	0.016	0.016	0.018	0.000
John G. Wood Revocable Trust	6597	GW F	0.089	97.0%	0.086	0.086	0.081	0.079	0.008	0.000
Keen Sales Rentals & Utilities Inc	6679	GW F	0.022	97.0%	0.021	0.021	0.020	0.019	0.002	0.000
Hidden Cove Ltd	6893	GW F	0.025	97.0%	0.024	0.024	0.023	0.022	0.002	0.000
Tevalo, Inc	7172	GW F	0.028	97.0%	0.027	0.027	0.026	0.025	0.002	0.000
Camp Inn Associates LLC	7315	GW F	0.079	97.0%	0.077	0.077	0.030	0.029	0.048	0.000
Lakemont Ridge LLC	7557	GW F	0.055	97.0%	0.053	0.053	0.021	0.020	0.033	0.000
Peace Creek RV Park, LLC	7610	GW F	0.022	97.0%	0.021	0.021	0.020	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	0.000
Florida Governmental Utility Authority	7653	GW F	0.072	97.0%	0.070	0.070	0.054	0.052	0.017	0.000
Orange Acres Ranch	7703	GW F	0.056	97.0%	0.054	0.054	0.051	0.049	0.005	0.000
Sterlingwood LLC	8370	GW F	0.008	97.0%	0.008	0.008	0.008	0.008	0.000	0.000
Woodland Lakes Mobile Home Community	8536	GW F	0.050	97.0%	0.049	0.049	0.001	0.068	0.000	0.000
Good Life Resort Inc	8684	GW F	0.036	97.0%	0.035	0.035	0.016	0.016	0.019	0.000
Plantation Landings Ltd	8753	GW F	0.057	90.6%	0.052	0.052	0.052	0.047	0.005	0.001
Pinecrest Utilities, LLC	9128	GW F	0.028	97.0%	0.027	0.027	0.013	0.013	0.015	0.000
Keen Sales, Rentals and Utilities, Inc	9569	GW F	0.011	97.0%	0.011	0.011	0.006	0.006	0.005	0.000
Village of Highland Park	9807	GW F	0.062	97.0%	0.060	0.060	0.024	0.023	0.037	0.000
Van Lakes HOA	9835	GW F	0.038	97.0%	0.037	0.037	0.030	0.029	0.008	0.000
Agcy For Comm Treatment Services Inc	10564	GW F	0.004	97.0%	0.004	0.004	0.003	0.003	0.001	0.000
Action Ministries Inc	12421	GW F	0.002	97.0%	0.002	0.002	0.001	0.001	0.001	0.000
Holiday Travel Park H I Resorts Inc	12899	GW F	0.019	97.0%	0.018	0.018	0.017	0.016	0.002	0.000
Alafia Preserve & Eagle Ridge (Mulberry)	12964	GW F	1.542	97.0%	1.496	1.496	0.000	0.000	1.496	0.000
Small Utilities (<0.1 mgd permitted)			**2.798**		**2.710**	**2.710**	**0.846**	**0.884**	**1.846**	**0.001**
Polk County Total			**104.078**		**102.642**	**102.642**	**64.684**	**63.631**	**39.030**	**5.021**

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	2020 Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2020 Annual Ave Withdrawals (mgd) [4]	2020 Annual Ave Daily Use (mgd) [5]	2020 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
Groundwater Total			104.078					63.631	39.030	
Floridan Groundwater Total			104.078					63.631	39.030	
Surface Water Total			0.000					0.000	0.000	
2025 Projected PS Needs by Utility										5.021
2025 Projected DSS Needs										0.223
2025 Projected AI Needs										0.147
2025 Projected PS Needs inc. DSS and AI										**5.391**
SARASOTA COUNTY										
City of North Port [8, 12]	2923	GW I,SW, Import	7.100	83.4%	5.921	8.786	1.869	3.266	5.520	0.583
City of Sarasota (WUP 4318)	*4318*	*GW F*	*6.000*							
City of Sarasota (WUP 10224)	*10224*	*GW F*	*6.000*							
City of Sarasota (WUP 10225)	*10225*	*GW F*	*0.043*							
City of Sarasota Consolidated Total [8]		*GW F*	12.043	79.1%	9.526	9.526	8.164	6.456	3.070	0.059
Englewood Water District [13]	4866	GW I	5.360	73.8%	3.956	3.956	4.280	3.028	0.928	0.128
City of Venice	5393	GW I	6.864	51.1%	3.508	3.508	4.804	2.453	1.055	0.046
Camelot Communities (GW/RO)	5807	GW I	0.390	100.0%	0.390	0.390	0.359	0.359	0.031	0.000
Sun-in-Fun	7448	GW I	0.165	90.9%	0.150	0.150	0.115	0.105	0.045	0.000
Sarasota County Utilities [8, 9, 14]	8836	GW F, Import	13.737	89.5%	12.295	27.355	0.692	19.705	7.650	0.461
Sum of Large Utilities			**45.659**		**35.745**	**53.670**	**20.283**	**35.372**	**18.298**	**1.277**
Venice Ranch MHE	5456	GW I	0.077	97.0%	0.075	0.075	0.047	0.046	0.029	0.000
Ridgelake Residential	20737	GW I	0.049	97.0%	0.048	0.048	0.045	0.044	0.004	0.000
Small Utilities (<0.1 mgd permitted)			**0.126**		**0.122**	**0.122**	**0.092**	**0.089**	**0.033**	**0.000**
Sarasota County Totals			**45.785**		**35.867**	**53.792**	**20.375**	**35.461**	**18.331**	**1.277**
Groundwater Total			41.985					33.828	15.571	
Floridan Groundwater Total			17.350					21.642	8.571	
Surface Water Total			4.400					1.633	2.760	
2025 Projected PS Needs by Utility										1.277
2025 Projected DSS Needs										0.422

WUPs within the County	WUP #	Source Type	Permitted Annual Average (mgd) [1]	2020 Treatment Efficiency [2]	Available Supply (mgd)	Adjusted Supply in County (mgd) [3]	2020 Annual Ave Withdrawals (mgd) [4]	2020 Annual Ave Daily Use (mgd) [5]	2020 Annual Ave Reserve Available (mgd) [6]	2025 Utility Demand Increase (mgd) [7]
2025 Projected AI Needs										0.320
2025 Projected PS Needs inc DSS and AI										**2.019**
SWUCA										
SWUCA Totals			**395.630**		**340.488**	**414.334**	**244.323**	**250.539**	**110.603**	**16.871**
Groundwater Total			218.192					125.106	67.175	
Floridan Groundwater Total			186.758					110.082	57.480	
Surface Water Total			153.038					51.846	35.072	
2025 Projected PS Needs by Utility										16.871
2025 Projected DSS Needs										2.510
2025 Projected AI Needs										1.011
2025 Projected PS Needs inc. DSS and AI										**20.392**

Notes:

Acronyms: AI – Additional Irrigation, DSS – Domestic Self Supply, mgd - million gallons per day, GW - ground water, SW - surface water, SEA - sea water, PRMRWSA - Peace River Manasota Regional Water Supply Authority

[1] The permitted annual average quantities for Public Supply in 2020. For permits with multiple predominant use types, the allocation for only public supply is shown.

[2] Treatment efficiency accounts for water loss incurred during the treatment process, such as evaporations, water contained in slurries, and concentrate from reverse osmosis. Actual efficiencies are used if data was provided by the utility. An estimate of 97% was used where data was not provided or unrealistic.

[3] This value includes quantities identified in "Available Supply" plus adjusts for any quantities imported and/or exported to another utility or water authority.

[4] The “Average Daily Withdrawal" is the metered pumpage reported by utilities permitted for greater than 0.1 mgd, as provided in the 2020 Estimated Water Use Report (EWUR) Table 1A.

[5] The “Average Daily Use” is provided in the EWUR Table 1A Draft as “Gross Use”. The gross use is the withdrawal adjusted for imports, exports, and treatment loss. For the utilities permitted for less than 0.1 mgd, which are not required to report water use, withdrawals estimates generated for the 2020 EWUR were used and multiplied by treatment efficiency.

[6] The “Reserve for Service in County” equals the "Adjusted Available Supply in County" - "Daily Use for Service in County". This measure estimates the unutilized permitted quantity.

[7] The “Utility Demand Increase” is from the District's 2020 Regional Water Supply Plan Appendix 3-3 and was calculated per utility as (2025 public supply demand) - (2020 public supply demand). Bottom totals as labeled include quantities for domestic self-supply and irrigation wells within each county.

[8] The Authority's Peace River Facility, located in DeSoto County, provides water allocations to its customers totaling 34.7 mgd. Customers include DeSoto County Utilities (0.675 mgd), Charlotte County Public Works (16.1 mgd), Sarasota County (15.060 mgd), and the City of North Port (2.865 mgd). The permitted capacity is 80 mgd annual average but the facility's current treatment capacity is 51 mgd.

[9] Tampa Bay Water’s Brandon Urban Disbursed (BUD) and South Central (S/C) wellfields are assumed to represent potable supply for the SWUCA portion of Hillsborough County.

[10] The Alafia River Supply and the Tampa Bay Water Desalination systems are components of Tampa Bay Water’s regional system. The unused quantities were assumed available to meet demands in the SWUCA portion of Hillsborough County.

[11] Indicates the utility has either been issued a wholesale permit or receives 100 percent of its water supply from an outside source.

[12] The North Port WUP # 2923 allocates 4.4 mgd of surface water and 3.3 mgd or more of groundwater from intermediate aquifer. The groundwater is RO treated and used for blending with the surface water.

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 FY2017-2021

Projects	FY2017-FY2021 District Budget [1]	Cooperator Funding	Total Project Costs	Est. Water Conserved (mgd)
City of Arcadia South Distribution Looping Project (N815)	$236,250	$78,750	$315,000	0.026
Manatee County Toilet Rebate Program Phase 10 (N806)	$113,250	$113,250	$226,500	0.040
City of Venice Toilet Rebate Program (N808)	$29,450	$29,450	$58,900	0.013
Polk County Landscape and Irrigation Evaluation Program (N820)	$41,400	$41,400	$82,800	0.042
PRWC Outdoor Best Management Practices (P920)[2]	$166,075	$166,075	$332,150	0.052
PRWC Indoor Conservation Incentives (P921)[2]	$121,275	$121,275	$242,550	0.087
PRWC Florida Water Star Rebates (P922)[2]	$350,000	$0	$350,000	0.066
City of Venice Advanced Metering Analytics Project (N840)	$11,000	$11,000	$22,000	0.004
Polk County Landscape and Irrigation Evaluation (N846)	$42,500	$42,500	$85,000	0.042
Manatee County Toilet Rebate Phase XI (N877)	$113,250	$113,250	$226,500	0.040
Braden River Utilities Soil Moisture Sensor Rebate Program Phase 2 (Q020)	$154,000	$154,000	$308,000	0.055
City of North Port Water Distribution System Looping (N979)	$352,000	$352,000	$704,000	0.036
Town of Lake Hamilton Distribution System Looping (N996)	$124,610	$396,390	$521,000	0.020
PRWC Indoor Incentives (N948)	$78,000	$78,000	$156,000	0.092
PRWC Outdoor Best Management Practices (N971)	$96,250	$96,250	$192,500	0.113
Winter Haven Consumption and Conservation Programs Data Management (N973)	$60,000	$60,000	$120,000	0.016
Hillsborough County UF/IFAS Soil Moisture Sensor Project (N988)	$25,000	$25,000	$50,000	0.013
Manatee County Toilet Rebate Phase 12 (N982)	$75,500	$75,500	$151,000	0.026
City of Venice Toilet Rebate and Retrofit - Phase 6 (N992)	$29,450	$29,450	$58,900	0.005

Projects	FY2017-FY2021 District Budget [1]	Cooperator Funding	Total Project Costs	Est. Water Conserved (mgd)
PRWC Water Demand Management Plan (Q023)	$170,000	$170,000	$340,000	0.000
City of Palmetto Toilet Rebate (Q073)	$20,000	$20,000	$40,000	0.042
Tampa Bay Water Demand Management Project (Q087)	$549,775	$549,775	$1,099,550	0.280
Manatee County Toilet Rebate Phase 13 (Q111)	$75,500	$75,500	$151,000	0.026
City of Venice Toilet Rebate and retrofit Phase 7 (Q126)	$29,450	$29,450	$58,900	0.005
Manatee County Toilet Rebate Phase 14 (Q168)	$82,500	$82,500	$165,000	0.026
Long Boat Key Golf Club Advanced Irrigation System (Q145)	$508,516	$606,484	$1,115,000	0.095
City of Venice Toilet Rebate and Retrofit Project Phase 8 (Q179)	$23,900	$23,900	$47,800	0.005
Bartow Golf Course Advanced Irrigation System (Q166)	$250,000	$250,000	$500,000	0.051
Tampa Bay Water Demand Management Program Phase 2 (Q215)	$1,432,238	$1,432,238	$2,864,476	0.680
City of North Port Water Distribution Hartsdale/Aldonin/ Totem Area Looping Project (Q185)	$207,500	$207,500	$415,000	0.017
City of Palmetto Toilet Rebate Program (Q214)	$13,250	$13,250	$26,500	0.011
Total	**$5,581,889**	**$5,444,137**	**$11,026,026**	**2.03**

[1] "FY2017-FY2021 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.
[2] District share is passthrough grant from DEP.

Table A2-2. Agricultural Demand Management Projects: Completed, Ongoing or Planned FY2017-2021

PROJECTS	FY2017-FY2021 District Budget [1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
734 LMC Groves, LLC (Alico) – Lily Grove (H771)	$74,184	$26,566	$100,750	.027
A&A Blueberries, LLC (H745)	$34,754	$60,419	$95,173	.020
Alico Bermont Grove - Phase 2 (H593)	$183,770	$63,259	$247,029	.208
Bermont Properties, LLC - Section 22 (H793)	$180,000	$72,900	$252,900	.050
Bermont Properties, LLC - Section 34 (H784)	$166,500	$59,750	$226,250	.050
Bethel Farms, LLLP - Hog Bay (H770)	$163,921	$83,704	$247,625	.060
Bethel Farms, LLLP - Hog Bay Phase 2 (H775)	$337,952	$242,519	$580,471	.150
Bethel Farms, LLLP - Phase 3 (H777)	$434,011	$248,358	$682,369	.130
Bethel Farms, LLLP - Ryals Property (H796)	$279,520	$156,221	$434,741	.075
Bickett Holdings, LLC (H785)	$644,639	$214,880	$859,519	.140
Blueberry Hill – Phase 2 (H748)	$262,651	$129103	$391,754	.050
Bonnie Blue Ranch, LLC (H746)	$297,610	$332,501	$630,111	.050
Boyz Properties LLC (H794)	$631,000	$450,000	$1,081,000	.170
Brenner Groves, LLC (H747)	$255,754	$90,387	$229,643	.013
Council Growers (H764)	$389,971	$336,869	$726,840	.142
Creekside Nursery, Inc. (H780)	$151,600	$68,143	$229,643	.030
DeSoto Excavating (H759)	$200,000	$102,031	$302,031	.036
Dixie Groves and Cattle Company (H767)	$249,367	$211,038	$460,404	.120
Doe Hill Citrus - Phase 2 (H758)	$232,409	$314,772	$547,181	.085
Doe Hill Citrus - Phase 3 (H781)	$40,125	$13,375	$53,500	.030
Dover Land, LLC and Haynes Road, LLC (H782)	$656,250	$261,353	$917,603	.111
Family Dynamics, Inc. (H776)	$189,525	$301,718	$543,643	.059
Farmland Reserve (H760)	$196,300	$112,531	$308,831	.055
FLM - Blossom Grove - Phase 4 – Amend (H737)	$364,767	$759,884	$1,124,651	.198

PROJECTS	FY2017-FY2021 District Budget [1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
Frogmore Ranch, LLC – Amendment (H706)	$60,619	$92,422	$153,041	.032
Hancock Groves - Phase 5 (H754)	$21,450	$32,038	$53,488	.035
Hi Hat Ranch (H769)	$111,151	$37,050	$148,202	.110
Jack Paul Properties (H749)	$503,208	$205,289	$708,496	.144
Jack Paul Properties Phase 2 (H778)	$295,500	$111,452	$406,952	.112
Keith Davis (H752)	$95,400	$126,851	$222,251	.025
KLM Farms, LLC AWS (H757)	$192,587	$64,196	$256,783	.043
Luna Berry Farms Amended 2 (H671)	$88,844	$29,615	$118,459	.025
Lykes - Lake Placid Grove - Phase 2 (H779)	$134,171	$134,171	$268,343	.075
M & R Farms (H790)	$96,235	$32,078	$128,314	.025
North Joshua Groves, LLC (H788)	$186,000	$123,281	$309,281	.158
Ocean Breeze - Phase 2 (H763)	$79,030	$34,248	$113,278	.015
Pebbledale Farms, Inc. (H773)	$533,799	$639,155	$1,192,954	.184
Premier Citrus - Southeast Groves - Phase 2 (H755)	$5,744	$1,915	$7,659	.012
Premier Citrus - West Vero Farms (H753)	$34,500	$12,353	$46,853	.043
QC DeSoto Grove Ventures PRR Ph 4 (H756)	$426,323	$142,108	$568,430	.100
QC Pelican Grove, LLC (H761)	$560,000	$555,435	$1,115,435	.160
Reynolds Farms, Inc. - Annes Block (H766)	$90,852	$30,284	$121,136	.033
Rolling Meadow Ranch (H792)	$221,273	$73,757	$295,030	.050
Schwartz Farms, Inc. – Amended (H762)	$55,672	$18,557	$74,230	.044
Symon Grove, LLC (H787)	$495,668	$298,000	$793,668	.110
Symon Grove, LLC - Phase 2 (H795)	$238,112	$79,370	$317,482	.060
Turner Family Partnership - Nocatee Grove (H786)	$326,000	$232,871	$558,871	.100
Turner Groves Citrus, LP - Phase 2 - Hickory Grove (H789)	$181,000	$126,392	$307,392	.080
University of Florida GCREC (H774)	$65,794	$21,931	$87,725	.023

PROJECTS	FY2017-FY2021 District Budget [1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
Wauchula Road Duette (H744)	$49,823	$57,412	$107,235	.060
Wauchula Road Duette, LLC Phase 2 (H791)	$62,713	$62,713	$125,426	.075
William Kip Keene (H783)	$87,854	$29,285	$117,139	.016
Total	**$ 11,915,902**	**$ 8,116,510**	**$19,997,215**	**4.008**

[1] "FY2017-FY2021 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 FY2017–2021

PROJECTS	FY2017-FY2021 District Budget [1]	Coop Funding	Total Project Costs	Crop
Florida Automated Weather Network Data Dissemination and Education (B136)	$500,000	N/A	$800,000	All
Reduction of Water Use for Citrus Cold Protection (B407)	$21,000	N/A	$21,000	Citrus
Effect of Composting at Animal Stock Facilities on Nutrients in Groundwater (B412)	$175,000	N/A	$175,000	Livestock
Effect of Water Scheduling and Amounts on Growth of Young Citrus Trees in High Density Plantings (B413)	$168,623	N/A	$168,623	Citrus
Blueberry Water Allocation and Irrigation Scheduling Using Evapotranspiration-based Methods (B414)	$210,000	N/A	$210,000	Blueberry
Leaching Fraction-Adjusted Irrigation Impact on Nutrient Load and Plant Water Use (B415)	$81,320	N/A	$81,320	Nursery
Improved Irrigation Management on Mature Citrus Trees Productivity in High Planting Densities (B416)	$143,000	N/A	$192,015	Citrus
Soil Amendments and Maturing Landscapes for Reduced Irrigation Potential (B418)	$50,000	N/A	$50,000	Turf
Compact Bed Geometries for Watermelon in Southwest Florida (B420)	$190,000	N/A	$282,460	Watermelon
Evaluation of Water Use & Water Quality Effects of Amending Soils & Lawns with Compost Material (P446)	$60,000	N/A	$60,000	Turf
Rainfall Signage to Reduce Residential Irrigation (B421)	$50,000	N/A	$125,000	Turf
Mircoirrigation for Reducing Water Use for Bare-Root Strawberry Establishment and Freeze Protection (B423)	$90,000	N/A	$301,629	Strawberry
Evaluation of Nitrogen Leaching From Reclaimed Water Applied to Lawns, Spray Fields, and Rapid Infiltration Basins (B403)	$197,000	N/A	$294,000	Turf
New Practical Method for Managing Irrigation in Container Nurseries (B404)	$105,310	N/A	$165,310	Nurseries
Eliminating Sprinkler Irrigation Use in Strawberry Transplant Establishment (B405)	$99,000	N/A	$167,000	Strawberry

PROJECTS	FY2017-FY2021 District Budget [1]	Coop Funding	Total Project Costs	Crop
Evaluating Fertigation with Center Pivot Irrigation for Water Conservation on Commercial Potato Production (B406)	$294,000	N/A	$400,000	Potato
Managing Forests for Increased Regional Water Availability (P102)	$20,000	N/A	$101,661	Trees
Total	**$2,454,253**		**$3,595,018**	

[1] "FY2017-FY2021 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 FY2017-2021

				At Build-Out	
PROJECTS	**FY2017-FY2021 District Budget [1]**	**Cooperator Funding**	**Total Project Costs**	**Reclaimed Water Provided (mgd)**	**Water Resource Benefit (mgd)**
Winter Haven #3 RW Interconnect, Storage and Pumping Project (N339)	$2,750,000	$6,716,000	$9,466,000	0.30	0.15
Charlotte County Regional Reclaimed Water Expansion, Ph 3 (N556)	$2,377,250	$4,715,000	$9,430,000	2.23	1.67
Braden River Utilities Reclaimed Water Transmission Line (N711)	$1,225,000	$2,150,000	$4,300,000	1.0	0.5
Hillsborough Co. 19th Ave Reuse Transmission (N776)	$2,713,671	$2,713,672	$5,427,343	1.20	0.60
Winter Haven Reuse: Southern Basin Aquifer Recharge Feasibility (N796)	$150,000	$200,000	$350,000	Study	Study
Bradenton Reclaimed Water Aquifer Recharge Feasibility (N842)	$141,695	$141,696	$283,391	Study	Study
Hillsborough Co SHARP Reuse Recharge Expansion Phase 2 (N855)	$4,850,000	$4,850,000	$9,700,000	4.00	4.00
Hillsborough Co. Summerfield Sports Reuse (N863)	$77,500	$77,500	$155,000	0.07	0.05
Arcadia Golf Course Reclaimed Water Pond (N881)	$225,000	$75,000	$300,000	0.10	0.08
Haines City Reclaimed Recharge Feasibility (N888)	$225,000	$75,000	$300,000	Study	Study
Haines City Reclaimed Storage and Pumping Project (N898)	$4,620,000	$2,180,000	$6,800,000	Storage	Storage
West Villages Improvement District to Sarasota Co Reuse (N920)	$356,000	$356,000	$712,000	0.25	0.19
Bowling Green to Mosaic Mine Reuse (Q022)	$833,250	$277,750	$1,111,000	0.14	0.14
Venice Reclaimed Water ASR (Q050)	$2,532,500	$2,532,500	$5,065,000	Storage	Storage
North Port Direct Potable Reuse Study (Q139)	$125,000	$125,000	$250,000	Study	Study
Sarasota Co Honore Ave Reuse (Q160)	$1,500,000	$1,500,000	$3,000,000	0.533	0.35
Winter Haven Reclaimed Water Recharge (Q177)	$2,000,000	$2,000,000	$4,000,000	0.40	0.40
Winter Haven Direct Potable Reuse Study (Q200)	$100,000	$100,000	$200,000	Study	Study
Total	**$26,801,866**	**$30,785,118**	**$60,849,734**	**10.22**	**8.13**

[1] "FY2017-FY2021 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 FY2017-2021

PROJECTS	FY2017-FY2021 District Budget [1]	Cooperator Funding	Total Project Costs	Supply (mgd)
Aquifer Recharge at Flatford Swamp (H089)	$5,436,717	$0	$13,475,099	Study
South Hillsborough County Aquifer Recharge Program (N287)	$201,927	$1,382,500	$2,765,000	Study
PRMRWSA - Regional Integrated Loop System, Phase 1 (N416)	$6,000,000	$6,000,000	$12,000,000	Pipeline
Punta Gorda Reverse Osmosis Facility (N780)	$15,650,000	$16,550,000	$32,200,000	4.0
PRMRWSA Regional Integrated Loop System, Phase 3B (N823)	$8,100,000	$8,600,000	$16,700,000	Pipeline
North Port ASR Permanent Facilities (N833)	$340,000	$770,319	$1,110,319	Storage
PRWC West Polk Co. Lower Aquifer Deep Wells (N882)	$4,970,367	$4,970,367	$8,940,734	Design
PRWC Southeast Wellfield (N905)	$6,270,958	$4,846,958	$11,117,916	Design
TBW Regional Treatment Facility Pumping Expansion (N998)	$1,200,000	$1,200,000	$2,400,000	Pumping
Hydrogeologic Investigation of the Lower Floridan Aquifer in Polk County (P280)	$7,802,559	$0	$12,000,000	Study
Hydrogeologic Investigation of the Lower Floridan Aquifer at Polk Central Regional Water Production Facility (P924)	$244,550	$2,407,957	$2,652,507	Study
Optical Borehole Imaging Data Collection of LFA Wells in Polk County (P925)	$100,200	$66,800	$167,000	Study
Sources and Ages of Groundwater in the Lower Floridan Aquifer in Polk County (P926)	$368,300	$0	$368,300	Study
Tampa Bay Water Regional Surface Water Treatment Plant Expansion Feasibility (Q061)	$275,000	$275,000	$550,000	Study
Tampa Bay Water Desalination Facility Expansion Feasibility (Q063)	$1,500,000	$1,500,000	$3,000,000	Study
North Hillsborough Aquifer Recharge Program (Q064)	$750,000	$750,000	$1,500,000	Study
PRWC Peace River/Land Use Transition Treatment Facility and Reservoir (Q133)	$480,550	$480,550	$961,100	Study
TBW South Hillsborough Co. Booster Pump Station (Q146)	$3,550,000	$3,550,000	$12,686,049	See Table A2-6

PROJECTS	FY2017-FY2021 District Budget [1]	Cooperator Funding	Total Project Costs	Supply (mgd)
Sarasota County Bee Ridge Water Reclamation Facility Aquifer Recharge (Q159)	$915,511	$915,511	$1,831,022	Study
PRWC Southeast Wellfield Implementation (Q184)	$10,125,000	$110,940,000	$241,085,132	See Table A2-6
PRMRWSA Regional Loop Phase 2B and 2C Feasibility and Routing (Q202)	$150,000	$200,000	$400,000	Pipeline
PRMRWSA Phase 3C Integrated Loop Routing and Feasibility (Q205)	$200,000	$300,000	$600,000	Pipeline
PRMRWSA Reservoir No. 3 Feasibility and Siting (Q212)	$625,000	$625,000	$1,250,000	Study
PRWC Regional Transmission Southeast (Q216)	$7,425,000	$76,013,000	$170,698,548	Pipeline
PRWC Southeast Polk Wellfield LFA Exploratory Production Well No. 3 (Q294)	$2,062,500	$2,062,500	$4,125,000	Data Collection
Totals	**$84,744,139**	**$244,406,462**	**$529,108,627**	**4.0**

[1] "FY2017-FY2021 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 – FY2022-2025

PROJECTS	Entity Responsible for Implementation	Total Project Cost (million $)	District Eligible Cost FY2022-2025 (million $)	Total Quantities (mgd)	Quantities FY2022-2025 (mgd)
Aquifer Recharge at Flatford Swamp (H089, P189) [2]	SWFWMD	$13.48	$0.83	2.0	2.0
TBW South Hillsborough County Booster Pump Station (Q146)	Tampa Bay Water	$12.69	$2.80	5.0 to 7.0	5.0 to 7.0
PRWC Southeast Wellfield Implementation (Q184) [1]	PRWC	$241.09	$25.96	12.5	0.0
PRWC Regional Transmission Southeast (Q216) [1]	PRWC	$170.70	$31.28	N/A	N/A
TBW South Hillsborough County Transmission Expansion (Q241) [1]	Tampa Bay Water	$426.00	$15.86	N/A	N/A
PRMRWSA Regional Acquisition of the Project Prairie Pumping and Storage Facilities (Q248)	PRMRWSA	$2.03	$0.60	N/A	N/A
PRMRWSA Reservoir No. 3 (Q272) [1,3]	PRMRWSA	$551.66	$32.68	15 to 18	N/A
Haines City Lake Eva Aquifer Recharge MFL Recovery (Q303) [1]	Haines City	$5.9	$2.9	0.6	0.6
PRWC West Polk Wellfield (Q308) [1]	PRWC	$237.36	$13.02	10.0	0.0
PRWC Test Production Well No. 2 West Polk Wellfield (Q309)	PRWC	$4.13	$2.06	N/A	N/A
PRMRWSA Regional Integrated Loop System Phase 3C (Q313) [1]	PRMRWSA	$67.60	$26.55	N/A	N/A
PRMRWSA Regional Integrated Loop System Phase 2B (Q355) [1]	PRMRWSA	$73.00	$29.29	N/A	N/A
Totals		**$1,805.64**	**$183.83**	**45.1 to 50.1**	**7.6 to 9.6**

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

[2] District Initiative project.

[3] Quantities reflect the companion Peace River Facility expansion project; reservoir storage capacity is nine (9) billion gallons.

[4] Actual costs may vary for projects completed under budget, or due to multi-year funding outside this fiscal timeframe.