SOUTHERN WATER USE CAUTION AREA RECOVERY STRATEGY

FIVE-YEAR ASSESSMENT FOR FY2007-2011

Updated June 2015 with the MIA and Ridge Lakes Stakeholder Outreach Response and Results

Southwest Florida
Water Management District

NOVEMBER 2013
FINAL REPORT

Southern Water Use Caution Area Recovery Strategy

Five-Year Assessment, FY2007-2011

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Updated June 2015 with the MIA and Ridge Lakes Stakeholder Outreach Response and Results

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Section I
Introduction

The Southern Water Use Caution Area (SWUCA) encompasses approximately 5,100 square miles, including all or part of eight counties in the southern portion of the Southwest Florida Water Management District (District). This area was designated to address declines in aquifer levels occurring throughout the groundwater basin, exceeding 50 feet in some areas, from groundwater withdrawals. Although efforts have since stabilized the withdrawals, depressed aquifer levels continue to cause saltwater intrusion along the coast and contribute to reduced flows in the upper Peace River and lower lake levels in areas of Polk and Highlands counties. To address these issues, the District established minimum flows and levels (MFLs) for several water bodies in the SWUCA and adopted a SWUCA Recovery Strategy (Recovery Strategy) in 2006.

District regional water supply planning has been the primary tool in ensuring water resource sustainability in the SWUCA. Florida law requires regional water supply planning in areas where it has been determined that existing sources of water are not adequate for all existing and projected reasonable-beneficial uses, while sustaining the water resources and related natural systems. Regional water supply planning quantifies the water needs for existing and projected reasonable-beneficial uses for at least 20 years, and identifies water supply options, including traditional and alternative sources. In addition, MFLs, established for priority water bodies pursuant to Chapter 373, F.S., identify the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. If the existing flow or level of a water body is below, or is projected to fall below the applicable minimum flow or level within 20 years, a recovery or prevention strategy must be implemented as part of the regional water supply plan. The District has adopted MFLs for 41 priority water bodies 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 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 that there are sufficient water supplies for all existing and projected reasonable-beneficial uses

Rule provisions call for annual and five-year assessments of this strategy. This report is the first five-year assessment of the Recovery Strategy. The report spans fiscal years 2007-2011, and evaluates and assesses the recovery in terms of resource trends, as well as trends in permitted and used quantities of water, and completed, ongoing and planned projects to address issues within the SWUCA. This assessment provides the information necessary to determine progress in achieving recovery and protection goals, and allows the District to revise its approach if necessary to respond to changes in resource conditions and issues.

The Recovery Strategy has six major elements:

1. **Development of a regional water supply plan.**
   Regional water supply planning allows the District and its communities to strategize on how to address growing water needs while minimizing impacts to the water resources and natural systems.

2. **Use of existing rules.**
   The District's water use permitting rules provide the regulatory criteria to accomplish the majority of what is contemplated in the Recovery Strategy.

3. **Enhancements to existing rules.**
   The Recovery Strategy introduced the Net Benefit concept to provide additional flexibility in situations where existing rules, coupled with water supply planning and water resource development projects, are not adequate to achieve the Recovery Strategy goals. An additional strategy is to improve data collection for assessing per capita standards.

4. **Provide financial incentives for conservation and development of alternative supplies.**
   District funding sources include the Cooperative Funding and Water Supply and Resource Development initiatives.

5. **Development and implementation of water resource development projects to aid in reestablishing minimum flows to rivers and enhance recharge**.
   A project focus area is to increase the wet-weather storage in the upper Peace River watershed.

6. **Resource monitoring, reporting and cumulative impact analysis.**
   The Recovery Strategy includes the continuous monitoring of trends in resource conditions and permitted and actual water use. The cumulative impact analysis evaluates changes in permitted and used groundwater quantities and water resource development projects benefiting the Upper Floridan aquifer in and around the Most Impacted Area (MIA).

Section II
Water Resource Monitoring

The Governing Board approved the Southern Water Use Caution Area designation in 1992 to manage water resources comprehensively in the Southern West-Central Florida Groundwater Basin (SWCFGWB) (Figure 2-1). This designation was based on a considerable amount of data collection and numerous studies of water resources in the region. Adoption of the Recovery Strategy was the culmination of a long-term effort to implement a management strategy to first stabilize and then recover groundwater levels to achieve established environmental goals (SWFWMD, 2006). Principal water resource concerns included saltwater intrusion in coastal areas, lowering of lake levels along the Lake Wales Ridge and the periodic cessation of flow in the upper Peace River.

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

The District uses its extensive hydrologic monitoring network to monitor resource conditions to measure progress toward recovery. Primary resource monitoring includes long-term groundwater levels and surface water levels and flows; coastal groundwater quality; estimated and permitted groundwater use; and the status of MFL water bodies. Groundwater levels from six "sentinel" long-term Upper Floridan aquifer monitoring wells are shown in Figure 2-2. These wells enable observation of recovery progress through a comparison of recent to historical water level trends. The water level histories for each well are similar with respect to their general patterns of rise and decline. The levels respond to both local and regional (basin) 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. All of these wells showed signs of stabilizing or increasing water levels during the 1990s. Over the long-term, water levels in the more northern wells (Coley Deep, ROMP 50 and ROMP 60) have generally stabilized or increased since the mid-1970s. Water levels in the southern wells (Edgeville Deep, Marshall and Sarasota 9) have generally stabilized or decreased in recent years.

Results of efforts to monitor coastal groundwater quality show the saltwater interface is continuing to move inland. This is expected since saltwater intrusion is directly related to groundwater levels and will continue to move landward even after recovery to the Saltwater Intrusion Minimum Aquifer Level (SWIMAL) is achieved. The goal of the strategy is to slow the rate of landward movement. Once the SWIMAL is achieved, the District will decide what additional steps should be implemented to further slow and possibly halt the rate of movement. To provide improved estimates of the rate of movement, the District is continuing to refine the coastal monitoring network by strategically adding wells in areas of greatest change in groundwater quality. The additional information will improve the District's ability to distinguish between local variability and regional intrusion.

Figure 2-1. Boundaries for Southern Water Use Caution Area, Most Impacted Area, and Central Florida Water Initiative

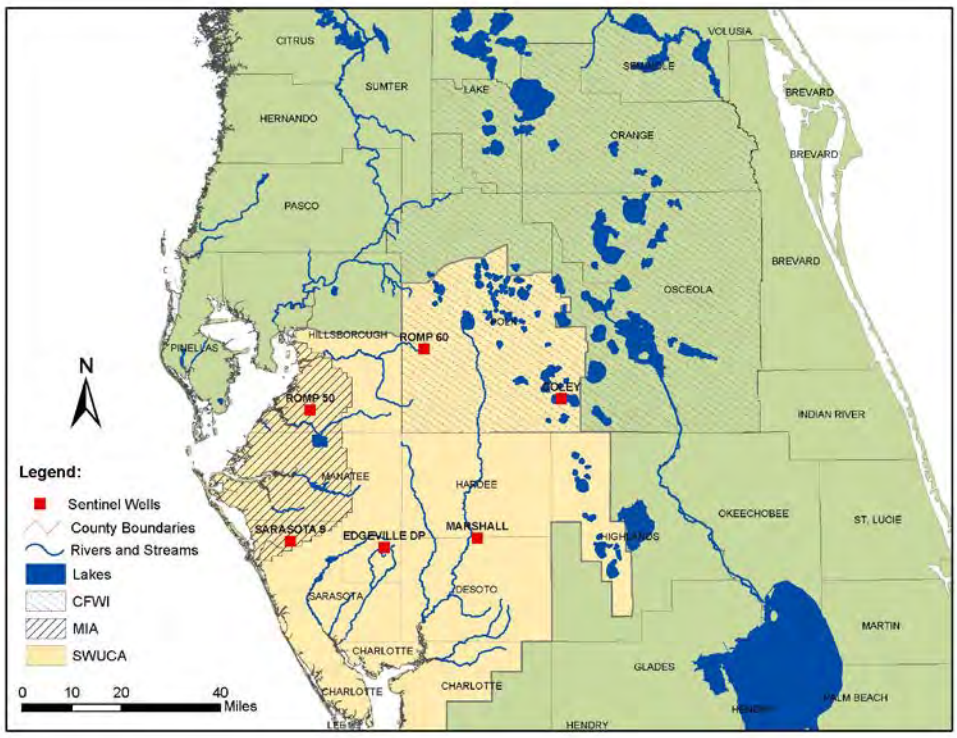
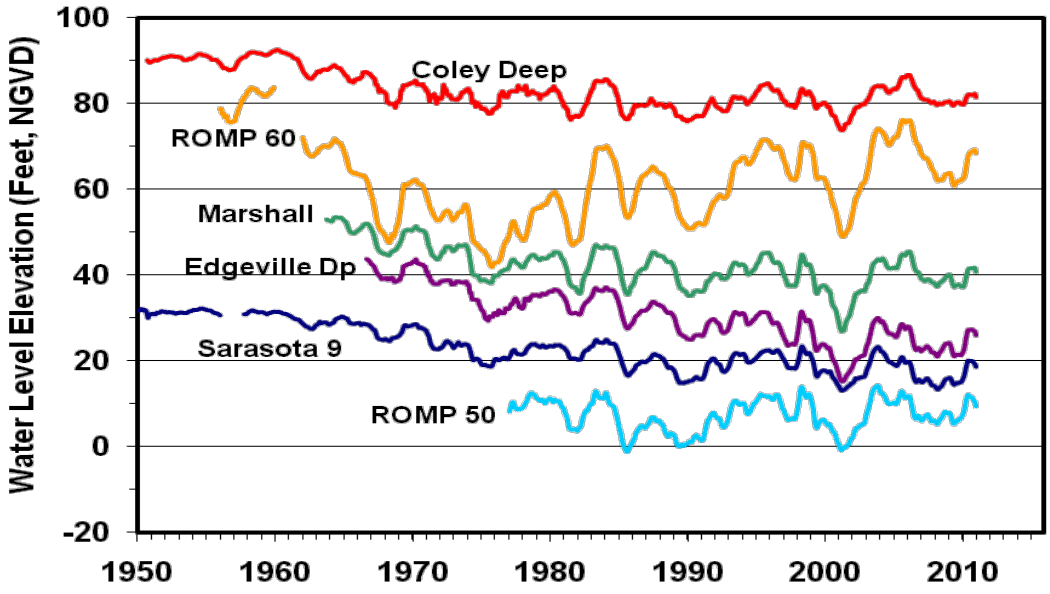


Figure 2-2. SWUCA Long-term Groundwater Monitoring Sites



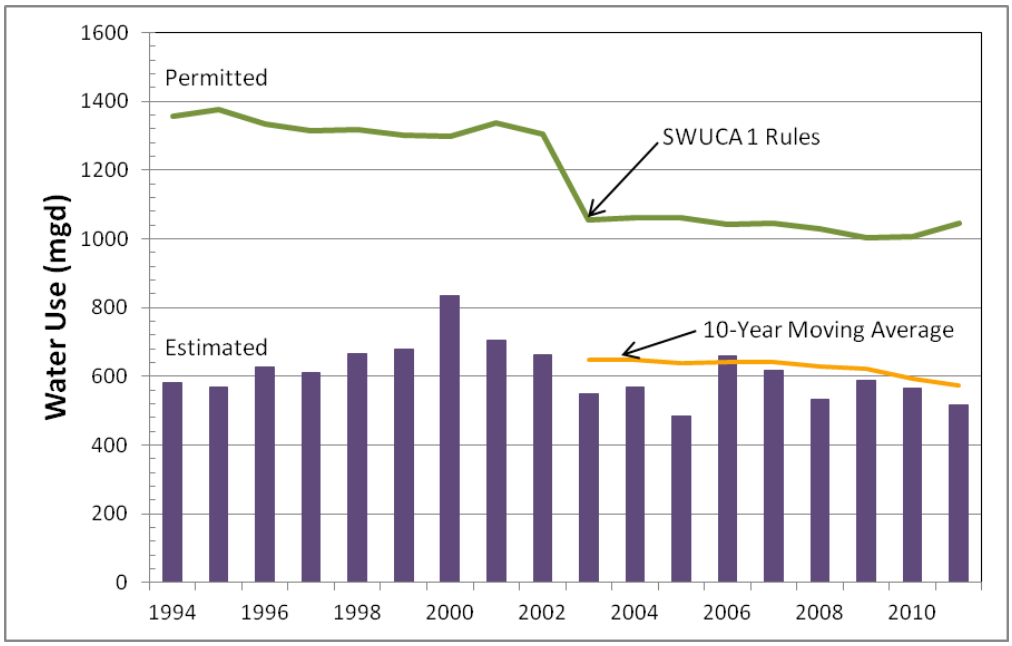
Water level fluctuations in the basin are principally in response to changes in rainfall/recharge and pumping, and to some extent drainage alterations. Variations in rainfall directly affect lake levels and river flows and can affect Upper Floridan aquifer water levels both directly and indirectly. The indirect effect is that low rainfall results in higher groundwater withdrawal amounts (lower groundwater levels)

and high rainfall results in lower groundwater withdrawal amounts (higher groundwater levels). Since 2005, annual rainfall over much of the basin has mostly been below long-term average rainfall.

Historical groundwater withdrawals increased significantly from the mid 1900s to the 1980s and have since stabilized. Though the Recovery Strategy does not strictly limit groundwater withdrawals, the District previously estimated it would be necessary to reduce total pumping over time from 650 mgd (about 580 mgd from the Upper Floridan aquifer) to about 600 mgd (about 540 mgd from the Upper Floridan aquifer) in order to meet the adopted SWIMAL over the MIA of the SWUCA (SWFWMD, 2006). While year to year changes can be quite large in response to variations in rainfall, long-term total pumping, as indicated by the 10-year moving average, has generally been above 625 mgd and only recently declined below the 600 mgd benchmark (Figure 2-3). This is the result of considerable efforts by the District and water users in the basin to implement conservation measures and implement alternative water supply projects, as well as changes in water use activities. In addition to monitoring changes in actual (estimated) water use, the District monitors changes in permitted withdrawals. Since the adjustments made to permitted amounts for many irrigation uses in 2003 (implementation of the SWUCA I rules) permitted groundwater withdrawals in the basin have been generally stable. Of particular interest to long-term management of water levels is that actual groundwater use is about 50 to 60 percent of total permitted groundwater use. Because most permits include elements of future growth, it is expected that actual use would be less than permitted use. However, this difference represents the potential for actual groundwater use to increase, and it is important to monitor trends in the difference as a means of projecting future resource trends and potential problems with the District's recovery efforts. Public supply and agricultural users, the two largest use groups, have average pumped-to-permitted ratios of about 67 percent and 54 percent, respectively.

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

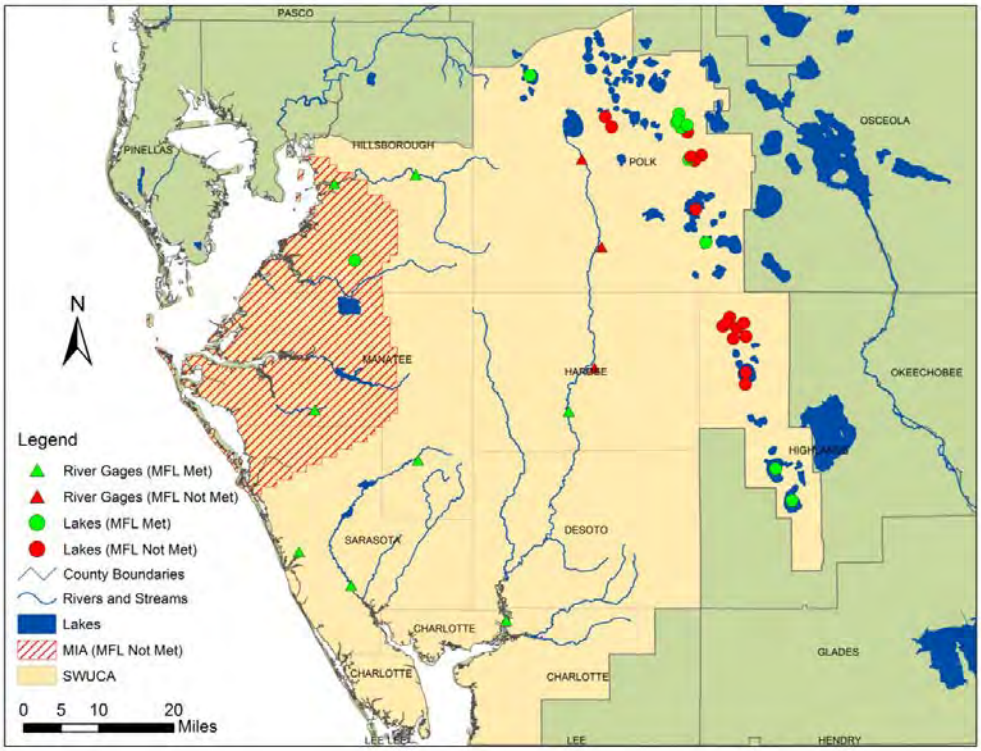
Figure 2-3. Total Historical and Permitted Groundwater Use in the SWUCA



Minimum Flows and Levels and Regulatory Levels

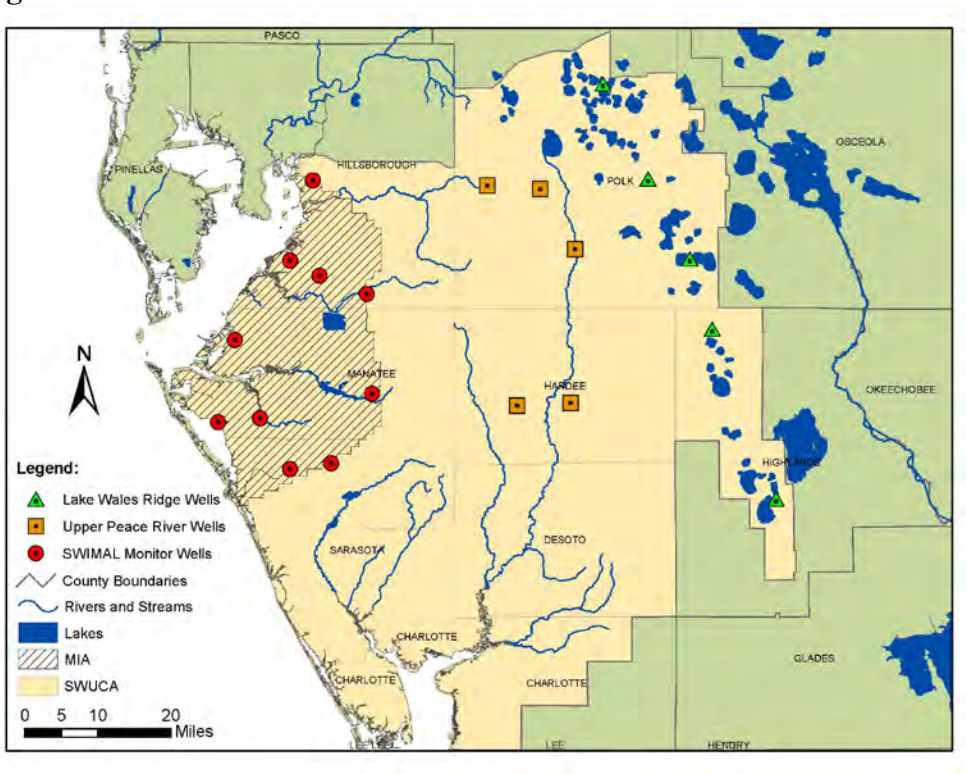
Florida law (Section 373.042, F.S.) requires the water management districts to establish MFLs for aquifers, surface watercourses, and other surface water bodies to identify the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. In the early 2000s, the District proposed minimum "low" flows on the upper Peace River, minimum levels on eight lakes on the Lake Wales Ridge and the SWIMAL over the MIA of the SWUCA. Because most of these flows and levels were not being met, as required by Florida law (Section 373.0421, F.S.), the District initiated development of a Recovery Strategy to achieve these MFLs. To date, MFLs have been adopted on 41 priority water bodies, including minimum flows on 11 river segments and two springs, and minimum levels on 27 lakes and the Upper Floridan aquifer within the MIA. As shown in Figure 2-4, five river segments are meeting minimum flows, whereas six are not being met; two springs are meeting minimum flows; 11 lakes are meeting minimum levels, whereas 16 are not being met; and the MIA SWIMAL is not being met (i.e., the recent 10 year average MIA aquifer level is 0.7 feet below the adopted level of 13.1 feet).

Figure 2-4. Adopted MFLs within the SWUCA, as of December 2011



In addition to these MFLs, the District established regulatory levels to preserve the water level recovery in the upper Peace River basin and Lake Wales Ridge area that occurred through the 1990s. These levels are used as regional water level indicators. If these regulatory levels are met, water use permit applications are presumed to not cause cumulative impacts and new permits may be allowed as long as the withdrawals meet all rule criteria, including not impacting those water bodies failing to meet their adopted MFLs. If these levels are not met, permits for withdrawals can only be authorized if a "Net Benefit" occurs. Both the upper Peace River basin and Lake Wales Ridge regulatory levels are currently being met. Figure 2-5 gives the locations of minimum aquifer level and regulatory wells within the SWUCA.

Figure 2-5. Well Locations



Central Florida Water Initiative

A major activity that can affect the future management of water resources in the SWUCA is the Central Florida Water Initiative (CFWI). This is a cooperative effort among the St. Johns River, South Florida and Southwest Florida water management districts, the Florida Department of Environmental Protection (DEP), the Florida Department of Agriculture and Consumer Services (DACS), and public water supply utilities to assess groundwater availability in the Central Florida area. The area encompasses all of Orange, Osceola, Polk and Seminole counties and portions of Lake County. This is an area where the districts have previously determined through water supply planning efforts that groundwater availability is limited over the 20-year planning horizon. The effort will result in a common approach to be used by the districts to allocate groundwater and includes development of water supply solutions and regulations. A decision-making process has been established including an Executive Steering Committee consisting of one Governing Board member from each district, senior level staff representatives from DEP and DACS, and a public water supply utilities representative. It is anticipated that a Regional Water Supply Plan for the area will be completed in early 2014 and that the solutions and regulatory components will be completed by the end of 2014.

Section III
Regional Water Supply Planning

Section III reviews the predicted water needs published in the Recovery Strategy and discusses the changes in projected water demand for each water use category, including withdrawal reductions needed for environmental restoration. The water use projections in this section are based on demand increases from 2010 to 2025 published in the District's 2010 Regional Water Supply Plan (RWSP) (Table 3-1). The Recovery Strategy's Appendix 4 was updated, and is included in Appendix 1 for comparison of permitted public supply quantities and reported water use to the projected demand increases on a per utility basis. Table 3-1 (below) provides a summary of demands under average and drought conditions by county.

Table 3-1. Projected Increases in Public Supply Demands for the Period 2010 to 2025: Comparison of Increased Demands from the 2006 Recovery Strategy to Recently Updated Demands (mgd)

COUNTY	2006 Strategy – Increased Demands Average Conditions	Updated Increased Demands Average Conditions	Updated Increased Demands Drought Conditions
Charlotte (SWUCA)	6.2	4.1	4.3
DeSoto	1.1	0.6	0.6
Hardee	0.4	0.2	0.2
Highlands	2.9	2.5	2.7
Hillsborough (SWUCA)	19.9	16.6	17.6
Manatee	14.1	10.7	11.3
Polk (SWUCA)	19.7	28.9	30.7
Sarasota	12.2	9.7	10.3
TOTALS	76.5	73.3	77.7

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 2010 RWSP Appendix 3-3 Tables 3, 5, 6, 8, 9, 12, 16, and 17.
The additional quantities needed during a drought are based on low-rainfall conditions that occur once every 10 years.

A. Reductions Needed to Achieve Saltwater Intrusion Minimum Aquifer Levels

The 2006 Recovery Strategy estimated that long-term average annual withdrawals from the Upper Floridan aquifer needed to be reduced by 50 mgd in the SWUCA to meet the saltwater intrusion minimum aquifer level, or less if reductions occurred within or near the MIA. The reduction of withdrawals from the Upper Floridan aquifer would also enhance restoration efforts for the upper Peace River and Ridge area lakes, although water resource restoration projects are still necessary to achieve minimum flows and levels for those water bodies. Cumulative recovery strategy efforts appear to have generally stabilized aquifer levels in the MIA, but the recovery of impacted levels is still necessary. Because recovery has not yet been achieved and the fact that some groundwater users will grow into their permitted quantities, it is estimated that from 10 mgd to 50 mgd of further reductions in groundwater withdrawals or similar quantities of aquifer recharge might be needed to achieve recovery to the SWIMAL. 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, reductions that can be achieved through land use transitions, and potential recovery projects that might be implemented.

B. Public Supply – Permitted Quantities and Changes in Water Use 2010-2025

The Recovery Strategy predicted public supply water use to be 254.9 mgd by 2010. The 2010 Estimated Water Use Report shows that public supply use was only 198.1 mgd.[1] Net water use has even decreased in Charlotte, Hardee, Highlands, and Sarasota counties. The less-than-expected water use is attributable to reclaimed water utilization and reduced per capita water use achieved by conservation initiatives. Remaining increases from 2010 to 2025 were reevaluated for this update based on utility-level demand projections.[2] The public supply demand in the SWUCA is projected to increase by 73.3 mgd on an annual average basis and 77.7 mgd for drought conditions from 2010 to 2025. The public supply demands and existing permitted quantities available to meet these demands are discussed below by planning region.

1. Southern Region

The Southern Region consists of Manatee, Sarasota, Charlotte, and DeSoto counties. These counties have a regionally unified approach to developing and distributing water supplies through the Peace River Manasota Regional Water Supply Authority (PRMRWSA). When completed, the PRMRWSA loop system will provide the coordination and infrastructure to transmit permitted surplus water supplies to areas of need within the region. The Recovery Strategy predicted the region's public supply water use would increase by 23.9 mgd from 2001 to 2010. Net water use actually declined by 8.5 mgd over this period. Since 2001, conservation efforts have reduced countywide per capita water use in the Southern Region to some of the lowest rates in Florida: from 121 to 87 gpcd in Charlotte County, 117 to 81 gpcd in DeSoto County, 126 to 90 gpcd in Manatee County, and 89 to 73 gpcd in Sarasota County.

As shown in Tables 3-2a and b, the region's projected public supply increase from 2010 to 2025 is 25.1 mgd under average conditions and 26.5 mgd under drought conditions. Domestic self-supply accounts for 3.7 mgd of this increase, and 18.2 mgd could be met with quantities currently permitted to utilities under average conditions. The PRMRWSA has identified 35 mgd of unused capacity among its members available for redistribution to areas of need.[3]

[1] The totals include surface and groundwater, 2010 EWUR Domestic Self Supply quantities and RWSP additional irrigation quantities for consistency with original Recovery Strategy methodology.
[2] It is acknowledged that base water use for 2010 was underestimated in the RWSP due to economic changes, but the rate of demand increase over the planning period (2010 to 2025) is considered a reasonable estimate for this purpose.
[3] From PRMRWSA presentation to the Water Alliance 2012 Water Summit, http://www.regionalwater.org/pdfs/alliance-2012-pres2.pdf.

Table 3-2a. Projected Increase in Public Supply Water Needs for 2010 through 2025, Average Annual Conditions (mgd)

REGION	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	
Southern	25.1	3.7	4.0	9.7	4.5	3.2
Heartland (SWUCA)	31.6	1.7	25.1	0.0	1.5	3.3
Hillsborough (SWUCA)	16.6	1.9	1.1	0.1	0.04	13.5
TOTALS	73.3	7.3	30.2	9.8	6.04	20.0

[1]The average public supply increase matches table 3-1.
[2]The domestic self supply increase is derived from 2010 RWSP Appendix 3-3 Tables 3, 5, 6, 8, 9, 12, 16, and 17.
[3]From revised Appendix 1, sum of individual utility demand increases where demand is less than permitted reserve. "Other" includes groundwater from surfical and intermediate aquifers.
[4]The remaining increase to be met equals the second column (Est. Demand Increase) subtracted by subsequent columns.

Table 3-2b. Projected Increase in Public Supply Water Needs for 2010 through 2025, Drought Conditions (mgd)

REGION	Estimated Drought 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	
Southern	26.5	3.9	4.1	9.9	4.9	3.7
Heartland (SWUCA)	33.5	1.8	26.1	0.0	1.6	4.0
Hillsborough (SWUCA)	17.6	2.0	1.1	0.1	0.04	14.4
TOTALS	77.6	7.7	31.3	10.0	6.5	22.1

[1]The drought public supply increase matches table 3-1.
[2]The domestic self supply increase is derived from 2010 RWSP Appendix 3-3 Tables 3, 5, 6, 8, 9, 12, 16, and 17.
[3]From revised Appendix 1, sum of individual utility demand increases where demand is less than permitted reserve. "Other" includes groundwater from surfical and intermediate aquifers.
[4]The remaining increase to be met equals the second column (Est. Demand Increase) subtracted by subsequent columns.

2. 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 Polk County Utilities has initiated the planning for a regional distribution system. The Recovery Strategy predicted that the region's average water use would increase by 18.1 mgd from 2001 to 2010. The actual increase in public supply use in Polk County was only 3.7 mgd by 2010. Public supply water use in Hardee and Highlands counties decreased by 1 mgd from 2001 to 2010. The countywide per capita water use rate for Polk County has decreased in the last ten years from 172 to 121 gpcd. This marks progress within the county, but there is opportunity for improvement toward the Districtwide average of 94 gallons per day. Per capita water use was reduced from 121 to 102 gpcd in Highlands County and 126 to 80 gpcd in Hardee County.

Polk County's public supply demands are projected to increase by 28.9 mgd under average conditions and 30.7 mgd under drought conditions from 2010 to 2025. Quantities currently permitted to utilities could meet 25.0 mgd of this demand under average conditions and 26.0 mgd under drought conditions, leaving a remaining deficit of 3.9 and 4.7 mgd under average and drought conditions, respectively. Based on these planning numbers, it appears the deficit can be managed through available conservation and reclaimed water supply options, but the cumulative impact of all utilities using their permit allocations may be detrimental to the SWIMAL and MFLs. From 2006 to 2010, the difference between Polk County's total permitted public supply quantities and used public supply quantities increased from 19.5 to 44.6 mgd. The utilities are expected to grow into their permit allocations over the next 20 years. Approximately 7 mgd of this increase may be negated by decreases in agricultural, mining, and industrial use (land use transitions). Alternative water supplies may be necessary if cumulative groundwater use strains natural resources.

Public supply use in Highlands County is projected to increase 2.5 mgd under average conditions and 2.7 mgd under drought conditions from 2010 to 2025. Domestic self-supply accounts for 0.2 mgd of the increase and 1.3 mgd of the demand would be met with existing permitted quantities. Potential offsets from conservation and reclaimed water projects could provide the remaining 1.0 mgd in Highlands County. Additionally, future interconnections developed in Polk County could extend through Highlands County along the US-27 corridor. The projected public supply water use increase in Hardee County is 0.2 mgd under both average and drought conditions from 2010 to 2025. Domestic self-supply accounts for 0.07 mgd of this demand, and 0.1 mgd could be met by existing permitted quantities. Conservation and reclaimed water offsets could potentially meet the remaining 0.03 mgd deficit.

3. Hillsborough County Portion in SWUCA

The Recovery Strategy anticipated that public supply demands in the portion of Hillsborough County within the SWUCA could increase by 8.4 mgd from 2001 through 2010. The actual increase for this period was only 1.3 mgd. The current countywide average per capita rate is 104 gpcd, which is an improvement from the 130 gpcd recorded in 2001. In 2010, the SWUCA portion of Hillsborough County accounted for approximately 20 percent of the County's public supply water use. The predicted increase from 2010 to 2025 in the SWUCA portion of Hillsborough County is 16.6 and 17.6 mgd under average and drought conditions, respectively. Domestic self-supply use accounts for 1.9 mgd under average conditions.

Tampa Bay Water, a wholesale drinking water utility for the Tampa Bay region, operates the South Central Wellfield, which is situated in the SWUCA portion of the county and permitted for more than 24 mgd of public supply. The wellfield is a cost-efficient source for the Tampa Bay region and is currently used near capacity, leaving minimal reserves for future demand identified in the SWUCA portion of the county. A redistribution of supply from other sources within Tampa Bay Water's regional service area, along with conservation and reclaimed water offsets, could help meet the additional demand.

Public supply demands are summarized by planning region in Tables 3-2a and b. The portion of demand through 2025 met by domestic self-supply and by water utilities with sufficient permitted reserves is 53.3 and 55.5 mgd under average and drought conditions, respectively. The remaining public supply demand increase in the SWUCA identified by this process is 20.0 mgd under average conditions and 22.1 mgd under drought conditions. The existing permitted quantities discussed above will allow many utilities to meet the projected increases. However, some utilities may choose to develop new supplies to retain a certain level of reserve capacity. For example, the PRMRWSA phases its source development based on maintaining a 15 percent reserve for its customers. Utilities seeking to

better manage demand or develop additional sources over the planning period could be eligible for project funding assistance. Project options are discussed in Section IV and financial assistance is discussed in Section VII.

C. Agriculture - Changes in Water Use 2010-2025

During the second half of the last century, agricultural water use increased substantially and became the dominant water use in the SWUCA. However, based on projections from the 2010 RWSP, agricultural water use is expected to decline in many areas of the SWUCA over the next several decades (shown as a decrease in Table 3-3), while minor increases are expected in other areas (shown as an increase in Table 3-3). Overall, the net change is expected to be a decline in agricultural water use. Since 2000, a period of record drought, the estimated groundwater withdrawn for agricultural irrigation in the SWUCA has remained relatively stable.

The Recovery Strategy anticipated major reductions in agricultural water use due to transitions of agricultural land for other purposes such as residential development. Figure 3-1, displaying the change in agricultural land use in the SWUCA between 1999 and 2009, shows that agricultural acreage is declining in areas where urban expansion is occurring. This assumption, made prior to the housing market downturn in 2008, has occurred but to a lesser extent than predicted, and agriculture continues to be a vibrant segment of the region's economy. It should be noted, however, that while acreage may remain in agriculture, the type of agriculture on a particular farm may change to a different crop type with different water needs. In particular, 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 are attributable to improved irrigation and other 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 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.

Table 3-3. Summary of projected water use changes for all categories in the SWUCA from 2010 through 2025 (mgd)

USE TYPE OR NEED	Average Conditions 2010 – 2025		Drought Conditions 2010 – 2025	
	Increase	Decrease	Increase	Decrease
Additional Quantities Needed to Meet Saltwater Intrusion Minimum Aquifer Levels[1]	Up To 50.0		Up to 50.0	
Public Supply[2]	73.3		77.6	
Agriculture[3]	0.9	-4.6	1.6	-6.6
Industry and Mining[4]	5.7	-6.5	5.7	-6.5
Recreational and Aesthetic[5]	14.5		18.3	
TOTALS	144.4	-11.1	153.2	-13.1

The additional quantities needed during a drought are based on low-rainfall conditions that occur once every 10 years.
[1]From 2010 RWSP Chapter 3, Section 5, of respective volumes
[2]From Table 3-1 of this document
[3]From 2010 RWSP Tables 3-2 of respective volumes
[4]From 2010 RWSP Tables 3-3 of respective volumes
[5]From 2010 RWSP Tables 3-4 of respective volumes

D. Phosphate Mining, Industrial and Power Generation - Changes in Water Use 2010-2025

Overall, based on projections from the 2010 RWSP, water use for industry and mining is expected to increase in certain areas of the SWUCA while decreasing in other parts of the region. Groundwater use for phosphate mining and production peaked at more than 300 mgd in the 1970s, but has declined dramatically since the industry began to store and recycle water. Average daily use of groundwater associated with mining and industrial uses in the SWUCA has declined to about 50 mgd in recent years. However, phosphate deposits proposed for future mining are located south of the historical mining areas in Polk County, and are generally located deeper beneath the surface and in areas of higher clay content, which could potentially result in a greater water quantity needed per amount of ore extracted.

Overall water use for other industrial uses and power generation would remain stable or slightly increase in the SWUCA through 2025. Power generation water use is projected to increase by 4 mgd, but reclaimed water sources may meet most of the increase. Tampa Electric is planning to utilize reclaimed water from Lakeland, Mulberry, and Polk County in place of groundwater sources for future expansion of its Polk power facility.

E. Recreational and Aesthetic Use - Changes in Water Use 2010-2025

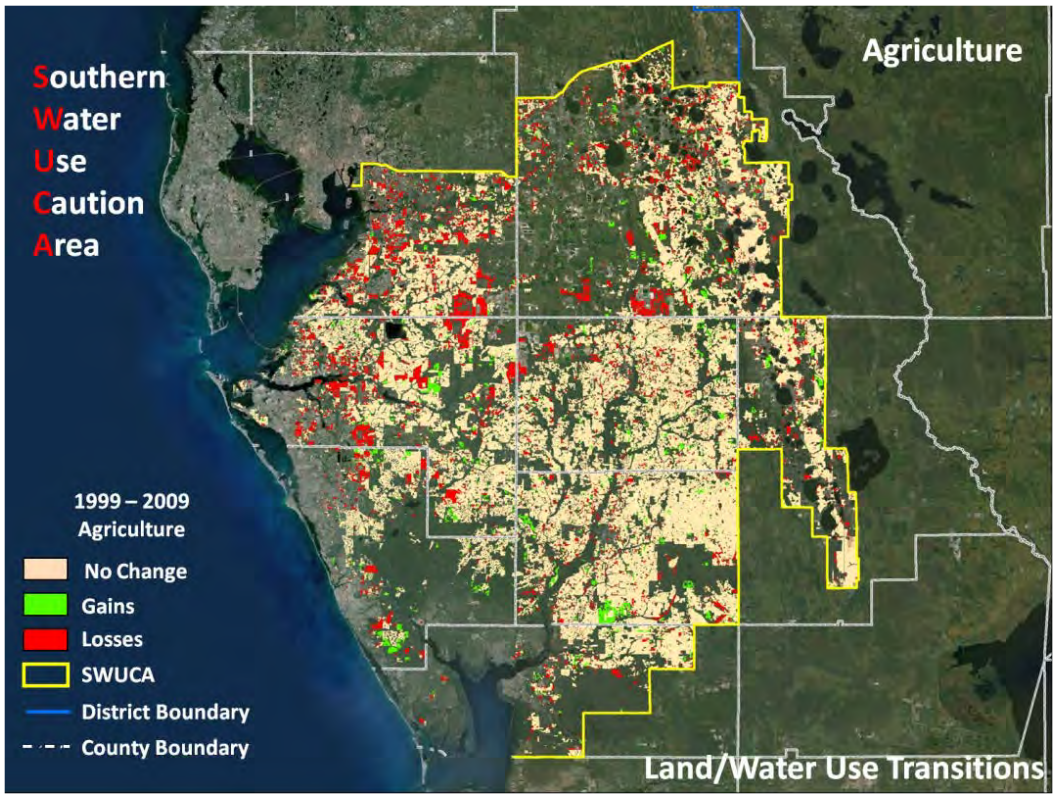
The projected water use for recreational and aesthetic uses in the SWUCA increases through 2025 by 14.5 and 18.3 mgd during average and drought conditions, respectively. Much of this increase is for golf course irrigation that could utilize reclaimed water, captured storm water and other alternatives. Almost half of the District's cooperatively funded reclaimed water projects would have a positive effect on reducing potable water use for recreation and aesthetic irrigation uses in the SWUCA.

F. Changes in Water Use Associated with Land Use Changes

Two approaches take advantage of land and water use changes to meet future water uses. The first recognizes the displacement of nonresidential land uses by urban/suburban land uses in areas where alternative supplies are available, such as Hillsborough County and in the Southern Region. Regionally developed alternative supplies could be relied on to meet the expanding public supply needs in areas where the displaced land use relied on groundwater. The second approach is the displacement of

nonresidential land uses by urban/suburban land uses in the Heartland Region where alternative supplies are not readily available. In these areas, public supply increases are met with groundwater previously used by displaced agricultural land uses.

Figure 3-1. Change in agricultural land use in the SWUCA between 1999 and 2009



It is difficult to quantify the magnitude of the water savings realized by this land use transition. The Recovery Strategy projected that reductions from land use transitions would result in additional available water quantities of 74.1 mgd (average) and 95.6 mgd (drought) between 2005 and 2025. However, due to economic conditions and housing market decline, land use transitions did not occur at the scale and rate previously predicted. Updated projections indicate 11 mgd (average) to 13 mgd (drought) could become available for the remaining 2010 to 2025 period.

Summary of Total Water Use

The updated water use changes for all categories from 2010 through 2025 are shown in Table 3-3. This table indicates increases are expected in public supply and recreational and aesthetic use categories. It also shows both increases and decreases are projected to occur in agriculture and industry/mining, with the decreases projected based on land use transitions. The table also incorporates the additional 50.0 mgd needed to meet the saltwater intrusion minimum aquifer levels. The projected increase from 2010 to 2025 is 144.4 and 153.2 mgd, under average and drought conditions, to ensure the saltwater intrusion minimum aquifer level is met and sufficient supplies are available for projected increases in water use. Environmental restoration accounts for approximately one-third of the remaining increase (up to 50 mgd). Although some of this additional use may be offset by the 11.1 mgd (average) or 13.1 mgd (drought) projected to result from land use transitions, changes in water use may occur at different points in time and in different locations. Therefore, it is 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.

Section IV
Water Conservation

Section IV addresses how demand increases could be met through a variety of conservation 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. For purposes of the Recovery Strategy, the use of reclaimed water in lieu of potable quality water for non-potable purposes is considered water conservation. This section identifies a total potential savings of up to 116 mgd (surface and ground water) through the year 2025 attributable to conservation and reclaimed water projects in the SWUCA. Some activities provide substantial positive benefits that 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. This section also provides alternative potable water supply sources identified through the RWSP planning process. Alternative sources are more costly and challenging to develop than conservation efforts and are therefore not the first option, but are available for water users that may be unable to meet demands solely through conservation. Identified alternative sources include regional interconnections, the seasonal storage of surface water resources, utilization of storm water, and membrane treatment of available brackish groundwater resources.

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

The District has a comprehensive demand management program in place in the SWUCA that has been effective at reducing water demand for public supply, industrial, recreational, and agricultural uses. The District generally employs a combination of three approaches to water conservation: education, water use permitting and water shortage rules, and technical and financial assistance. The District also participates in research to address the measurement of water savings and investigate new methods of demand management. The District has cooperatively funded conservation programs focusing on residential, industrial, commercial, and institutional water use since 1991. For the period FY2000 to FY2011, the District completed 25 SWUCA water conservation projects, with a total savings of .534 mgd and District cost of $1.45 million. Appendix 2, Tables A2-1a and b list 27 demand management projects in the SWUCA that are completed, ongoing, or planned with funding budgeted from FY2007 through FY2011. These projects include one completed and seven ongoing District-funded research projects. Projects completed before FY2010 are subtotaled to coincide with the five-year schedule of water demand projections. The 27 projects had estimated/projected water conservation savings of 0.92 mgd at a total cost of $5.85 million, averaging approximately $6 million per mgd.

The District routinely offers technical assistance to water utilities in developing regional and local conservation programs. This includes site visits from the District's Utility Services Program to assist water utilities with water use efficiency and to strengthen staff communication. The program provides model plumbing and landscape codes, and a quantitative water conservation model that calculates a permittee's potential water savings. The conservation model predicted that quantifiable projects such as plumbing retrofits and irrigation system improvements could potentially offset 5.3 mgd in the Southern Region, 14.8 mgd in the Heartland Region, and 1.5 mgd in the SWUCA portion of Hillsborough County. These types of projects are cost-efficient and an effective method of meeting future water demands.

B. Agricultural Demand Management

The District has numerous ongoing agricultural demand management initiatives designed to increase the water use efficiency of agricultural operations. There are three with a watershed-based focus. Shell, Prairie and Joshua Creeks (SPJC) has a focus on water quality and quantity issues. The upper Myakka River watershed (UMRW) 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 for an agricultural irrigation efficiency evaluation project using a Mobile Irrigation Laboratory (MIL).

Appendix 2, Tables A2-2a and b list the agricultural demand management projects, and Appendix 2, Tables A2-3a and b list agricultural research projects funded partially or completely by the District from 2007 through 2011. Additional details on the District's agricultural programs follow.

1. Facilitating Agricultural Resource Management Systems Program

The Facilitating Agricultural Resource Management Systems (FARMS) program is an agricultural cost-share reimbursement program, developed by the District and FDACS. The program funds and expedites the implementation of production-scale agricultural BMPs that provide water resource benefits. Since the initiation of FARMS in FY2003 through FY2011, the District implemented a total of 89 projects within the SWUCA resulting in a projected annual average daily and frost-freeze protection groundwater offset of 18.1 mgd and 9.5 mgd, respectively. Total project cost was $32.9 million with the District cost-sharing $17.2 million. For the assessment period, the District has provided $8.9 million in funding for 10 mgd in projected offsets. The annual number of FARMS projects, and associated funding, has increased dramatically over the years and is expected to continue to be a major contributor to addressing water supply issues within the SWUCA.

Shell, Prairie and Joshua Creek

FARMS initiatives in the SPJC watersheds, located in Charlotte and DeSoto counties, are designed to help growers reduce groundwater withdrawals by increasing the water use efficiency of their operations and replacing groundwater with surface water, while at the same time reducing agricultural impacts to surface water features. The use of surface water features for irrigation reduces adverse water quality impacts to natural surface water systems by replacing high salinity groundwater applications, reducing the potential for high salinity runoff in the watershed. The majority of the FARMS projects in the SPJC involve the utilization of surface water reservoirs for irrigation. Water quality degradation in the SPJC appears to coincide with irrigation practices during extreme drought and freeze conditions in the last decade, when growers required increased irrigation and cold protection. Water conservation projects implemented through the FARMS Program are a key component of addressing the water quality and quantity issues. Through 2011, 43 FARMS projects were funded in the SPJC, 31 of which were operational by December 2011. The projected total groundwater offset for the 43 funded projects is approximately 7.75 mgd and the 31 operational projects were averaging an actual offset of approximately 6.15 mgd through 2011. The 43 projects received approximately $7.5 million in funding from the FARMS program. For the assessment period, there were 24 SPJC projects completed, ongoing or planned, representing an estimated/projected offset of 4.4 mgd. These 24 projects received approximately $3.4 million from the FARMS program.

Upper Myakka River Watershed

A 1998 District study determined that excess water in Flatford Swamp, located within the UMRW, resulted in abnormal tree stress and mortality beginning in the late 1990s and continuing today. The District expanded on the 1998 study through the Myakka River Watershed Initiative (MRWI) in 2007.

The MRWI investigated strategies to restore natural systems while addressing issues of water supply and flood protection. The MRWI identified that agricultural irrigation, along with physical alterations in the watershed, affected the vegetation and the timing and quantities of surface water flows. To help mitigate this effect, the District collaborates with farmers in the area to conserve water. The District approached the agricultural community for innovative ways to reduce the amount of water entering Flatford Swamp to restore hydroperiods and reverse the abnormal tree stress and mortality. Partnerships with Falkner Farms and Pacific Tomato Growers were established in 1999-2001 to implement Surface Water Exchange Program (SWEP) projects. These projects capture and reuse subsurface seepage to provide supplemental irrigation to offset groundwater allocations. Project funding was matched between each cooperator and the District, and both cooperators expanded on the SWEP projects in subsequent years either through the FARMS Program or at their own expense. As of the end of 2011, four FARMS projects in the UMRW have been funded, in addition to the two original SWEP projects. Three of these projects collect surface water runoff for reuse. For the FY2007 through FY2011 assessment period, two FARMS projects were identified as completed, ongoing or planned. These projects had an estimated/projected offset of .11 mgd and received total District funding of approximately $127,000.

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. Four FARMS projects funded during the assessment period address DPCWUCA frost/freeze protection concerns for the SWUCA and are projected to reduce overall water use in the SWUCA by 325,975 gallons per day.

2. Mini-FARMS Program

Mini-FARMS is a spinoff of the FARMS Program. While the FARMS Program funds larger projects, the Mini-FARMS Program is focused on farms with less than 100 irrigated acres and reimburses growers for 75 percent of their costs, up to a maximum of $5,000 per approved water resources project. The Mini-FARMS Program is managed by DACS and works with local soil and water conservation districts and IFAS to administer the program with area agriculturalists. The District provides funding and technical support for the program. The District and DACS have funded approximately 27 Mini-FARMS projects within the SWUCA since 2007 at a cost of approximately $157,000. Many of these projects involve the installation of weather stations and/or soil moisture probes for improved water management and irrigation conversions to more efficient systems.

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 the 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's surface water reservoir receives water from the SPJC watersheds and has been impacted by the contributions of poor-quality water from agricultural irrigation runoff. Water quality in the reservoir has improved significantly since the initiation of the back-plugging efforts. Growers also experience several advantages from back-plugging wells including elevated crop yields from reduced salts, decreased soil-water requirements and pumping costs, and reduced corrosion and fouling of irrigation equipment.

Seventy wells have been back-plugged in the SWUCA overall through FY2011, with 51 of these wells located in the SPJC priority watersheds. Analytical results for samples collected from the back-plugged wells have averaged a 60 percent reduction in chloride levels in rehabilitated wells, while retaining an average 78 percent of well volume yield.

4. Mobile Irrigation Laboratory

The Mobile Irrigation Laboratory (MIL) is a cooperative project, started in 1987, between the USDA-NRCS and the District. The MIL evaluates agricultural irrigation system efficiencies on a voluntary basis and helps with new technology awareness. The District uses the MIL as a tool to assist growers in reducing their water use. The water savings realized from MIL evaluations can be significant per project and regionally benefits the watersheds. The MIL has evaluated over 1,200 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 as a means to provide a smoother regulatory experience. The MIL project contract has been approved through 2014 and increased to $50,000 per year for a three-year term. In 2006, a Privately Outsourced Mobile Irrigation Laboratory (PrOMIL) was introduced to assist growers with water use overpumpage compliance scenarios and to help with the high demand and lengthy waiting list for MIL assistance. These two programs now act in concert to help improve irrigation efficiencies and regulatory compliance. 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.

5. Federal Cost Share Fund Programs in the SWUCA

The NRCS has implemented two cost-share programs for the SWUCA that fund projects designed to improve water use efficiency and/or reduce groundwater use. The Environmental Quality Incentives Program (EQIP) has been used by growers to implement a variety of water conservation projects including conversions to more efficient irrigation systems, excavation of reservoirs, and implementation of various irrigation BMPs. EQIP funds may be used by growers with or without FARMS funding, though in recent years EQIP applicants receive additional consideration if they are also participating in the FARMS Program. Approximately 17 FARMS projects have also received EQIP funding for the assessment period, and approximately 27 projects have received funding to date. The Agricultural Water Enhancement Program (AWEP) was funded by the NRCS in 2010 and 2011 primarily for freeze protection projects in the DPCWUCA, although no AWEP projects were funded within the portion overlapping the SWUCA as of 2011.

C. Reclaimed Water Projects

Simply defined, reclaimed water is highly treated wastewater that helps in meeting reasonable-beneficial needs. The objective of the District's reclaimed water initiative in the SWUCA is 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 the use of potable water for non-potable purposes. One way to increase utilization is to store excess reclaimed water, 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 the various components such as transmission and distribution lines, storage tanks and ponds, recharge basins, and ASR systems. The use of meters and volume-based rate structures are encouraged through the cooperator agreements.

The District has assisted in the funding of numerous cooperative reclaimed water projects, typically up to 50 percent of the total project costs. For the period FY2000 to 2011, the District assisted in the completion of 50 SWUCA reclaimed water projects. These projects helped achieve approximately 6.5 mgd in offsets during that timeframe. At build-out these projects are anticipated to achieve offsets and expanded water resources totaling 28.88 mgd for a District investment of $40.75 million. Appendix 2, Tables A2-4a and b list the reclaimed water projects, and associated offsets, in the SWUCA for FY2007 to FY2011. As shown, these reclaimed water projects would offset approximately 14.2 mgd of traditional supplies at a District cost of $40 million, and a total cost (District and Cooperator) of approximately $127.5 million or about $9 per mgd. The total cost includes groundwater recharge and indirect potable reuse study projects. 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 the infrastructure constructed and the nature of the end user. The District has an extensive reclaimed water infrastructure network within its boundaries. The growth of this infrastructure would continue with future development. Reclaimed water has the potential to offset an additional 83.7 mgd within the SWUCA by 2025. The RWSP identifies 39.4 mgd of potential offsets in the Southern Region, 42.5 mgd in the Heartland Region (primarily in Polk County), and 1.8 mgd in the SWUCA portion of Hillsborough County.

D. Impact of Public Land Acquisition Program

The District acquires land for a variety of water resource management purposes. The District acquired 19,407 acres in the SWUCA during this assessment period. These properties had associated water use permits totaling 103,300 gpd of groundwater withdrawals. All of these groundwater quantities are retired as a result of the acquisition activity, aiding in aquifer recovery. The Recovery Strategy estimated 10 mgd of actual groundwater use could be retired through public land acquisition by 2025. As with the reductions in groundwater withdrawals associated with land-use transitions, this 10 mgd would be available to contribute to recovery and, where determined appropriate, potentially to meet growing needs.

E. Additional Use of the Surficial and Intermediate Aquifers

More than 85 percent of historical groundwater supplies in the SWUCA are derived from the Upper Floridan aquifer. These withdrawals have resulted in the water resource impacts that led to development of the Recovery Strategy. It is possible that in some areas of the SWUCA groundwater supplies could be further optimized by additional withdrawals from the surficial and intermediate aquifers. While small diameter, low-yield wells could be completed into the surficial aquifer in almost any location within the District, there clearly are more favorable areas such as in thick sands along the Lake Wales Ridge, and the shell beds of Charlotte, southern DeSoto, and Sarasota counties. The yields associated with these aquifers would generally be low, except in a few areas. Groundwater associated with lawn watering needs 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, 34.7 mgd of additional demand over the next 20 years can be met from surficial and intermediate aquifer sources.

F. Potential Sources of New Water Supply

Since implementation of the SWUCA Recovery Strategy through FY2011, the District has invested approximately $90.3 million in new alternative water supplies in the SWUCA. For the period FY2000 to FY2011, the District has completed 11 SWUCA water supply development water projects including feasibility studies, pilot testing, and planning; regional water supply interconnections; and new treatment and reservoir facilities. The new treatment and reservoir facilities have resulted in an additional 39.5 mgd, developed at a District cost of approximately $66 million. The water supply projects shown in Appendix 2, Table A2-5 are for the FY2007-2011 timeframe. The largest of these projects was the PRMRWSA's Peace River Facility 24-mgd expansion and above-ground reservoir completed in 2011, although much of the District's share was budgeted prior to 2010. The table includes plans and studies necessary for the future development of projects. The District assistance for this research helps to alleviate the financial drain on water suppliers that do not receive a direct revenue benefit from these efforts. Approximately one-third of the District's new water supply budget since FY2007 has been for the development of regional interconnects in the Southern Region. It is likely that the Heartland Region would require the next large investment in regional water supply infrastructure. Utilities in Polk County anticipate the need for regional systems and additional sources by 2025 to assure reliability of service. The District has initiated an investigation of the Lower Floridan aquifer within Polk County to determine its viability as a resource.

The PRMRWSA has identified a variety of large-scale surface water and brackish groundwater options available to meet its future needs. Demand projections through 2025 could be met in the region with existing supplies and the integrated loop system, although the Authority intends to develop an expandable brackish groundwater source within ten years to maintain a 15 percent regional reserve. Other new supplies could become available as components of resource development projects for Dona Bay and the Flatford Swamp. Up to 41 mgd of potential alternative water supply projects have been identified for the Southern Region.

The SWUCA portion of Hillsborough County has the resources of Tampa Bay Water to assist with new supplies. Options available in or near the SWUCA portion of Hillsborough include expansions of the seawater desalination and surface water facilities, additional quantities from the proposed Thonotosassa wellfield, and potential resource benefits from aquifer recharge projects. Tampa Bay Water has identified more than 27 mgd of new supplies, and some of the Authority's existing regional capacity could become available as multiple utilities in Pinellas County increase the use of local brackish groundwater sources.

G. Water Resource Development Projects

The District is undertaking a series of Water Resource Development (WRD) projects that are anticipated to enhance Upper Floridan aquifer levels. WRD is defined under Florida Statute 373.019 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. Several projects are investigating aquifer recharge systems in the SWUCA that could develop up to 9 mgd. The projects include rapid infiltration basins and reclaimed water injection to a non-potable zone of the Upper Floridan aquifer to improve water levels in the MIA. The District is also conducting hydrogeologic investigations of the Lower Floridan aquifer in Polk County to determine whether the water quality, productivity and geologic confinement are suitable for the development as a new water source.

A portion of the Ecosystem Protection/Restoration projects discussed in Section V are water resource development projects that are expected to enhance quantity of water available for beneficial use, and some could provide additional water supply. A series of projects to provide perennial flow to the upper Peace River are anticipated to enhance groundwater recharge, as the upper river is well connected to the aquifers by karst features. Through the Flatford Swamp Hydrologic Restoration in the Myakka River watershed, the District is investigating ways to reduce altered hydroperiods in a manner that could potentially make 10 mgd of water supply available for mining, public supply or other use types.

1. Net Benefits

Net Benefit activities provide a major role in solving resource issues in the SWUCA. Several of the District's Water Resource Development projects would result in a Net Benefit in terms of reducing impacts from Upper Floridan aquifer withdrawals. These include the capturing of high surface water flows and recharging the aquifer during the wet season, and recovering a percentage in the dry season. Quantified offsets are not provided because of the difficulties involved in predicting when and where they will occur, and how much Net Benefit would be provided.

Section V
Storage, Flows and Ecosystem Protection/Restoration Projects

Section V discusses ecosystem protection and restoration projects in the SWUCA. These projects include those addressing the extensive drainage and surficial alteration of land features in the Peace River watershed. The projects for this watershed seek to restore historically lost lake and floodplain storage to aid in reestablishing minimum flows to rivers and enhanced recharge. The projects providing recovery of lake levels in the Ridge area are more localized. Structure modification (inflow/outflow), drainage system restoration, back-plugging of canals and augmentation are the focus of these projects. In the Myakka River watershed, the emphasis is on the Flatford Swamp Hydrologic Restoration project. This initiative, currently in a feasibility stage, is an innovative project combining natural systems restoration and alternative water supply development. Its objective is to provide storage of excess surface water flows for use in lieu of groundwater, assisting with aquifer recovery and natural systems restoration.

As resource projects are implemented and begin to restore the aquifer, river and lake levels, the associated water resources are expected to see significant recovery. Restoration projects completed, ongoing or planned with secured or pledged funding from FY2007-2011 are addressed below.

A. Lake Hancock Lake Level Modification and Ecosystem Restoration Project

This restoration project will aid in reestablishing perennial flow to the upper Peace River. The project design raises the control elevation of Lake Hancock, a 4,500-acre lake in the headwaters of the Peace River watershed, from 98.7 feet NGVD up to a target elevation of 100.0 feet NGVD for water storage, and then slowly releases the water during the dry season to help meet the low-flow requirements in the upper Peace River. Currently the upper Peace River, from Bartow to Zolfo Springs, achieves the minimum flows and levels approximately 70 percent of the time. It is anticipated that this project will increase the time the upper Peace River meets the minimum flows and levels to approximately 89 percent. In 2003 the District began acquiring property around the lake to support the project. To date all property necessary to implement the project, approximately 8,337 acres, has been acquired. The Florida Department of Environmental Protection issued the Conceptual Environmental Resource Permit (ERP) on June 14, 2007, and in September 2007, the Governing Board authorized staff to implement the Lake Hancock Lake Level Modification Project. All construction activities necessary to implement the project will be completed by March 2014.

B. Peace Creek Restoration via the USDA-NRCS Wetland Reserve Program

This project was proposed as part of the SWUCA Recovery Strategy, but it has not been pursued due to lack of an executed contract between the USDA and the property owner. The project remains a viable option for future implementation.

C. Upper Peace River Resource Development Project

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

determine whether additional projects are needed to meet the minimum flow requirements in the upper Peace River.

D. Lake Hancock Outfall Treatment Project

The purpose of this project is to improve the quality of water discharging from Lake Hancock into South Saddle Creek. The project involves construction of a 1,000-acre treatment wetland to improve water quality leaving the lake on part of the 3,500-acre parcel formerly known as Old Florida Plantation. The system is designed to reduce nitrogen loads by approximately 27 percent. The primary goal of the project is to reduce nitrogen loads discharged from the lake to the upper Peace River and ultimately Charlotte Harbor, an estuary of national significance and a Surface Water Improvement and Management (SWIM) Program priority water body. Testing, design, permitting and construction documents for the wetland treatment system are complete. Construction of the treatment system began in September 2011. The project is expected to be completed December of 2013. This project also requires one to two years of wetland plant establishment prior to being fully functional.

E. Ridge Lakes Initiative

There are a number of lakes requiring protection or restoration due to urbanization and the continual impacts from historical development. A comprehensive water resource management approach to the area's lakes was initiated to ensure effective use of available funding. The goal of this initiative is to reduce both point and non-point source pollutant loadings to attain the water quality necessary to maintain or restore healthy natural systems, sustain the water sources and related natural systems, and to attain the highest possible water use classification. The first phase of the plan, completed in 2006, involved screening the lakes throughout the Ridge based on specific criteria (water quality, natural systems, stormwater discharges, watershed size and composition, etc.). The second phase of the plan, completed in 2008, utilized the results of the screening procedure combined with additional critical factors such as land availability and the availability of funding partners to select lakes for the development of conceptual plans for storm water retrofit projects. The third phase of the plan, currently ongoing, consists of forming partnerships with local municipalities to finalize the conceptual plans and implement the stormwater projects on the selected lakes.

A successful partnership between the District, the Florida Department of Transportation, and the town of Dundee, led to the completion of the Lake Menzie storm water retrofit project as the first project to be completed under this initiative. The District has partnered with the City of Avon Park for storm water retrofit projects on Lake Isis and Lake Tulane, as well as a Lake Verona project, which commenced in FY2013. Conceptual plans are moving forward for construction on Lake Wales in partnership with the City of Lake Wales, and on Lake Clinch with the City of Frostproof. Highlands County is an active participant in the initiative as well, with a cooperative project on Lake Clay and two more projects scheduled to commence in FY2013 for Lake June-in-Winter and Lake McCoy. In addition, the initiative evaluated the Josephine Creek system to determine the potential for hydrologic restoration to help meet the minimum level for Little Lake Jackson and Lake Jackson. The results indicated that the cost of new structures did not justify the minimal gains to be realized.

F. Flatford Swamp Hydrologic Restoration

The project's goal is to help restore hydroperiods to a more natural state and provide an alternative source of water for beneficial use. The project would accomplish this by intercepting excess water in tributaries, prior to it entering the swamp, and then transporting the water to a central storage facility for future use. 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 improvements. These flow increases have resulted in higher water levels and the prolonged inundation of Flatford Swamp, which historically was flooded only

seasonally. The project is currently in a feasibility study phase. Construction would commence in 2016 if the project moves forward.

G. Peace Creek Canal Watershed Management Project

The District has identified the upper Peace River watershed as experiencing significant land alterations and extensive groundwater withdrawals resulting in declines in Upper Floridan aquifer levels and upper Peace River flows. The District has been developing a Watershed Management Plan to identify projects to restore historic basin storage, improve water quality, provide flood protection benefits and improve natural systems. The plan will assist local governments with land management responsibilities, provide watershed model simulations for floodplain management, and help achieve water quality management for National Pollution Discharge Elimination System permit requirements. The plan has been completed and is expected to be submitted to FEMA soon. This plan would provide a method to evaluate the capacity of the watershed to protect, enhance, and restore water quality and natural systems, while achieving flood protection. The resulting updated FEMA maps should be effective sometime in the winter 2014.

H. Streamflow Losses through Karst Features in the Upper Peace River

This project focused on the portion of the Peace River from Bartow to Homeland and was conducted in two phases: the first phase assessed the hydrologic connections (i.e., karst openings or sinkholes) between the river and underlying aquifers; and the second phase investigated the feasibility of constructing low flow restriction barriers around these connections to maintain flow in the river and help meet the adopted minimum "low" flows. The first phase of the project was initiated in FY2002 by the United States Geological Survey (USGS) and completed in 2008. A final report, entitled *Hydrologic Conditions that Influence Streamflow Losses in a Karst Region of the Upper Peace River, Florida* was published in 2009. The project budget for the study was $1.4 million, divided equally between the USGS and the District. The second phase was completed with the issuance of a final report by AMEC-BCI Inc. in March 2011. The study determined that berming or covering over smaller karst features to reduce streamflow losses was feasible. The final report included preliminary design and cost estimates to complete the work. The District's intent is to implement and monitor the Lake Hancock lake level management project for several years to see whether the project alone allows the Peace River minimum flows to be met. If not, the sink-berm project would be considered along with other options to achieve full recovery.

I. Aquifer Recharge

The District continues to support the investigation and implementation of aquifer recharge opportunities as a means to store excess flows to augment water supplies and mitigate impacts of groundwater withdrawals. Since the early 1980s the District has worked with local governments and utilities to implement ASR projects, and initiated a feasibility study in 2009 to quantify the effects of direct and indirect aquifer recharge projects. A major factor that has affected the progress on recharge projects has been the mobilization of arsenic in the aquifer during recharge and recovery operations. In 2011 the City of Bradenton, in coordination with the District, successfully demonstrated a method for pretreating the water prior to injection to minimize or eliminate the mobilization of arsenic. Continued work on this method as well as other methods has provided encouragement towards the successful implementation of future ASR projects. There are currently six ASR projects that are under development in the SWUCA, three of which will store potable water (City of Bradenton, City of North Port, and Peace River Manasota Regional Water Supply Authority) and three that will store reclaimed water (City of Palmetto, Polk County, and Sarasota County). In addition to ASR, the District is working with local governments to identify opportunities to develop projects to indirectly or directly recharge the Upper Floridan aquifer. In Polk County, there are two feasibility projects (Polk County Northeast Regional Utilities Service Area and Winter Haven) evaluating the water supply benefits of using reclaimed water to indirectly recharge

the aquifer by applying the water to rapid infiltration basins in the surficial aquifer. Additional treatment of the water is provided by filtration of the water through the surficial sands prior to recharging the Upper Floridan aquifer. With respect to direct recharge projects, the District is working cooperatively with Hillsborough County to implement a project to directly recharge the Upper Floridan aquifer. The project will help to improve aquifer levels within the MIA and provide opportunities for some additional water supply in the area. With continued growth in the region, the District continues to look for opportunities to optimally use excess flows to benefit water supplies and environmental systems in the region.

J. Lake Lotela Pilot Augmentation

The initial phase of the Lake Lotela Pilot Augmentation Project was a feasibility study to identify and assess possible options for stabilizing lake levels. The long-term goal of the project is to construct a pilot augmentation and monitoring system to more fully evaluate the feasibility of augmentation to increase surface water levels in Lake Lotela, an 800-acre lake in northern Highlands County. The initial feasibility study considered 11 augmentation scenarios, including various water sources, pumping schedules, and augmentation quantities. The Upper Floridan aquifer was determined to be a suitable potential source for augmentation water. However, Upper Floridan aquifer augmentation is not deemed to be a regional solution to the low lake levels due to the magnitude of withdrawals that would be required to augment all lakes in the SWUCA that are below adopted minimum levels. Any local application of Upper Floridan aquifer lake augmentation would require a balance with the needs for water supplies in the region.

Section VI
Regulatory Component

Section VI addresses the success of the Recovery Strategy's regulatory component in contributing to the SWUCA goal. The regulatory component included: Rule amendments for the adoption of minimum flows and levels; enhancement of public supply conservation (per capita) requirements; implementation of restrictions on new groundwater withdrawals that would impact MFL water bodies; a comparative analysis process of actual groundwater levels compared to the median levels experienced during the 1990s in the areas surrounding the upper Peace River and MFL lakes, and adoption of a series of Net Benefit options for permittees seeking new or increased quantities in impacted areas. The Recovery Strategy's regulatory component has contributed to the consistent progress made to date in the SWUCA. It has also assisted in the achievement of the District's stated objectives of significantly contributing to resource recovery while protecting the investments of existing legal users and allowing for economic expansion.

A major accomplishment of the adopted regulatory enhancements is the additional flexibility for permit applicants while ensuring the continued resource recovery. The implementation of per capita and utility reporting requirements, the requirement of wholesale permits and site-specific conservation plans for industrial, mining and recreational uses, and the implementation of an irrigation drought credit system have resulted in more consistency in permitting and enhancing the District's ability to assess success in the achievement of its conservation goals. The enhancements also allow additional conservation measures, further reliance on alternative water supplies and turnover in water use as land use changes occur. Other requirements, such as requiring more permittees to report actual water use (in conjunction with their actual activities), limiting application rates for irrigation use, and requiring water audits and more comprehensive annual reports for public supply permittees have allowed for better tracking of progress toward the conservation goals. In addition, the implementation of Net Benefit options adopted pursuant to the Recovery Strategy has allowed a number of water use permit applicants to secure new or additional quantities, while providing for increased water conservation.

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 at this time other than the continued development of MFLs for SWUCA water bodies on the District's MFL Priority List. The existing regulatory framework, however, would be re-evaluated as part of the next assessment of the Recovery Strategy, and updates to the Regional Water Supply Plan and Strategic Plan.

Section VII
Financial Component

Section VII 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 FY2011-2012 through FY2024-2025.

The primary funding mechanism is the District's Cooperative Funding Initiative (CFI), which includes the Cooperative Funding program for more localized projects and the Water Supply and Resource Development program for larger, regional projects. The Governing Board through its regional subcommittees jointly participates with local governments and other entities to ensure proper development, use and protection of the regional water resources of the District. The CFI is a matching grant program and projects are split up to 50 percent by the District and public or private cooperators. Any state and federal funds received for the projects are applied directly against the project costs, with both parties benefitting equally. The CFI has been highly successful. Since 1988, the District has provided approximately $1.2 billion in incentive-based funding assistance for a variety of water projects addressing its four areas of responsibility: water supply, natural systems, flood protection and water quality.

A. Projection of Potentially Available Funding

Table 7-1 illustrates the funding that can potentially be generated by the District and its cooperators from FY2011-2012 through fiscal year 2024-2025, consistent with and based on the District's long-range funding plan. The funding represents the amount the District has allocated through fiscal year 2024-2025 for the large-scale water supply and resource development projects identified in Appendix 2, Table A2-6, plus an estimated amount for additional CFI projects to address water supply in the SWUCA over the same planning period.

It is important to note that the planned funding identifies only known sources of funding and does not include state or federal funds, which the District and its partners continue to seek. Some of the funding sources from prior years, and anticipated again in the future, are listed in the table with the funding amount to be determined (TBD). The table illustrates that $719 million can potentially be generated or made available to fund the water supply and water resource development projects necessary to fully implement the SWUCA Recovery Strategy by 2025.

As previously shown in Table 3-3, an estimated 144 mgd of additional water demand is expected over the 2010-2025 planning period to meet the needs of all user types and to restore impacted natural systems in the SWUCA. Of the 144 mgd, it is estimated that 53 to 56 mgd of supply will be met by surface water and groundwater sources already permitted to water users and by domestic self-supply, leaving approximately 90 mgd of supply to be met through conservation, water reuse, alternative sources, and other measures described in this report**.** Of the 90 mgd, average conditions, it is estimated that 53 mgd, or 58 percent of the demand has been met or will be met by projects that were under development (shown in Appendix 2) as of October 1, 2011.

B. Evaluation of Project Costs to Meet Projected Demand

Projects under development include projects: (1) completed during fiscal years 2009-2010 or 2010-2011; (2) in the planning, design, or construction phase; or (3) not yet in the planning phase, but at least partially funded through FY2010-2011. The District's total cost for the projects currently under development is $135.5 million. Of this amount, $116.3 million has been funded through FY2010-2011, leaving $19.2 million remaining to be funded.

Table 7-1. Potential Funding Sources to Implement the SWUCA Recovery Strategy

POTENTIAL FUNDING SOURCES THROUGH 2025	
District Cooperative Funding Initiative funding through FY2024-2025	**$355 million**
District Long-Term Project Reserves for SWUCA recovery projects	**$50 million**
Funding provided by partners assuming the $405 million of District Cooperative Funding Initiative and project reserves are used for projects that would be matched on an equal cost-share basis	**$405 million**
State of Florida, West Central Florida Restoration Action Plan (WRAP)	**TBD**
State of Florida, Water Protection & Sustainability Trust Fund	**TBD**
State of Florida, Florida Forever Trust Fund	**TBD**
State of Florida, Appropriations for FARMS or other SWUCA Recovery Projects	**TBD**
Federal Funding	**TBD**
Local, Regional Authority, Utilities Water Supply Development	**TBD**
Total potential funding sources through 2025	**$810 million**

To develop an estimate of the capital cost of projects that will need to be developed to meet the 48 mgd of demand not yet under development as of October 1, 2011, the District has compiled a list of proposed large-scale water supply and resource development project options that may produce up to 56 mgd of water supply. The table shows the estimated total cost of water supply produced by these projects is $719 million.

The selection of alternative water source and conservation project options to meet additional demands will be based on input from water users.

C. Evaluation of Potential Available Funding to Assist with the Cost of Meeting Projected Demand

The $810 million in District and cooperator financial resources that is projected to be available through 2025 would be sufficient to fund the remaining $19 million for projects under development and the projected $719 million for the list of proposed projects in Appendix 2, Table 7-1. The remaining $72 million will be sufficient to address the remaining demand (costs range from $10-15 million per mgd for the proposed large-scale projects to $1.6 million per mgd for FARM projects). These funds would also be available to replace new water supplies that may be reduced as the result of the establishment and revision of minimum flows and levels.

Section VIII
Conclusion

Since the Recovery Strategy was first adopted in 2006, there has been observed progress toward recovery. However, many challenges remain to achieve recovery by 2025. The District is gaining a better understanding of how the overall hydrologic system responds to changes in rainfall and pumping, based on information obtained from its extensive monitoring program. This information can be used to identify critical areas and develop options for achieving recovery. Recovery will ultimately be achieved through a combination of maintaining existing withdrawals at or below current levels and implementing water resource development projects designed to augment or preserve levels and flows in surface water bodies. Options such as land use transitions that were identified in the 2006 document will continue to play a role in recovery although changes have not occurred at the rate initially predicted.

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

1. Groundwater levels in the SWUCA have generally been stable with increasing levels in the north and decreasing levels in some southern areas. This was anticipated to occur and reflects changes in water-use related activities that have been occurring in the basin.

2. Since 2006 annual rainfall over much of the basin has mostly been below the long-term average. This is reflected in lower surface water levels and flows experienced throughout the basin.

3. Monitoring of coastal groundwater quality indicates the saltwater interface continues to move inland. This was expected to occur. The goal of the strategy is to reduce the rate of movement of the interface by achieving the SWIMAL. The SWIMAL represents the average groundwater level during the 1990s and, until the level is met, it is not expected that the interface movement will have been reduced relative to that time period.

4. As of 2011, "long-term" total groundwater withdrawals over the past 10 years have gradually declined to near 555 mgd (about 500 mgd from the Upper Floridan aquifer). However, actual groundwater withdrawal quantities are about 50 to 60 percent of quantities permitted for groundwater withdrawal. Since it is possible that actual groundwater withdrawals could grow into permitted amounts, it is important that the District continue to monitor the relationship between permitted and actual used quantities and continue its efforts to reduce both quantities.

5. MFLs have been established on 41 water bodies. Of these, 21 are being met and 20 are not being met. In 2011, the MIA aquifer level was 0.7 feet below the adopted SWIMAL.

    a. Based on analyses conducted by District staff, the effect created by 10 mgd of aquifer recharge or reduced withdrawals on groundwater levels in the MIA would be needed to meet the SWIMAL.

    b. The District will review currently established lake levels to make sure they are consistent with improvements made to the methodologies since development of the original method in 1999. Based on results of the review, lakes identified as not meeting adopted levels will be designated as candidate lakes for projects to achieve adopted levels.

6. Overall, groundwater demands have declined over the past 10 years. This is attributed to development of alternative water supply projects, changes in water use activities and implementation of conservation in the area. It is estimated that total water supply demands will increase 94.4 mgd

above 2010 demand by 2025 (refer to Table 3-3). Of this amount, 30.2 mgd will be supplied by currently permitted but unused groundwater associated with existing permits for public supply. Additionally, it is estimated that from 10 mgd to 50 mgd of further reduction in groundwater withdrawals or aquifer recharge might be needed to meet the established SWIMAL.

7. Implementation of water resource development projects to achieve recovery of impacted water bodies has principally been focused on Lake Hancock and the upper Peace River. These projects are progressing and should be completed by 2014. The performance of these projects will be assessed over the next five-year review cycle. The District continues to look for other project opportunities to achieve recovery. Currently ongoing ASR and aquifer recharge projects will provide the information necessary for successful implementation of these leading edge technologies in the future.

8. Demand management is critical to maintaining groundwater withdrawals at or below current levels. 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 FY2007-2011 period include:

    a. A total of 27 public supply, commercial, and institutional initiatives resulting in approximately 1 mgd of quantifiable water conservation at a District cost of $3.6 million. Conservation modeling suggests quantifiable projects could potentially offset 21.6 mgd. In addition, 24 reclaimed water projects are projected to offset 14.2 mgd of traditional supplies at a cost of $40 million. Significant reductions in per capita water use can be attributable to non-quantifiable water conservation initiatives.

    b. During the assessment period, the District has allocated funding for 65 FARMS projects implemented by growers in the SWUCA at a District cost of $8.9 million for a projected 10 mgd offset of groundwater withdrawals. Since FARMS's inception through FY2011, $19.8 million has allocated for 102 FARMS projects in the SWUCA for a total projected offset of 21.9 mgd.

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

Based on these conclusions, the District will be forming two stakeholder groups. The first stakeholder group will evaluate and make recommended adjustments to the strategies in the SWUCA Recovery Strategy intended to achieve the SWIMAL in the MIA. This group will meet and report back to the District's Governing Board with recommendations in the fall of 2014. The second stakeholder group will evaluate and make recommended adjustments to the strategies in the SWUCA Recovery Strategy intended to meet the minimum lake levels along the Lake Wales Ridge. This working group will meet and report back to the District's Governing Board with recommendations in the winter of 2015 (see Appendix 3).

Section IX
Bibliography

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Appendix 1
Public Supply Permitted Quantities and 2010 Withdrawals in the SWUCA

Public Supply Permitted Quantities and 2010 Withdrawals in the SWUCA

ALL WUPS AFFECTING THE LISTED COUNTY	WUP #	Source Type	Permitted Daily Avg.[1] (mgd)	Treatment Efficiency [2] (Ratio)		Available Supply (mgd)	Available Supply in County[3] (mgd)	2010 Avg. Daily W/D for Service in County[4] (mgd)	2010 Avg. Daily Use for Service in County[5] (mgd)	2010 Avg. Reserve for Service in County[6] (mgd)	2025 Utility Demand Increase[7] (mgd)
CHARLOTTE COUNTY											
GASPARILLA ISLAND WATER ASSOC (GW/RO)	718	GW S.I	1.538	0.78	A	1.200	1.256	1.227	0.959	0.297	0.028
CITY OF PUNTA GORDA UTILITY DEPT	871	SW	8.088	0.87	A	7.037	7.352	4.818	4.214	3.138	0.718
CHARLOTTE HARBOR WATER ASSOC (GW/RO)	1512	GW I	0.712	0.79	A	0.565	0.565	0.415	0.330	0.235	0.067
CHARLOTTE COUNTY UTILITIES	3522	GW I	3.172	0.72	A	2.284	0.794	0.530	0.386	0.408	0.098
CHARLOTTE COUNTY PUBLIC WORKS [8]	7104	SW	0.000	0.97	E	0.000	9.437	0.000	9.082	0.355	1.959
ISLAND HARBOR BCH CLB LTD & CHAR	7768	GW I	0.103	0.56	A	0.058	0.072	0.088	0.049	0.023	0.024
Sum of Large Utilities			**13.613**			**11.142**	**19.476**		**15.020**	**4.456**	
Small Utilities (<0.1 mgd permitted)			**0.069**			**0.067**	**0.067**		**0.023**	**0.044**	**0.006**
Charlotte County Total			**13.682**			**11.210**	**19.543**		**15.043**	**4.500**	**2.900**
Ground Water Total			**5.594**						**1.747**	**1.007**	
Floridan Groundwater Total			**0.069**						**0.023**	**0.044**	
Surface Water Total			**8.088**						**13.296**	**3.493**	
2025 Projected PS Needs by Utility											2.900
2025 Projected PS Needs inc. DSS and Irrigation											4.075
DESOTO COUNTY											
ARCADIA, CITY OF (GW)	4725	GW I	1.117	0.97	E	1.083	1.083	0.827	0.814	0.269	0.050
PRMRWSA (Lake Suzy, DeSoto County Utilities) [8]	10420	SW	32.700	0.94	A	30.738	0.539	21.728	0.033	0.506	0.000
Sum of Large Utilities			**33.817**			**31.821**	**1.622**		**0.847**	**0.775**	
Small Utilities (<0.1 mgd permitted)			**0.032**			**0.031**	**0.031**		**0.015**	**0.016**	**0.026**
DeSoto County Total			**33.849**			**31.853**	**1.654**		**0.862**	**0.791**	**0.076**
Ground Water Total			**1.149**						**0.829**	**0.285**	
Floridan Groundwater Total			**0.032**						**0.015**	**0.016**	
Surface Water Total			**32.700**						**0.033**	**0.506**	
2025 Projected PS Needs by Utility											0.186
2025 Projected PS Needs inc. DSS and Irrigation											0.613

Public Supply Permitted Quantities and 2010 Withdrawals in the SWUCA

ALL WUPS AFFECTING THE LISTED COUNTY	WUP #	Source Type	Permitted Daily Avg.[1] (mgd)	Treatment Efficiency [2] (Ratio)		Available Supply (mgd)	Available Supply in County[3] (mgd)	2010 Avg. Daily W/D for Service in County[4] (mgd)	2010 Avg. Daily Use for Service in County[5] (mgd)	2010 Avg. Reserve for Service in County[6] (mgd)	2025 Utility Demand Increase[7] (mgd)
HARDEE COUNTY											
BOWLING GREEN, CITY OF (GW)	30	GW F	0.386	0.97	E	0.374	0.374	0.235	0.235	0.139	0.002
WAUCHULA, CITY OF (GW)	4461	GW F	1.237	0.964	A	1.192	1.150	0.716	0.643	0.507	0.043
ZOLFO SPRINGS, TOWN OF (GW)	7658	GW F	0.229	0.97	E	0.222	0.222	0.162	0.162	0.060	0.005
WAUCHULA HILLS PWS	13026	GW F	0.439	0.97	E	0.426	0.470	0.000	0.049	0.421	0.040
Sum of Large Utilities			**2.291**			**2.215**	**2.217**		**1.089**	**1.128**	
Small Utilities (<0.1 mgd permitted)			**0.535**			**0.500**	**0.500**		**0.372**	**0.128**	**0.009**
Hardee County Total			**2.826**			**2.715**	**2.717**		**1.461**	**1.256**	**0.099**
Ground Water Total			**2.826**						**1.461**	**1.256**	
Floridan Groundwater Total			**2.781**						**1.425**	**1.267**	
Surface Water Total			**0**						**0**	**0**	
2025 Projected PS Needs by Utility											0.099
2025 Projected PS Needs inc. DSS and Irrigation											0.179
HIGHLANDS COUNTY											
LAKE JOSEPHINE HEIGHTS WATER	4167	GW F	0.255	0.97	E	0.247	0.247	0.014	0.014	0.233	0.017
CITY OF SEBRING	4492	GW F	5.699	0.97	E	5.528	5.528	3.256	3.256	2.272	0.641
LAKE PLACID HOLDING CO	4980	GW F	0.400	0.97	E	0.388	0.388	0.278	0.278	0.110	0.031
TOWN OF LAKE PLACID	5270	GW F	1.192	0.97	E	1.156	1.156	0.419	0.419	0.737	0.085
CITY OF AVON PARK	6029	GW F	2.225	0.99	A	2.203	2.203	1.687	1.652	0.551	0.203
HIGHLANDS CO / TOMOKA HEIGHTS	6326	GW F	0.366	0.97	E	0.355	0.355	0.153	0.153	0.202	0.008
BUTTONWOOD BAY UTILITIES	7139	GW F	0.222	0.99	A	0.220	0.220	0.153	0.153	0.067	0.156
COUNTRY CLUB OF SEBRING, INC	7704	GW F	0.183	0.97	E	0.178	0.178	0.237	0.235	-0.057	0.048
EAGLE LAKE ESTATES	9140	GW F	0.169	0.97	E	0.164	0.164	0.000	0.000	0.164	
WOODLANDS OF LAKE PLACID	9490	GW F	0.150	0.97	E	0.146	0.146	0.057	0.057	0.089	0.023
HIGHLANDS CO BOCC	11609	GW F	0.168	0.97	E	0.163	0.163	0.048	0.048	0.115	0.005
SUN N LAKE OF SEBRING	13099	GW F	1.104	0.98	A	1.080	1.080	0.606	0.604	0.476	0.335
Sum of Large Utilities			**12.133**			**11.826**	**11.826**		**6.869**	**4.957**	
Small Utilities (<0.1 mgd permitted)			**0.331**			**0.321**	**0.321**		**0.175**	**0.146**	**0.162**

Public Supply Permitted Quantities and 2010 Withdrawals in the SWUCA

ALL WUPS AFFECTING THE LISTED COUNTY	WUP #	Source Type	Permitted Daily Avg.[1] (mgd)	Treatment Efficiency [2] (Ratio)		Available Supply (mgd)	Available Supply in County[3] (mgd)	2010 Avg. Daily W/D for Service in County[4] (mgd)	2010 Avg. Daily Use for Service in County[5] (mgd)	2010 Avg. Reserve for Service in County[6] (mgd)	2025 Utility Demand Increase[7] (mgd)
Highlands County Total			**12.463**			**12.147**	**12.147**		**7.044**	**5.103**	**1.714**
Ground Water Total			**12.463**						**7.044**	**5.103**	
Floridan Groundwater Total			**12.437**						**7.022**	**5.099**	
Surface Water Total			**0**						**0**	**0**	
2025 Projected PS Needs by Utility											1.714
2025 Projected PS Needs inc. DSS and Irrigation											2.517
HILLSBOROUGH COUNTY											
TAMPA BAY WATER (S-C Hillsborough)	4352	GW F	24.100	0.940	A	22.654	22.693	21.181	21.181	1.512	13.825
WILDER MOBILE HOMES INC	4757	GW I	0.065	0.980	E	0.063	0.063	0.039	0.039	0.024	0.000
CAX RIVERSIDE LLC	7637	GW F	0.291	0.980	E	0.285	0.285	0.663	0.663	-0.378	0.374
TAMPA BAY WATER (BUD Well Field)[9]	11732	GW F	6.000	0.980	E	3.348	3.348	3.367	0.019	3.329	
TAMPA BAY WATER (Alafia River)[10]	11794	SW	17.510	0.980	E	17.160	17.160	5.796	0.000	17.160	
TAMPA BAY WATER (Desalination Plant)[10]	n/a	SEA	25.000	0.570	A	25.000	8.105	19.443	0.000	8.105	
Sum of Large Utilities			**72.965**			**68.510**	**51.654**		**21.902**	**29.752**	
Small Utilities (<0.1 mgd permitted)			**0.315**			**0.306**	**0.306**		**0.236**	**0.070**	**0.481**
Hillsborough County (SWUCA Portion)			**73.281**			**68.816**	**51.960**		**22.138**	**29.822**	**14.680**
Ground Water Total			**30.771**						**22.138**	**4.558**	
Floridan Groundwater Total			**30.669**						**22.071**	**4.525**	
Surface Water Total			**17.510**						**0.000**	**17.160**	
2025 Projected PS Needs by Utility											14.680
2025 Projected PS Needs inc. DSS and Irrigation											16.611
MANATEE COUNTY											
MANATEE COUNTY / LAKE MANATEE	5387	SW	34.900	0.940	A	32.806	34.034	24.312	28.092	5.942	6.962
IMC FERTILIZER & MANATEE COUNTY	7345	GW F	1.960	0.956	A	1.874	0.469	1.481	0.000	0.469	0.550
MANATEE COUNTY / EAST COUNTY	7470	GW F	15.986	0.940	A	15.027	1.462	13.605	0.000	1.462	1.713
CITY OF BRADENTON	6392	SW	6.950	0.980	A	6.811	7.012	5.302	5.397	1.615	0.225
LONGBOAT KEY [11]	10963	SW	0.000			0.000	1.695	0.000	1.689	0.006	0.000
CITY OF PALMETTO [11]	12443	GW F	0.000			0.000	1.410	0.000	1.281	0.129	0.207

Public Supply Permitted Quantities and 2010 Withdrawals in the SWUCA

ALL WUPS AFFECTING THE LISTED COUNTY	WUP #	Source Type	Permitted Daily Avg.[1] (mgd)	Treatment Efficiency [2] (Ratio)		Available Supply (mgd)	Available Supply in County[3] (mgd)	2010 Avg. Daily W/D for Service in County[4] (mgd)	2010 Avg. Daily Use for Service in County[5] (mgd)	2010 Avg. Reserve for Service in County[6] (mgd)	2025 Utility Demand Increase[7] (mgd)
Sum of Large Utilities			**59.796**			**56.518**	**46.082**		**36.459**	**9.623**	
Small Utilities (<0.1 mgd permitted)			**0.049**			**0.048**	**0.048**		**0.024**	**0.023**	**0.013**
Manatee County Total			**59.845**			**56.565**	**46.130**		**36.483**	**9.646**	**9.670**
Ground Water Total			**17.995**						**1.305**	**2.083**	
Floridan Groundwater Total			**17.994**						**1.305**	**2.082**	
Surface Water Total			**41.850**						**35.178**	**7.563**	
2025 Projected PS Needs by Utility											9.670
2025 Projected PS Needs inc. DSS and Irrigation											10.648
POLK COUNTY											
BARTOW, CITY OF	341	GW F	7.900	0.851	A	6.723	6.723	2.240	1.777	4.946	3.858
FORT MEADE, CITY OF	645	GW F	1.014	0.970	E	0.983	0.983	0.563	0.563	0.420	0.144
LAKE REGION MOBILE HOME OWNERS	1616	GW F	0.163	0.940	E	0.153	0.153	0.059	0.059	0.094	0.000
FOUR LAKES GOLF CLUB	1625	GW F	0.406	0.970	E	0.393	0.393	0.299	0.299	0.094	0.000
LAKE HAMILTON, TOWN OF	2332	GW F	0.381	0.992	A	0.377	0.377	0.240	0.238	0.139	0.059
ORCHID SPRINGS DEVELOP. CORP	3415	GW F	0.115	0.970	E	0.111	0.111	0.067	0.067	0.044	0.000
CROOKED LAKE PARK WATER CO INC.	4005	GW F	0.302	0.982	A	0.297	0.297	0.223	0.219	0.078	0.031
WINTER HAVEN, CITY OF	4607	GW F	12.326	0.993	A	12.235	12.235	9.179	9.111	3.124	4.590
LAKE WALES, CITY OF	4658	GW F	3.821	0.970	E	3.706	3.706	2.568	2.568	1.138	1.183
LAKELAND, CITY OF	4912	GW F	35.030	0.977	A	34.224	33.714	20.269	19.703	14.011	6.954
SPORTS SHINKO (FLA) / GRENELEFE	5251	GW F	1.278	0.990	A	1.265	1.265	1.404	1.404	-0.139	0.034
FROSTPROOF, CITY OF	5870	GW F	1.347	0.970	E	1.307	1.307	0.282	0.282	1.025	1.635
DUNDEE, TOWN OF	5893	GW F	1.831	0.970	E	1.776	1.776	0.542	0.542	1.234	0.165
MULBERRY, CITY OF	6124	GW F	1.120	0.970	E	1.086	1.086	0.386	0.386	0.700	0.128
SADDLEBAG LAKE OWNERS	6174	GW F	0.117	0.930	A	0.109	0.109	0.096	0.096	0.013	0.001
POLK CO. / NORTHWEST REGIONAL SA	6505	GW F	5.085	0.970	E	4.932	5.141	3.024	3.188	1.953	1.463
POLK CO. / SOUTHWEST REGIONAL SA	6506	GW F	4.948	0.970	E	4.800	4.857	3.616	3.654	1.203	1.576
POLK CO. / CENTRAL REGIONAL SA	6507	GW F	2.271	0.970	E	2.203	2.203	1.018	1.014	1.189	0.609
POLK CO. / SOUTHEAST REGIONAL SA	6508	GW F	1.367	0.970	E	1.326	1.326	0.530	0.482	0.844	0.946

Public Supply Permitted Quantities and 2010 Withdrawals in the SWUCA

ALL WUPS AFFECTING THE LISTED COUNTY	WUP #	Source Type	Permitted Daily Avg.[1] (mgd)	Treatment Efficiency [2] (Ratio)		Available Supply (mgd)	Available Supply in County[3] (mgd)	2010 Avg. Daily W/D for Service in County[4] (mgd)	2010 Avg. Daily Use for Service in County[5] (mgd)	2010 Avg. Reserve for Service in County[6] (mgd)	2025 Utility Demand Increase[7] (mgd)
LAKE ALFRED, CITY OF	6624	GW F	1.381	0.970	E	1.340	1.340	0.924	0.924	0.416	0.292
CITY OF EAGLE LAKE	6920	GW F	0.947	0.970	E	0.918	0.918	0.365	0.365	0.553	0.271
AUBURNDALE, CITY OF	7119	GW F	7.036	0.970	E	6.825	6.826	4.756	4.756	2.070	0.684
CENTURY REALTY FUND - CHC VII	7187	GW F	0.257	0.970	E	0.249	0.249	0.358	0.358	-0.109	0.000
POLK CO. / EAST REGIONAL SA	8054	GW F	1.065	0.980	A	1.044	1.044	0.460	0.452	0.592	0.498
CENTURY REALTY FUNDS / SWISS VILL.	8344	GW F	0.234	0.970	E	0.227	0.227	0.169	0.169	0.058	0.000
HAINES CITY, CITY OF	8522	GW F	5.712	0.920	A	5.257	5.257	3.618	3.330	1.927	2.075
PLANTATION LANDINGS LTD.	8753	GW F	0.111	0.970	E	0.107	0.107	0.069	0.069	0.038	0.000
SWEETWATER COOP, INC.	8967	GW F	0.110	0.970	E	0.106	0.106	0.120	0.120	-0.014	0.000
ALAFIA PRESERVE, EAGLE RIDGE	12964	GW F	1.542	0.970	E	1.496	1.496	0.000	0.000	1.496	0.000
Sum of Large Utilities			**99.215**			**95.577**	**95.334**		**56.195**	39.139	
Small Utilities (<0.1 mgd permitted)			**2.112**			**2.049**	**2.049**		**1.158**	**0.891**	**0.873**
Polk County Total			**101.327**			**97.626**	**97.383**		**57.353**	**40.029**	**28.069**
Ground Water Total			**101.327**						**57.353**	**40.029**	
Floridan Groundwater Total			**101.322**						**57.349**	**40.029**	
Surface Water Total			**0.000**						**0.000**	**0.000**	
2025 Projected PS Needs by Utility											28.085
2025 Projected PS Needs inc. DSS and Irrigation											28.941
SARASOTA COUNTY											
CITY OF NORTH PORT [8]	2923	SW/GW	7.100	0.959	A	6.809	7.971	1.150	2.373	5.598	2.405
CITY OF SARASOTA (WUP 4318, 10224)	4318	GW F	12.000	0.807	A	9.684	9.684	8.238	6.670	3.014	0.283
ENGLEWOOD WATER DISTRICT [12]	4866	GW I	5.360	0.750	A	4.020	4.020	2.796	2.095	1.925	0.508
CITY OF VENICE	5393	GW I	6.864	0.460	A	3.157	3.157	3.867	1.793	1.364	0.226
ELL-CAP 66 / CAMELOT LAKES (GW/RO)	5807	GW I	0.188	0.800	E	0.150	0.150	0.127	0.127	0.023	0.000
ROYALTY RESORTS / SUN N FUN RV. (GW/RO)	7448	GW I	0.205	0.852	A	0.175	0.175	0.087	0.073	0.102	0.000
SARASOTA CO. CONSOLIDATED PERMIT [8,13]	8836	GW F,I	13.737	0.804	A	11.045	24.998	2.366	15.856	9.142	5.126
PRMRWSA SUPPLEMENTAL MABRY CARLTON [13]	12926	GW F,I	7.200	0.804	E	5.789	5.789	0.004	0.004	5.785	
Sum of Large Utilities			**52.654**			**40.829**	**55.944**		**28.991**	**26.953**	

Public Supply Permitted Quantities and 2010 Withdrawals in the SWUCA

ALL WUPS AFFECTING THE LISTED COUNTY	WUP #	Source Type	Permitted Daily Avg.[1] (mgd)	Treatment Efficiency [2] (Ratio)	Available Supply (mgd)	Available Supply in County[3] (mgd)	2010 Avg. Daily W/D for Service in County[4] (mgd)	2010 Avg. Daily Use for Service in County[5] (mgd)	2010 Avg. Reserve for Service in County[6] (mgd)	2025 Utility Demand Increase[7] (mgd)
Small Utilities (<0.1 mgd permitted)			**0.145**		**0.167**	**0.167**		**0.024**	**0.143**	**0.078**
Sarasota County Totals			**52.799**		**40.996**	**56.111**		**29.015**	**27.096**	**8.625**
Ground Water Total			**48.399**					**27.865**	**24.141**	
Floridan Groundwater Total			**17.310**					**11.586**	**6.700**	
Surface Water Total			**4.400**					**1.445**	**2.955**	
2025 Projected PS Needs by Utility										8.625
2025 Projected PS Needs inc. DSS and Irrigation										9.696
SWUCA TOTALS										
SWUCA Totals			**350.1**		**321.9**	**287.6**		**169.4**	**118.2**	**65.8**
Ground Water Total			**220.5**					**119.7**	**78.5**	
Floridan Groundwater Total			**182.6**					**100.8**	**59.8**	
Surface Water Total			**104.5**					**50.0**	**31.7**	
2025 Projected PS Needs by Utility										65.9
2025 Projected PS Needs inc. DSS and Irrigation										73.3
PLANNING REGION SUBTOTALS										
Southern County Totals			**160.2**		**140.6**	**123.4**		**81.4**	**42.0**	**21.3**
Ground Water Total			**73.1**					**31.7**	**27.5**	
Floridan Groundwater Total			**35.4**					**12.9**	**8.8**	
Surface Water Total			**87.0**					**50.0**	**14.5**	
2025 Projected PS Needs by Utility										21.4
2025 Projected PS Needs inc. DSS and Irrigation										25.0
Heartland County Totals			**116.6**		**112.5**	**112.2**		**65.9**	**46.4**	**29.9**
Groundwater Total			**116.6**					**65.9**	**46.4**	
Floridan Groundwater Total			**116.5**					**65.8**	**46.4**	
Surface Water Total			**0.0**					**0.0**	**0.0**	
2025 Projected PS Needs by Utility										29.9
2025 Projected PS Needs inc. DSS and Irrigation										31.6

Notes:

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 average annual quantities were provided by WMIS database and the District's 2010 Estimated Water Use Report (EWUR). For permits with multiple use types, only the allocation for public supply is shown.
2 Treatment efficiency accounts for water loss incurred during the treatment process, such as water contained in slurries and other water-containing waste products including concentrate from reverse osmosis. The superscript "A" identifies actual efficiencies based on data provided by the utility. The superscript "E," identifies treatment efficiencies estimated by staff where actual data was not provided, unreasonable, or cross referenced from other permit data.
3 This measure includes quantities identified in "Available Supply" adjusted 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 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, this amount was estimated using the ratio of withdrawal/use by the large utilities within the same county.
6 The "Reserve for Service in County" equals the "Available Supply in County" - "Daily Use for Service in County". This measure represents the unutilized permitted quantity.
7 The "Utility Demand Increase" is from the District's 2010 Regional Water Supply Plan Appendix 3-3 and was calculated per utility as (2025 public supply demand) - (2010 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, is permitted for 32.855 mgd. A large magnitude of this source is exported out of DeSoto County. Exported quantities are imported by Charlotte County Public Works, Sarasota County, and the City of North Port.
9 The BUD and S/C wellfields constitute the 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 quantities were treated as not used (exported) to meet demands in the SWUCA portion of Hillsborough County.
11 Indicates the utility has either has been issued a wholesale permit or receives 100 percent of its water supply from an outside source.
12 The Englewood Water District service area spans both Sarasota and Charlotte counties. The utility water use is credited to Sarasota County due to the reporting methodology and location of withdrawals. Exports were sent to other utilities in Charlotte County.
13 The Wellfields under permits #8836 and #12926 include both Floridan and intermediate aquifer wells. A ratio of applied to determine the share of Floridan groundwater total based on 2010 pumpage history for each well; 31 percent for #8836 and 14 percent for #12926.

Appendix 2
Water Conservation, Agriculture Demand Management and Research, Reclaimed Water and Water Supply and Resource Development Projects within the SWUCA

Table A2-1a. Conservation Projects for Public Supply, Industrial, Commercial and Institutional Demand Management: Completed, Ongoing or Planned with Secured or Pledged Funding FY2007-2011 (Funding was completed before FY2010)

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	Est. Water Conserved (mgd)
Braden River Soil Moisture Sensor Pilot (N107)	$100,000	$100,000	$200,000	TBD
Charlotte Toilet Rebate (L856)	$50,050	$50,050	$100,100	0.01
IFAS Field Evaluation of Bahia Dwarf for Water Use Efficiency (B229)	$118,125	$160,000	$317,500	Research
Lakeland Plumbing Retrofit(L914)	$300,000	$300,000	$600,000	0.13
Lakeland Pre-Rinse Spray Valve Retrofit (L915)	$22,500	$22,500	$45,000	0.06
Manatee County Indoor Water Conservation (L601)	$42,825	$42,825	$85,650	0.02
Manatee Indoor Water Conservation Retrofit (N115)	$63,072	$63,072	$124,778	0.02
Manatee Low Flow Toilet (L949)	$80,550	$80,550	$161,144	0.02
North Port Water Conservation and Retrofit (L627)	$68,800	$68,800	$137,600	0.01
Winter Haven Toilet Rebate (N074)	$53,750	$53,750	$107,500	0.02
Subtotal - Funding was completed for above projects before FY2010	**$899,672**	**$941,547**	**$1,879,272**	**0.29**

[1] "FY2007-FY2011 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 A2-1b. Conservation Projects for Public Supply, Industrial, Commercial and Institutional Demand Management: Completed, Ongoing or Planned with Secured or Pledged Funding FY2007-2011

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	Est. Water Conserved (mgd)
Charlotte Toilet Replacement (N113)	$57,010	$57,010	$114,020	0.01
District Outsourced Flow Meter Audit Verification Project (P425)	$180,000	N/A	$180,000	Research
Frostproof Toilet Rebate (N249)	$2,850	$2,850	$5,700	0.00
Highlands Mobile Irrigation Lab (N329)[4]	$13,335	$6,665	$20,000	0.01
Highlands Soil & Water Conservation Initiative Mobile Irrigation Lab(N165)	$7,595	$3,255	$10,850	0.01
IFAS Determination of Irrigation Deficit Turf Grass(B284)	$290,000	N/A	$440,000	Research
IFAS Evaluation of Soil Moisture Controllers for Conserving Reclaimed Water (B252)	$450,000	N/A	$450,000	Research
IFAS Investigation of Methods to Determine Urban Landscape Irrigation (P424)	$470,000	N/A	$470,000	Research
IFAS Landscape Irrigation Water Use[3](B283)	$703,445	$46,555	$1,187,000	Research
IFAS Net Irrigation Requirements for Turfgrass (B285)	$32,000	N/A	$32,000	Research
IFAS Turfgrass Establishment Irrigation for SW Florida(B777)	$193,960	N/A	$404,203	Research
Lake Alfred Water Conservation (N314)	$8,100	$8,100	$16,200	0.00
Lakeland Plumbing Retrofit (N112)	$70,098	$70,098	$140,196	0.08
Manatee Toilet Rebate (N231)	$63,072	$63,072	$126,144	0.02
Manatee Toilet Rebate (N325)	$108,750	$108,750	$217,500	0.03
Polk Utilities Rain Sensor Rebate (N161)	$58,275	$58,275	$116,550	0.13
Winter Haven Smart Controller Pilot (N221)	$22,500	$22,500	$45,000	0.34
Subtotal - Ongoing FY2010-FY2011	**$2,730,990**	**$447,130**	**$3,975,363**	**0.63**
Totals	**$3,630,662**	**$1,388,677**	**$5,854,635**	**0.92**

[1] "FY2007-FY2011 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 A2-2a. Agricultural Demand Projects: Completed, Ongoing or Planned with Secured or Pledged Funding FY2007-2011 (Funding was completed before FY2010)

PROJECTS	FY2007-FY2011[1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
FFD Land Company, Inc (H538)	$36,676	$36,676	$73,353	.10
IFAS Royce Ranch Citrus Grove (H537)	$27,159	$27,158	$54,317	.03
BH Griffin – C & S, Grove (H539)	$306,854	$133,146	$440,000	1.46
Holmberg Farms, Inc (H515)	$214,379	$346,877	$561,256	.18
Lallymix Farms (H509)	$203,623	$236,053	$439,676	.13
MD Council & Sons (H520)	$96,447	$149,751	$246,198	.08
Island Grove – Farm 5 (H522)	$159,903	$137,713	$297,616	.05
Classic Caladiums LLC (H540)	$74,000	$74,000	$148,000	.06
Hopewell (H541)	$112,500	$501,270	$613,770	.11
Citrus Creek Grove – Electronics (H548)	$8,599	$9,270	$17,868	.03
Lykes – Camp Mack Grove (H525)	$45,837	$45,837	$91,674	.07
Twenty-Twenty Groves (H543)	$4,328	$9,433	$13,761	.11
IMG Enterprises (H551)	$10,986	$16,306	$27,292	.03
WFA Land Company (H558)	$116,737	$116,737	$233,475	.18
Collins – Collins, Inc.(H557)	$122,340	$40,780	$163,120	.13
Blue Goose – Phase 2 – Hancock Groves (H516)	$160,968	$332,348	$493,316	.08
Island Grove – Farm 6 (H556)	$265,115	$97,472	$362,588	.10
Orange Co Joshua Section 29 East (H555)	$114,343	$60,586	$174,929	.23
Island Grove Integrated Automated (H560)	$47,800	$55,843	$103,643	.03
TJ Chastain Shell Creek Grove (H563)	$69,386	$23,173	$92,559	.06
Blue Fields USA (H564)	$255,868	$168,015	$423,883	.06
CFI Venus Grove – Phase 1 /1A (H532)	$119,693	$260,512	$380,205	.09
FLM – PRR – Phase 2 + Culverts (H569)	$181,696	$119,826	$301,522	.13
Bethel Farms LTD (H568)	$20,314	$26,174	$46,488	.08
Down South Blues Corporation (H570)	$188,609	$63,878	$252,487	.05
ESDA Jerry Dakin Dairy (H511)	$24,682	$46,233	$70,915	.05
TJ Chastain Neal Road Grove (H573)	$29,865	$9,955	$39,820	.02
Island Grove (H582)	$94,107	$46,687	$140,794	.06
4 Star Tomato – Long Creek Farm (H583)	$102,000	$55,900	$157,900	.06
Bishop Citrus, Inc (H585)	$190,000	$63,350	$253,350	.08
Blue Goose – Phase 3 – Hancock Groves (H584)	$287,204	$119,991	$407,195	.35
Mixon Family Farm (H572)	$176,000	$176,000	$352,000	.13
Tornello Landscape Corp (H587)	$49,965	$25,645	$75,610	.12
Subtotal-Funding was completed for above projects before FY2010	**$3,917,985**	**$3,632,594**	**$7,550,580**	**4.53**

[1] "FY2007-FY2011 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 A2-2b. Agricultural Demand Management Projects: Completed, Ongoing or Planned with Secured or Pledged Funding FY2007-2011

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
Bermont Properties-Otto Varner (H588)	$191,192	$463,731	$254,923	.15
Mont-Lest, LLC (H595)	$65,500	$85,500	$151,000	.49
Sun-Fire Nurseries (H597))	$26,000	$150,000	$176,000	.02
C&D Fruit and Vegetable-Hecht Manatee (H599)	$225,000	$225,000	$450,000	.08
FLM-Blossom Grove (H615)	$350,250	$116,750	$467,000	.25
Francis White (H598)	$180,000	$60,000	$240,000	.15
Orange Co Bermont Grove (H593)	$73,961	$24,654	$98,615	.20
Bethel Farms-Phase II (H601)	$112,602	$41,550	$154,152	.16
BH Griffin –Weather Station (H602)	$4,370	$4,718	$9,088	.09
FLM-PRR-Phase 2-Pump 2 (H604)	$95,969	$31,989	$127,958	.07
WFA-Grove 64 Reservoir (H605)	$30,210	$30,210	$60,421	.10
Orange Co Joshua-10 SW (H606)	$209,899	$146,619	$356,518	.43
Orange Co Reservoirs – Phase 1 Amend 1 (H606)	$349,870	$87,696	$437,566	.39
Alafia Berry Farm (H611)	$100,500	$33,500	$134,000	FFP[2]
Bethel Farms Charlotte Co (H611)	$82,270	52,345	$134,614	.11
JWCD-Dr. G Waters Grove (H608)	$88,162	$38,303	$126,465	.08
Mixon Family Farms Phase 2 (H607)	$64,740	$225,852	$290,592	.03
Oak Creek Farms, LLC-Bentley Amendment (H586)	$348,750	$116,916	$465,666	.06
Windmill Farms (H614)	$175,000	$222,773	$397,773	.10
Roper Growers Cooperative (H594)r	$48,000	$12,000	$60,000	.03
Mary McTeer (H621)	$23,000	$23,000	$46,000	.01
Clear Springs (H627)	$547,500	295,992	$843,492	.44
Loop Farms (H631)	$272,500	$413,425	$685,925	.26
Richard Worch Tangerine Grove (H629)	$25,560	$13,477	$39,037	.02
Astin Farms-South Farm (H636)	$263,240	$469,704	$732,944	.14
San-Way Central (H634)	$150,484	$107,205	$257,689	.10
Heavenscent Citrus Corp (H626)	$21,952	$7,317	$29,269	.01
Ark Industries (H643)	$21,904	$21,904	$43,808	.01
Highland Park Services (H616)	$18,847	$6,281	$25,128	.03
Wheeler Farms (H642)	$116,548	$187,772	$$304,320	.06
Jones Potato Farm, Inc (H640)	$642,938	$347,701	$990,639	1.3
Sun Bulb Company (H609)	$28,740	$31,801	$60,541	.09
Subtotal for above FARMS Agricultural Projects for FY2010-2011s	**$4,955,458**	**$3,695,687**	**$8,651,145**	**5.46**
Total for all FARMS Agricultural Projects (FY2007-2011).	**$8,873,443**	**$7,328,281**	**$16,201,725**	**9.99**
Total for all Agricultural Projects in Table 6-3 (Research & FARMS)	**$12,700,098**	**$7,676,811**	**$24,166,034**	

[1] "FY2007-FY2011 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] Frost/Freeze Protection

Table A2-3a. Agricultural Demand Research Projects: Completed, Ongoing or Planned with Secured or Pledged Funding FY2007–2011 (Funding was completed before FY 2010)

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
Automatic Meter Reading Services (AMR) Pilot Project (P416)	$411,000	N/A	$501,323	Research
Evaluating Components of Recharge on Impervious Surfaces (P422)	$231,000	N/A	$231,000	Research
IFAS BMP Plan Implementation - Flatwood Citrus (H528)	$150,000	N/A	$150,000	Research
IFAS BMP Plan Implementation - Row Crops (H510)	$150,000	N/A	$150,000	Research
IFAS Cold / Chill Protection of Tropical Plants in Nursery (B203)	$53,332	N/A	$106,666	Research
IFAS Comparison of Eddy Correlation and Lysimeter Techniques for Quantifying Evapotranspiration (P430)	$125,000	N/A	$125,000	Research
IFAS Crop Coefficients and Water Use for Peppers in Southwest Florida (B238)	$135,000	N/A	$135,000	Research
IFAS Evaluation of Soil Moisture Based On Demand Irrigation Controllers for Vegetable Production (B228)	$107,175	N/A	$142,900	Research
IFAS Evaluation and Development of an ET reference Model for Irrigation of Woody Ornamentals (B200)	$32,450	N/A	$99,900	Research
IFAS Irrigation Schedule & Crop Coefficients For Trees (Seedlings to 5" Calipers) Phase II (B227)	$75,000	N/A	$98,750	Research
IFAS Water Budget and Irrigation Requirements For Southern Highbush Blueberries on Pine Bark (B226)	$114,756	N/A	$153,006	Research
IFAS Water Needs in Poly-Mulched & MBr Fumigation Alternatives -Tomatoes & Peppers (B240)	$150,000	N/A	$150,000	Research
IFAS Water Requirements For Genetically Altered Lantana Camara Plants (B239)	$100,050	$12,890	$112,940	Research
Reduction of Water Use for Citrus Cold Protection (B241)	$15,000	N/A	$15,000	Research
Tailwater Recovery Management Practices to Reduce Pathogens (B201)	$45,000	N/A	$135,000	Research
Subtotal - Funding was completed for above projects before FY2010	**$1,894,763**	**$12,890**	**$2,306,485**	**-**

[1] "FY2007-FY2011 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 A2-3b. Agricultural Demand Research Projects: Completed, Ongoing or Planned with Secured or Pledged Funding FY2007-2011

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	Estimated Water Conserved (mgd)
IFAS Accounting For Interception of Sprinkler Irrigation Water by Container Grown Plants (B266)	$91,125	N/A	$91,125	Research
IFAS Automatic sprinkler irrigation in container nurseries using a web-based program (B291)	$29,500	N/A	$165,000	Research
IFAS BMP Plan Implementation Team Support (H579)	$100,000	$200,000	$650,000	Research
IFAS Citrus Irrigation Management to Increase Young Tree Growth on Flatwoods Ridge Soils (B264)	$109,500	N/A	$122,300	Research
IFAS Determining Specific Irrigation Volumes & Fertilization Rates for Strawberry Cultivars (B254)	$125,000	N/A	$125,000	Research
IFAS Development of Irrigation Schedules & Crop Coefficients for Trees (B293)	$17,960	N/A	$107,760	Research
IFAS Development of Landscape Fertilizer BMPs (N013)	$122,700	$122,750	$519,879	Research
IFAS Evaluation of Different On-Farm Blueberry Systems To Improve Irrigation Efficiency (B263)	$69,900	N/A	$69,900	Research
IFAS Evaluation of Minimal Required Number of Soil Moisture Sensors (B286)	$74,000	N/A	$110,000	Research
IFAS Evaluation of Nutrient Leaching From Mixed Landscapes (B292)	$25,000	N/A	$100,000	Research
IFAS Florida Automated Weather Network (FAWN) Data Dissemination and Education (B136)	$575,000	N/A	$1,325,000	Research
IFAS Irrigation Requirements for diverse soilless and open field production (B290)	$25,000	N/A	$75,000	Research
IFAS Non-Irrigation Alternatives for Strawberry Cold Protection (B294)	$37,500	N/A	$187,500	Research
IFAS Optimizing Irrigation For Shade Tree Production (B265)	$62,906	N/A	$83,875	Research
IFAS Reducing Nursery and Landscape Water Use by Genetically Altering Nandina Plants (B257)	$100,000	N/A	$125,000	Research
IFAS Reduction of Irrigation for Bare-Rooted Strawberry Transplanting & Cold Protection (B288)	$50,000	N/A	$75,000	Research
IFAS Reduction of Water Use for Citrus Cold Protection (B287)	$11,000	N/A	$16,500	Research
IFAS Strawberry Cold Protection Optimization (B295)	$30,000	N/A	$120,000	Research
IFAS Water Use Determination for two Bio Fuel Crops (B289)	$140,000	N/A	$200,000	Research
Subtotal - Ongoing FY2010-FY2011	**$1,796,091**	**$322,750**	**$4,268,839**	**-**
Total for above Agricultural Research Projects	**$3,690,854**	**$348,530**	**$8,881,809**	**-**

[1] "FY2007-FY2011 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 A2-4a. Reclaimed Water Projects: Completed, Ongoing or Planned With Secured or Pledged Funding FY2007-2011 (Funding was completed before FY 2010)

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	At Build-Out	
				Additional Water Supply (mgd)	Traditional Supplies Offset (mgd)
Aqua Utility's Reclaimed Water Trans. and Pumps to Lakewood Ranch (L874)	$1,720,700	$1,553,300	$3,274,000	1.50	1.50
Auburndale Reuse and Alternative Sources Study (N001)	$50,000	$50,000	$100,000	Study	Study
Bradenton/Manatee Co./Palmetto Reuse Interconnect Study (L854)	$40,000	$80,000	$120,000	Study	Study
Hillsborough Co Lithia-Pinecrest Reclaimed Water Transmission (L294)	$630,312	$2,304,000	$3,600,000	3.58	1.82
North Port Reuse Master Plan (L629)	$47,500	$47,500	$95,000	Study	Study
Palmetto's 1.2 mgd Dry Season Reclaimed Water ASR System (L608)	$869,000	$1,066,000	$2,340,000	Storage	Storage
Punta Gorda Reuse Feasibility Study (L640)	$125,000	$125,000	$250,000	Study	Study
Sarasota County's 3.0 mgd Reclaimed Water ASR System in N. County (K269)	$420,000	$3,221,773	$6,443,546	Storage	Storage
Subtotal - Funding was completed for above projects before FY2010	**$3,902,512**	**$8,447,573**	**$16,222,546**	**5.08**	**3.32**

[1] "FY2007-FY2011 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 A2-4b. Reclaimed Water Projects: Completed, Ongoing or Planned With Secured or Pledged Funding FY2007-2011

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	At Build-Out	
				Additional Water Supply (mgd)	Traditional Supplies Offset (mgd)
Charlotte's East/West Reclaimed Water Systems Interconnects (H085)	$900,000	$1,314,550	$2,800,000	TBD	TBD
Charlotte County Regional Reclaimed Water Expansion (H027)	$2,399,926	$3,206,825	$7,250,000	1.27	0.95
Englewood's Additional Reclaimed Water ASR Well and Pond Expansion (N218)	$130,000	$130,000	$260,000	0.08	0.06
Haines City Southern Reclaimed Water Transmission Main Extension (N065)	$2,217,371	$2,084,629	$4,302,000	0.60	0.49
Hillsborough Aquifer Recharge With Reclaimed Water in South County (N287)	$1,168,073	$1,382,500	$2,765,000	Study	Study
Manatee's First of Four MARS 10 MG Reclaimed Storage Tank (H086)	$2,250,000	$2,250,000	$4,500,000	Storage	Storage
Manatee's Second of Four MARS 10 MG Reclaimed Storage Tank (H093)	$1,250,000	$2,500,000	$5,000,000	Storage	Storage
North Port Reuse Storage Tank and High Service Pump Station (N084)	$1,051,250	$1,051,250	$2,102,500	1.60	0.96
North Port's Reclaimed Water Transmission Main Phase 1 (N277)	$194,500	$1,945,000	$3,890,000	1.30	0.80
Polk County Recharge Investigation With Reclaimed Water (N304)	$188,874	$377,748	$755,496	Study	Study
Polk's SWRUSA Carter Road Reclaimed Water Transmission Main (N156)	$392,065	$392,065	$784,130	0.22	0.13
Riverwood CDD's Reclaimed Water Interconnect to Charlotte County (N327)	$225,000	$350,000	$700,000	0.66	0.45
Rotunda ASR Well Conversion for Reuse Water ASR (L215)	$1,261,700	$1,414,550	$3,000,000	Storage	Storage
TECO's Power Station Reclaimed Water Interconnect to Lakeland & Polk (H076)	$22,507,754	$34,676,734	$72,686,800	7.00	7.00
WateReuse Research Foundation Study of Reclaimed Nutrient Loading (P698)	$16,700	$288,400	$305,100	Research	Research
Winter Haven Desktop Study of Reclaimed Water for Recharge (N286)	$100,000	$100,000	$200,000	Research	Research
Subtotal - Ongoing FY2010-FY2011	**$36,253,213**	**$53,464,251**	**$111,301,026**	**12.73**	**10.84**
Totals	**$40,155,725**	**$61,911,824**	**$127,523,572**	**17.81**	**14.16**

[1] "FY2007-FY2011 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 with Secured or Pledged Funding FY2007-2011

PROJECTS	FY2007-FY2011 District Budget[1]	Cooperator Funding	Total Project Costs	Supply (mgd)
Highlands County Groundwater Quality (B244)	$60,000	$514,000	$574,000	Study
Longboat Key Potable Water Interconnect (L230)	$500,000	$6,156,958	$6,656,958	Pipeline
Polk Comprehensive Water Supply Plan (H072)[2]	$382,127	$573,191	$955,318	Planning
Potential for ASR in Avon Park Formation (B242)	$144,000	$0	$144,000	Study
PRMRWSA Regional Loop Phase 1A (H069)	$12,007,500	$7,007,500	$19,015,000	Pipeline
PRMRWSA Resource Development Feasibility Study (H063)	$1,025,000	$1,225,000	$2,414,562	Planning
Punta Gorda Shell Creek WTP Expansion (H060)	$1,500,000	$1,269,307	$2,769,307	2.0
Subtotal - Funding was completed for above projects before FY2010	**$15,618,627**	**$16,745,956**	**$32,529,145**	**2.0**
Arcadia DeSoto Interconnect (H084)	$112,500	$37,500	$150,000	Pipeline
ASR Pretreatment Investigation (H046)	$270,000	$400,000	$1,556,693	Study
Myakka River Watershed Initiative (H048)	$4,810,000	$0	$5,334,319	Study
North Port ASR Feasibility (K120)	$368,882	$1,374,070	$2,000,000	Study
North Port Brackish RO Project (N082)	$1,400,000	$10,198,782	$11,598,782	1.5
Polk Groundwater Recharge Investigation (N304)	$188,874	$377,749	$755,496	Study
PRMRWSA 6 bg Regional Reservoir (F032)	$20,748,654	$38,418,817	$77,049,655	Storage
PRMRWSA Brackish Groundwater Study (H079)	$900,000	$600,000	$1,800,000	Study
PRMRWSA Peace River Facility Expansion (F033)	$23,191,571	$46,115,403	$90,143,200	24.0
PRMRWSA Regional Loop Phase 2 (H051)	$7,783,015	$7,616,985	$15,400,000	Pipeline
PRMRWSA Regional Loop Phase 3A (H052)[3]	$13,825,135	$19,174,865	$33,000,000	Pipeline
Sarasota Dona Bay Pilot Treatment Study (H088)	$1,132,108	$1,047,500	$2,095,000	Study
Subtotal - Ongoing FY2010-FY2011	**$74,730,739**	**$125,361,671**	**$240,883,145**	**25.5**
Totals	**$90,349,366**	**$142,107,627**	**$273,412,290**	**27.5**

[1] "FY2007-FY2011 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] Project funding for H072 was transferred from another project (H080) in 2008, therefore funding did not appear in the adopted budget.

[3] In 2010, the adopted budget for H052 was reduced $5.4M by amendment after construction costs were much lower than estimated. The revised District, Cooperator, and Total Costs are shown.

Table A2-6. Proposed Large-scale Water Supply and Water Resource Development Projects from 2011-2025 (in million dollars) [1]

PROJECTS	Entity Responsible For Implementation	Quantities (mgd)	Capital Costs	Land Costs	Potentially Eligible Land Costs	Total Costs (Capital + Land)
Regional Resource Development	PRMRWSA	8	$117	$4	-	$121
Regional Loop System	PRMRWSA	N/A	$112	$3	-	$115
Polk County Water Supply Development	Polk County and potentially municipalities	30	$320		-	$320
Flatford Swamp Hydrologic Restoration	Mosaic	12	$81		-	$81
Hydrogeological Investigation of the Lower Floridan Aquifer	SWFWMD	N/A	$12			$12
Southwest Polk County/Tampa Electric RW (Phase 2)	Tampa Electric Co.	6	$70			$70
Total – Southern Water Use Caution Area		56	$712	$7	-	$719

[1] These projects are not all anticipated to be fully completed by 2025; however, there are other projects such as the Hydrogeological Investigation of the Lower Floridan Aquifer that is expected to producenew supply but the amount cannot yet be quantified.

Appendix 3
MIA and Ridge Lakes Stakeholder Outreach Response and Results

Executive Summary
The SWUCA Recovery Strategy Five-Year Assessment for FY2007-2011 determined that additional options above and beyond those identified in the Recovery Strategy would be necessary to achieve recovery of minimum flows and levels (MFL) in the Most Impacted Area (MIA) and 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 recovery.

Four meetings were held in each of the two areas. Participants represented all the major water use groups along with a variety of environmental organizations, state agencies, and other interested parties. Most of the organizations represented at the meetings were also involved in the development of the Recovery Strategy in 2006. Discussions explored the water resource concerns, causes and potential non-regulatory solutions. District staff took the information obtained from these meetings and developed options for the Governing Board's consideration. These options were provided for comment to the stakeholders and various District advisory boards prior to being presented to the Governing Board.

MIA Options
Six options identified by staff to help meet the saltwater intrusion minimum aquifer level goal for the MIA were presented to the Governing Board on February 24, 2015. The six options were:

1. **Continue monitoring**
2. **Update analytical tools**
3. **Promote water conservation initiatives**
4. **Expand FARMS, the District's public/private cost-share program to promote agricultural best management practices, in the MIA**
5. **Expand beneficial reuse**
6. **Explore aquifer recharge/aquifer storage and recovery (ASR)**

Expanding FARMS is a key component because agriculture is the largest groundwater user in the region. The Board voted in support of the first five options and directed staff to gather more information regarding the exploration of aquifer recharge and ASR. At its meeting on April 28, 2015, the Board approved the initiation of rulemaking to increase the District's cost share to 75% for FARMS projects in the MIA for a period of three years to encourage participation in the program.

Ridge Lakes Options
Three options identified by staff to help meet the minimum levels goals in the Ridge Lakes area of SWUCA were presented to the Governing Board on April 28, 2015. The three options were:

1. **Continue monitoring**
2. **Reevaluate established minimum lake levels**
3. **Evaluate available options for individual lakes**

Reevaluating minimum levels on lakes is being done on specific lakes that had MFLs established using older methodology. Management plans will be evaluated for individual lakes rather than relying on a primarily regional approach. The Governing Board supported the three options.

The next SWUCA Recovery Strategy five-year assessment will begin in FY2017.

Background/History

In March 2006, the Governing Board adopted minimum "low" flows for the Upper Peace River, minimum levels for eight lakes along the Lake Wales Ridge in Polk and Highlands counties and a saltwater intrusion minimum aquifer level (SWIMAL) for the Upper Floridan aquifer in the Most Impacted Area (MIA) of the SWUCA. Since most, if not all, of these minimum flows and levels (MFLs) were not meeting their adopted levels and flows, the Board adopted a SWUCA Recovery Strategy (Strategy) and changes to its water use permitting rules to implement the Strategy.

The principle goals of the Recovery Strategy are to:

1. Restore minimum levels to priority lakes in the Ridge area by 2025;
2. Restore minimum flows to the upper Peace River by 2025;
3. Reduce the rate of saltwater intrusion in coastal Hillsborough, Manatee and Sarasota counties (referred to as the MIA) by achieving the proposed minimum aquifer level for saltwater intrusion by 2025; once achieved, future efforts should seek further reductions in the rate of saltwater intrusion and the ultimate stabilization of the saltwater-freshwater interface; and
4. Ensure that there are sufficient water supplies for all existing and projected reasonable/beneficial uses.

The guiding principles approved by the Board for the Recovery Strategy included:

- Contribute significantly to resource management and recovery;
- Protect investments of existing water use permit holders;
- Allow for economic expansion and new economic activities.

The Strategy provides a plan for achieving MFLs by 2025, providing sufficient water supplies for all reasonable-beneficial uses, and protecting investments of existing water use permittees.

At the August 2013 Governing Board meeting, District staff provided an overview of the first five-year assessment of the Recovery Strategy. Though significant progress has been made with respect to the Upper Peace River and water supply goals, there is more work that needs to be done to ensure recovery can be achieved in the MIA and Ridge Lakes areas. As recommended at the meeting, District staff established separate stakeholder groups in each of these areas and conducted a series of meetings over the last year. The purpose of these meetings has been to review the five-year assessment in more detail and to obtain input from the stakeholders on options for achieving recovery goals.

MIA Stakeholder Workgroup

This workgroup involved representatives from a diverse array of stakeholders including representatives of all water use groups (public supply, agriculture, commercial/industrial, mining/dewatering and recreation/aesthetic), along with a variety of environmental organizations and state agencies.

The District has been successful in reducing SWUCA groundwater withdrawals by 50 million gallons per day (mgd), but the aquifer levels remain approximately a foot lower than the goal.
The primary options the Workgroup discussed to achieve the aquifer level goal are to increase water use efficiencies to continue to reduce overall water use (conservation), to implement additional alternative water source projects and/or to recharge the aquifer.

The workgroup discussed four programmatic approaches:

- Conservation
- FARMS (Cost-sharing program to reduce groundwater use and improve water quality)
- Alternative Water Supplies (AWS)
- Aquifer recharge/Aquifer Storage and Recovery (ASR)

Conservation

Conservation was identified by stakeholders as a priority. Much of the discussion on conservation focused on public supply use. Agricultural conservation was covered during the FARMS section.

The District leads the state in its low per capita rates. Within the District, recent reductions in per capita have been most dramatic in the MIA. Since 2002, per capita Districtwide has been reduced by 16 percent, within the SWUCA by 20 percent, and within the MIA by 23 percent.

Some of the stakeholders' recommendations for public supply conservation were to use inclining rate structures, financial incentives/rebates (e.g., to be used for low-flow fixtures, soil moisture sensors, leak detection, irrigation audits), education, outreach and advertising. Many of these tools are already being used by the District and utilities.

FARMS

The District's FARMS program was viewed as an important option to partner with the agricultural community to implement conservation and alternative water source projects. As of September 2014, there were 123 FARMS projects in the SWUCA including 8 FARMS projects in the MIA. At an average cost of $1.29 per thousand gallons, the expected reduced use as a result of these projects is:

- SWUCA (including MIA): 23.7 mgd
- MIA: 4.5 mgd

FARMS is a voluntary, cost-share program. Stakeholders provided recommendations on how to increase participation in the program, including:

- Increase the District's share of costs
- Allow excavation costs to be eligible for reimbursement
- District pays up front rather than reimburses
- Promote good news stories of FARMS successes to agricultural community
- Recognize farmers with successful FARMS projects
- District shares operation and maintenance costs

Alternative Water Supplies

Stakeholders discussed the use of alternative water sources to reduce demand on the Upper Floridan aquifer. The MIA contains potential sources of alternative water supplies. Available surface water and reclaimed water quantities are shown in the following tables:

Potential surface water sources identified in Regional Water Supply Plan (mgd)

- Alafia River: 18.2
- Flatford Swamp: 10
- Cow Pen Slough: 32.9
- Peace River: 80.4

Reclaimed water

County	Used (mgd)	Additional Available (mgd)
S. Hillsborough	10.8	7.6
Manatee	15.4	11.9
N. Sarasota	8.2	6.6

Some of the stakeholder recommendations on alternative water sources included:

- Expand use of reclaimed water to offset groundwater uses
- Use former mining areas for reservoirs
- Identify potential customers; have large customers help pay for infrastructure

Stakeholders also identified challenges to using reclaimed water, including:

- Contractual prohibitions with agriculture driven by perceived food safety concerns
- Regulatory prohibitions with agriculture driven by perceived food safety concerns
- Local watershed regulations driven by perceived water quality impacts to drinking water supplies
- Public perception
- Lack of infrastructure to deliver water
- Increasing costs of reclaimed water

Aquifer Recharge/Aquifer Storage and Recovery (ASR)

In addition to being used as a substitute source to reduce groundwater withdrawals, the same alternative sources listed above could also provide a benefit through aquifer recharge or aquifer storage and recovery (ASR).

Aquifer recharge puts water into the aquifer and leaves it there for a resource benefit. ASR injects water into the aquifer to store it temporarily until it is retrieved for use (usually from the same well).

Aquifer recharge has significant potential because of its direct impact on water levels. However, significant challenges include treatment costs and permitting. The treatment costs depend on the type and quality of the water being used – reclaimed or surface water – as well as the water quality in the aquifer where the injection would occur.

Injecting water into a zone of the aquifer that contains high quality water may provide the greatest benefit from a water level recovery standpoint but would also dramatically increase the treatment costs and the permitting challenges. Injecting water into a lower water quality zone of the aquifer would cost less and be easier to permit, but may not provide as much lift to aquifer levels in the potable zones. Current projects on which the District is partnering should shed additional light on these issues.

Stakeholder feedback on ASR/Aquifer Recharge:

- Utilities: any capital they spend must be a benefit to customers
- Must be cost-effective
- Need to develop a way to economically treat reclaimed water to drinking water standards

Options

Following a review of District information and stakeholder feedback, a diverse, multi-disciplinary team of District staff developed the following options for the Governing Board to consider to help meet the saltwater intrusion minimum aquifer level goal for the MIA identified in the SWUCA Recovery Strategy by 2025.

1. **Continue monitoring**
   Continue to collect data on water levels and quality, rainfall, and groundwater withdrawals to adequately assess the status of aquifer levels and the affects from various factors on those levels.
2. **Update analytical tools**
   Continue to refine modeling and other analytical tools to more accurately assess the wells at risk from saltwater intrusion, and the effects of changing water use patterns, rainfall/pumping influences and sea level rise.

3. **Conservation initiatives**
   Continue to encourage behaviors and actions that conserve water through speaking engagements, social and news media, advertising and the District's website, including promoting:
   - Florida Water Star℠
   - Florida-Friendly Landscaping™
   - Seasonal behaviors/campaigns ("Skip a Week" in winter and "Watch the Weather, Wait to Water" in summer)
   - Incentive programs (toilet rebates, etc.)
4. **Expand FARMS in the MIA**
   Expand FARMS in the MIA to help achieve the minimum aquifer level through conservation or source substitution, to include:
   - Setting a specific FARMS groundwater offset target for the MIA
   - Increasing the District's cost share to 75% for FARMS projects in the MIA
   - Increasing recognition of FARMS participants
5. **Expand beneficial reuse**
   Increase the use of reclaimed water in the MIA to help achieve the minimum aquifer level by:
   - Seeking cost-share projects
   - Working with local, state and federal agencies to reduce obstacles to increased use of reclaimed water
6. **Explore aquifer recharge/ASR**
   Explore ways to use various water sources to recharge the aquifer including:
   - Seeking partners for cost-share projects
   - Working with local, state and federal agencies to address permitting issues
   - Seeking ways to lower the treatment costs

These options were presented to the Governing Board on February 24, 2015. The Board voted in support of the first five options and directed staff to gather more information regarding the exploration of aquifer recharge and ASR. At its meeting on April 28, 2015, the Board approved the initiation of rulemaking to increase the District's cost share to 75% for FARMS projects in the MIA through September 30, 2018, to encourage participation in the program.

Ridge Lakes Stakeholder Workgroup

This workgroup involved representatives from a diverse array of stakeholders including representatives of all water use groups (public supply, agriculture, commercial/industrial, mining/dewatering and recreation/aesthetic), along with a variety of environmental organizations and state agencies. The workgroup focused on methods to achieve adopted lake levels in the Ridge Lakes region. Over the past decade, groundwater withdrawals in the SWUCA have declined by about 50 mgd, but long-term levels in several lakes continue to fluctuate below adopted minimum levels.

The primary options the Workgroup discussed to achieve adopted lake levels are increased water use efficiencies to continue to reduce overall water use (conservation), and to implement projects to develop additional alternative water sources and/or to recharge impacted environmental systems.

The workgroup discussed three programmatic approaches:

- Conservation
- Alternative Water Supplies (AWS)
- Management Options

Conservation

Conservation was identified by stakeholders as a priority. With respect to public water supplies, the District leads the state in its low per capita rates. Since 2002, per capita Districtwide has been reduced by 16 percent, within the SWUCA by 20 percent, and within the Ridge Lakes area by 20 percent.

Some of the stakeholders' recommendations for public supply conservation were education, outreach, advertising, and implementing projects to prevent excess drainage of the area. Many of these tools are already being used by the District and utilities.

The District's FARMS program is a voluntary cost-share program that is viewed as an important option to partner with the agricultural community to implement conservation and alternative water source projects. As of September 2014, there were 123 FARMS projects in the SWUCA including 13 FARMS projects in the Ridge Lakes area. At an average cost of $1.29 per thousand gallons, the expected reduction in water use as a result of these projects is:

- SWUCA (including the Ridge Lakes area): 23.7 mgd
- Ridge Lakes area: 1.2 mgd

Stakeholders provided recommendations on how to increase participation in the program, including:

- Increase the District's share of costs
- Allow excavation costs to be eligible for reimbursement
- District pays up front rather than reimburses
- Promote good news stories of FARMS successes to the agricultural community
- Recognize farmers with successful FARMS projects
- District shares operation and maintenance costs

Alternative Water Supplies

Stakeholders discussed the use of alternative water sources to reduce demand on the Upper Floridan aquifer. Potential surface water and reclaimed water sources for the Ridge Lakes area are shown in the following tables:

Potential surface water sources identified through the Regional Water Supply Plan process (mgd)

- Peace River at Fort Meade: 4.2
- Interconnect with PRMRWSA: 5.1
- Kissimmee River: up to 25*
- Interconnect with TBW (Alafia River): 10

Reclaimed water

County	Used (mgd)	Additional Available (mgd)
Highlands	0.1	1.2
Polk	23	6.5

Some of the stakeholder recommendations on alternative water sources included:

- Expand use of reclaimed water to offset groundwater uses
- Keep reclaimed water in the area for recharge
- Identify potential customers; have large customers help pay for infrastructure

*The future availability of water supply from the Kissimmee River will be determined by the SFWMD through the process of establishing a water reservation that is anticipated to be complete in 2015.

Stakeholders also identified challenges to using reclaimed water, including:

- Public perception
- Lack of infrastructure to deliver water
- Increasing costs of reclaimed water

Brackish water

Brackish water desalination from the Lower Floridan aquifer (LFA) is a potential source of future water. The District is currently exploring this potential source as a management option to supplement supplies from the Upper Floridan aquifer and minimize impacts to surface features.

Feedback from stakeholders on this topic included:

- These alternative sources are expensive.
- Cost is not regularly discussed in public meetings and should be emphasized.

Stormwater

The Florida Department of Transportation (FDOT) recently suggested providing/storing stormwater in medians and ponds of new roadways, which could be an option if it is proposed during the early phases of roadway design.

Feedback from stakeholders on this topic included:

- The District should further examine excess drainage flowing out of the Ridge Lakes area and evaluate the potential to use indirect methods (such as RIB systems) to recharge and/or reuse this water.

Management Activities

Several lakes in the Ridge Lakes area are currently not meeting established minimum levels. Because these lakes are distributed throughout the area, it will be difficult to implement a single project to achieve recovery in all the lakes. The result is that separate action plans will likely need to be developed and implemented for each lake or group of lakes. These plans will consist of implementing combinations of different management activities that achieve a reduction in impact and/or provide additional water to the lake. The types of activities discussed included: relocating and/or deepening existing, nearby withdrawals that adversely affect the lake(s); replacing groundwater withdrawals with an alternative water supply; and, providing recharge either directly or indirectly to augment the lake(s).

Feedback from stakeholders included:

- Reclaimed water should be used for recharge versus irrigation
- Excess surface water drainage should be maintained in the area and recharged where possible.

Options

Following a review of District information and stakeholder feedback, a diverse, multi-disciplinary team of District staff developed the following options for the Governing Board to consider to help meet established minimum lake levels identified in the SWUCA Recovery Strategy by 2025. Two key components include reevaluating minimum levels on lakes that were set using older methodology to ensure the targets were appropriate, and looking at management plans for individual lakes rather than relying on a primarily regional approach. The three options were:

1. **Continue monitoring**
    a. Continue to collect data on water levels and quality, rainfall, and groundwater withdrawals to adequately assess the status of lake levels and the affects from various factors on those levels.

2. **Re-evaluate established minimum lake levels**
    a. Re-evaluate established minimum levels on key lakes to ensure most updated methods are incorporated into the established levels. This will ensure the best available information is used prior to implementing recovery projects.
3. **Evaluate available options for individual lakes**
    a. Reduction of groundwater withdrawals
        i. Continue to encourage conservation through financial incentive programs, education and outreach, including promoting:
            1. Incentive programs (toilet rebates, etc.)
            2. Expansion of FARMS in the Ridge Lakes
            3. Florida Water Star℠
            4. Florida-Friendly Landscaping™
            5. Seasonal behaviors/campaigns ("Skip a Week" in winter and "Watch the Weather, Wait to Water" in summer)
        ii. Increase the use of reclaimed water and other alternative sources in the Ridge Lakes area to help achieve minimum lake levels by:
            1. Seeking cost-share projects
            2. Working with appropriate agencies to reduce obstacles to increased use of reclaimed water
    b. Relocation of groundwater withdrawal points and/or deepening of these points.
    c. Direct or indirect augmentation
        i. Seeking partners for cost-share projects
        ii. Working with local, state and federal agencies to address permitting issues
        iii. Seeking ways to lower the treatment costs

These options were presented to the Governing Board at its April 28, 2015 meeting. The Board supported this approach.