Lake County Water Supply Plan

Executive Final Report

Prepared for
Lake County Water Alliance

Prepared by
Water Resource Associates, Inc.

In association with
Biological Research Associates
SDII Global
Wendy Grey Planning

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ACKNOWLEDGEMENTS

Members of the Lake County Water Alliance Board

Allen Sherrod, Vice-Mayor, City of Groveland
Bob Thielhelm, Council Member, City of Mount Dora
Bill Polk, Commissioner, City of Leesburg
Catherine Hanson, Commissioner, Lake County Board of County Commissioners
Christopher Bell, Mayor, Fruitland Park
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Nancy Clutts, Commissioner, City of Tavares
Robert Lovell, Mayor, City of Leesburg
Robert Olsen, Political Representative, Town of Howey-In-The-Hills
Robert Wolfe, Council Member, City of Tavares
Sandy Gamble, City of Tavares
Shane Perrault, Council Member, City of Minneola
Sue Cordova, Council Member, City of Minneola
Tony Holden, Commissioner, Town of Lady Lake

Lake County Water Alliance Project Manager

Ray Sharp, Director, Environmental Services Department, City of Leesburg
Marj Allman, Administrative Assistant, Environmental Services, City of Leesburg

St. Johns River Water Management District Project Manager

Terry Clark, Liaison to St. Johns River Water Management District

Members of the Lake County Water Alliance Technical/Management Committee

Arthur Nix, City Engineer, Town of Montverde
Bill Herrington, Town of Howey-In-The-Hills
Bradley Hayes, Director of Utilities, City of Tavares
Burney Vaughn, City of Tavares
Carl Gosline, City of Minneola
Chin Khor, Senior Dir of Public Services, City of Eustis
Daryl Smith, Director, Lake County Dept. of Environmental Services
Gary Hammond, Director Public Services, City of Mount Dora
Gregg Welstead, Deputy Lake County Manager
Heath Frederick, Director of Public Works, City of Tavares
John Bostic, Public Works Director, City of Fruitland Park
Ken Keough, Public Works Director, Town of Lady Lake
LaChea Parson, Lake County Attorney's Office
Larry Konieczko, City of Eustis
Larry Walker, Public Works Director, City of Groveland
Mark Odell, Public Works Director, City of Minneola
Michael Perry, Executive Director, Lake County Water Authority
Paul Lahr, City of Mount Dora
Ralph Bowers, Fruitland Park City Manager
Ray Sharp, Director, Environmental Services Department, City of Leesburg
Robert Holland, Public Works Director, City of Mascotte
Sarah Whitaker, CUP Consultant for Tavares, Leesburg and Minneola
Tamara Richardson, P.E., Director of Engineering & Utilities, City of Clermont
Ted Wicks, City of Umatilla, Wicks Consulting Services, Inc.

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Arlen N. Jumper, Ft. McCoy
Hersey “Herky” Huffman, Enterprise

St. Johns River Water Management District

Barbara Vergara, Water Supply Division Director
David Hornsby, Water Supply Project Manager

James Hollingshead, Supervising Hydrologist
Bill Adams, Hydrologist IV

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ACRONYMS

AADF	Average Annual Daily Flow
AF	Absorption Fields
Alliance	Lake County Water Alliance
AWS	Alternative Water Supply
BMPs	Best Management Practices
CFCA	Central Florida Coordination Area
Committee	Alliance Management/Technical Committee
CUPs	Consumptive Use Permits
DWSP	2005 SJRWMD Water Supply Plan
ECF	East-Central Florida
EIS	Environmental Impact Statement
F.S.	Florida Statutes
GCI	Golf Course Irrigation
gpcd	Gallons Per Capital Per Day
gpd	Gallons Per Day
LCWA	Lake County Water Authority
LOR	Lower Ocklawaha River
MFLs	Minimum Flows and Levels
mgd	Million Gallons Per Day
NCFCA	North-Central Florida Coordination Area
OC	Other Crops
OPAA	Other Public Access Areas
OUC	Orlando Utilities Commission
PD	Preliminary Design
PDF	Preliminary Design Reports
Plan	Lake County Water Supply Plan
RI	Residential Irrigation
SJRWMD	St. Johns River Water Management District
SWUCA	Southern Water Use Caution Area
UORB	Upper Ocklawaha River Basin
WRA	Water Resource Associates
WRWSA	Withlacoochee Regional Water Supply Authority

I. Introduction

Water Resource Associates (WRA) was selected by the Lake County Water Alliance (Alliance) to develop the "Lake County Water Supply Plan (Plan)" for its member governments. The Alliance is constituted of the following jurisdictions: the Cities of Clermont, Eustis, Fruitland Park, Groveland, Howey-In-The-Hills, Lady Lake, Leesburg, Mascotte, Minneola, Montverde, Mount Dora, Tavares and Umatilla. Originally, Lake County and Astatula were members of the Alliance but withdrew during the Plan process. The City of Leesburg, acting as an administrative arm of the Alliance, contracted with WRA in May of 2006 to complete the Plan. The St. Johns River Water Management District (SJRWMD) provided funding to the Alliance for the study and has been an active participant in providing data to the study and review of work-product.

The Scope of Work outlined five objectives that must be met in order for the Plan to be successful. These included:

1. Estimating the sustainable groundwater yield;
2. Maximizing the use of Alliance member water resources;
3. Avoidance of unacceptable environmental impacts;
4. Identification of cost-effective water supply development projects; and
5. Identification of new traditional or alternative water supply development projects that will not conflict with other local government users.

The Scope of Work that WRA accomplished for the Plan was broken into three phases. Phase 1 involved project initiation and project management/administration throughout the duration of the project. Phase 2 involved the collection and assessment of existing data. Phase 3 included the identification of alternative water supply development projects, review of existing regional monitoring programs and final reporting. Groundwater modeling was originally considered as part of Phase 3 but was later cut from the scope based on consensus of the Alliance, SJRMWD and WRA.

This review and analysis resulted in the production of four (4) Technical Memorandums. Each Technical Memorandum was presented at the Alliance Management/Technical Committee (Committee) in a series of required workshops. The Committee is made up of utility directors and consultants from the Alliance members and representatives from the SJRWMD. The Technical Memorandums were also presented to the Alliance Board, which is constituted of elected officials from each of the Alliance member municipalities.

A project management system was utilized to give Alliance Committee and Board Members opportunities to review draft work product and information and data collected to base various analyses on. Utilizing this project management system, workshops and presentations the Alliance was able to give WRA input throughout the study process as Technical Memorandums were produced.

This final executive report is an overview of the analyses, findings, conclusions and recommendations from the Technical Memorandums. The Technical Memorandums are attached to the report summary as appendices. This will give the reader the ability to review the data and detailed analyses that went into the executive report, conclusions and recommendations.

1.0 Existing Plan Review

This task entailed surveying Lake County and the region's current water resource related documents. Although the Plan focuses on Lake County, surrounding counties, governments and initiatives will affect future water resource availability and development. Thus, it is essential to have an understanding of water supply development plans and initiatives in the areas surrounding Lake County and their potential influence on water supply projects currently underway or proposed for implementation. A review of existing water supply plans and other pertinent reports related to water needs and sources was carried out to fulfill this need. These reports were obtained from utilities, local governments, and water management districts directly or from their websites. Each paper was reviewed and summarized for this task. The background, objectives and conclusions of each report are detailed in each summary and included in Technical Memorandum #1 (attached).

2.0 Existing Water Use and Sources

The SJRWMD regulates water use under Chapter 373, Florida Statutes (F.S). The Plan presents an examination of existing Consumptive Use Permits (CUPs) and associated data in Lake County. This portion of the Plan does not address water demand for the County, but rather is an assessment of existing permitted or allocated quantities. These quantities are estimates of what users anticipate to be their average daily demands over the permit duration at the time of application for the permit. However, it is not uncommon for population growth to be above or below anticipated populations when permit applications were submitted, so actual water use can exceed or fall short of existing permitted quantities. Pumpage data was obtained and are presented in Technical Memorandum #2 in order to provide a general comparison between expected demand (allocated quantities) and actual demand. Allocated quantities assessed in this part of the Plan were used later (in Technical Memorandum #4) in estimating potential future groundwater availability.

Domestic self-supplied water use was not included in this analysis, as CUPs are not required for this use (although well construction is tracked by the SJRWMD). However, an analysis of demand associated with domestic self-supplied users will be presented later in the Plan along with existing and projected demand of other users in the County.

Specifically, the analysis of existing CUPs included an inventory of CUPs permitted for golf course irrigation, CUPs that include four (4) – inch wells[1], and CUPs permitted for 100,000 gallons per day (gpd) or greater. An analysis of these CUPs, including allocated quantities, spatial distribution, supply sources, use types, and pumpage data served to establish a baseline of existing permitted water use within the County and within the Alliance. Data used to complete these tasks were obtained from the SJRWMD. For more details on this component of the Plan, including spatial mapping and more detailed analyses of data and data limitations, refer to Technical Memorandum #2.

While water allocated to golf course (recreational) water uses is substantially lower in comparison to other water use categories on a countywide basis, it is useful to identify and categorize the allocated sources of water for this water use. Identification of potential opportunities for reuse water supply is a critical component of the overall water strategy. To

[1] Since the SJRMWD does not provide allocated data by well, no analysis on water source, use type or pumpage would be representative of data directly associated with 4-inch wells. The location of 4-inch wells may be available through SJRWMD well construction permits.

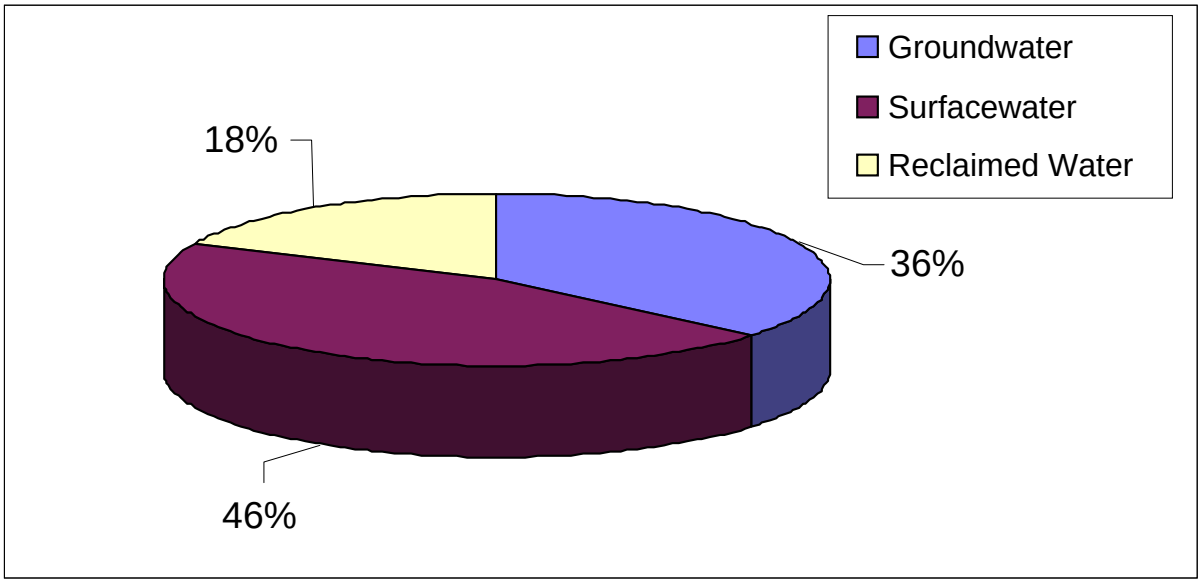
meet the needs of a growing population, the number of golf courses in the County is expected to grow over the years, and meeting these demands with reclaimed water would reduce stress on new groundwater supplies.

Approximately 5.4 mgd 36%) of allocated quantities for these permits are from groundwater sources, 6.9 mgd (46%) are from surfacewater and 2.7 mgd (18%) are from reclaimed water (Table 2-1, Figure 2-1).

Table 2-1 Lake County Golf Course CUP Allocations by Source

Source	Golf Course CUPs Allocated Quantities (mgd)	Percent
Groundwater	5.43	36.1%
Surfacewater	6.92	46.0%
Reclaimed water	2.70	17.9%
Total	**15.1**	**100.0%**

Figure 2-1 Lake County Golf Course CUP Allocations by Source



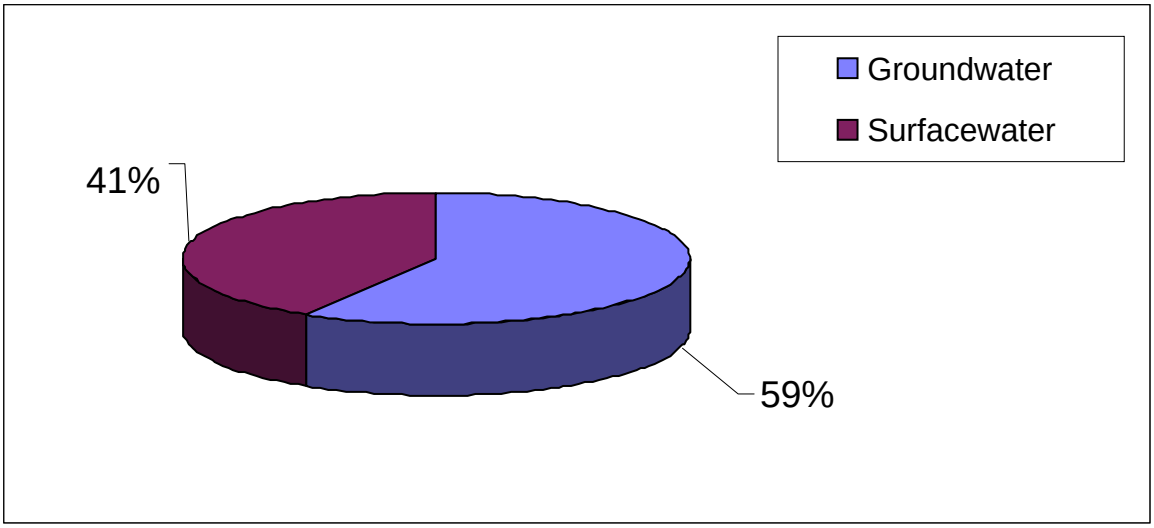
CUPs permitted for 100,000 gpd or greater are of primary interest due to the magnitude of withdrawals that could potentially impact groundwater and surfacewater supplies, water quality, environmental features and other legal water users. As previously stated, there is some overlap between 4-inch wells and golf course (recreational) permits within this data set.

Approximately 96.1 mgd (59%) of allocated quantities for these permits are from groundwater sources, and 67.9 mgd (41%) are from surfacewater (Table 2-2, Figure 2-2).

Table 2-2 Lake County Allocations for CUPs permitted for ≥100,000 gpd

Source	CUPs ≥100,000 gpd Allocated Quantities (mgd)	Percent
Groundwater	96.07	58.6%
Surfacewater*	67.9	41.4%
Total**	**164.0**	**100.0%**

Figure 2-2 Lake County Allocations for CUPs permitted for ≥100,000 gpd*,**



***Approximately 46 mgd of the mining/dewatering use is re-circulated surfacewater.
**Does not include 0.8% public supply allocations attributed to small utilities that (allocated for <0.1 mgd public supply use type). Does not include reuse supplementation and surfacewater augmentation as these allocated quantities account for 1% of total allocated quantities.

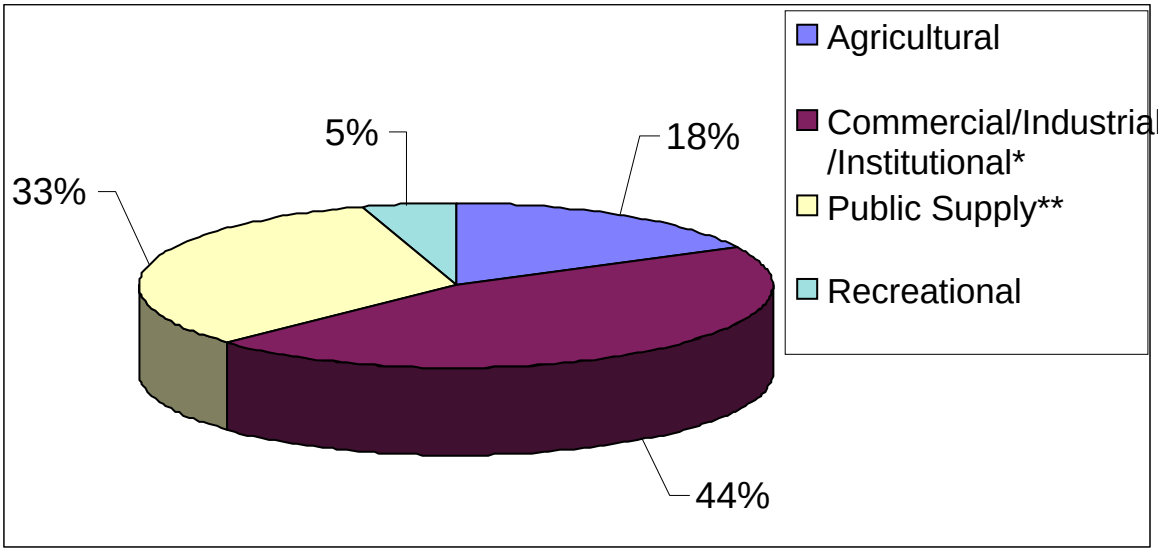
These CUPs permitted for 100,000 gpd or greater span all the water use categories, including: public supply, agricultural irrigation self-supply, recreational self-supply, commercial / industrial / institutional self-supply, and power generation self-supply. Of the total currently permitted use for these CUPs, approximately 53.5 mgd (33%) is public supply, 74.0 mgd (45%) is commercial/industrial/institutional, 7.6 mgd (5%) is recreational, and 28.8 mgd (17%) is agricultural irrigation (Table 2-3, Figure 2-3). There are no power generation CUPs in Lake County.

Of the 74 mgd for commercial/industrial/institutional, mining/dewatering surfacewater use is approximately 46 mgd. It should be noted that a majority of the water use associated with mining/dewatering is re-circulated and its use does not generally contribute to water resource limitations.

Table 2-3 Allocations by Use Type for CUPs permitted for ≥100,000 gpd

Use Type	CUPs ≥100,000 gpd Permitted Quantities (mgd)	Relative Percent
Agricultural	28.8	17.5%
Commercial/Industrial/Institutional*	74.0	45.1%
Public Supply**	53.5	32.6%
Recreational	7.6	4.7%
Total* **	**163.9**	**100.0%**

Figure 2-3 Allocations by Use Type for CUPs permitted for ≥100,000 gpd***



*Approximately 46 mgd of the mining/dewatering use is re-circulated surfacewater.

**Includes the following uses: household, essential, utility-supplied, and urban landscape irrigation.

***Does not include 0.8% public supply allocations attributed to small utilities that (allocated for <0.1 mgd public supply use type). Does not include reuse supplementation and surfacewater augmentation, as these allocated quantities account for 1% of total allocated quantities.

3.0 Potential Future Sources of Water

As was illustrated in Section 2.0, fresh groundwater, a traditional water source, is currently the main source of supply in the County, and surfacewater also provides significant quantities of water. In order to move towards identification of feasible Alternative Water Supply (AWS) projects for the Plan, it was necessary to identify and characterize both traditional and alternative future sources that may be viable to meet future demands throughout the County. These potential future sources include surfacewater, fresh groundwater, reclaimed water and brackish groundwater.

3.1 Groundwater

Groundwater, a traditional water source, is currently the main potable water supply source in the County, with fresh water from the Upper Floridan aquifer being the main source for public

supply. The SJRWMD anticipates that the development of future groundwater projects will be minimal due to existing stresses on groundwater availability, which will cause a shift from traditional to alternative water supplies.

The Lower Floridan aquifer typically contains lower quality or brackish water, which does not meet potable standards due to its higher mineral content[2], although it is of higher quality in some areas of Lake County. The removal of dissolved solids to meet potable water standards results in relatively higher treatment costs than the costs of treating fresh groundwater to meet potable water standards, and thus will impose additional considerations to development as a future water supply due in part to concerns with disposal of the mineralized by-product or concentrate.

Based on the primary use of the Upper Floridan aquifer for water supply, the apparent absence of an effective confining layer between the Upper and Lower Floridan aquifers throughout much of Lake County indicates that Lower Floridan aquifer withdrawals would generally affect the potentiometric surface of the Upper Floridan aquifer. As a result, Lower Floridan aquifer withdrawals would have a similar impact to surfacewater features as Upper Floridan withdrawals and would contribute to pending groundwater resource limitations. Because of these factors, the Lower Floridan aquifer is not considered to be a viable water supply source. Additional discussion of the potential use of the Lower Floridan aquifer is provided in Technical Memorandum #3.

An estimate of groundwater availability is presented in Section 8.0.

3.2 Surfacewater

Surfacewater sources are not currently utilized for potable water supply in the County. Relative to groundwater supplies, utilization of surfacewaters for potable supply entails more sophisticated and costly means of treatment, management of variability in supply quantity and quality, and management of the associated environmental impacts to downstream ecology and water resources. However, as the County and the region continue to grow, and the use of groundwater becomes more restricted, the need for regional alternative surfacewater supplies will become an important element of the County's future growth. Refer to Technical Memorandum #2 (Section 2.8) for more information.

In addition to the these considerations, Minimum Flows and Levels (MFLs) will dictate the viability of water supply from surface water bodies and groundwater by imposing limits to withdrawals. Table 3-1 shows the surfacewater bodies that have already had MFLs adopted, and Table 3-2 shows the priority water bodies that are scheduled for MFLs. Refer to Technical Memorandum #2 for the locations of these water bodies.

[2]Chloride and sulfate concentrations greater than or equal to 250 milligrams per liter (mg/L), or total dissolved solids (TDS) greater than or equal to 500 mg/L.

Table 3-1 Adopted MFLs in Lake County

Water Body Type	Water Body Name
River	St. Johns River @ S.R. 44 near Deland
River	Wekiva River @ S.R. 46 Bridge
Spring	Messant Spring
Spring	Seminole Spring
River	Black Water Creek @ S.R. 44 Bridge
Lake	Apshawa North
Lake	Apshawa South
Wetland	Boggy Marsh
Lake	Cherry
Lake	Dorr
Lake	Emma
Lake	Louisa
Lake	Lucy
Lake	Minneola
Lake	Norris
Lake	Pine Island
Lake	Sunset

Table 3-2 Priority Water Bodies Scheduled for MFLs in Lake County

Proposed MFLs			
Water Body Type	**Water Body Name**	**Voluntary Peer Review**	**Year**
Lake	Dyches	Not Listed	2008
Lake	Mt. Plymouth	Not Listed	2008
Lake	Saunders	Not Listed	2008
Spring	Apopka Spring	Yes	2009
Spring	Bugg Spring	Yes	2009
River	Alexander Springs Creek	Yes	2011
Spring	Alexander Springs	Yes	2011
Spring	Silver Glen	Yes	2011

The three (3) principal surfacewater systems that were initially identified for the Plan as major potential water supply sources are the Ocklawaha River, St. Johns River, and the Withlacoochee River. Refer to Technical Memorandum #2 for the contextual data on these surfacewater bodies that were gathered as part of preliminary identification of potential surfacewater sources.

3.3 Reclaimed Water

Reclaimed (reuse) water is characterized in the Plan as a current and future non-potable alternative water source. The SJRWMD typically seeks to achieve a water resource benefit with reclaimed water by:

- Using readily available reclaimed water in place of higher quality water for uses that do not require higher quality, as required by SJRWMD permitting criteria; and
- Using reclaimed water to augment water supply sources (SJRWMD DWSP, 2006).

Reuse water can be applied in a number of ways to decrease reliance on traditional water supplies, including golf course irrigation; landscape / residential irrigation; industrial use, and others (Water Reuse Program, 2006). The relative desirability of reuse applications vary, however, in terms of their potable offset and groundwater recharge potential as shown in Table 3-3.

Table 3-3 Reuse Desirability (FDEP, 2003)

Category	Desirability: Beneficial Reuse or Recharge[3]
Aquifer recharge (e.g., rapid infiltration basin)[4]	↑ **HIGH**
Golf course and landscape/residential areas irrigation[5]	
Spray field irrigation[6]	↓ **LOW**

A total of twenty-six (26) wastewater facilities in Lake County with a capacity of 22.31 mgd are currently providing 100% of their 12.9 mgd flows for reuse applications. Of this reuse flow, 4.09 mgd (32%) is applied to aquifer recharge using RIBs. Approximately 2.95 mgd (23%) of the reuse flow is classified as beneficial (residential irrigation (RI), golf course irrigation (GCI), and other public access areas (OPAA)). The remaining 5.83 mgd of flows are distributed to sprayfields (absorption fields (AF) or other crops (OC) (Figure 3-1). Refer to Technical Memorandum #2 for more extensive details on existing wastewater/reuse data.

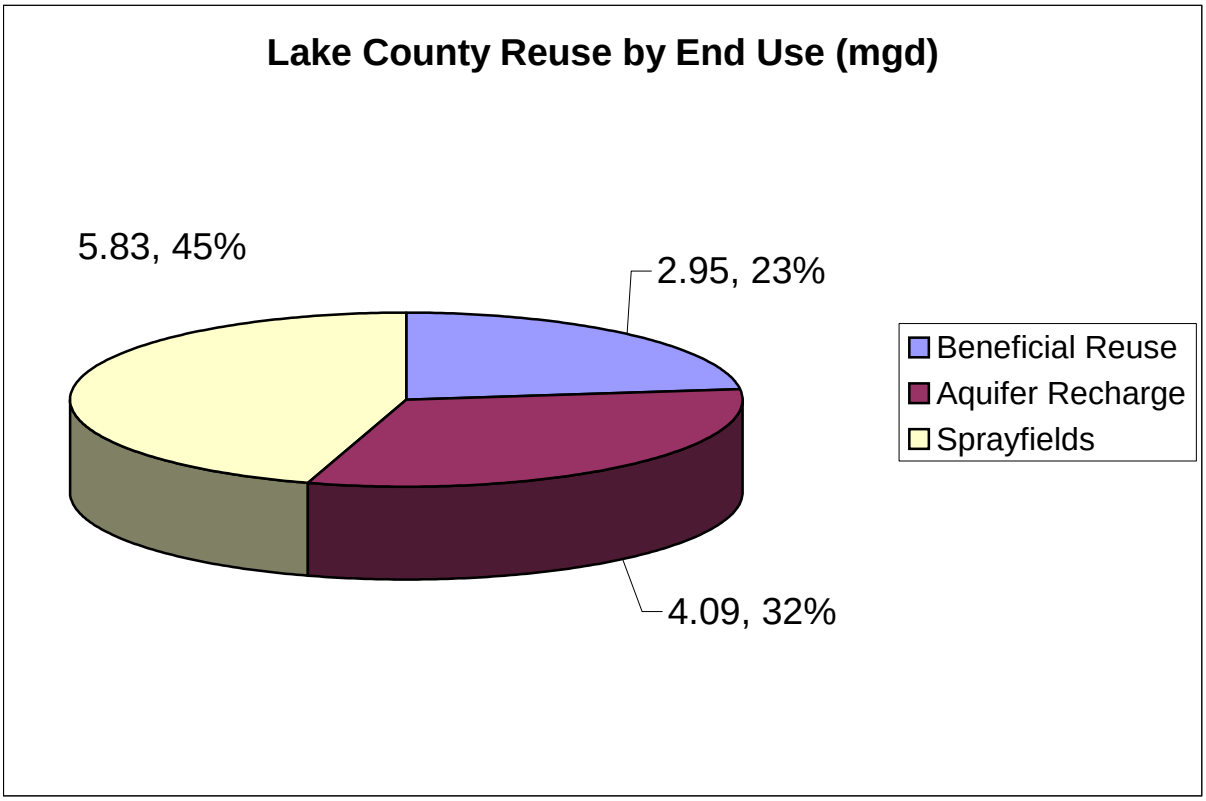
3 Florida Department of Environmental Protection, Water Reuse for Florida. 2003. "Strategies for Effective Use of Reclaimed Water"

4 Non-beneficial reuse, but considered potentially valuable by the FDEP and SJRWMD as recharge.

5 Beneficial reuse.

6 Non-beneficial reuse.

Figure 3-1 Lake County Reuse Distribution by End Use



Potential future sources for reuse water include increases in flows within existing utility service areas, the re-allocation of existing, non-beneficial reuse flows, and the new collection of wastewater from expansion of utility service. An inventory of readily available reuse projects, including those identified in the 2005 SJRWMD Water Supply Plan (DWSP), and those included in CUP technical staff reports was included in Technical Memorandum #2. The potential applicability of a more detailed infrastructural analysis of existing facilities and regional reuse projects was completed as part of Technical Memorandum #3 (also refer to Section 6.0).

3.4 Demand Reduction (Water Conservation)

Water conservation is an essential, cost effective element of water supply planning that allows for management of both existing and future water demands without requiring major capital outlays. Water conservation (demand reduction) is an important component of the Plan, in that it can extend availability of traditional and alternative future water supplies.

A myriad of conservation elements or Best Management Practices (BMP's) may be applied within a conservation program. These generally fall within the categories of watering restrictions, pricing incentives (inverted rate structures), metering, structural (plumbing and landscape) measures, and education. Watering restriction enforcement, inverted rate structures, education programs, and conservation coordinators are some of the broad, effective elements of a comprehensive conservation program for a municipality or community. Technical Memorandum #2 contains a more comprehensive description of these water conservation practices.

3.5 Stormwater

Stormwater as discussed in the context of the Plan is usually not identified as a water supply source per se, since water supply plans tend to focus on the larger supplies available in surfacewaters (e.g., SWFWMD, 2006; SJRWMD, 2006). However, stormwater is commonly utilized as a supplemental non-potable water supply source (FDEP, 2005), and additional stormwater supply projects are planned (SJRWMD, 2006; Hartman, 2006). Refer to Technical Memorandum #2 for a list of proposed reuse projects augmented by stormwater.

4.0 Potable Water Demand – Public Supply and Domestic Self- Supply

4.1 Population Projections

Population projections, and associated per capita water use rates, ultimately form the foundation for projecting future water demands. An examination of existing documents provided by the Alliance Members in addition to projections developed by the SJRWMD was performed. Population projections were not developed independently for the Plan.

Comparisons of Alliance Member demands to population estimates performed by the SJRWMD and Lake County are summarized in Table 4-1. The latest common projection year for each data source is 2025, so comparisons are made for projections in this year. A description of the population projections analyzed is contained in Technical Memorandum #3.

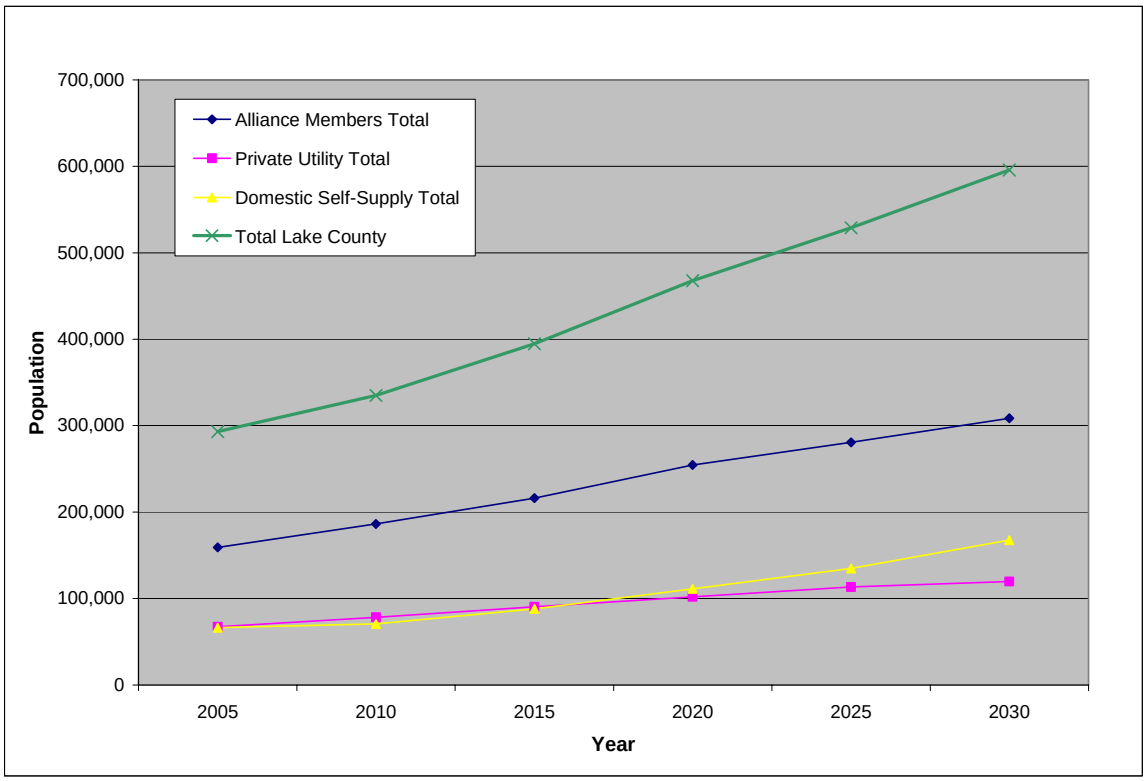
Table 4-1 Countywide Population Projections Comparison

Source	2025[7] Population Projections	Comments
SJRWMD Draft 2008 Water Supply Assessment	519,395	Based on 2007 BEBR Medium/High projections
Lake County Comprehensive Plan Update	463,500	Based on 2004 Medium/High BEBR projections and historical analysis of population growth
Lake County School Concurrency Projections	571,225	Based on individual projections prepared by each municipality – not normalized to a Countywide population projection.

The SJRWMD draft 2008 Water Supply Assessment population projections were used to develop water demand projections for the Plan. The population increase for Alliance Members over the 2005-2030 planning horizon is approximately 149,300 (a 94% increase). Private utility and domestic self-supply users were also analyzed in the Plan, as these groups are ultimately competing water users for Alliance Members. The total private utilities population is expected to increase by 52,226, and the domestic self-supplied population by 102,885. Therefore, the total non-Alliance population increase is projected to increase by 155,111, or by 132%. The total Lake County population is projected to increase by 304,411 (a 110% increase) (Figure 4-1).

[7] 2025 populations were used for comparative purposes, as it was the latest year common to all data sources.

Figure 4-1 Lake County Population Projections



Source: SJRWMD draft projections

4.2 Water Demand Projections

Public supply water demand projections were tabulated over the planning horizon from 2005-2030. Similar to population projections, these demand projections were determined by Alliance Member, private utilities, and domestic-self supply users. Independent methodologies for water demand projections were not developed for public supply water demands.

The draft demand projections developed for the SJRWMD 2008 Water Supply Assessment were determined to be the most appropriate projections available for use in the Plan. This data was selected in part due to the uniform approach employed by the SJRWMD for all Alliance Members, satisfying the need for a level playing field in terms of methodology. This "apples to apples" comparison of demands between Members is important for developing a consistent assessment for the Plan. Furthermore, projected water demands must be accepted by the SJRWMD in order to assign CUP allocations, so it is important that demand projections used in water supply planning efforts are generally consistent with demand projections developed by the SJRWMD.

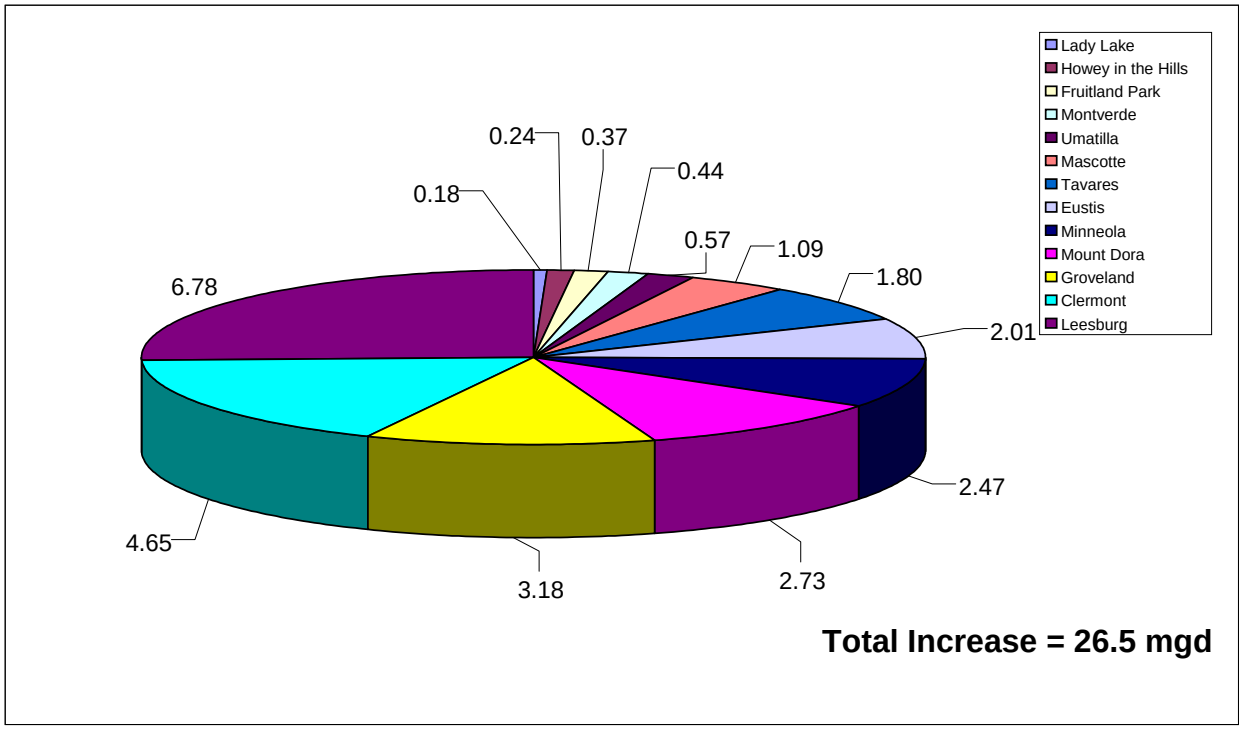
While many demand projections were not independently provided by Alliance Members for the Plan, it is important to point out that some Alliance Members (e.g., Mount Dora, Minneola, and Montverde) have indicated that their demand projections are not generally consistent with the SJRWMD draft projections. A detailed review of each Member's demand projections was beyond the scope of this study, but differences in approaches to population projection calculations and methodologies for per capita rate determination are likely to contribute to these variations. In the context of the Plan, an Alliance-wide planning tool, these discrepancies do not

affect the outcome to any significant degree. However, if used for other purposes, such as SJRWMD's review of future CUP applications, care should be taken and the source of these discrepancies distinguished before applying these demands on an individual Member basis.

The demand projections developed by the SJRWMD and used in the Plan do not include potential reductions in groundwater demand due to increased aggressiveness in water conservation by Alliance Members, additional groundwater offset by reuse water, or groundwater demand potentially supplied by agricultural water use shifting to potable supply water use (see discussions in sections 5.0, 6.0 and 7.0 for details on these estimates).

The total water demand increase for Alliance Members over the planning horizon is approximately 26.51 mgd (or 102%) (Figure 4-2). The total private utilities demands are expected to increase by 14.05 mgd (or 75%) and the domestic self-supply demands by 24.35 mgd (or 178%). The total non-Alliance demand increase is projected to increase by 38.40 mgd (or 118%). The total Lake County public supply and domestic self-supply demands are projected to increase by 64.91 mgd (or 111%).

Figure 4-2 Alliance Member Projected Unadjusted Demand Increases from 2005-2030 (mgd)



Source: SJRWMD draft projections

In order to determine the portion of total demand that could be met by lower quality sources, an estimate of utility irrigation demands was required based on information available from the Alliance Members. However, due to lack of data, irrigation requirements were estimated at 50% of public supply demand estimates, based on approximate estimates from the SJRWMD on irrigation water use (SJRWMD 2005). Based on this percentage, it was estimated that a 13.25 mgd (51%) increase in public supply irrigation will occur over the planning horizon for Alliance Members, a 7.02 mgd (37.5%) increase for private utilities will occur, and a 10.09 mgd (103%) increase will occur for domestic self supply. Therefore, the total estimated Lake County public

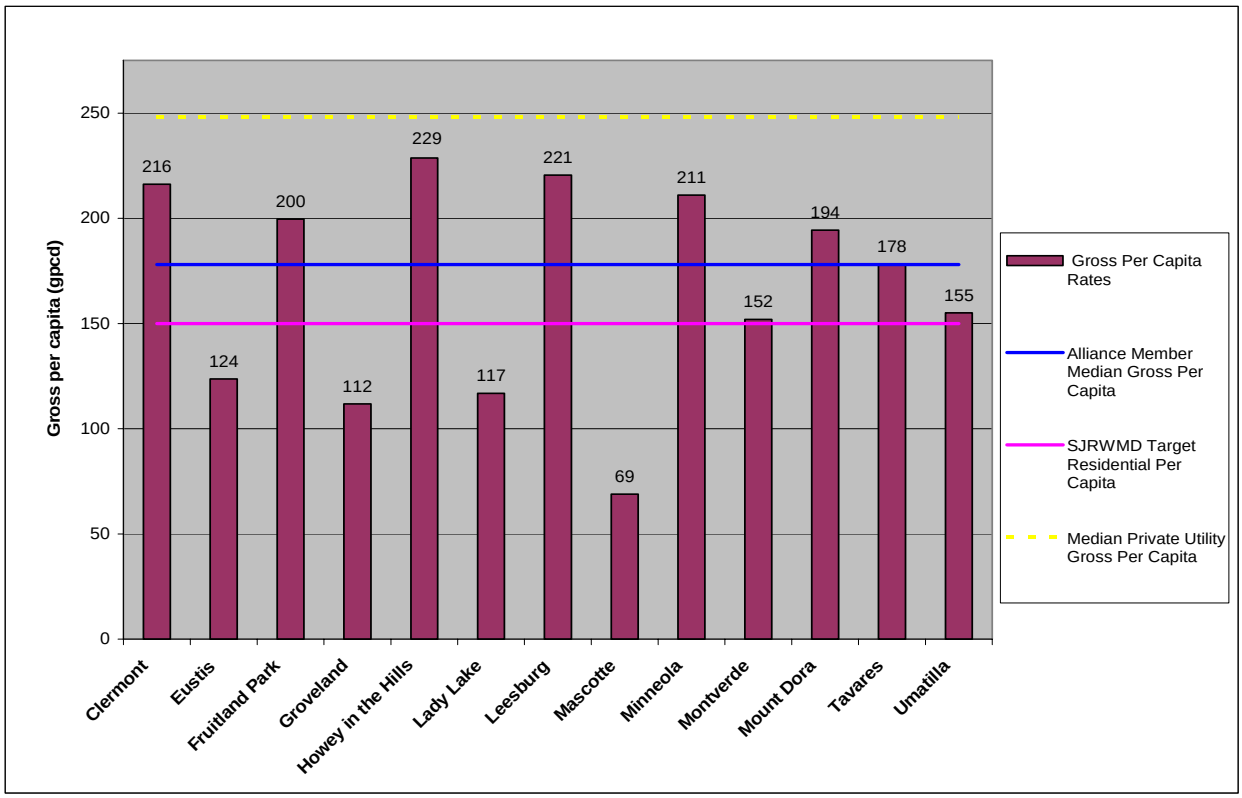
supply irrigation increase over the planning horizon is 30.36 mgd. Projected reuse quantities developed for the plan (Section 6.0) could supply 50% of the total projected increase in irrigation quantities, based on the assumption that 50% of projected reuse flows will be applied beneficially. If the percent beneficial reuse rate is greater than 50%, or reuse is augmented by other sources, a greater share of these irrigation demands will be met by reuse water.

5.0 Water Conservation / Potable Water Demand Reduction

Water conservation is an essential, cost effective element of water supply planning that allows for management of water demands from existing users and new growth without requiring major capital outlays. Although water conservation applies to all water use sectors, it is particularly relevant in the residential sector, since the greatest potable water demand for water in Lake County falls under this category.

The unadjusted water demands presented in Section 4.0 - including those of Alliance Members, private utilities, and domestic self-supply users - do not include potential reductions in demand that can be realized through more aggressive conservation practices. Although individual per capita rates vary, viewing these rates from an Alliance-wide and Countywide perspective, the median gross per capita rate is a good indicator of water use trends (Figure 5-1). This rate is 178 gpcd, which is above the SJRWMD residential Districtwide goal of 150 gpcd (Hollingshead, email correspondence 6/8/2007). The removal of commercial use would show an Alliance-wide residential per capita rate closer to the SJRWMD target. However, additional conservation efforts can reduce usage below this level. A residential per capita rate of 120 to 130 gpcd is possible based on land use in Lake County comparable to other areas in Florida. The statewide residential average per capita is reported at 106 gpcd (Marella, 2004), and the SWFWMD residential average per capita is reported at 113 gpcd (Hazen and Sawyer, 2007).

Figure 5-1 Alliance Member Gross Per Capita Rates



The scope of water conservation program elements and water conservation best management practices (BMPs) employed by the Alliance Members differs by Member. A summary of the presence or absence of these BMP's is presented in Technical Memorandum #3. The effectiveness of these programs as a whole were assessed on the basis of comparing per capita rates of Alliance Members to the demands targeted by these programs. Most members have an opportunity to reduce per capita rates, and therefore water demands, through increasing the aggressiveness of existing BMPs or adding effective BMPs to their existing programs.

Technical Memorandum #3 includes a suite of conservation BMPs that are recommended for implementation if not already employed by a Member. However, aggressive inverted rate structures, wide-ranging education programs, dedicated water conservation staff, and watering restriction enforcement are highly effective BMPs that are emphasized and applicable to nearly all Alliance Members, as described further in Technical Memorandum #3.

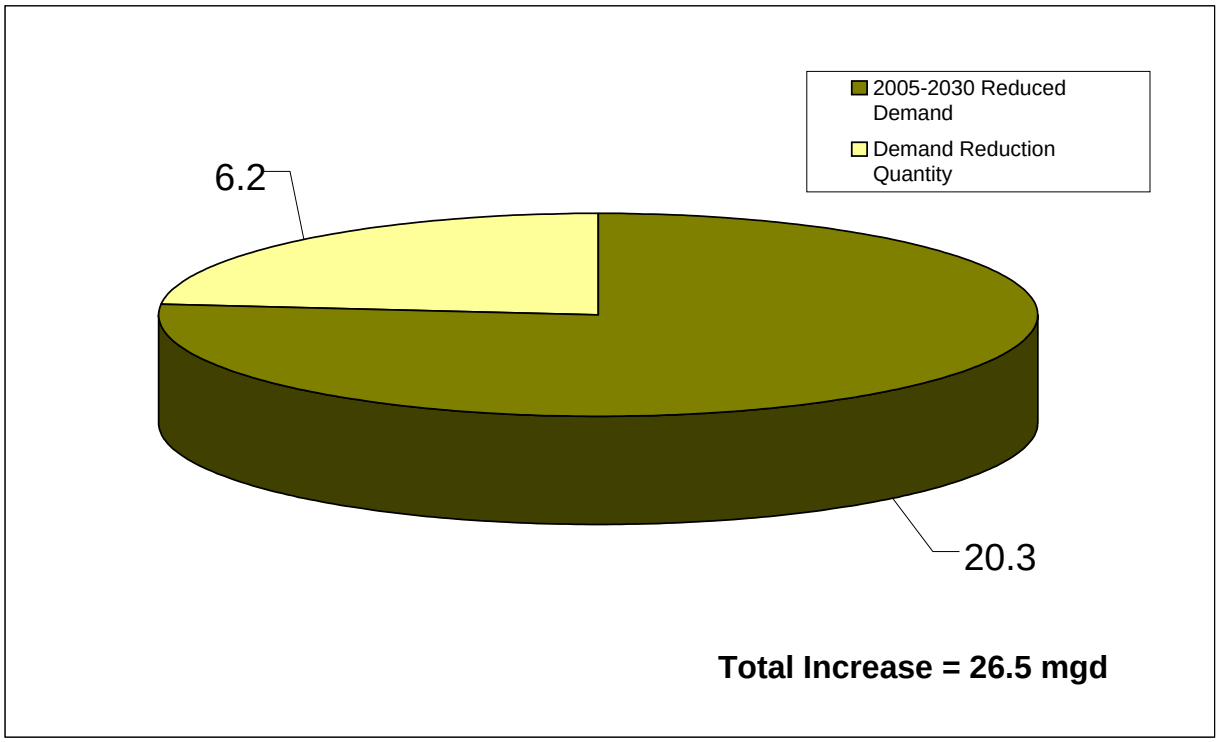
A conservation review inventory was completed for Alliance Members, which is an assay of existing and proposed conservation practices. Options for expanding conservation practices in the County was completed for Technical Memorandum #2, and was compared with per capita rates and the conservation inventory to quantify potential demand reduction for Alliance Members.

The SJRWMD's Applicant Handbook (2006) for consumptive use permitting does not list reduction in per capita water consumption as a factor to be considered in determining the duration of a permit. However, aggressive inverted rate structures, wide-ranging education

programs, dedicated water conservation staff, and watering restriction enforcement are highly effective BMP's that are emphasized and applicable to nearly all Alliance Members, as described in Section 2.3.1 – 2.3.3 of Technical Memorandum #3. Use of these tools can extend the length of time that groundwater is available to Alliance Members.

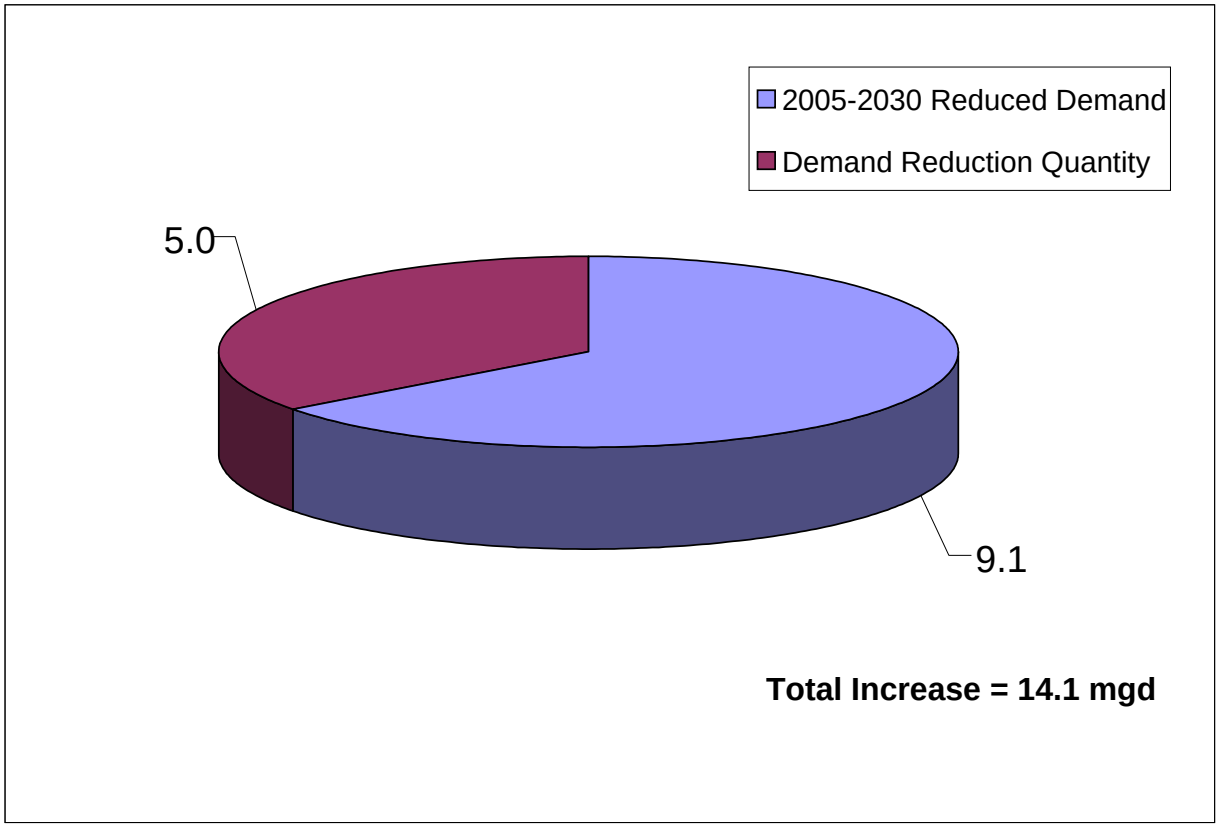
The Alliance Members can potentially reduce projected water demands by a total of 6.18 mgd over the planning horizon (Figure 5-2). This demand reduction reduces the total Alliance potable water demand over the planning horizon by 23%, from 26.5 mgd to 20.3 mgd. Section 2.4.3 of Technical Memorandum #3 details the methodology applied to calculate these potential potable water savings.

Figure 5-2 Potential Demand Reduction for Alliance Water Demands from 2005-2030 (mgd)



Private utilities can potentially reduce water demands by a total of 5.0 mgd over the planning horizon (Figure 5-3). This demand reduction reduces the total private utilities demand by 35%, from 14.1 mgd to 9.1 mgd.

Figure 5-3 Potential Water Demand Reduction for Private Utilities from 2005-2030 (mgd)



No demand reductions were established for the domestic self-supply water use category, primarily because pricing and regulatory incentives do not impact this user group. While watering restriction enforcement can be an effective conservation tool for domestic users, this user group is within the jurisdiction of the unincorporated County and the users do not fall under SJRWMD CUP regulations (although well construction is tracked). Since Lake County is not a member of the Alliance and the SJRWMD does not have regulatory jurisdiction, demand reductions are not anticipated for this user group.

6.0 Reuse Projections

Reuse applications within Lake County vary in terms of their potable water offset and groundwater recharge potential, as discussed in Technical Memorandum #2. Beneficial reuse is defined for water supply applications as reuse that replaces or offsets potable water use.[8] Since beneficial reuse replaces or offsets potable water use, it can serve future water demands.

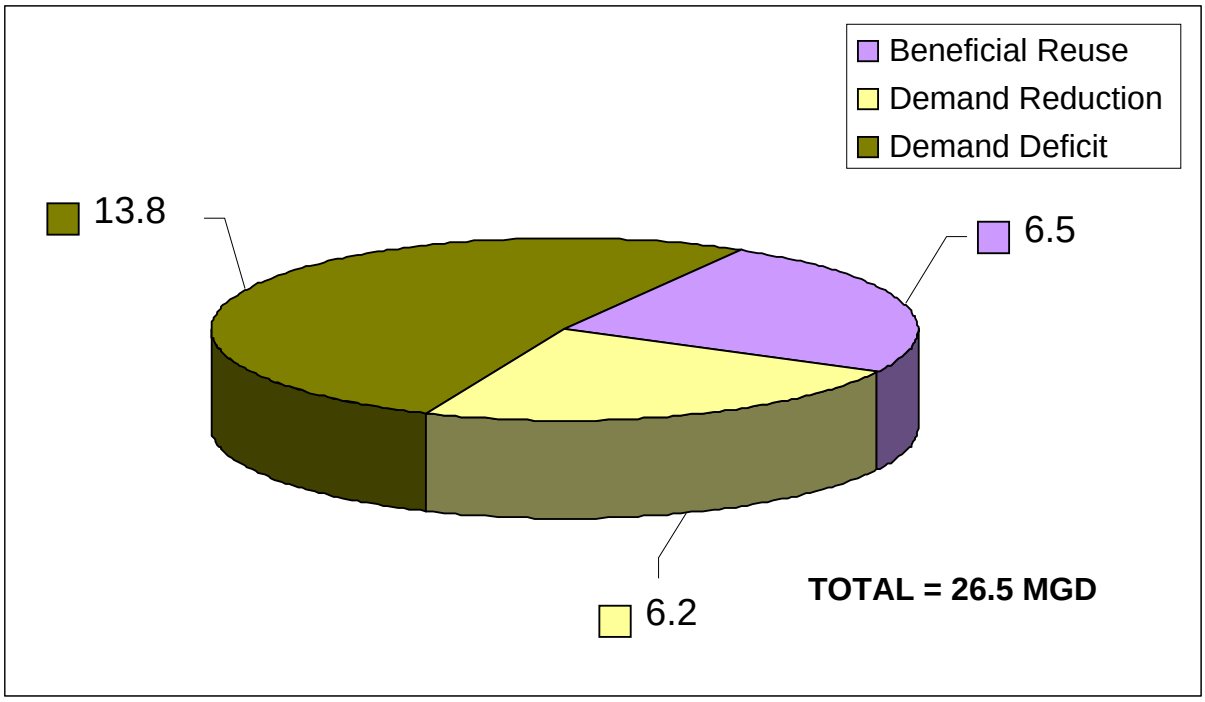
Technical Memorandum #3 developed average annual daily flow (AADF) projections to 2030 for centrally collected wastewater and associated reuse flows in Lake County. Existing reuse estimates were prepared for both beneficial and non-beneficial flows, in order to assess the amount of demand currently or proposed to be met by beneficial reuse. The existing reuse

[8] Golf course and landscape/residential irrigation are considered beneficial reuses, while aquifer recharge and sprayfield irrigation are not considered beneficial reuses.

estimates were compared with future projections to determine the beneficial reuse flows that are expected to be available to reduce or offset future potable water demands. On a Countywide basis, the beneficial reuse expected to be available was compared to the increase in future water demands to establish the outstanding supply requirement. Within the County, the outstanding supply requirement is expected to be met by a combination of groundwater and alternative water supplies.

The total projected beneficial reuse flow for the Alliance in 2030 is 10.61 mgd, which is an increase in beneficial reuse flow for the Alliance to 2030 of 6.51 mgd from 2005 (Figure 6-1). This available reuse water supply contribution would serve approximately 25% of the Alliance water demand increase from 2005 to 2030, assuming it is used as efficiently as po water. Refer to Technical Memorandum #3 for specific methodology used to calculate potential increases in beneficial reuse flows.

Figure 6-1 2005-2030 Projected Alliance Demand with Conservation and Reuse



In addition, reuse projections were developed for private utility facilities. Since many of the private utilities are much smaller than the Member facilities, their ability to treat wastewater to more costly public access standards and distribute to beneficial reuse applications is likely to be more limited.[9] Therefore, reuse distribution to beneficial applications is not anticipated for the projections unless the utility currently distributes reuse beneficially or their wastewater flow is projected to increase by more than 0.25 mgd. Total projected beneficial reuse flow for 2030 is 2.04 mgd. Total non-beneficial reuse flow is projected at 3.16 mgd. The total available increase in beneficial reuse flow to 2030 for Non-Alliance Members is projected at 1.01 mgd.

Potential Sub-Regional Cooperative Project Areas were also identified and assessed for the Plan as part of Technical Memorandum #3. Three (3) potential project areas were identified in the northeast, northwest, and southern areas of Lake County (Table 6-1). The project areas

[9] Reuse treatment requirements for different applications are summarized in Appendix B.

were developed on the basis of Member proximity to one another, and to the large surfacewater lakes in the County that may be viable supplemental sources. It was noted that stormwater can also serve as a supplemental source, particularly for project areas where lake withdrawals are not viable. However, as part of the detailed feasibility analysis completed for Technical Memorandum #4, these projects were not further reviewed due to lack of data on the potential yield of the lakes.

Table 6-1 Members Located in Cooperative Project Areas*

Northeast:	Northwest:	Southern:
Eustis	Leesburg	Mascotte
Mount Dora	Fruitland Park	Minneola
Umatilla	Lady Lake	Clermont
Tavares		Groveland

*Howey-in-the-Hills and Montverde do not have a central wastewater treatment facility and are not included in the cooperative project areas.

7.0 Agricultural Conversion

With total population growth increasing in Lake County by approximately 150% over the planning horizon, a portion of the existing agricultural land will be converted to residential or commercial/industrial land. A shift from agricultural water uses to public supply or domestic self-supply is likely to occur to help support this growth, with the procedural aspects of the shift to vary depending on the specific regulatory circumstances of the individual water users In general, this demand shift will affect future groundwater availability and could affect the water demand to be met by AWS.

In order to determine the amount of water that may be potentially available for use in other water use sectors, projections were necessary in order to approximate the quantity of water used in the agricultural sector that may be available due to the conversion from agricultural use to public supply and/or domestic self-supply use. This analysis involved an assessment of existing land within agricultural consumptive use permits (CUPs) and associated agricultural water use and allocations. Technical Memorandum #4 provides a detailed description of methodology and assumptions used in this analysis.

Three agricultural water quantity baselines were established to compute a range of potentially available groundwater from the water use shift. The actual amount of water that could be available is dependent on the extent to which public supply utilities could meet SJRWMD permitting requirements, and will also vary spatially within the County on an (Alliance) Member by Member basis. Scenario (1) assumes that the baseline quantity is the total existing water allocated to agricultural permits. Scenario (2) is based on the allocations of existing agricultural users using > 25% of their existing allocations. Scenario (3) is based on the pumped quantities only.[10] To obtain the potential groundwater quantities for each scenario, the 39% agricultural conversion factor[11] was applied, and the current proportion of groundwater (89.9%) in existing

[10] 2000-2005 average pumpage.
[11] Refer to Technical Memorandum #4

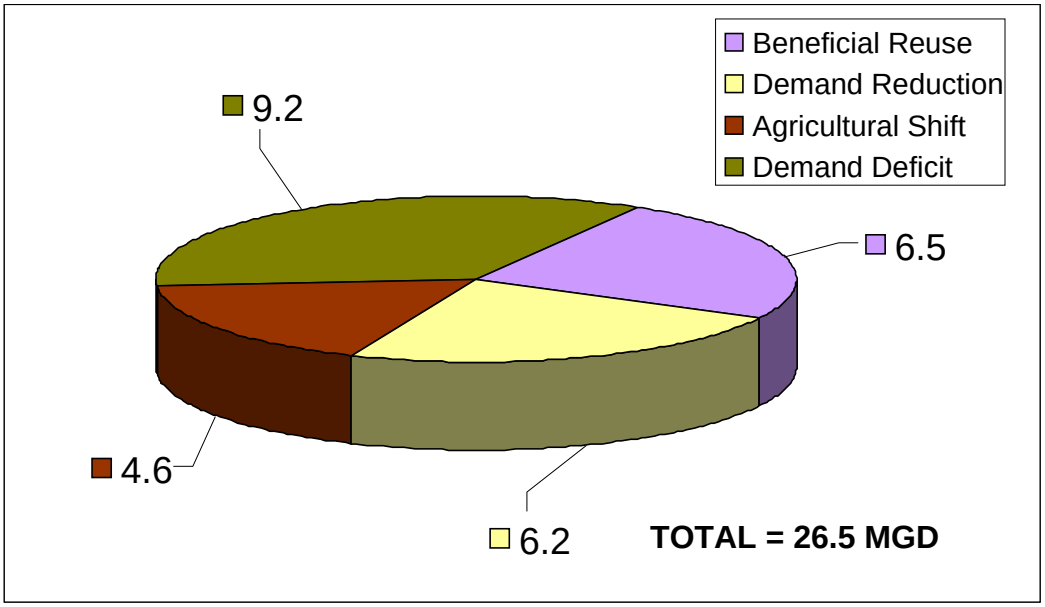
allocations was assumed to remain constant. Using this methodology, 12.09 mgd annual average is available in scenario 1, 8.47 mgd annual average in scenario 2, and 7.61 mgd annual average in scenario 3. These results are presented in Table 7-1.

Table 7-1 Agricultural Conversion Scenario Comparison

Agricultural Quantity Category Scenarios and Associated Potential Groundwater Shift			
	(1) Total Existing Agricultural Allocations (mgd)	**(2) "Active" Agricultural Allocations (mgd)**	**(3) Pumped Share of Total Agricultural Allocations (mgd)**
Baseline Quantity	34.65	24.28	21.81
Quantity with 39% Conversion Factor	13.52	9.47	8.50
Total Groundwater Potentially Available to Shift	**12.09**	**8.47**	**7.61**

Since Alliance Members account for approximately 60% of the total increase in water demand, 60% of the lower estimate or 4.6 mgd are expected to become available to Alliance Members. This estimate generally assumes that increases in water demand from private suppliers will involve expansion of their service areas to include former agricultural properties. Figure 7-1 shows the demand deficit when projected water conservation, reuse, and the conservative estimate for agricultural demand shift are considered. In contrast to conservation and reuse which are generally under the control of a single permit holder, public supply access to agricultural demand shift will require coordination between multiple permit holders under the umbrella of the SJRWMD's permitting program.

Figure 7-1 2005-2030 Projected Alliance Demand with Conservation, Reuse and Agricultural Conversion



8.0 Groundwater Availability

Section 4.0 presents the future unadjusted water demand for the Plan. However, before the feasibility of potential AWS projects could be evaluated, it was necessary to first determine amount of traditional groundwater available to meet estimated future water demands over the planning horizon (2005 – 2030). In addition to conservation, reuse, and agricultural conversion, this determination was made by exploring groundwater availability. Groundwater availability, as detailed in Technical Memorandum #4, refers to the development of an estimate of how much groundwater will be available for future use. The SJRWMD regulatory and geographic constraints and planning approaches lend different perspectives to the estimate of groundwater availability. This planning and regulatory dynamic affects the estimate of how much groundwater is essentially available for future use.

8.1 Public Supply and Domestic Self-Supply Groundwater Availability Analysis

The SJRWMD has identified 2013 as a date when groundwater sources will be regionally restricted in the Central Florida Coordination Area (CFCA). The CFCA is a region established by the South Florida, Southwest Florida, and St. Johns River WMDs to assure a coordinated and consistent approach for the areas with shared water management district boundaries. These include Polk, Orange, Osceola and Seminole counties, southern Lake County, and the City of Cocoa's public supply service area in Brevard County.

From a regulatory perspective within Lake County, the year 2013 applies to groundwater supply restrictions of Alliance Members within the CFCA (Clermont, Groveland, Mascotte and Minneola). The CFCA members cannot be supported by groundwater after 2013. This date, therefore, influences the CUP issuance for these CFCA Alliance Members. After 2013, groundwater restrictions for Alliance Members outside the CFCA (northern Alliance Members) are not directly controlled by this regulatory level. However, 2013 impact assessments using the East-Central Florida (ECF) modeling results may be applied on a case-by-case basis as a

supplement in assessing the potential for harm from proposed groundwater withdrawals in addition to other factors set forth in the 40C-2 rule.

The SJRWMD's ECF groundwater model was used to establish 2013 as the date of regional groundwater restriction for the CFCA. Regional groundwater modeling will continue to play an important role in determining the groundwater availability in Lake County, but a regional limitation for Alliance Members outside of the CFCA has not yet been determined (see Technical Memorandum #4 for more detail).

It is appropriate to present data pertinent to the 2013 planning target date for all Alliance Members in the absence of a more defined regional limitation for northern Alliance Members (Eustis, Fruitland Park, Howey in the Hills, Lady Lake, Leesburg, Montverde, Mount Dora, Tavares, Umatilla). Within this defined planning framework it is also appropriate to recognize the regulatory data for each Alliance Member as applied by the SJRWMD regulatory staff, as this data used within the context of CUP processing will affect how much water individual Alliance Members will seek for alternative water supply development.

The groundwater estimates calculated here include analyses stemming from both the regulatory and planning positions. The distinctions between the two frameworks within the SJRWMD lead to a range of estimated future groundwater availability. A summary of these two approaches are summarized as follows:

Planning: For planning purposes, AWS projects must be identified to meet the projected demands beyond 2013. In the absence of a more defined regional limitation for northern Alliance Members, 2013 is used as a basis of comparison. For purposes of water supply planning, the SJRWMD has determined 2013 to be the date after which no additional groundwater will be available in the CFCA, due to adverse impacts such withdrawals may cause.

Regulatory: The Cities of Clermont, Groveland, Mascotte, and Minneola are subject to the 2013 groundwater availability constraint, as they are situated in the CFCA. The SJRWMD determined the CFCA to have regionally unacceptable groundwater impacts after 2013. Individual CUPs for the northern Alliance Members will be reviewed on a case-by-case basis, relative to potential adverse environmental impacts. Consequently, from a regulatory perspective, the current CUP allocations become an additional basis of comparison.

8.2 Lake County Groundwater Deficit Evaluation

Due to uncertainties and variation between planning, regulatory, and geographic perspectives on groundwater availability, groundwater deficits are calculated for each Alliance Member and private utility to reflect a range of potential values. The total deficit will ultimately depend on which basis is used and cannot be determined with reasonable certainty at this time.

Demand deficits (Table 8-1) were calculated on a demand basis (planning perspective) and from a CUP allocation basis (regulatory perspective). For each supplier group, demand deficits (from 2013 to 2030) were calculated based on a number of factors. Given the dualistic approach to viewing groundwater availability, two additional scenarios were developed, which are a mix of allocations and demand projections. Technical Memorandum #4 describes the methodology used to calculate these demand deficits.

Data is presented for non-Alliance or private water suppliers, because some of these suppliers are potential AWS partners to Alliance members and competing users for remaining groundwater supplies. Private utilities also tend to use more water, on a per capita basis, than do Alliance municipalities. The median gross per capita for private utilities in Lake County is 249 gallons per capita per day (gpcd), and the median gross per capita for Alliance Members is 178 gpcd. Data for domestic self-supply is also presented. Projections of these uses will influence estimates of resource availability to the public suppliers.

Table 8-1 Range of Projected 2030 Demand Deficits*

Supplier Group	Deficit by 2013 Demand Estimate (mgd)	Deficit by Current Allocation (mgd)	Low Aggregate Deficit (mgd)	High Aggregate Deficit (mgd)
Alliance Members	**16.6**	**19.7**	**13.99**	**22.31**
Private Suppliers (>0.1 mgd)	8.55	14.16	8.44	14.27
Total Public Supply	23.43	33.86	22.43	36.58
Domestic Self-Supply**	19.71	19.71	19.71	19.71
County-wide Deficit	43.14	53.57	42.14	56.29

*Does not include potential reductions in groundwater demand from conservation, reuse or agricultural demand shift.

**Domestic self-supply water use is not permitted, so the projected 2013 – 2030 deficit by demand is listed for each scenario.

As shown, if the aggregate of demand and allocation quantities are considered, the selection of a low aggregate demand deficit based on the most beneficial allocation will result in a lower public supply need for AWS. The selection of a high aggregate demand deficit based on the least beneficial allocation would result in a higher public supply need for AWS.

9.0 Readily Available Regional Alternative Water Supply

Surfacewater sources are not currently utilized for potable water supply in the County. Relative to groundwater supplies, utilization of surfacewaters for potable supply entails more sophisticated and costly means of treatment, management of variability in supply quantity and quality, and management of the associated environmental impacts to water resources due to withdrawal and potential disposal of byproducts from the treatment process. However, as the County and the region continue to grow, the need for regional alternative surfacewater supplies is likely to become an important element of the County's future growth.

9.1 Identification of Potential Alternative Water Supply (AWS) Projects

The County is in a unique location centered between three major river systems that provide the potential for significant surfacewater supply alternatives: the St. John's River to the east, the Ocklawaha River which transects the County (flowing north into Marion County), and the Withlacoochee River to the west. Initially, thirteen readily available regional alternative water supply (AWS) projects were identified along these rivers. As discussed in Technical

Memorandum #2, a preliminary screening step was performed which resulted in identification of the most viable alternatives for future consideration by the Alliance. These six projects include:

- St. Johns River Yankee Lake Project
- Lower Ocklawaha River (LOR) – (below confluence with Silver River)
- St. Johns River Near DeLand
- Lake Panasoffkee
- Withlacoochee River at Holder
- Withlacoochee River at Lake Rousseau

9.2 Development of AWS Demands

A water balance approach to evaluate the AWS project demands was developed based on the Alliance-wide 2030 demands and the potential resources to meet the demand deficit. The potential demand deficit is a variable based on the management and implementation of four key elements:

- Conservation;
- Reuse;
- Agricultural Conversion
- Groundwater Availability

Each of these elements will vary by utility, and management and implementation of each element will interface in different ways with the planning and regulatory functions of the SJRWMD.

The multiple variables that currently exist in the regional water supply planning process make it impossible to conduct a specific, detailed AWS evaluation that results in a recommendation of a single AWS project for the Alliance. Consequently, the intent is to develop an evaluation/decision matrix that will incorporate the many variables and uncertainties into a logical decision matrix that the Alliance Members can use to evaluate their individual water demands and determine which, if any, AWS projects are appropriate to a given member.

As presented in Technical Memorandum #4, there are a variety of methods to reduce the 2030 projected demand deficit in conjunction with future AWS projects. A summary of elements that can impact the demand deficit is provided as a guide. The AWS alternatives review follows.

Alliance 2005-2030 Total Unadjusted Water Demand Increase ----- 26.5 mgd

Potential Alternative Methods to Meet Demand Increase

a. Current Groundwater (Allocated) ..... 7.3 mgd
b. Additional Groundwater (2013 Planning Number) ..... 2.6 mgd
c. Conservation Demand Reduction ..... 6.2 mgd
d. Projected Beneficial Reuse Supply ..... 6.5 mgd
e. Agricultural to Residential Shift ..... 4.6 mgd
Total Potential Deficit Reduction without AWS.....27.2 mgd

9.3 Demand Projections for AWS Comparison

Recognizing the substantial variability related to the Alliance future water supply demands, each AWS was evaluated in Technical Memorandum #4 based on two levels of need:

- Demand Scenario 1 – assumes a moderate demand deficit projection of about 10 to 15 mgd. This range was selected based on assuming groundwater availability to Alliance members will be between the regulated and planning numbers discussed above, but no additional groundwater from agricultural to residential demand shift will be provided, and limited reduction from conservation and reuse will be realized.

- Demand Scenario 2 – assumes a high demand deficit projection of greater than 20 to 25 mgd. This range is based on groundwater availability to Alliance members based on current allocations (SJRWMD regulatory water use permit values) and no additional groundwater from agricultural to residential demand shift, conservation or reuse.

On an Alliance-wide basis, it should be noted that it is possible that through aggressive conservation, the projected contribution from reuse, and additional future groundwater allocations that no AWS demand will be present to 2030. However, eventually, AWS will be required to meet the growing water demands of the County.

9.4 AWS Project Evaluation

The AWS project evaluation is not only complicated by the range of potential demand deficits for the Alliance members, but also by the potential for a broad and diverse group of partners that may be interested in sharing the cost of AWS development and operation. The AWS options are evaluated based on Alliance Member projected demands without regional partnerships, such as Orange County or the Withlacoochee Regional Water Supply Authority (WRWSA), to create an equivalent comparison of AWS options to the Alliance. Discussion is added to summarize the anticipated benefits assuming multiple partners are found.

The Evaluation Criteria developed for this detailed AWS review includes seven (7) categories, which are described in Table 2-1 of Technical Memorandum #4. These categories include:

- Resource Availability, Reliability, and Longevity;
- Raw Water Quality;
- Permittability;
- Environmental Compatibility;
- Cost;
- Jurisdictional Complexity; and
- Location.

The feasibility for each AWS project development, using the qualitative evaluation criteria is summarized in Table 9-1. A detailed discussion of the ranking logic is included in Technical Memorandum #4. Summaries of the feasibility of each project are presented below.

9.4.1 St. Johns River Yankee Lake Project

Overall Grade

The Yankee Lake project gets high marks (B or higher) for 5 of the 7 evaluation criteria. Raw water quality and cost, however, are significant factors, which lower the overall ranking. Therefore the overall project score is C.

Grade: C

9.4.2 St. Johns River, near DeLand

Overall Grade

The DeLand AWS project gets high marks (B or higher) for 3 of the 7 evaluation criteria. The project was rated as C for the other categories, except for cost which it received a lower D score. Therefore, the overall project score is C-.

Grade: C-

9.4.3 Lower Ocklawaha River

Overall Grade

The LOR AWS project gets high marks (B or higher) for 6 of the 7 evaluation criteria. Environmental compatibility received the rating of C based on no MFLs currently established and a historical track record which is not favorable. Therefore, the overall project score is B.

Grade: B

9.4.4 Lake Panasoffkee

Overall Grade

The Lake Panasoffkee AWS project gets high marks (B or higher) for 4 of the 7 evaluation criteria when considering a lower demand projection (Demand Scenario 1). However, the high marks are reduced to 2 when considering Demand Scenario 2. In addition, permittability, environmental compatibility, and jurisdictional complexity are rated very low because of the characteristics of the lake. Therefore, the overall project score is C for Demand Scenario 1 and D for Demand Scenario 2.

Grade: C+ (Demand Scenario 1)
D (Demand Scenario 2)

9.4.5 Withlacoochee River at Holder

Overall Grade

The Withlacoochee at Holder AWS project gets high marks (B or higher) for 5 of the 7 evaluation criteria. However, cost and jurisdictional complexity are rated very low because of the need for a reservoir and crossing District boundaries. Therefore, the overall project score is C.

Grade: C

9.4.6 Lake Rousseau

Overall Grade

The Lake Rousseau AWS project gets high marks (B or higher) for 3 of the 7 evaluation criteria. However, cost, location, and jurisdictional complexity are rated very low. Therefore, the overall project score is similar to the project at Holder.

Grade: C

9.5 Alternative Water Supply Project Discussion

The considerable uncertainties involved in establishing an AWS demand, and the sheer number of possible partnership opportunities for a given AWS project, make selection of a specific AWS project difficult. A discussion of possible AWS alternatives is provided below.

Lower Ocklawaha River - The LOR AWS project appears to provide the most effective balance of evaluation criteria including resource availability, raw water quality, cost, jurisdictional complexity and location. This AWS project also is projected to be the least costly outside-County AWS project that will meet the high end of the demand range that the Alliance may experience over the planning horizon. This project also has the yield to serve long-term water needs in Lake County beyond the planning horizon. The primary weakness of the LOR project is its environmental compatibility, primarily based on the historic alterations to the river hydrology and the need to access the Ocala National Forest for transmission.

Upper Ocklawaha River Basin - In addition to the LOR AWS project, individual Alliance Members have access to several in-county lakes within the Upper Ocklawaha River Basin (UORB) which could serve as a local source of water supply. These lakes were identified in Technical Memorandum #2 as a potential AWS alternative. However, the in-county lakes were not further reviewed due to a lack of verifiable data regarding their yield.

The lakes could supply anywhere from upwards of 20 mgd to as low as 6 mgd. Actual yield determination would require hydro-biologic analyses and review of additional water use data. Clearly, the lakes could provide reuse augmentation and potentially could serve as a potable water supply. There are two significant concerns with development of the in-County lakes:

- Any yield from the lakes could be substantially reduced as upstream and downstream withdrawals are proposed and permitted. Water use in Florida is essentially “first come, first serve” as long as the use is reasonable and beneficial, does not interfere with existing legal users, and is consistent with the public interest. These three tests are

unlikely to prevent upstream and downstream withdrawals from affecting available yield in the in-County lakes.

- The Lake County Water Authority (LCWA) has a relatively unique statutory authority over the in-County lakes. It includes "controlling and conserving the freshwater resources" of Lake County and improving the "streams, lakes and canals". However, the role and legal authority of the LCWA relative to water supply is unclear.

OUC Settlement Agreement - The Lake County settlement agreement approved in 2004 provides Lake County with the option to use up to 5 mgd of alternative water supply developed by OUC for the municipalities in Lake County. Since Lake County does not have a water utility, this agreement suggests that 5 mgd may become available to offset Alliance AWS demands. However, it is unclear if the Alliance has any formal standing relative to the agreement.

The Villages Settlement Agreement - The Villages settlement agreement approved in 2007 provides Lake County with a $250,000 cost-share contribution towards joint water supply planning efforts. It is unclear if the Alliance has any formal standing relative to the agreement. Additionally, the Villages has a large AWS requirement within the SWFWMD and WRWSA jurisdiction. This will complicate any joint planning efforts that are to be simultaneously funded by the SJRWMD.

Lake Panasoffkee - The Lake Panasoffkee AWS project scores well for three significant evaluation criteria: raw water quality, location and cost. This AWS project is projected to be the least costly outside-County AWS project that will meet the low end of the demand range that the Alliance may experience over the planning horizon. The primary weaknesses of this project to the Alliance are its resource availability and its location within the SWFWMD and WRWSA. This project does not have the yield to serve long-term water needs in Lake County beyond the planning horizon, and its yield could also be reduced by competing users within the WRWSA.

A graphical illustration of the viable water supply alternatives for the Alliance is shown as Figure 9-1. This illustration includes the AWS project options as well as two additional water supply options for the Alliance Members: the use of in-county lakes and the potential supply from the OUC/Lake County AWS agreement.

II. Conclusions

1. Future Demand

a. Overall unadjusted public supply water demand for the Lake County Water Alliance members will grow from 26.1 mgd to 52.6 mgd by the year 2030, an increase of 26.5 mgd. Additionally, water supply demand of other users (primarily domestic self-supply and private utilities) will continue to increase over time, creating additional competition for limited groundwater supply.

b. Domestic self-supply demand is a significant quantity of current groundwater use and will grow at a rate exceeding that of public supply. Current self-supply demand is 13.7 mgd and is expected to grow to 38.0 mgd by the year 2030. This demand is primarily within unincorporated Lake County.

c. Private utility unadjusted water demand in Lake County will increase 14.05 mgd from the year 2005 to the year 2030. Private utilities could be viable AWS partners to Alliance Members. Private utilities are also competing users for remaining groundwater supplies, and tend to use more water on a gross per capita basis than do Alliance Members. The median private utility gross per capita is 249 gpcd, and the median Alliance Member gross per capita is 178 gpcd.

d. Of the unadjusted 2030 water demand of Alliance members, the quantities required per municipality fall within widely differing ranges of need. Of the thirteen (13) municipalities of the Alliance three (3) fall below 0.5 mgd of future water demand; one (1) requires 0.57 mgd and the remaining nine (9) communities require 1.0 mgd or greater ranging up to 6.78 mgd.

2. Conservation and Reuse

a. On an Alliance-wide basis, beneficial reuse will continue to provide a significant contribution to water supply needs. The Plan estimates that beneficial reuse currently provides, or is proposed to provide, 4.1 mgd. Over time, the Plan estimates that an additional 6.5 mgd of beneficial reuse will become available.

b. On an Alliance-wide basis, there are significant opportunities for demand reduction due to increased conservation efforts beyond that currently required by the SJRWMD. The Plan estimates that a demand reduction of 6.2 mgd could be achieved by the year 2030. The primary tools that could be used to achieve this reduction include moderately aggressive conservation rate structures, moderately aggressive watering restriction enforcement, and increased education efforts.

c. Aggressive conservation and increasing the beneficial use of reclaimed water by member governments can significantly reduce future water demand quantities. These reductions could be used to lessen the short-term demand for alternative water supplies or to extend the time of groundwater availability by flattening the water demand curve.

3. Potential Future Sources of Water

Groundwater Availability

a. Groundwater is currently the main water supply source within Lake County making up approximately 58% of the total permitted capacity greater that 100,000 gpd. The remaining 42% is composed of surfacewater, much of which is used in recirculating mining applications and its use does not generally contribute to water resource limitations. The SJRWMD anticipates that additional groundwater development will be minimal due to existing stress on the groundwater system. However, groundwater is available to Alliance Members located outside of the CFCA, but the extent of its availability has not yet been determined.

b. There is also potential for a significant groundwater contribution to public supply as agricultural water uses convert to residential uses over time. The Plan estimates that 7.6 mgd of groundwater may become available to public supply by the year 2030. Public supply access to this groundwater will require coordination between multiple permit holders under the umbrella of the SJRWMD's permitting program.

Alternative Water Supplies

c. Surfacewater in and around Lake County appears to be a viable alternative to groundwater sources. However, due to seasonal flow and level fluctuations in the surfacewater system storage can be a major consideration in project development. Establishment of Minimum Flows and Levels by the Southwest and St. Johns River Water Management Districts can also constrain the availability of surfacewater. Surfacewater is also more difficult to treat due to higher concentrations of biological and organic contaminants.

d. Reclaimed water development and use can play a major role in reducing future water supply demands. Lake County governments are utilizing reclaimed water for water supply relatively effectively. However, there are opportunities for augmentation of existing reuse supplies and an increase in the supply of lower-quality water to serve non-potable demands.

4. Alternative Water Supply Development

a. With continued population growth in Lake County and pending resource limitations to traditional groundwater supplies, AWS will clearly be required in Lake County either within and/or beyond the planning horizon.

b. Large, regional-scale alternative water supply projects have been identified by the SJRWMD and conceptual designs have been prepared. Facilitation efforts are ongoing at the SJRWMD to identify a lead municipality and partners to prepare preliminary design reports (PDR) for these projects. The SJRWMD has prepared order-of-magnitude cost estimates for each project and developed a consistent methodology to distribute the costs associated with each project.

c. Large, regional-scale alternative water supply projects have been identified by the Withlacoochee Regional Water Supply Authority (WRWSA), which includes Citrus, Sumter, and Hernando Counties within the SWFWMD, and the City of Ocala. Conceptual designs for these projects are underway with facilitation efforts to follow in late 2007.

d. The process of developing AWS projects for municipalities within Lake County will be a complex and expensive process involving capture, storage, transmission and treatment costs. This impact is particularly great to the communities that are either close to build-out or have very low projected growth anticipated. Partnerships with other municipalities are highly significant factors in determining the actual cost of AWS development.

e. The approved Orlando Utilities Commission (OUC) and Villages settlement agreements with Lake County have significant potential to support or provide alternative water supply to Lake County Alliance Members.

f. The current CUP requirement for AWS participation per municipality varies. Of the thirteen (13) Alliance municipalities, four (4) are not currently required to participate in AWS planning efforts.

5. Water Supply Management

a. Present water supply strategies cannot be solely relied upon to meet the long-term water demand in Lake County. With continued population growth, development of water supply strategies both locally and regionally will be required to satisfy future water supply needs. These strategies will require integrated consideration of groundwater availability, conservation and reuse, and alternative water supply development.

b. The CFCA is an area established by the WMDs to assure a consistent planning and regulatory water supply approach for a multi-jurisdictional area that is rapidly approaching the limit of available groundwater. The Alliance Members located within the CFCA are Mascotte, Groveland, Clermont, and Minneola. As a result, water supply development for these Alliance Members may occur in a different planning and regulatory context than that of other Alliance Members.

c. A North-Central Florida Coordination Area (NCFCA) was recently proposed by the SWFWMD and the SJRWMD. The draft borders of the NCFCA encompass the Alliance Members not located within the CFCA. Since there are potential water supply partners that are geographically close to Alliance communities but are physically located in the SWFWMD jurisdiction, establishment of the NCFCA as a planning area could provide additional partners to Alliance Members for water supply development.

III. Recommendations

The development of the Plan is a watershed moment for municipalities in Lake County. Its production recognizes the pending resource limitations to traditional groundwater supplies. The Plan identifies an interrelated suite of technical, economic, and socio-political issues that must be effectively managed to ensure future water supply at reasonable cost.

The formation of the Alliance and the subsequent development of the Plan recognize that coordinated water supply planning can assist in managing the complex issues associated with future water supply. However, the Plan is only an initial step towards serving the future water supply needs of Lake County. Implementation of the Plan must be considered, with limited Member resources available with which to pursue water supply initiatives. The dual nature of the Alliance as a single planning entity composed of many independent Members increases the complexity of its implementation.

The complex issues associated with water supply development in Lake County acknowledge that multiple perspectives on a given water supply issue will be present, and that there is no simple, single way to meet future water supply needs. As such, the Plan recommendations are provided as a series of menu options: they are designed to merit consideration individually, and to serve as building blocks towards the development of an integrated water supply strategy or strategies on a municipality by municipality basis or on a regional basis with multiple partners.

The content of the Plan and the current status of water supply in Lake County call attention these general areas of consideration:

- Groundwater Availability
- Conservation and Reuse
- AWS Development
- Water Supply Management

The recommendations for the Plan are grouped as elements to these general areas. However, none of the general areas are independent of the others. An identified increase in groundwater availability to an Alliance Member will decrease the requirement for AWS. Conservation and reuse gains will both extend groundwater availability and reduce the requirement for AWS. Water supply management includes policy, planning, and managerial aspects that also have strong potential to affect water supply. These interrelationships necessitate an integrated approach to water supply planning and development.

As applicable, the recommendations for the Plan are identified as elements that could be implemented by individual or groups of Alliance Members. Due to the considerable complexity and uncertainty involved with parts of the Plan, these recommendations are anticipated to be considered on a case-by-case basis by Alliance Members.

Where applicable, the recommendations from the Plan that would require implementation and coordination by the Alliance as a single entity are also identified.

The Plan recommendations are provided below.

1. Groundwater Availability

a. Request that the SJRWMD accurately determine the safe, sustainable groundwater yield from the area in Lake County not located within the CFCA. Perform an independent review of this analysis by an expert familiar with the regional groundwater models used in north-central Florida.

b. Request that the SJRWMD determine a threshold within the CFCA at which continued groundwater development will be allowed for the long-term water supply for smaller or low future demand municipalities. This added groundwater development must still meet all District CUP rule criteria. It would also require the local government to assure the SJRWMD that all feasible water conservation and beneficial reuse was implemented to maximize water resource protection.

c. For individual CUP renewals, identify the consumptive use allocations held by Agricultural and agricultural-related Commercial/Industrial properties (e.g., citrus processors) in the vicinity of the community that are likely to be discontinued during the duration of the proposed CUP. Coordinate with the existing permit holder and the SJRWMD relative to the possible transfer of these allocations.

d. Request that the SJRWMD require more aggressive conservation practices among private utilities in Lake, and rescind private utility groundwater allocations that show excessive water use (as measured by gross per capita rates). Ensure that reduced private utility per capita water consumption rates are incorporated in regional groundwater modeling efforts. Rulemaking by the SJRWMD may be required to meet this request.

e. Monitor the results of the groundwater modeling simulations performed using the SWFWMD's Northern District model.

f. Request that the SJRWMD clarify, from planning and regulatory perspectives, how groundwater currently allocated for uses related to agriculture in Lake County could be used for other reasonable and beneficial purposes upon discontinuation of uses related to agriculture. Within the CFCA, this clarification will require coordination with regional groundwater modeling efforts.

g. Request that the SJRWMD retire inactive or underutilized (<25% of allocation typically used) Agricultural and Commercial/Industrial water uses, and eliminate their use in cumulative impact analyses.

2. Conservation and Reuse

<u>Conservation</u>

a. Utilize the Plan to determine existing and potential water conservation and reclaimed water opportunities for individual Members. Determine potential offsets effectuated by these opportunities for cost-benefit comparison to AWS water supplies.

b. Request that the SJRWMD's Applicant Handbook for consumptive use permitting be revised to list reduction in per capita water consumption as a factor to be considered in determining the duration of a permit. Prepare measurable conservation goals in CUP applications in exchange for longer duration permits.

c. Use the Plan to develop and coordinate aggressive, long-term conservation activities and programs with Lake County and other Members to support the progression of behavioral changes required for aggressive conservation.

d. Coordinate an improved and consistent planning methodology for the estimation of retail service area population for use in the calculation of per capita water consumption rates. Monitor the ongoing development of the SWFWMD Southern Water Use Caution Area (SWUCA) II population methodology and methodologies under consideration by other Florida WMDs.

e. Develop and implement more aggressive water conservation rate structures targeting medium and high-volume residential users. Individual utility rate studies will be required. Develop sources of cost-share funding for these studies.

f. Establish aggressive watering restriction enforcement programs based on the SJRWMD watering restrictions. Ensure that the programs are self-supporting through their violation fee schedules.

Reuse

g. Develop feasible surfacewater and stormwater withdrawals and storage to augment beneficial reuse production. Consider the use of mine facilities in the development of these opportunities.

h. Conduct a yield study to determine the safe, sustainable withdrawal from the Upper Ocklawaha River Basin (UORB). . The study must include an accurate determination of current and proposed surfacewater use within the UORB.

i. Encourage cost-share funding opportunities for construction of highly efficient reuse systems. Request that the SJRWMD establish a minimum beneficial reuse threshold for reuse funding that involves the potable offset provided by the proposed project.

3. AWS Development

a. Utilize the Plan to determine potential AWS opportunities for individual Alliance Members. Determine potential supplies effectuated by these opportunities for cost-benefit comparison to conservation and reuse opportunities.

Outside-County AWS

b. Actively pursue AWS development partnerships both among Alliance Members, with private utilities located in Lake County, and with public and private utilities located outside of Lake County, as appropriate.

c. Request that the SJRWMD include the cost of an Environmental Impact Statement (EIS) in the projected costs for preliminary design (PD) for the Lower Ocklawaha River project.

d. Participate in a preliminary design (PD) planning effort facilitated by the SJRWMD.

e. Submit a statement of interest to the WRWSA regarding partnerships for developing AWS.

f. Request that the SJRWMD include the costs of a deep well brine concentrate disposal option in the order-of-magnitude and PD costs for the St. Johns River AWS projects.

g. Develop a consistent Alliance position relative to both the Orlando Utilities Commission (OUC) and Villages agreements with Lake County for the development of AWS.

h. Develop Alliance-based water supply planning partnerships with entities located outside of Lake County, as appropriate.

Within-County AWS

i. Conduct a yield study to determine the safe, sustainable withdrawal from the Upper Ocklawaha River Basin (UORB). The study must include an accurate determination of current and proposed surfacewater use within the UORB.

j. Request that the SJRWMD include a project involving the UORB as an AWS in the 2008 District Water Supply Plan. The project configuration will be dependent on the results of a yield study.

k. Actively pursue AWS partnerships with private utilities in Lake County, as appropriate. Private utilities with established revenue sources, management structures, and CUP requirements comparable to Alliance Members are likely to offer superior AWS partnership opportunities when compared to agricultural or commercial/industrial users.

l. Identify a viable AWS project involving the UORB and seek cost-share funding for the project.

4. Water Supply Management

a. Submit a request to the SJRWMD and the SWFWMD to establish the North Central Florida Coordination Area (NCFCA) as a coordinated Planning area between the two WMDs.

b. At individual municipalities with proposed developments entering the development review process, identify the consumptive use allocations held by the former Agricultural and agricultural-related Commercial/Industrial properties (e.g., citrus processors) within the property proposed for development.

Within-County AWS

c. Request that the SJRWMD establish a scientifically-based minimum flow for Lake Griffin, Harris, Eustis and Dora unit.

d. Support a negotiated settlement to the Lake Apopka withdrawal challenge that more equitably distributes the effect of the withdrawal among the lake levels and discharge flows.

e. Support the ongoing restoration of the North Shore of Lake Apopka.

f. Extend utility service to unincorporated areas to ensure more efficient residential water use, by reducing uncontrolled groundwater withdrawals (domestic self supply).

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g. Develop a post-Plan framework for communication both among Members and their Elected Officials.

h. Develop a post-Plan funding source to Alliance-identified initiatives.

i. Update the Alliance Plan to maintain its relevance within a rapidly changing regional water supply context. Prepare minor updates annually and major updates every five years.

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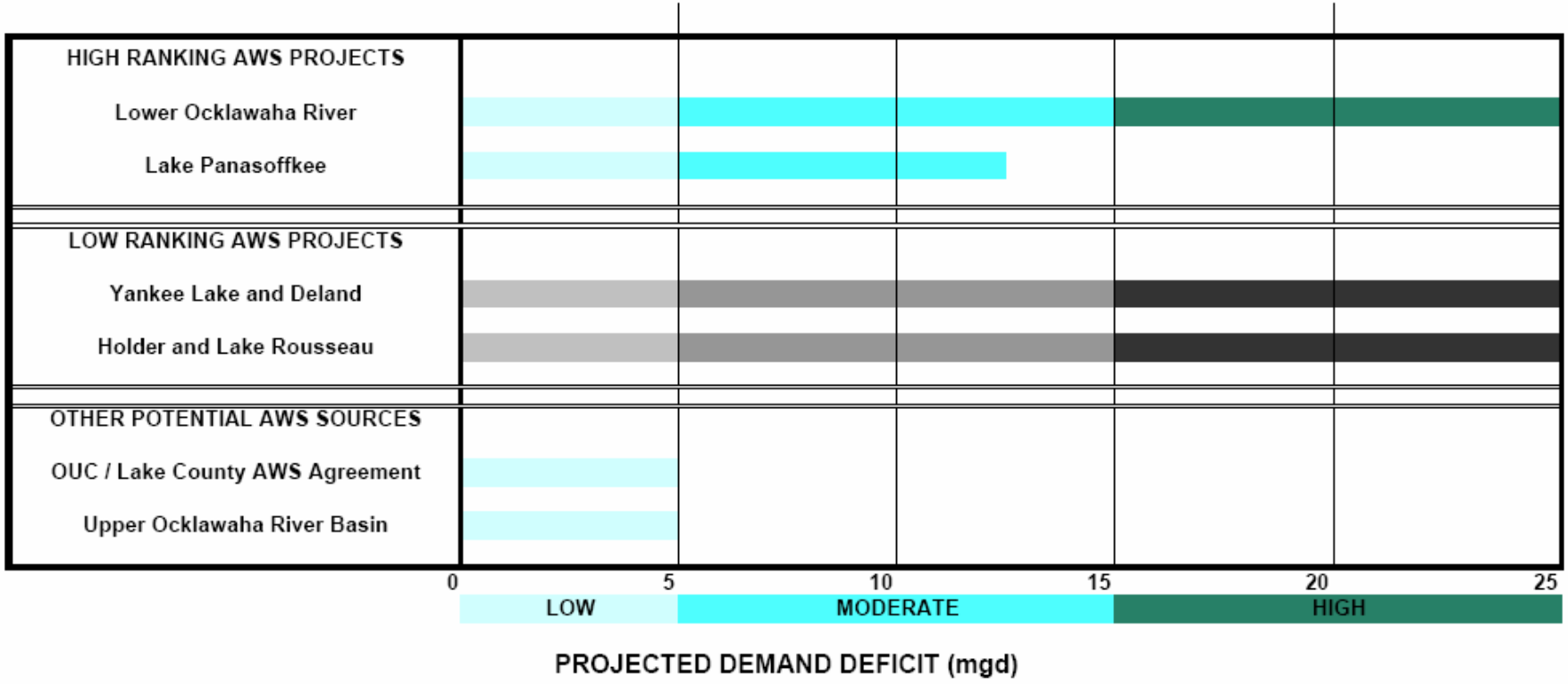
Table 9-1

Lake County AWS Comparison

General Characteristics	St John's River		Ocklawaha River	Withlacoochee River		
	Yankee Lake	Near Deland	Lower Reach - Silver Springs	Lake Panasoffkee	Near Holder	Lake Rousseau
Potential Surface Water Yield (MGD) [1]	116	94 - 127	100 - 107	9 - 19	52	87 - 98
Water Quality	Brackish	Brackish	Fresh	Fresh	Fresh	Fresh
Criteria Categories						
1. Resource Availability, Reliability, and Longevity	A	B	A	B/D [2]	B	A
2. Raw Water Quality	C	C	B	B	B	B
3. Permittability	B	C	B	C	B	B
4. Environmental Compatibility	B	C	C	C	B	B
5. Cost	D	D	B	A/D [2]	D	C
6. Jurisdictional Complexity	B	B	B	C	D	C
7. Location	B	B	B	A	B	C
OVERALL GRADE:	**C**	**C-**	**B**	**C+/D**	**C**	**C**

Notes: 1 Potential surface water yield may be reduced by future MFLs, environmental considerations, and detailed safe yield analyses.
2 Dual ranking is provided with with first ranking for Demand Scenario 1 and second ranking for Demand Scenario 2



Water Resource Associates, Inc.
Engineering ~ Planning ~ Environmental Science
4260 West Linebaugh Avenue
Phone: 813-265-3130
Fax: 813-265-6610
www.wraconsultants.com

PROJECT: 0407 - Lake County Water Supply Plan Development

Figure 9-1
Comparison of Demands and Water Supply Alternatives

ORIGINAL DATE: 08-31-07
REVISION DATE: none
JOB NUMBER: 0407
FILE NAME: N/A
GIS OPERATOR: DR