

Lake County Water Supply Plan
Technical Memorandum #4

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FINAL

Chapter 1 – Groundwater Availability

Chapter 2 – Alternative Water Supply Evaluation

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I. Introduction

The ongoing Lake County Water Alliance – Water Supply Plan (Plan) has identified existing and draft projected demand, conservation projections, and beneficial reuse projections within Lake County. These tasks have been completed through a series of draft Technical Memorandums and workshops to the Alliance Management/Technical Committee. The amount of traditional groundwater available to meet these estimated future demands over the planning horizon (2005 – 2030) is the topic of Chapter 1.

Chapter 2 addresses the preliminary screening and evaluation of readily available alternative water supply (AWS) development projects. The results of this AWS evaluation may provide input to the St. Johns Water Management District's (SJRWMD's) joint preliminary design report (PDR) for regional AWS projects, or may be used to support other AWS investigations. Accordingly, a number of Alliance Members have submitted statement of interests regarding a PDR to the SJRWMD. Since groundwater is a significantly less costly source than AWS sources, a detailed and accurate estimate of available groundwater is critical to developing an effective water supply plan. The estimate of available groundwater does affect the Plan's evaluation of AWS and the selection process of the most beneficial water sources to meet future demands.

1.0 Groundwater Availability

Determination of available groundwater quantities to meet estimated future water demands primarily revolves around two main concepts:

(1) The interplay of regulatory and planning perspectives and approaches on existing CUP allocations of varying duration, relative to imposed planning limitations on when groundwater is assumed to no longer be an option. This planning and regulatory dynamic can dictate the interpretation of how much groundwater is essentially available for future use.

(2) The amount of groundwater potentially made available through conversion of existing agricultural CUPs to serve public supply users, and the role of planning and regulatory policies in determining the groundwater quantities that may be shifted to other water use categories.

As shown in Table 1-1, the current regulatory duration of groundwater availability – as determined by a review of CUP data – varies significantly among Alliance Members. However, significant planning efforts are underway at the SJRWMD to encourage all Members to participate in Alternative Water Supply (AWS) planning, based on an approximate 2013 timeframe. Additionally, special regulatory requirements and groundwater restrictions are already in place for utilities located within the Central Florida Coordination Area (CFCA).

Table 1-1 Alliance Regulatory Groundwater Durations

| Alliance Member Status | Number | Longest Duration CUP | Shortest Duration CUP |
|---|---------------|-----------------------------|-------------------------------|
| Groundwater Allocated to Serve Projected 2013 Demands | 6 | 2026 | 2010 |
| Groundwater Not Allocated to Serve Projected 2013 Demands | 7 | 2014 | Monthly Temporary Allocations |

As shown in Table 1-2, the current regulatory duration of groundwater availability – as determined by a review of CUP data – also varies significantly among private utilities. 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. Since groundwater durations, groundwater availability, and regulatory requirements vary both within the Alliance and among private utilities, the specific circumstances of each utility will affect their AWS participation. This Chapter discusses the planning, regulatory, and geographic factors that will affect future groundwater availability to Alliance Members.

Table 1-2 Private Utility Regulatory Groundwater Durations

| Private Utility Status | Number | Longest Duration CUP | Shortest Duration CUP |
|---|---------------|-----------------------------|------------------------------|
| Groundwater Allocated to Serve Projected 2013 Demands | 6 | 2026 | 2009 |
| Groundwater Not Allocated to Serve Projected 2013 Demands | 10 | 2026 | 2007 |

1.1 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 water management districts 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). Groundwater restrictions for Alliance Members outside the CFCA (northern Alliance Members) are not directly controlled by this date. However, 2013 impact assessments using the SJRWMD's 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. As shown in Figure 1-1, the SJRWMD's ECF model encompasses most of Lake County, but a regional limitation for Alliance Members outside of the CFCA has not yet been determined. Additionally, in addition to the ECF model, the SJRWMD's North Central Florida (NCF) model encompasses much of Northern Lake County. NCF model results were recently used by the SJRWMD in issuing a 20-year groundwater permit to a utility located in Marion County. It is possible that the NCF model results may vary from the ECF model results for the portion of Lake County where the model areas overlap.

An additional modeling concern is the location of the ECF model boundary along the western perimeter of Lake County. Model artifacts generally increase with proximity to model boundaries, so the ECF model may not provide the most accurate representation of groundwater availability along the western perimeter of the Lake County. In comparison, the boundaries of the Southwest Florida Water Management District's Northern District (ND) model extend well beyond the western perimeter of Lake County. The ND model was calibrated to 1995 conditions with transient analyses to 2002, and released for use by the SWFWMD in 2007. The potential for conflicting model results will complicate future efforts to assess groundwater availability in northern Lake County, and will require coordination both within the SJRWMD and between the SJRWMD and the SWFWMD.

It is appropriate to present data pertinent to the 2013 target date, in the absence of a defined regional groundwater limitation for northern Alliance Members (Eustis, Fruitland Park, Howey in the Hills, Lady Lake, Leesburg, Montverde, Mount Dora, Tavares, Umatilla), a planning estimate of groundwater availability applicable to the Alliance must be developed.

Within the planning framework of the Lake County WSP, 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 in this Technical Memorandum include analyses stemming from both the regulatory and planning positions. This Technical Memorandum points to the distinctions between the two frameworks within the SJRWMD which may lead to a range of estimated future groundwater availability, and attempts to interpret this range as it applies to AWS development. 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 defined regional limitation for northern Alliance Members, 2013 is used in this technical memorandum 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 as 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 located outside of the CFCA 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.

This Technical Memorandum includes tabulation and analysis of data presented in previous technical memoranda relative to groundwater availability, and discusses incorporating an estimate of groundwater availability to the Plan.

Existing data for Lake County utilities have been identified and tabulated under Task 3 of the Plan's scope of work. Utility demands, their withdrawal allocations and pumpage have now been reviewed and generally verified by SJRWMD regulatory staff.¹ In order to ensure that groundwater is the primary emphasis of this analysis, reclaimed and surfacewater allocations are not included here. Since the Alliance is the focus of the Plan, the data presented is generally organized as Alliance members and non-members.

Data is presented for non-Alliance or private water suppliers, because some of these suppliers are potential AWS partners to Alliance members and the Plan's groundwater estimate may be affected by these entities. Data for domestic self-supply is also presented, because projections of this use can influence estimates of resource availability to the public suppliers.

1.1.1 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 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. The deficit by demand assumes that the projected 2013 demand is subtracted from 2030 demand, without consideration of existing CUP allocations. Deficits by current CUP allocation assumes that the existing allocation as a baseline to subtract from 2030.

Given the dualistic approach to viewing groundwater availability, two additional scenarios were developed, which are a mix of allocations and demand projections. Where allocations were incorporated, the current allocation is used as best available information, even though these allocations may change over time. The low aggregate deficit value was determined by assuming, for each supplier, the higher of the permitted allocation or 2013 demand allocation of groundwater is available and this value was subtracted from the 2030 demand. This assumes that CUP allocations exceeding the 2013 demand are not rescinded by the SJRWMD. Alternately, the high aggregate deficit value was determined by assuming, for each supplier, the lower of the permitted allocation or 2013 demand allocation of groundwater is available and this value was subtracted from the 2030 demands. The high aggregate deficit scenario assumes SJRWMD will rescind groundwater allocations currently exceeding 2013 demand. Table 1-2 summarizes the range of demand deficits. It should be noted that these projections are unadjusted, and therefore do not reflect potential groundwater demand reductions from conservation / reuse as discussed in Technical Memorandum #3. Tables A-1 and A-2 (Appendix A) present the details for each supplier summarized in Table 1-2.

In addition to Alliance and private utility demand deficits, projections of domestic self-supply demand can influence resource availability to public suppliers, since this demand is typically

¹ See the finalized Tech Memo 2 for complete data.

taken into account in modeling the environmental effects of groundwater withdrawals. Unless a local government establishes effective conservation practices applicable to domestic self-supply (e.g., watering restriction enforcement), this use can function as an uncontrolled groundwater supply. These projected deficits are included in Table 1-2.

Table 1-2 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 |

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

**Does not include potential reductions in groundwater demand from conservation/reuse as discussed in Technical Memorandum # 3

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.

1.1.2 Conclusions

This Technical Memorandum includes tabulation and analysis of data presented in previous technical memoranda relative to groundwater availability, and discusses incorporating an estimate of groundwater availability to the Plan based on the following conclusions:

- The potential differences between the regulatory, planning, and geographic perspectives on groundwater availability imparts considerable uncertainty to the Plan. Groundwater availability for public supply in Lake County can only be estimated, at this time, in terms of the range of groundwater that may be available.
- For utilities within the CFCA that show a demand deficit to 2013, the SJRWMD has not indicated that current allocations will be increased to serve projected 2013 demand. These utilities have experienced recent difficulty increasing their groundwater allocations, even though they are not allocated to serve projected 2013 demand.
- For utilities within the CFCA that show an allocation surplus beyond 2013, the SJRWMD has indicated that if demand is not present to justify a given allocation, the allocation may be recalled. However, this will not be an issue for the public supply utilities in Lake

County, as they have demands that increase beyond the current allocation from 2013 to 2030.

- Both private and public utilities in Lake County show significant demand deficits on the basis of their current CUP data. As a result, 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.
- As a conceptual AWS design input for each individual utility, the selection of either the 2013 projected geographic demand or the current permitted allocation could be a nexus from which to define a demand deficit for AWS projects. These nexus reflect the planning and regulatory perspectives, of the Plan, respectively. However, any selection would affect different utilities differently. Those utilities that do not have a current permitted groundwater allocation to serve their projected 2013 demand would benefit from a 2013 selection. Those utilities that have a current permitted groundwater allocation that serves beyond their projected 2013 demand would be restricted by a 2013 selection.

1.2 Agricultural Water Use

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 will necessarily occur to help support this growth, with the procedural aspects of this shift to vary depending on the specific regulatory circumstances of the water users. In general, this demand shift will affect future groundwater availability and could affect the water demand to be met by AWS. Locations of agricultural CUPs are shown in Appendix B.

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 shift 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.

1.2.1 Agricultural Land Conversion Methodology

Population vs. Countywide Agricultural Land

A spatial depiction of population growth and its intersection with existing (2005) agricultural land was analyzed to predict the total number of acres that may convert from agricultural land use to residential or commercial/industrial land use over the planning horizon. The draft SJRWMD agricultural land use layer and population growth layers were used in this analysis.

Existing Countywide Agricultural Land vs. Agricultural CUP Land

For this groundwater availability analysis, it was pertinent to look spatially at the intersection of population growth with existing CUP boundaries rather than a countywide land use map or other source, as it is the area tied to agricultural consumptive water use that is of interest. However, only the intersection of population growth with the 2005 countywide agricultural land use layer

(discussed above) was available. Thus, it was necessary to establish the relationship between agricultural land that may convert on this countywide scale and land within agricultural CUP boundaries that may convert.

In comparing existing countywide agricultural land use coverage with agricultural CUP boundaries, discrepancies between the two datasets were apparent. When the CUP layer was superposed on the existing agricultural land layer, the majority of the area was not designated agricultural (Figure 1-2). It is possible that this discrepancy is a result of refinements still underway for the agricultural land use layer as part of the quality assurance phase, or by mapping issues in the CUP data. The process employed by the SJRWMD in establishing the county-wide agricultural layer is very intensive, and includes a compilation of aerial photography coupled with field verification, and data gleaned from land use cover and future land use maps, the Florida Agricultural Statistics Service (FASS), and information from local growers.² The CUP process is more straightforward. CUP applicants submit drawings depicting the boundaries of the area to be covered by the CUP, and these drawings are ultimately transferred to GIS by the SJRWMD after individual project review and approval of boundaries.

The differences in datasets outlined above limited the scope of agricultural conversion analysis, and precluded a closer examination of individual CUPs. Considering the discrepancies in datasets, a broad approach was taken to correlate population growth with agricultural CUP land.

Conversion Factor

The quantitative relationship between population growth and each agricultural land dataset (countywide and CUP agricultural land) was ascertained in order to cross check the overall relationship between the two spatial depictions of agricultural land, and in turn, calculate an approximate value for agricultural CUP land conversion. This analysis generated a conversion factor that was used to project determined the total percentage of agricultural CUP land that may convert to residential or commercial/industrial land use by 2030 within Lake County. The conversion factor calculations were based on the intersection of parcels exhibiting 2005 to 2030 population growth with the countywide agricultural land dataset. The following calculations were made:

- The ratio of agricultural land exhibiting population growth to total existing countywide agricultural land (approximately 39%)
- The ratio of existing agricultural CUPs containing agricultural land (from the countywide layer) exhibiting population growth to the total number of existing agricultural CUPs (approximately 54%)

These values were similar enough such that 39% was taken to be a sound approximation for a land use conversion factor. This value was selected over the 54%, as it is a more conservative estimate.

² The layer used in this analysis is outdated by 2-3 months, but within that time frame approximately 4,000 acres of citrus was not captured, as citrus is easily confused with timer and other agricultural operations without field verification.

1.2.2 Existing Agricultural Consumptive Use Permits – Allocations and Actual Use

A baseline of existing agricultural CUP data was determined and analyzed in order to establish the amount of water that is currently allocated and the quantity actually used. This data, with the conversion factor applied, ultimately yields an approximation of groundwater currently allocated for agricultural use that may supply future residential and/or commercial/industrial water needs.

Data associated with existing agricultural CUPs was extracted from the 100,000 gpd and 4-inch well tabulation in Technical Memorandum 2 of the Lake County Water Supply Plan. The total existing allocated agricultural CUP quantity for Lake County is 34.6 mgd³. The total groundwater and surfacewater allocations are approximately 31.1 mgd (96% of the total allocation) and 2.3 mgd (6% of the total allocation), respectively. The remaining 1.4 mgd (4% of the total allocation) is allocated to reuse water. Groundwater is the major agricultural water use allocation and is also the focus of this analysis.

It is important to estimate the actual water use, or pumpage, of agricultural water allocations on a countywide basis, as actual use may affect the amount of water that the SJRWMD reallocates to other water use sectors. For the purpose of this analysis, individual CUPs were assigned one of the following three (3) categories according to historical pumpage:⁴

- Inactive: No pumpage over the 2000-2005 timeframe. Eight (8) permits having no pumpage reported from 2000 to 2005, with a total inactive allocated quantity of approximately 2.22 mgd (6.4% of all agricultural permit allocations).
- Underutilized: <25% of the total existing allocated quantities were utilized over the 2000-2005 period. A total of thirty-five (35) permits fell under this category, for a total of 8.16 mgd underutilized (23.5% of the total agricultural permit allocations).
- Active: ≥25% of total existing allocated quantities were utilized over the 2000-2005 period. Sixty-eight (68) total permits fell under this category, with a total allocation (the total average pumped quantity) of 6.14 mgd not utilized.

In summary, approximately 10.4 mgd of existing allocated agricultural quantities are unused in permits that are inactive or underutilized. These permits are located throughout the County and could potentially support future public supply or domestic self-supply demands. The quantity of existing agricultural water use that may be shifted to other water uses was then determined on a broad, countywide scale. The total projected estimated acreage of agricultural CUP land that may be converted over the planning horizon from 2005 to 2030 was then translated to a water quantity to help serve the demand shift.

³ Many agricultural CUPs have been allowed to expire due to the decline in agricultural operations throughout Lake County, so this number may appear lower than expected.

⁴ These categories are not reflective of those the SJRWMD assigns to indicate the status of CUPs. Scenarios 2 and 3 utilize the average of 2000-2005 agricultural CUP pumpage.

1.2.3 Conclusions

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 will be available is dependent on how the SJRWMD will view unused allocations, 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.⁵ To obtain the potential groundwater quantities for each scenario, the 39% agricultural conversion factor was applied, and the current proportion of groundwater (89.9%) in existing 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 1-3. 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.

Table 1-3 Agricultural Demand Shift 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 |

- (1) This scenario uses the total existing (2007) allocated quantities as a baseline and uses the conversion factor to arrive at the total amount of water potentially shifted to public supply or domestic self-supply use. The existing percent of groundwater allocation (89.9%) is then kept constant to calculate the total amount of groundwater potentially available to shift.
- (2) This scenario uses the total "active" allocated quantities as a baseline and uses the conversion factor to arrive at the total amount of water potentially shifted to public supply or domestic self-supply use. Active is defined as the portion of water actually pumped by users that pumped an average of >25% of their existing allocations from 2000-2005. The existing percent of groundwater allocation (89.9%) is then kept constant to calculate the total amount of groundwater potentially available to shift.
- (3) This scenario uses only the total averaged 2000-2005 pumped quantities as a baseline and then uses the 39% conversion factor to calculate the total water quantity potentially that will potentially shift to public supply or domestic self-supply use. The existing percent of groundwater allocation (89.9%) is then kept constant to calculate the total amount of groundwater potentially available to

⁵ 2000-2005 average pumpage.

shift. The drought 2000 and 2001 drought year conditions may cause pumpage calculations to appear high.

2.0 Alternative Water Supply

This Chapter evaluates potential regional alternative water supply (AWS) development projects that have passed a preliminary screening in Technical Memorandum No. 2. Specifically, this Chapter addresses the Scope of Work - Task 7 – Evaluation of Existing Facilities and Alternative Water Supply Development Projects. As stated in the scope, this technical memorandum includes:

- Review and evaluation of AWS projects; and
- Identification of the preferred development projects for Lake County.

The results of the preliminary screening process described in Technical Memorandum 2 identified six AWS projects for more detailed evaluation as viable potable water sources of alternate surfacewater for the County. The six project locations are shown on Figure 2-1 and 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

2.1 Development of AWS Demands

A water balance approach to evaluate the AWS project demands was developed based on the Alliance Member's 2030 demands and the potential resources to meet the demand deficit. The actual AWS demand deficit will ultimately be based on the management and implementation of four key elements:

- Conservation (discussed in TM # 3);
- Wastewater Reuse (discussed in TM # 3);
- Agricultural Land Conversion (discussed in Chapter 1);
- Groundwater Availability (discussed in Chapter 1)

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. As a result, the ultimate need for individual AWS participation is a judgment which each individual Alliance member will ultimately have to make.

Furthermore, the six AWS projects that passed the TM #2 screening step are included in the SJRWMD and/or Withlacoochee Regional Water Supply Authority water supply planning processes, suggesting that the Alliance (and individual members) only represent a portion of the total potential regional participants. The uncertainty regarding potential partners for each project was illustrated at the recent meeting sponsored by the SJRWMD, held in Orlando on July 18, 2007, which addressed Alternative Water Supply Project Planning Meeting for Local Governments and Utilities. The partnerships that eventually form will drive the selection of the AWS projects and the cost of implementing the AWS alternative. The possibility of more than one AWS regional project moving forward may also create a situation where the Alliance Members are better served by splitting their support for select AWS projects.

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 Section 1 of this memorandum, as well as previous Technical Memorandum and workshops, 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

The Alliance Members total unadjusted water demand increase over the planning horizon (through 2030) is approximately 26.5 mgd. Unadjusted demand is defined as the total water demand increase based on projected population increases and per capita usage rates discussed in TM #3 without any reductions in demand. However, when considering high cost AWS, a longer planning horizon (through 2055) and associated higher demand may be more appropriate because of the high investment cost and time frame for execution of any AWS program.

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 |
| <u>e. Agricultural to Residential Shift</u> | <u>4.6 mgd</u> |
| Total Potential Deficit Reduction without AWS..... | 27.2 mgd |

- a. Current Groundwater – The baseline assumption is that only currently allocated groundwater supply is available to meet the added Alliance demand, or 7.3 mgd. The SJRWMD has indicated that additional groundwater supply may be available and allocated as permits are renewed on a case-by-case basis for utilities that are not located in the CFCA. The four Alliance Members in the CFCA (Cities of Clermont, Groveland, Mascotte, and Minneola) are apparently restricted to 2013 demand numbers.
- b. Additional Groundwater – A more aggressive interpretation of groundwater supply is based on the SJRWMD 2013 planning numbers which suggest that an additional 2.6 mgd may be available.
- c. Conservation Demand Reduction – Conservation is a viable means to reduce the future dependency on AWS. As presented in TM #3, the potential reduction of 6.2 mgd could be realized by the Alliance based on aggressive conservation programs by members.
- d. Beneficial Reuse – Beneficial reuse of wastewater as the population grows can off-set some potable water demands through the planning horizon. As presented in TM #3, a planning target of 50% of the average annual daily wastewater flow for beneficial reuse

is reasonable for the entire Alliance, resulting in a potential demand reduction of 6.5 mgd for the Alliance Members (assuming beneficial reuse is used as efficiently as potable water).

- e. Agriculture to Residential Demand Shift – Agricultural to Residential demand shift presented in Chapter 1 of this memorandum incorporates two components; groundwater available from unused agricultural allocation and allocated groundwater shifting to residential public supply. A countywide range of demand shift was determined from an aggressive 12.1 mgd to a more moderate 7.6 mgd estimate. For AWS review purposes, it is assumed that the Alliance Members account for approximately 60% of the total county water demand, so the 60% of the lower estimate of 7.6 mgd or 4.6 mgd is assumed to become available for the Alliance members over the planning horizon.

2.2 Demand Projections for AWS Comparison

Recognizing the substantial variability related to the Alliance future water supply demands, each AWS is being evaluated 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.

2.3 AWS Project Evaluation Criteria

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.

In general, it is understood that the overall unit cost (cost per 1,000 gallons) for water supply will be reduced as more partners are aligned to develop a particular AWS project. However, as these partnerships are now just beginning to be developed for the larger AWS projects, it is not possible to predict the many partnership combinations that may occur.

The uncertainties related to groundwater availability, Alliance member methods to reduce demands, and the consolidation of partnerships for specific AWS projects clearly impacts the level of detail that can be incorporated into the AWS evaluation. Therefore, this evaluation is based on some simplifying assumptions, with discussion directed at the more significant “what if” scenarios that may develop.

- The AWS options are evaluated based on Alliance Member projected demands without regional partnerships, such as Orange County or the 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.
- For comparison of cost data, Demand Scenario 1 is used for Alliance Members, recognizing the cost comparison is only performed for evaluating differences between alternatives and does not reflect actual costs that may ultimately be realized. The estimate also assumes a similar in-county primary pipe network to provide a backbone for distribution to the Alliance Members is the same for each alternative.
- The Lake County settlement agreement approved in 2004 gives Lake County the option to use up to 5 mgd alternative water supply developed by OUC for the municipalities in Lake County. The companion four-party settlement agreement calls for a commitment from OUC and Orange County to develop at least 15 million gallons per day of alternative water supplies for use in their service areas by the year 2013. While the value the Alliance members will receive from this agreement is not clear, the 5 mgd supply is considered in the AWS evaluation description.

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

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

A brief discussion of each AWS project is included, along with a discussion focused on the evaluation criteria and grading for each element.

2.4 St. Johns River Yankee Lake Project

2.4.1 Project Description

The SJR Yankee Lake Project is being developed in two phases. Phase I includes construction of a river intake, raw water pump station, and a pipeline to convey the raw water from the St. Johns River to a new treatment facility which will supply about 10 mgd of water to augment Seminole County's reuse program. The program also includes the potential development of a 25 mgd potable water treatment capacity. The development program includes the potential to expand the treatment facility for a future capacity of 75 mgd to meet the regions potable needs. It is assumed that it would take 8 to 10 years for the Alliance Members to begin receiving water supply from this AWS

As Phase I of this project has already been initiated, this would be a shared facility with Seminole County (as a minimum).

Figure 2-2 illustrates the general location of the Yankee Lake intake facility as well as a potential transmission line route from the facility to Alliance Members. A northern pipeline of about 20 miles is assumed to convey water to the Mt. Dora area and a second north-south pipeline of about 34 miles is assumed to convey water to the Clermont area. Primary in-county piping is assumed to be the same for all regional AWS projects.

2.4.2 Resource Availability, Reliability, and Longevity:

The SJR Yankee Lake Project located on the St Johns River which has an estimated total yield of 116 mgd per the SJRWMD, independent of brine disposal needs and less water that may be allocated to the City of Melbourne and Cocoa Beach. This availability far exceeds the range of Alliance Member demands being considered. Resource reliability and longevity are both present, as MFLs for the St John's River have been established and it is assumed the estimated yield considers these values. Regulatory constraints on water supply development should maintain significant yield.

Grade: A

2.4.3 Raw Water Quality

The St John's River water quality is a mix of fresh water during high-flow conditions, and slightly-to-moderately brackish water during low flow periods. Consequently, surfacewater treatment methods will be more elaborate than fresh water supply (i.e. membrane technology and concentrate management) to produce a potable water supply. Discharge of the waste high-concentrate brine will be a critical component of the project viability. Currently, brine or concentrate discharge is proposed to be sent back to the river.

Grade: C

2.4.4 Permittability

The source is expected to be permissible for potable water supply. There is adequate water supply and interest by the SJRWMD and other state agencies, such that it is assumed any project development issues can be resolved. The management and disposal of concentrate from the brackish water treatment process will result in more complicated permitting issues from the FDEP to protect downstream resources.

Grade: B

2.4.5 Environmental Compatibility

The disposal of brine concentrate, generated from the water treatment process, is the most significant environmental factor associated with this project. A detailed evaluation of the brine dilution capacity of the St. Johns River at this location is currently being conducted; alternative brine disposal methods are not currently being evaluated. That portion of the St. Johns River located downstream of the mouth of the Wekiva River and upstream of S.R. 44 is designated as an Outstanding Florida Water (OFW). Included within or adjacent to it are additional state-owned lands, including portions of the Lower Wekiva River Preserve State Park, Blue Spring State Park, and Hontoon Island State Park. Most of these lands and more are designated as the

Wekiva River Aquatic Preserve. The Florida Department of Environmental Protection (FDEP) will not allow the discharge of brine into an OFW.

This project receives an Environmental Compatibility Score of B, meaning the likelihood of significant adverse environmental impacts is low, with the following assumptions: 1) The disposal of brine, whether it be into the St. Johns River, underground, or off site, will not adversely affect the St. Johns River ecosystem or downstream aquatic resources. 2) The pipeline will not be constructed through Wekiva River State Park or Lower Wekiva River Preserve State Park.

Grade: B

2.4.6 Cost

Development of the source would require conventional surfacewater treatment plus membrane treatment (enhanced coagulation, filtration, reverse osmosis, and disinfection). Some ground storage for equalization would be needed, but a large reservoir to manage seasonal variations would not be required.

For planning purposes, transmission lines would run from the potable water treatment location in Seminole County west to a point east of Mt Dora, where the main line would split, with the western line supplying central Lake County Alliance Members and the southern line feeding southern Lake County Alliance Members. As this AWS will be a shared project with Seminole County (as a minimum), the cost reflects a portion of the transmission line to Mt Dora (11 miles) as well as a portion of the southern pipeline cost is shared with non-Lake County utilities that are along the assumed pipe route. The in-county primary pipe network to provide a backbone for distribution to the Alliance Members is similar in all AWS scenarios.

Additionally, the large number of interested partners with associated demands from communities in Lake, Marion, Orange, Seminole, and Volusia Counties may translate into a more cost effective AWS until the projected capacity of 45 mgd is reached.

Based on Demand Scenario 1 (design capacity of about 15 mgd) for cost comparison, the preliminary estimate prepared by SJRWMD, unit production cost (October 2006) for Lake County Alliance, are as follows:

| | |
|--------------------------------------|------------------------------|
| ○ Treatment Cost | \$3.24 per 1000 gals. |
| ○ <u>Transmission Cost</u> | <u>\$2.17 per 1000 gals.</u> |
| Projected Total Unit Production Cost | \$5.41 per 1000 gals. |

As this unit cost is above \$5 per 1000 gallons, and reflects significantly higher treatment cost, it receives a relative ranking of D.

Grade: D

2.4.7 Jurisdictional Complexity

The Yankee Lake project and Alliance are within the SJRWMD area, so no interaction with other WMD's is necessary. However, this project is identified as an AWS with significant interest from

communities in Lake, Marion, Orange, Seminole, and Volusia Counties. As such, developing final partnership agreements between interested parties will be complex.

Grade: B

2.4.8 Location

The location is east of Lake County and is similar in most respects to the SJR DeLand project; including distance from the Alliance in-county pipe network. The transmission distance is greater than the Lake Panasoffkee AWS, but less than the remaining AWS projects.

Grade: B

2.4.9 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

2.5 St. Johns River, near DeLand

2.5.1 Project Description

The SJR DeLand alternative has been characterized as an alternate water source for Seminole, Volusia and Lake Counties. This alternative would include construction of a river intake, raw water pump station, and a pipeline to convey the raw water from the St. Johns River to a new treatment facility, which would supply the County with potable water needs. It is assumed that it would take 10 to 12 years for the Alliance Members to begin receiving water supply from this AWS.

Figure 2-3 illustrates the general location of the SJR DeLand intake facility as well as a potential transmission line route from the facility to Alliance Members. A pipeline of about 23 miles is assumed to convey water to the Mt. Dora area. Primary in-county piping is assumed to be the same for all regional AWS projects.

2.5.2 Resource Availability, Reliability, and Longevity:

The SJR DeLand project has an estimated total yield of 94 to 127 mgd, independent of brine disposal needs and less water that may be allocated to the City of Melbourne and Cocoa Beach. This availability far exceeds the range of Alliance Member demands being considered. Although the MFLs for the St John's River have been established and it is assumed the estimated yield is available, concerns regarding brine discharge are greater at this location. The presence of Outstanding Florida Waters both upstream and downstream of the preliminary facility location at SR-44 reduce the reach of river available for mixing of the brine and may significantly complicate the discharge of concentrate to the river and ultimately reduce the source reliability and longevity.

Grade: B

2.5.3 Raw Water Quality

The St John's River water quality is a mix of fresh water during high-flow conditions, and slightly-to-moderately brackish water during low flow periods. Consequently, surfacewater treatment methods will be more elaborate than fresh water supply (i.e. membrane technology and concentrate management) to produce a potable water supply. Discharge of the waste high-concentrate brine will be a critical component of the project viability. Currently, brine or concentrate discharge is proposed to be discharged back to the river.

Grade: C

2.5.4 Permittability

This AWS location is less likely to be permitted than the Yankee Lake AWS because of the brine concentrate disposal mixing zone appears to be smaller because of the OFWs immediately upstream and downstream of the facility. There is adequate water supply and interest by the SJRWMD such that the project development issues might be resolved. However, the FDEP and anticipated restriction in the management and disposal of concentrate from the brackish water treatment process may complicate or significantly reduce the usability of this AWS.

Grade: C

2.5.5 Environmental Compatibility

The disposal of the brine concentrate, which is a product of the desalination process, is the most significant environmental factor associated with this project. A detailed evaluation of the brine dilution capacity of the St. Johns River at this location is currently being conducted; alternative brine disposal methods are not currently being evaluated. Lake Woodruff National Wildlife Refuge is located immediately downstream of this project, and the Wekiva River Aquatic Preserve is located upstream; both systems are classified OFWs by the FDEP. The discharge of brine into an OFW will not be permitted by the FDEP.

The likelihood of significant adverse environmental impacts resulting from this project is higher than the Yankee Lake project as the OFWs are immediately adjacent to the brine discharge location. Therefore, this project receives an Environmental Compatibility Score of C with the following assumptions: 1) The disposal of brine concentrate, whether it be into the St. Johns River, underground, or off site, will not adversely affect the St. Johns River ecosystem or downstream aquatic resources. 2) The pipeline will be constructed in existing road right-of-ways and will not adversely affect the aquatic and wetland systems adjacent to SR 44.

Grade: C

2.5.6 Cost

Development of the source would require conventional surfacewater treatment plus membrane treatment (enhanced coagulation, filtration, reverse osmosis, and disinfection). Some ground storage for equalization would be needed, but a large reservoir to manage seasonal variations would not be required.

For planning purposes, transmission lines would run from the potable water treatment location on the Lake County/Seminole County border to a point east of Mt Dora (about 23 miles), where

the main line would connect to the in-county pipe network. The in-county primary pipe network to provide a backbone for distribution to the Alliance Members is similar in all AWS scenarios.

The smaller number of interested partners in Seminole, Lake and Volusia Counties and associated demands, may translate into only marginally lower costs as compared to the Yankee Lake project.

Based on Demand Scenario 1 (design capacity of about 15 mgd) for cost comparison, the preliminary estimate prepared by SJRWMD, unit production cost (October 2006) for Lake County Alliance are as follows:

| | |
|--------------------------------------|------------------------------|
| ○ Treatment Cost | \$3.47 per 1000 gals. |
| ○ <u>Transmission Cost</u> | <u>\$2.03 per 1000 gals.</u> |
| Projected Total Unit Production Cost | \$5.50 per 1000 gals. |

As this unit cost is above \$5 per 1000 gallons, and reflects significantly higher treatment cost, it receives a relative ranking of D.

Grade: D

2.5.7 Jurisdictional Complexity

The SJR DeLand project and Alliance are within the SJRWMD area, so no interaction with other WMD's is necessary. This project is identified as an AWS with interest from primarily communities in Seminole, Lake and Volusia Counties. The smaller interest group, when compared to the Yankee Lake project, should allow development of final partnership agreements between interested parties to be less complex.

Grade: B

2.5.8 Location

The location is northeast of Lake County and is similar in most respects to the Yankee Lake project; including distance from the Alliance in-county pipe network. The transmission distance is greater than the Lake Panasoffkee AWS, but less than the remaining AWS projects.

Grade: B

2.5.9 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-

2.6 Lower Ocklawaha River

2.6.1 Project Description

The Lower Ocklawaha River (LOR) alternative assumes a raw water intake structure and treatment system would be located downstream of the confluence with the Silver River in Marion County. This alternative would include construction of a river intake, raw water pump station and treatment facility, and a pipeline to convey the treated water from the LOR to Lake County. It is assumed that it would take 10 to 12 years for the Alliance Members to begin receiving water supply from this AWS.

Figure 2-4 illustrates the general location of the LOR intake facility as well as a potential transmission line route from the facility to the Alliance Members. A pipeline of about 28 miles is assumed to convey water to the northern end of the County. Primary in-county piping is assumed to be the same for all regional AWS projects.

2.6.2 Resource Availability, Reliability, and Longevity:

The SJRWMD and Marion County WRAMS studies, as previously discussed in Technical Memo #2, identified a potential high-water supply yield from this source. The SJRWMD suggested a yield of 100 to 107 mgd estimated for the Lower Ocklawaha River Basin (DWSP 2005). The WRAMS indicated a range of 70 to 100 mgd. Both the SJRWMD and the WRAMS indicated the high potential for an alternate surfacewater supply below the confluence with Silver River. Although MFLs are not yet established and the yield may be further restricted, it is assumed the established yield will be adequate to meet the long-term range of Alliance Member demands being considered.

Grade: A

2.6.3 Raw Water Quality

The LOR water quality is very good, due in large part to the substantial fresh groundwater contribution of Silver Springs. The water is always fresh and would require only conventional surfacewater treatment prior to transport and distribution.

Grade: B

2.6.4 Permittability

The LOR source is expected to be permittable for potable water supply. There is adequate water supply and interest by the SJRWMD and other state agencies, such that it is assumed any project development issues can be resolved. The need for transmission through the Ocala National Forest and the historic structural alterations to the river flow could complicate permitting.

Grade: B

2.6.5 Environmental Compatibility

Both the Silver and Ocklawaha Rivers are designated OFWs, and the proposed withdrawal is located within the sovereign submerged lands of the Ocklawaha River Aquatic Preserve and near Silver River State Park. Since MFLs have not been set for the Ocklawaha River, the available yield is uncertain, and the Ocklawaha River's confluence with the Silver River is complex. MFLs for the Ocklawaha River are currently being developed by the SJRWMD and will be set concurrently with the Silver Springs MFL in 2009 (Rainbow and Silver Springs MFLs will be set jointly by the SWFWMD and SJRWMD).

The transmission line to convey water from this location would have to be constructed through Ocala National Forest which may complicate the transmission line construction. Because the transmission line would be located on federal lands, a formal Environmental Impact Statement (EIS) may also be needed.

The Ocklawaha River has also been significantly affected by structural alterations in the past, and further alterations to the river's flow regime would receive significant opposition by environmental groups.

In addition, the SJRWMD recently permitted the withdrawal of water from Lake Apopka, the headwaters of the Ocklawaha River, which included modifications to Lake Apopka's flow control structures, decreasing the amount of water discharged to the Ocklawaha River. If this permitting approach is followed for other large lakes in the Upper Ocklawaha River Basin in the future (e.g., Lakes Griffin, Harris, and Dora), the amount of water discharged to the Ocklawaha River from the large lakes in the upper basin will continue to decrease which may adversely impact the lower basin.

This project receives an Environmental Compatibility Score of C, meaning that the likelihood of adverse environmental impacts is significant.

Grade: C

2.6.6 Cost

Development of the source would require conventional surfacewater treatment (enhanced coagulation, filtration, and disinfection). Some ground storage for equalization would be needed, but a large reservoir to manage seasonal variations in river flow would not be required.

For planning purposes, a transmission line would run from the potable water treatment location in Marion County to the northern Lake County area and interconnect with the in-county pipe network. The in-county primary pipe network to provide a backbone for distribution to the Alliance Members is similar in all AWS scenarios.

Additionally, the large number of interested partners with associated demands may translate into a more cost effective AWS as partnerships are realized.

Based on Demand Scenario 1 (design capacity of about 15 mgd) for cost comparison, the SJRWMD unit production cost (October 2006) for the Lake County Alliance are as follows:

| | |
|--------------------------------------|------------------------------|
| ○ Treatment Cost | \$2.01 per 1000 gals. |
| ○ <u>Transmission Cost</u> | <u>\$2.56 per 1000 gals.</u> |
| Projected Total Unit Production Cost | \$4.57 per 1000 gals. |

As this projected unit cost is less than \$5 per 1000 gallons, it receives a relative ranking of B when compared to the other AWS projects.

Grade: B

2.6.7 Jurisdictional Complexity

The LOR project and Alliance are within the SJRWMD area, so no interaction with other WMD's is necessary. However, this project is identified as an AWS with significant interest from communities in Lake, Marion, Orange, and Volusia Counties. As such, developing final partnership agreements between interested parties will be complex. However, as the number of communities increases with associated demands, this project becomes more cost effective.

Grade: B

2.6.8 Location

The LOR location in Marion County is north of Lake County and slightly further away from the in-county pipe network than the St John's River AWS options.

Grade: B

2.6.9 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

2.7 Lake Panasoffkee

2.7.1 Project Description

Lake Panasoffkee on the Withlacoochee River in Sumter County represents the AWS surfacewater location closest to the demand area in Lake County. This alternative would include construction of a lake intake, raw water pump station and treatment facility on the eastern side of the lake, and a pipeline to convey the treated water from Lake Panasoffkee to Lake County. It is assumed that it would take 10 to 12 years for the Alliance Members to begin receiving water supply from this AWS.

Figure 2-5 illustrates the general location of the Lake Panasoffkee intake facility as well as a potential transmission line route from the facility to Alliance Members. A pipeline of about 15

miles is assumed to convey water to the Leesburg area. Primary in-county piping is assumed to be the same for all regional AWS projects.

2.7.2 Resource Availability, Reliability, and Longevity:

Lake Panasoffkee has an estimated annual available yield of 9 to 19 mgd. Future withdrawals may be dependent on a withdrawal schedule connected to Lake Panasoffkee's adopted MFLs. The schedule will need to consider the hydraulic relationship between Lake Panasoffkee, the Wysong-Coogler Conservation Structure, and Tsala Apopka Chain of Lakes. Both resource availability and reliability are questionable subject to more detailed analysis of the historic record and hydraulic relationships relative to MFLs. A reduction in the lake's groundwater inputs could occur with increased groundwater withdrawals in Sumter County.

The range of potable water demands for the Alliance impacts the longevity of this water source to meet the Alliance future needs. Lake Panasoffkee appears to have sufficient water to meet Demand Scenario 1, but would be deficient in meeting Demand Scenario 2. Withdrawals from Sumter County users could further reduce available supply to the Alliance.

Because Lake Panasoffkee yield will be limited, compared to the river options, a dual grade is provided for the demand scenarios.

Grade: B (Demand Scenario 1)
D (Demand Scenario 2)

2.7.3 Raw Water Quality

Lake Panasoffkee has good water quality and receives substantial groundwater inputs, accounting for over 40% of the lake's inflow. Lake Panasoffkee's water quality has been considered good since 1989, when the first Lake Panasoffkee Surfacewater Improvement and Management Program (SWIM) Plan was drafted. However, sediment accumulation and encroachment of emergent vegetation are significant issues affecting the lake (SWFWMD, 2004). The Lake Panasoffkee Restoration Council has an on-going dredging program of sediments to rehabilitate navigation and fish spawning areas with the intention of returning the lake to hard bottom conditions.

Grade: B

2.7.4 Permittability

Lake Panasoffkee is a ranked water-body on the SWFWMD SWIM Priority List, an Outstanding Florida Water (OFW), and a popular sport fishery. Lake Panasoffkee flows to the Withlacoochee River via the Outlet River, which flows over a two-mile watercourse from the western shore of the lake and serves as the sole discharge from the lake. These issues create uncertainty with respect to obtaining necessary permits to utilize this source.

Grade: C

2.7.5 Environmental Compatibility

Lake Panasoffkee is a popular sport fishery, a ranked water body on the SWFWMD Surfacewater Improvement and Management Program (SWIM) Priority List, and an OFW. Lake Panasoffkee flows to the Withlacoochee River via the two-mile Outlet River, which serves as the sole discharge from the lake. Stage-based MFLs have been adopted by the SWFWMD for Lake Panasoffkee, which receives 40% of its water from groundwater via springs located within the lake. MFLs are currently under development for the Withlacoochee River by the SWFWMD; preliminary or proxy MFLs, developed for water supply planning purposes, will be available by the end of August 2007.

The ecological and hydrological relationships between the Withlacoochee River, the Tsala Apopka Chain of Lakes (which has an adopted stage-based MFL), and Lake Panasoffkee are extremely complex. Since Lake Panasoffkee is located in the Upper Withlacoochee River Basin, the available yield of surfacewater would be highly variable. When the SWFWMD develops MFLs for a particular water body, it evaluates historical flows and levels in the absence of any withdrawals, and the ground and surfacewater withdrawals in the Withlacoochee River Basin have not been accessed. Since MFLs have not been developed for the Withlacoochee River, the available yield is uncertain, and the Outlet River contributes a significant amount of water to the Withlacoochee River.

A project to withdraw surfacewater from Lake Panasoffkee, an OFW, has a reasonable likelihood of significant adverse environmental impacts.

Grade: C

2.7.6 Cost

Development of the source would require conventional surfacewater treatment (coagulation, filtration, and disinfection). Some ground storage for equalization would be needed, but a large reservoir to manage seasonal variations is not included in the cost projection. However, the cost would escalate considerably if storage is required due to a restricted withdrawal schedule

For planning purposes, the transmission line would run from the eastern side of Lake Panasoffkee to the Leesburg area and interconnect with the in-county pipe network. The transmission main would be approximately 15 miles long. The in-county primary pipe network to provide a backbone for distribution to the Alliance Members is similar in all AWS scenarios.

The smaller number of interested partners in northeastern Sumter and Lake Counties and associated demands, may translate into only marginally lower costs as compared to other AWS projects.

Based on Demand Scenario 1 (design capacity of about 15 mgd) for cost comparison, unit production costs for the Lake County Alliance are projected as follows:

| | |
|--------------------------------------|------------------------------|
| ○ Treatment Cost | \$1.96 per 1000 gals. |
| ○ <u>Transmission Cost</u> | <u>\$1.84 per 1000 gals.</u> |
| Projected Total Unit Production Cost | \$3.81 per 1000 gals. |

As this unit cost is less than \$4 per 1000 gallons and represents the least projected cost when compared to the other AWS options, it receives a relative ranking of A, assuming no reservoir is needed.

Grade: A (no reservoir required)

2.7.7 Jurisdictional Complexity

The Lake Panasoffkee project is located within the SWFWMD. Consequently, communication and cooperation between the SJRWMD and SWFWMD is critical and will complicate the project approval process.

With respect to partnerships, this project is considered a small regional AWS, so only communities in northeastern Sumter and Lake Counties are likely partners. As such, developing final partnership agreements between interested parties should be less complex than the larger AWS projects.

Grade: C

2.7.8 Location

The Lake Panasoffkee project west of Lake County is the closest AWS project to Lake County.

Grade: A

2.7.9 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, permissibility, 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)**

2.8 Withlacoochee River at Holder

2.8.1 Project Description

The Withlacoochee River is a potentially viable AWS source on the portion of the river that forms the boundary between Citrus and Marion Counties. The Withlacoochee River at Holder represents the river (i.e., USGS hydrologic gage) location assumed for this AWS evaluation. This alternative is being considered by the WRWSA for surfacewater supply.

This AWS assumes a raw water intake structure and treatment system would be located on the Withlacoochee River in the vicinity of the Holder. This alternative would include construction of a river intake, raw water pump station and treatment facility, and a pipeline to convey the treated

water to Lake County. It is assumed that it would take 10 to 12 years for the Alliance Members to begin receiving water supply from this AWS.

Based on preliminary MFLs analysis being conducted as part of the WRWSA planning study, it appears that during low flow conditions water will not be able to be harvested for water supply needs. Consequently, a reservoir is likely needed to capture water during high flow conditions to provide adequate year round water supply.

Figure 2-6 illustrates the general location of the Withlacoochee River at Holder intake facility as well as a potential transmission line route from the facility to Alliance Members. A pipeline of about 36 miles is assumed to convey water to the northern end of the County, similar to the LOR AWS. Primary in-county piping is assumed to be the same for all regional AWS projects

2.8.2 Resource Availability, Reliability, and Longevity:

The Withlacoochee River at Holder has an estimated annual available yield of about 50 mgd. This availability far exceeds the range of Alliance Member demands being considered. An MFL scheduled for 2009 for the Middle Withlacoochee could result in the river not being available for water supply during low-flow periods, but it is assumed that reliability and longevity are present, as the assumed average yields are far in excess the Alliance Members demands. Withdrawals from other users could further reduce available supply to the Alliance.

Grade: B

2.8.3 Raw Water Quality

The Withlacoochee at Holder maintains the organic and color rich character of the upper river, and also receives fair to good quality discharges from Tsala Apopka's Hernando Pool and Lake Panasoffkee. Some buffering of water quality due to the higher quality inputs is anticipated, but conventional treatment is expected to be required for potable use.

Grade: B

2.8.4 Permittability

The source is expected to be permittable. Some downstream competition for water may occur due to resource management issues with low levels in Lake Rousseau. A withdrawal schedule based on a "percent flow reduction" would be developed to protect downstream resources. It is anticipated this withdrawal schedule will result in the river not being available for water supply during low-flow periods.

Grade: B

2.8.5 Environmental Compatibility

MFLs are currently under development by the SWFWMD for the Withlacoochee River, an OFW. Preliminary or proxy MFLs will be available by the end of August 2007; these proxy MFLs were developed for water supply planning purposes. Historical flows and levels in the absence of any withdrawals are evaluated by the SWFWMD when developing MFLs, and the ground and surfacewater withdrawals in the Withlacoochee River Basin have not been accessed. Since MFLs have not been developed for the Withlacoochee River, the available yield is uncertain

This project receives an Environmental Compatibility Score of B since the likelihood of significant adverse environmental impacts is low. Transfer of water across basin boundaries would reduce recharge to the basin. This score also assumes that approximately 36 miles of transmission main needed to connect to a countywide distribution system will be constructed in existing right-of-ways and will not affect ecological resources.

Grade: B

2.8.6 Cost

Development of the source would require conventional surfacewater treatment (coagulation, filtration, and disinfection). In addition, a large reservoir to manage seasonal variations in flow is anticipated and included in the cost projection.

For planning purposes, the transmission line would run from the treatment facility to the northern area of Lake County and interconnect with the in-county pipe network. The transmission main would be approximately 36 miles long. The in-county primary pipe network to provide a backbone for distribution to the Alliance Members is similar in all AWS scenarios.

Additionally, the large number of interested partners with associated demands may translate into a more cost effective AWS as partnerships are realized.

Based on Demand Scenario 1 (design capacity of about 15 mgd) for cost comparison, unit production costs for the Lake County Alliance are projected as follows:

| | |
|--------------------------------------|------------------------------|
| ○ Treatment Cost | \$1.96 per 1000 gals. |
| ○ Reservoir Cost | \$2.30 per 1000 gals. |
| ○ <u>Transmission Cost</u> | <u>\$2.63 per 1000 gals.</u> |
| Projected Total Unit Production Cost | \$6.89 per 1000 gals. |

As this unit cost is above \$6 per 1000 gallons because of the likely need for a reservoir, it receives a relative ranking of D.

Grade: D

2.8.7 Jurisdictional Complexity

The Withlacoochee at Holder project is located within the SWFWMD. Consequently, communication and cooperation between the SJRWMD and SWFWMD is critical and will complicate the project approval process.

With respect to partnerships, this project is considered an AWS with significant interest from communities in Lake, Marion, Sumter, and the WRWSA members. As such, developing final partnership agreements between interested parties will be complex.

Grade: C

2.8.8 Location

The Withlacoochee at Holder project west of Lake County is slightly further away than the LOR AWS project.

Grade: B

2.8.9 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

2.9 Lake Rousseau

2.9.1 Project Description

Lake Rousseau is a man-made lake formed upstream of the Inglis Dam on the Withlacoochee River. Surfacewater resource availability is not an issue as Lake Rousseau represents the Withlacoochee Basin (i.e., USGS hydrologic gage) location with the highest available yield. This alternative is being considered by the WRWSA for surfacewater supply and is a viable option for consideration by the Lake County Alliance.

This AWS assumes a raw water intake structure and treatment system would be located below the confluence of the Rainbow River and Withlacoochee River near or within the boundaries of Lake Rousseau. This alternative would include construction of a river intake, raw water pump station and treatment facility, and a pipeline to convey the treated water to Lake County. It is assumed that it would take 10 to 12 years for the Alliance Members to begin receiving water supply from this AWS.

Figure 2-7 illustrates the general location of the Lake Rousseau intake facility as well as a potential transmission line route from the facility to Alliance Members. A pipeline of about 50 miles is assumed to convey water to the northern end of the County, similar to the Holder AWS. Primary in-county piping is assumed to be the same for all regional AWS projects

2.9.2 Resource Availability, Reliability, and Longevity:

Lake Rousseau has an estimated annual available yield ranging from 87 to 98 mgd. This availability far exceeds the range of Alliance Member demands being considered. A reduction in yield could occur with environmental studies to return freshwater to the Lower Withlacoochee. However, resource availability, reliability, and longevity are present.

Grade: A

2.9.3 Raw Water Quality

Lake Rousseau blends middle Withlacoochee River and Rainbow River characteristics with water quality impacts from adjacent land uses. Some buffering of water quality due to the higher quality inputs is anticipated, but conventional treatment is expected to be required for potable use.

Grade: B

2.9.4 Permittability

The U.S. Army Corps of Engineers regulates the discharge schedule from Lake Rousseau. Consequently, for this source to be utilized, the intake would be located upstream of the lake, but is still believed to have difficulty in receiving approval from both the Corps and the SWFWMD. Additionally, some competition for water may occur due to resource management issues with low levels and muck accumulation in Lake Rousseau, and saltwater intrusion patterns in the Lower Withlacoochee. A withdrawal schedule based on a “percent flow reduction” would be developed to protect downstream resources.

Grade: B

2.9.5 Environmental Compatibility

MFLs are currently under development for the Withlacoochee River by the SWFWMD. Preliminary or proxy MFLs will be available by the end of August 2007 for water supply planning purposes. The SWFWMD evaluates historical flows and levels in the absence of any withdrawals when developing MFLs, and the ground and surfacewater withdrawals in the Withlacoochee River Basin have not been accessed. Since MFLs have not been developed for the Withlacoochee River, the available yield for Lake Rousseau is uncertain and could be affected by the need to return freshwater to the Lower Withlacoochee River for ecological restoration reasons.

Since the likelihood of significant adverse environmental impacts is low, this project receives an Environmental Compatibility Score of B. This score assumes that the approximately 50 miles of transmission main needed to connect to a countywide distribution system will be constructed in existing right-of-ways and will not affect ecological resources.

Grade: B

2.9.6 Cost

Development of the source would require conventional surfacewater treatment (enhanced coagulation, filtration, and disinfection). Some ground storage for equalization would be needed, but a large reservoir to manage seasonal variations is not included in the cost projection.

For planning purposes, the transmission line would run from treatment facility to the northern area of Lake County and interconnect with the in-county pipe network. The transmission main would be approximately 50 miles long. The in-county primary pipe network to provide a backbone for distribution to the Alliance Members is similar in all AWS scenarios.

Additionally, the large number of interested partners with associated demands may translate into a more cost effective AWS as partnerships are realized.

Based on Demand Scenario 1 (design capacity of about 15 mgd) for cost comparison, unit production costs for the Lake County Alliance are projected as follows:

| | |
|--------------------------------------|------------------------------|
| ○ Treatment Cost | \$1.96 per 1000 gals. |
| ○ <u>Transmission Cost</u> | <u>\$3.00 per 1000 gals.</u> |
| Projected Total Unit Production Cost | \$4.96 per 1000 gals. |

As this projected unit cost is projected at about \$5 per 1000 gallons, it receives a relative ranking of C when compared to the other AWS projects.

Grade: C

2.9.7 Jurisdictional Complexity

The Lake Rousseau project is located within the SWFWMD. Consequently, communication and cooperation between the SJRWMD and SWFWMD is critical and will complicate the project approval process. Additionally, the Corps of Engineers will have significant input as this withdrawal may impact the discharges from Lake Rousseau at Inglis Dam.

With respect to partnerships, this project is considered an AWS with significant interest from communities in Lake, Marion, Sumter, and the WRWSA members. As such, developing final partnership agreements between interested parties will be complicated.

Grade: C

2.9.8 Location

The Lake Rousseau project west of Lake County is similar to the Holder AWS project but further away from the Alliance Members.

Grade: C

2.9.9 Overall Grade

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

Grade: C

2.10 Alternative Water Supply Comparison

Each AWS project has been graded based on each of the seven comparison criteria. The feasibility for AWS development, using the qualitative evaluation matrix is summarized in Table 2-2.

2.11 Other Alternative Water Supply Development Considerations

2.11.1 Regional Water Supply Development Strategies

Planning and development for water use must consider its mobility. Water crosses jurisdictional boundaries, and withdrawals in one jurisdiction may affect future withdrawals in another. Water resource availability varies with location, so that one jurisdiction may be water-rich, while another may be water-poor. Finally, “water banking,” or the capture of water supplies well before the time of use, is prevented by the Districts.

The mobility of water, its supply variability, and the inability to bank water mean that water supply development cannot be effectively conducted in a vacuum. The regional water supply context must be understood in order to adequately direct its development. Present water management strategies cannot be solely relied upon to meet the long-term water demand in Lake County. Involvement and development of water management strategies both locally and regionally will be required to satisfy water resource management needs in Lake County. This includes coordinating development of the remaining groundwater and surfacewater supplies within Lake County, and closely monitoring the regional water supply situation as it changes over time.

Orange, Seminole, Volusia, Flagler, and Brevard Counties are currently engaged in intensive searches for new sources of water to meet future demand. A recent permit application for 60 million gallons per day (mgd) of groundwater withdrawals was approved by the SJRWMD and received several legal objections, due to its potential to affect existing legal users. Another recent permit application for 5 mgd of surfacewater withdrawals was approved by the SJRWMD and also received a legal objection.

The legal wrangling in central Florida likely foreshadows increasing future water supply conflicts in its vicinity. As one jurisdiction may be water-rich, while another may be water-poor, the transfer of water across jurisdictional boundaries can help to manage water supply conflict. This need has been foreseen by the state legislature and inter-jurisdiction transfer of water is provided for under Florida law.

2.11.2 Transfer of Water – Florida Water Law

Florida water law provides that the ground and surfacewater sources in the State are the property of the citizens of Florida and that no jurisdictional water rights exist in Florida. Current Florida law does not allow local governments or the WMDs to keep water supply sources that are located within their jurisdictional boundaries to be utilized only to the benefit of users within their jurisdictional boundaries.

However, under the provision of Florida law known as “local sources first” (Ch. 373.223, F.S.), the permitting WMD must evaluate additional conditions for application that propose to transport water from one jurisdiction to another. The additional conditions require feasibility analyses of local sources before transport of water is approved, as described in 373.223 F.S.:

.....when evaluating whether a potential transport and use of ground or surfacewater across county boundaries is consistent with the public interest...the governing board or department shall consider:

(a) The proximity of the proposed water source to the area of use or application.

(b) All impoundments, streams, groundwater sources, or watercourses that are geographically closer to the area of use or application than the proposed source and that are technically and economically feasible for the proposed transport and use.

(c) All economically and technically feasible alternatives to the proposed source, including, but not limited to, desalination, conservation, reuse of nonpotable reclaimed water and stormwater, and aquifer storage and recovery.

(d) The potential environmental impacts that may result from the transport and use of water from the proposed source, and the potential environmental impacts that may result from use of the other water sources identified in paragraphs (b) and (c).

(e) Whether existing and reasonably anticipated sources of water and conservation efforts are adequate to supply water for existing legal uses and reasonably anticipated future needs of the water supply planning region in which the proposed water source is located.

(f) Consultations with local governments affected by the proposed transport and use.

(g) The value of the existing capital investment in water-related infrastructure made by the applicant.

Since inter-jurisdictional transfer of water is provided for under Florida under certain circumstances, the transfer of water can be an important tool in managing water supply conflict. However, inter-jurisdictional transfers of water must be carefully contemplated and evaluated relative to the availability of other local sources and demand reduction opportunities.

2.12 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.

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 2-8. 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.

Table 2-1

Lake County Surface Water Supply Evaluation Criteria

| Evaluation Information | |
|--|--|
| Criteria Categories | Grading Explanation |
| <p>1. Resource Availability, Reliability, and Longevity -This criterion relates to the quantity of water available for treatment, relative to projected demands. It includes the probability of long term availability without resulting in system or withdrawal termination. It considers the characteristics of the hydrogeology and/or surface water resources.</p> | <p>D - Supply source not adequate to meet high demand deficit (Demand Scenario 2) C - Significant negative water quantity or supply variability issues B - Few negative water quantity or supply variability issues A - No negative water quantity, variability, or resource issues</p> |
| <p>2. Raw Water Quality- This criterion is based on assessment of the raw water quality and the level of treatment expected for the intended water use. It also considers the compatibility for treatment for use in a blended system, and the potential for long-term degradation of source water quality.</p> | <p>C - Enhanced conventional-type treatment likely (e.g. high rate clarification, brackish reverse osmosis), or a reasonable possibility of future source degradation B - Conventional-type treatment likely (e.g. complete filtration, membrane softening) A - Limited treatment likely (e.g. lime softening)</p> |
| <p>3. Permittability - This criterion assesses the probability of complying with current rules and regulations of the applicable agencies, including permits for water use and environmental resources. It also includes the probability of being compatible with other existing legal users of water, and compatibility with minimum flows and levels.</p> | <p>C - Difficult to permit due to various regulatory reasons or local government opinion B - Permitting will follow normal permitting course with few issues A - Permitting will follow normal permitting course and likely will be supported by local governments and the WMDs</p> |
| <p>4. Environmental Compatibility - This criterion considers the potential environmental impacts or benefits of developing the supply at the given location, including disposal of wastes generated in the treatment process. It includes the impacts to the environment, groundwater, surface water flows, and downstream resources. Minimum flows and levels and stressed lakes will be considered. This criterion does not include environmental impacts from a specific construction footprint.</p> | <p>C - Reasonable likelihood of significant adverse environmental impacts B - Low likelihood of significant adverse environmental impacts A - No likelihood of significant adverse environmental impacts</p> |
| <p>5. Cost - This criterion includes evaluation of the facility's anticipated design, treatment, and storage requirements. It also includes construction time, need for transmission lines and interconnections, waste disposal needs, and facility operations and maintenance. It is relative to other new supply alternatives under consideration.</p> | <p>D - Very high anticipated costs from alternative treatment technologies (e.g., brackish water), reservoir and transmission needs C - High anticipated costs resulting from enhanced treatment, conventional treatment and transmission needs, or storage and transmission needs B - Moderate anticipated costs resulting from conventional treatment or transmission needs A - Low anticipated costs due to good source quality and limited transmission needs</p> |

Table 2-1

Lake County Surface Water Supply Evaluation Criteria

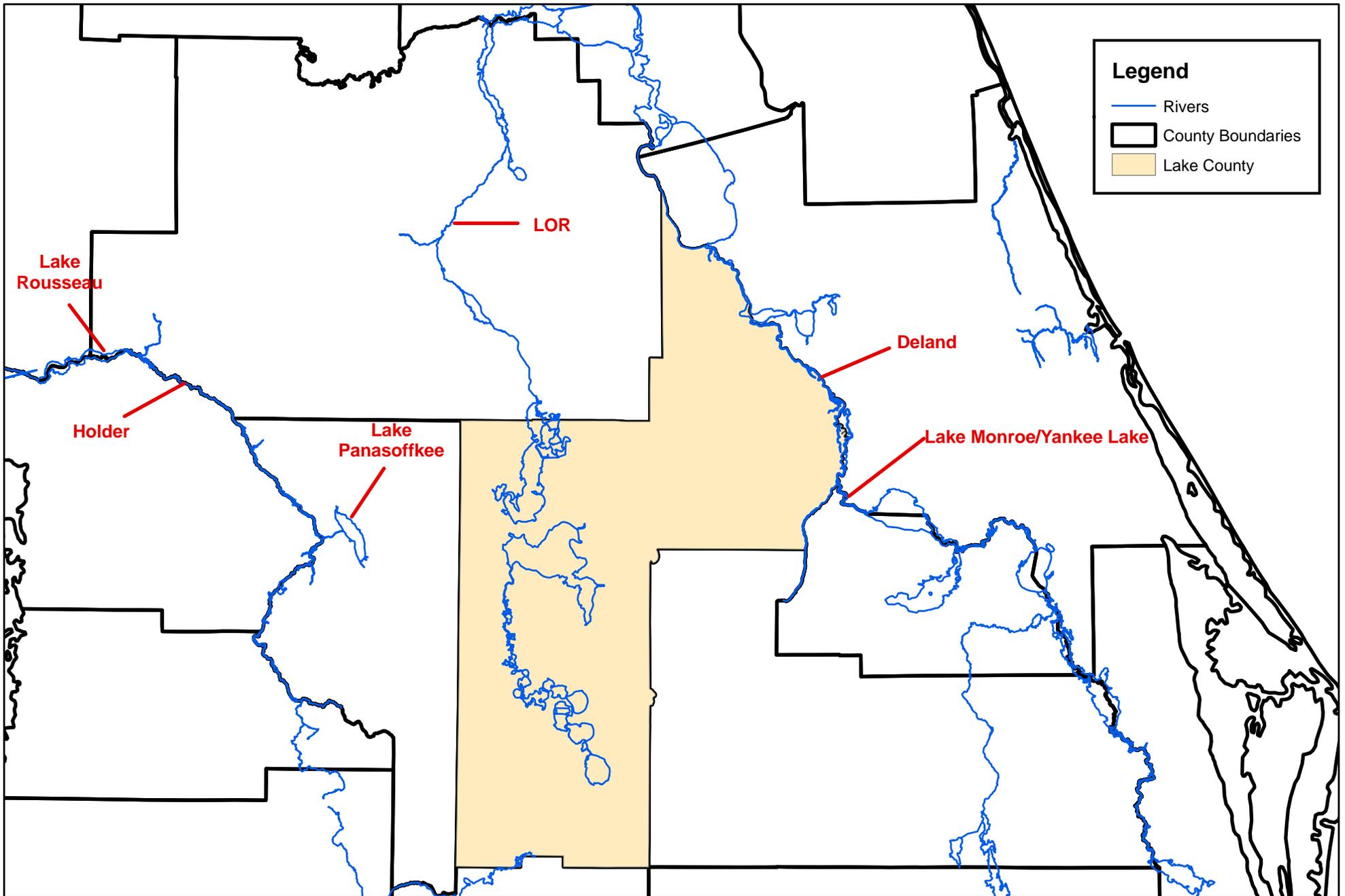
| Evaluation Information | |
|--|---|
| Criteria Categories | Grading Explanation |
| <p>6. Jurisdictional Complexity - This criterion evaluates the project relative to the jurisdictional issues associated with its development.</p> | <p>C - Project area is beyond both the SJRWMD and Lake County borders B - Project area is beyond Lake County borders; but is within SJRWMD A - Project area is within Lake County.</p> |
| <p>7. Location - This criterion assesses the proximity of the anticipated project area to water demand area(s).</p> | <p>C - Project area is significantly distant from Lake County demand areas (greater than 40 miles) B - Project area is reasonably proximate to demand areas, but not ideally located (between 15 and 40 miles) A - Project area is in close proximity to demand areas (less than 15 miles)</p> |
| <p>OVERALL GRADE:</p> | <p>D - Project is not recommended for further consideration Project is not recommended for further consideration without significant modifications B - Project is recommended for further consideration with qualifications A - Project is recommended for further consideration</p> <p style="text-align: right;">C -</p> |

Table 2-2

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 first ranking for Demand Scenario 1 and second ranking for Demand Scenario 2



Legend

- Rivers
- County Boundaries
- Lake County



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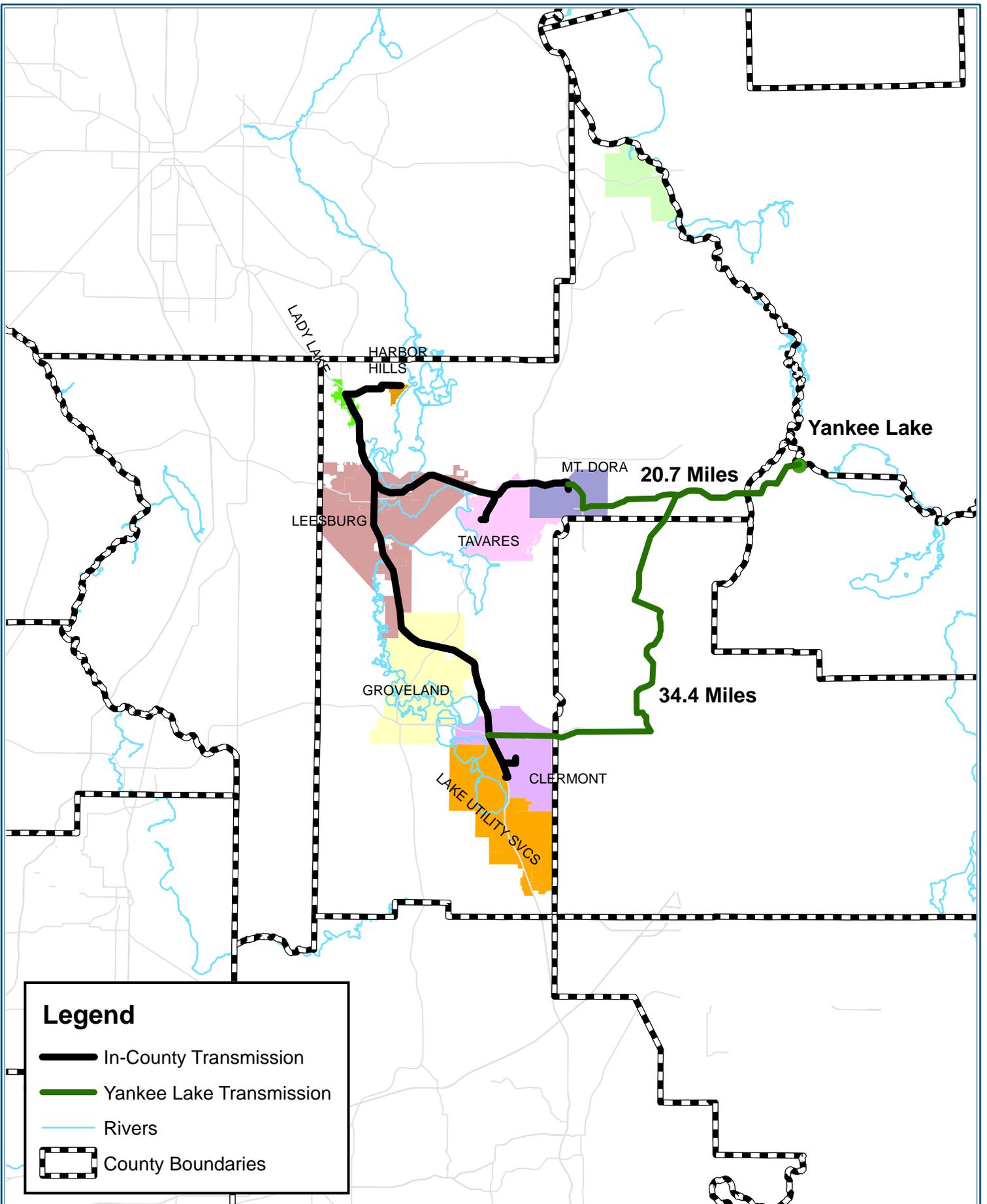
PROJECT: 0407 - Lake County Water Alliance

Figure 2-1
Alternative Water Supply Projects

| |
|---------------------------------|
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| REVISION DATE: N/A |
| JOB NUMBER: 0306 |
| FILE NAME: Recwaterprojects.mxd |
| GIS OPERATOR: DR |



1 Inch = 65,000 Feet



Legend

-  In-County Transmission
-  Yankee Lake Transmission
-  Rivers
-  County Boundaries



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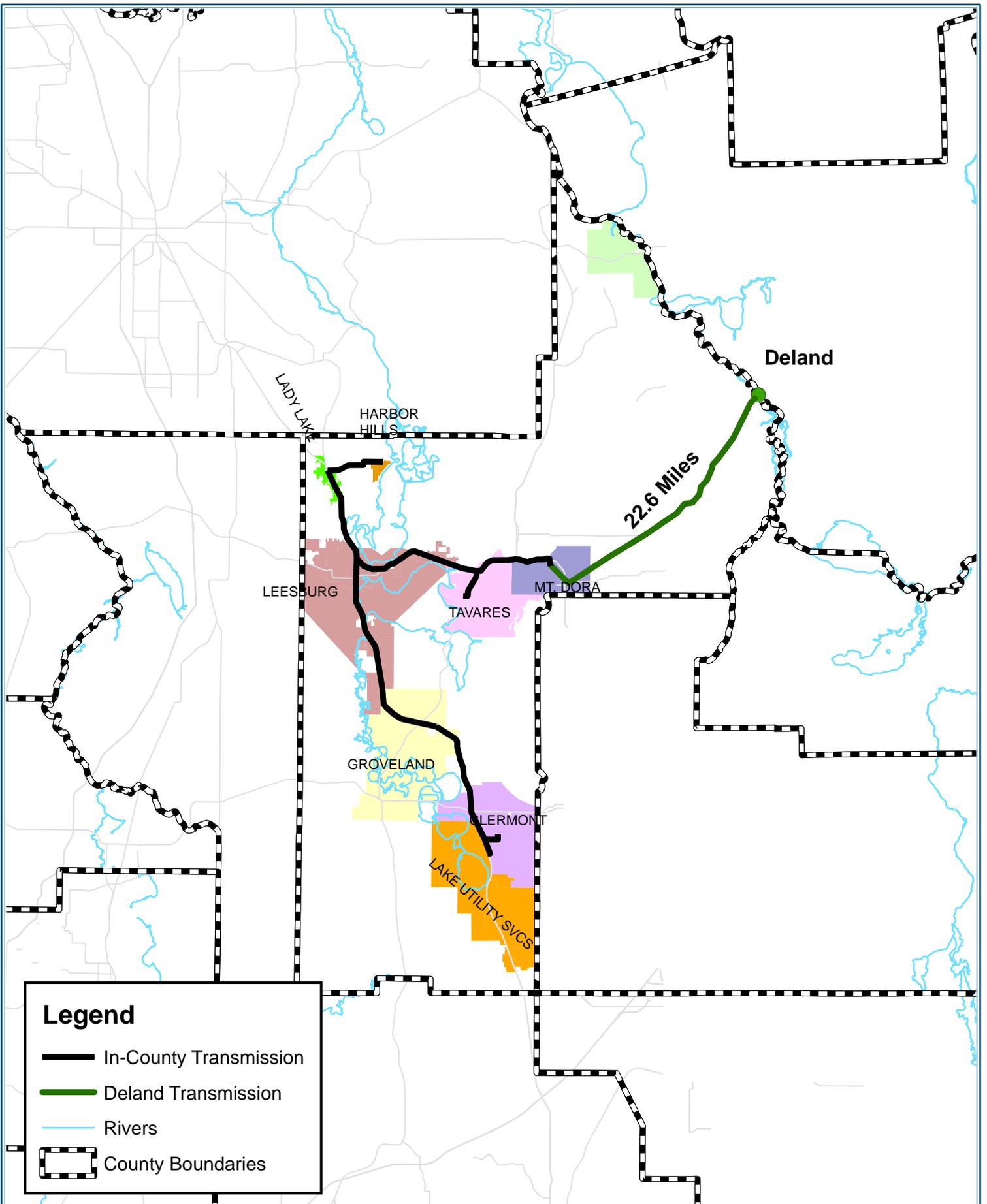
PROJECT: 0407 - Lake County Water Supply Plan Development

Figure 2-2
AWS-Yankee Lake Option

ORIGINAL DATE: 12-09-03
 REVISION DATE: 08-06-07
 JOB NUMBER: 0407
 FILE NAME: Alternative Water...mxd
 GIS OPERATOR: DR



1 Inch = 50,000 Feet



Legend

-  In-County Transmission
-  Deland Transmission
-  Rivers
-  County Boundaries



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Figure 2-3
AWS-Deland Option

ORIGINAL DATE: 12-09-03

REVISION DATE: 08-06-07

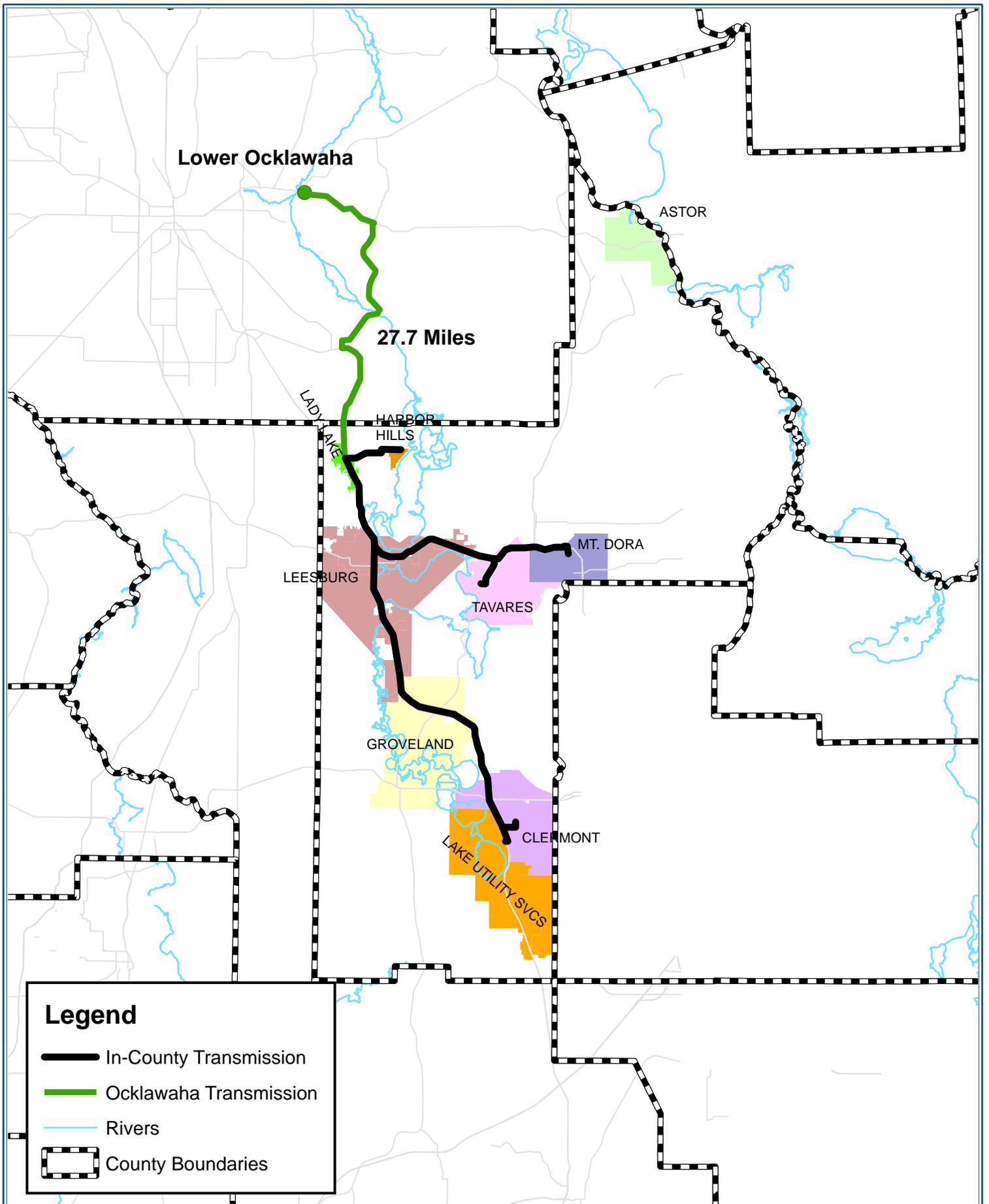
JOB NUMBER: 0407

FILE NAME: Alternative Water...mxd

GIS OPERATOR: DR



1 Inch = 50,000 Feet



Legend

-  In-County Transmission
-  Ocklawaha Transmission
-  Rivers
-  County Boundaries



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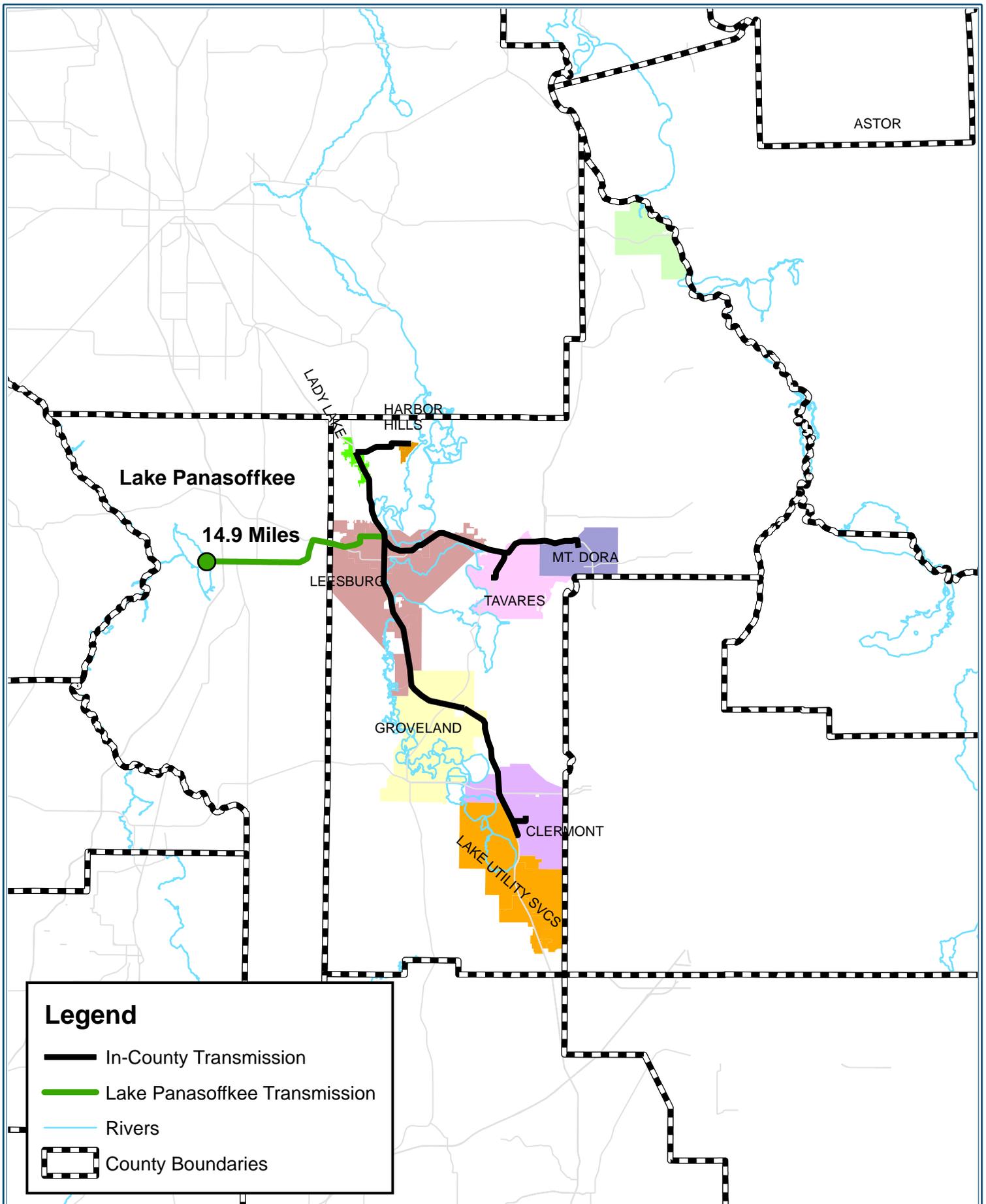
PROJECT: 0407 - Lake County Water Supply Plan Development

Figure 2-4
AWS-Lower Ocklawaha River Option

ORIGINAL DATE: 12-09-03
 REVISION DATE: 08-06-07
 JOB NUMBER: 0407
 FILE NAME: Alternative Water...mxd
 GIS OPERATOR: DR



1 Inch = 50,000 Feet



Legend

-  In-County Transmission
-  Lake Panasoffkee Transmission
-  Rivers
-  County Boundaries



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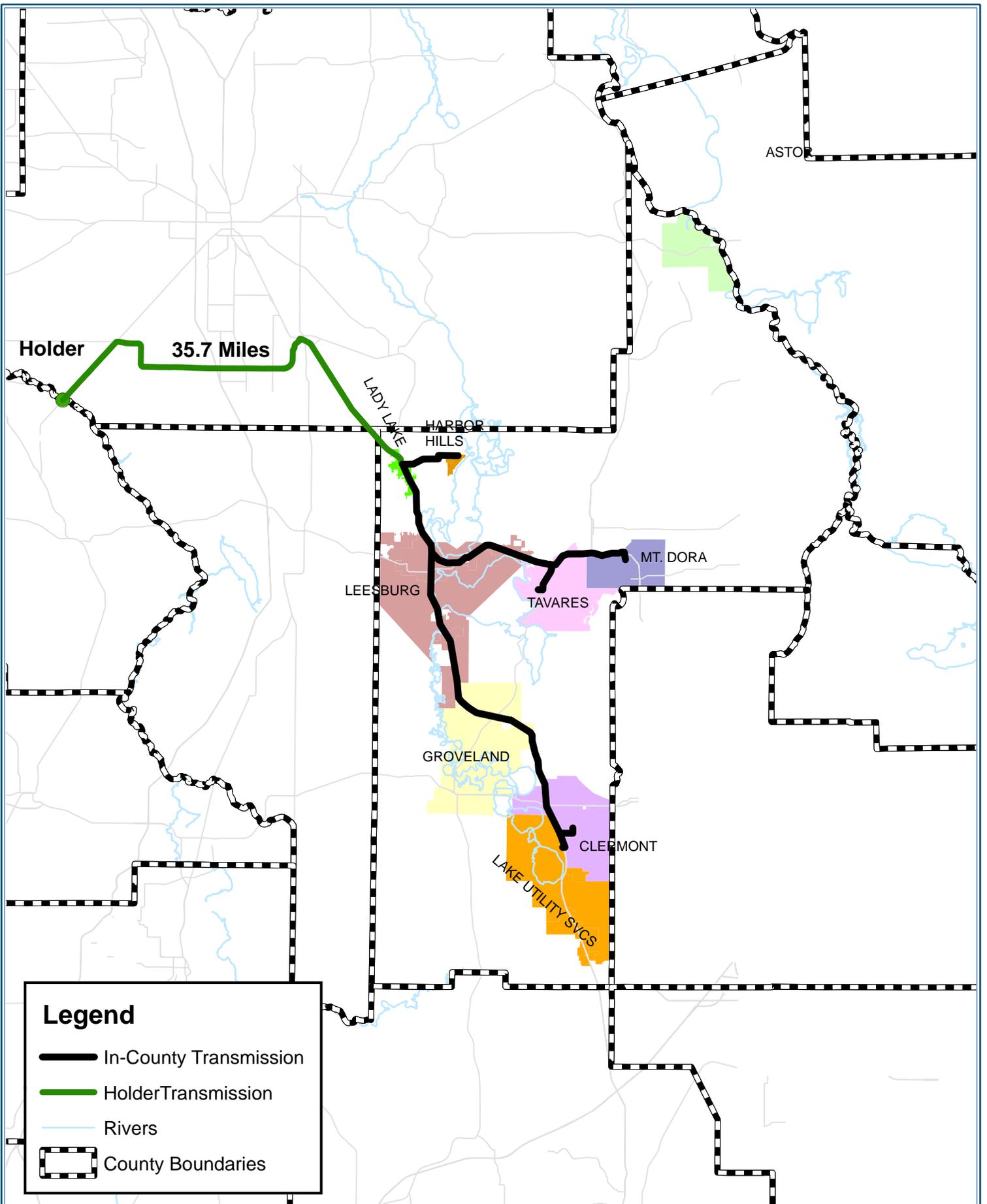
PROJECT: 0407 - Lake County Water Supply Plan Development

Figure 2-5
AWS-Lake Panasoffkee Option

ORIGINAL DATE: 12-09-03
 REVISION DATE: 08-06-07
 JOB NUMBER: 0407
 FILE NAME: Alternative Water...mxd
 GIS OPERATOR: DR



1 Inch = 50,000 Feet



Legend

-  In-County Transmission
-  Holder Transmission
-  Rivers
-  County Boundaries



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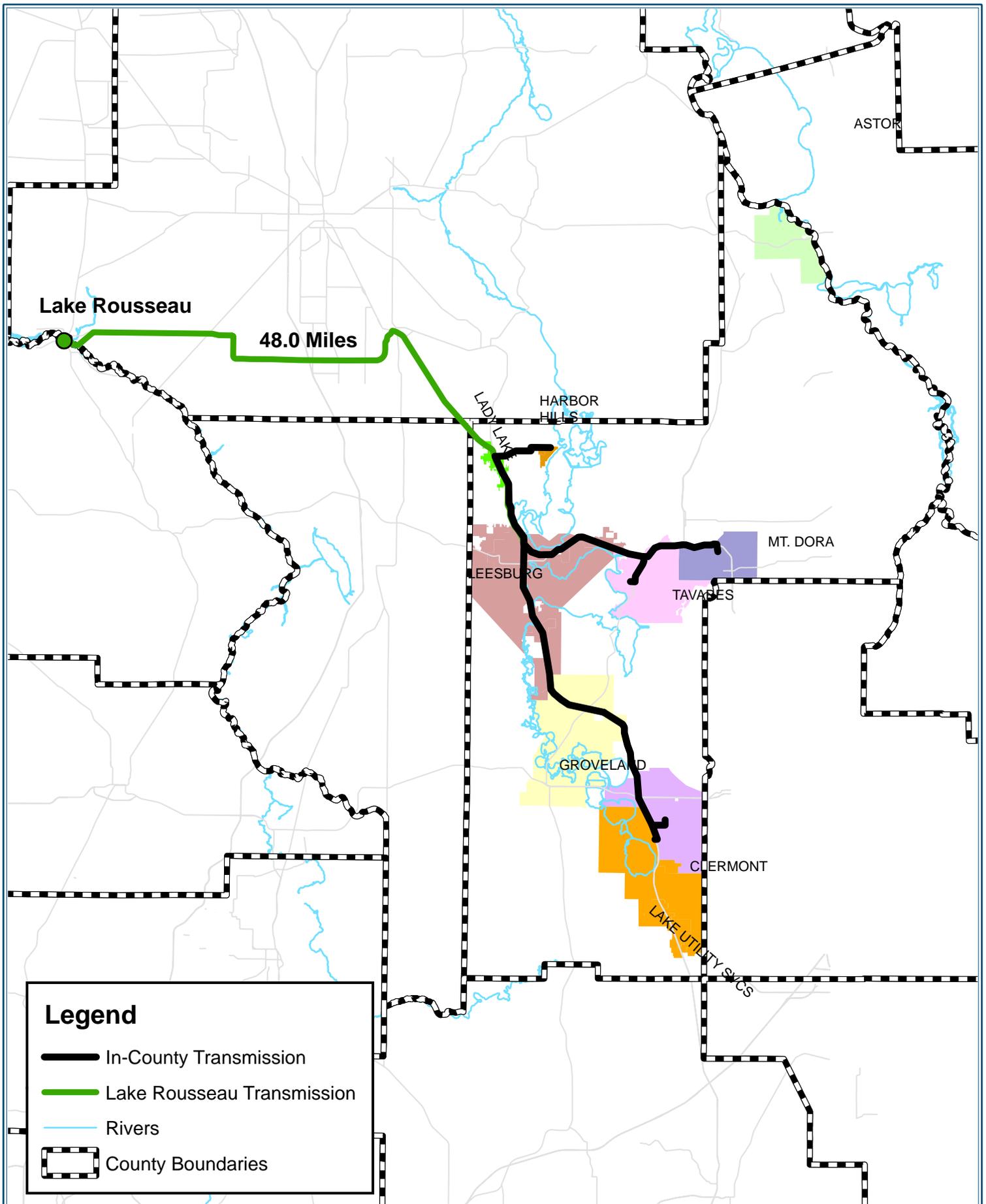
PROJECT: 0407 - Lake County Water Supply Plan Development

Figure 2-6
AWS-Holder Option

| |
|------------------------------------|
| ORIGINAL DATE: 12-09-03 |
| REVISION DATE: 08-06-07 |
| JOB NUMBER: 0407 |
| FILE NAME: Alternative Water...mxd |
| GIS OPERATOR: DR |



1 Inch = 50,000 Feet



Legend

-  In-County Transmission
-  Lake Rousseau Transmission
-  Rivers
-  County Boundaries



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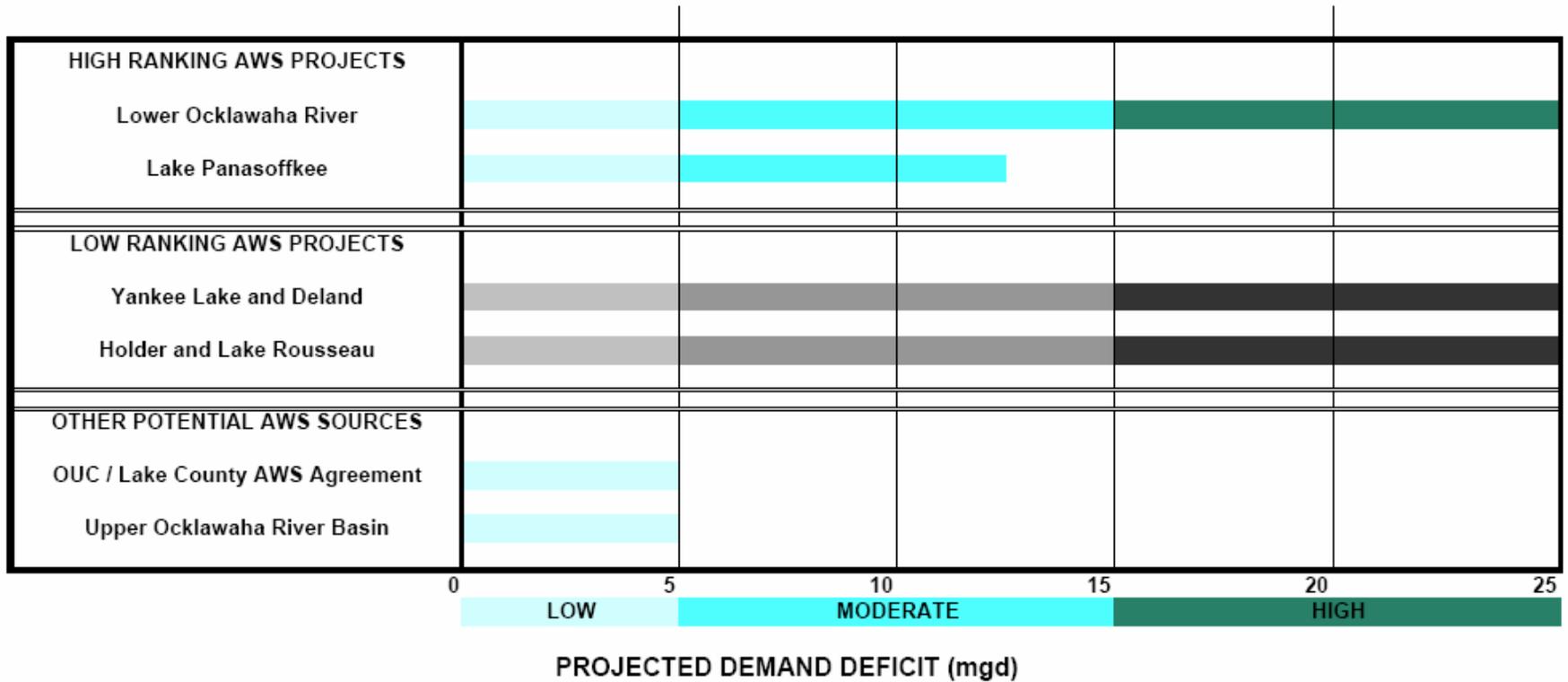
PROJECT: 0407 - Lake County Water Supply Plan Development

Figure 2-7
AWS-Lake Rousseau Option

ORIGINAL DATE: 12-09-03
 REVISION DATE: 08-06-07
 JOB NUMBER: 0407
 FILE NAME: Alternative Water...mxd
 GIS OPERATOR: DR



1 Inch = 50,000 Feet



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PROJECT: 0407 - Lake County Water Supply Plan Development

Figure 2-8
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

APPENDIX A

Summary of Table A-1

Table A-1 shows a tabulation of Plan data by Alliance member.¹ Key points from the table are listed below:

- As shown, CUP expiration dates vary from 2026 to present (e.g., monthly temporary CUPs).
- The total estimated demand in 2005 is 26.06 mgd. The total projected demand in 2013 is 35.98 mgd, a difference of 9.92 mgd.
- The total permitted allocation of 33.34 mgd is 2.64 mgd less than the total projected demand in 2013.
- The total permitted allocation is 21.25 mgd less than the total projected demand of 52.58 mgd in 2030. The total projected 2013 demand is 16.60 mgd less than the total projected demand in 2030.

¹ No County utility is currently using surfacewater for potable supply.

Table A-1. Lake County Water Alliance Groundwater Supply Data

| CUP # | CUP Name | Issue Date | Expiration Date | Avg. Actual Pumpage (mgd) (2000-2005) | 2005 Estimated Demand (mgd) | 2013 Projected Demand ⁽¹⁾ (mgd) | 2030 Projected Demand (mgd) | Total Permitted Groundwater Allocation ⁽²⁾ (mgd) | 2013 Projected Demand Allocated (Y/N) | 2013 Projected Demand Deficit (mgd) | Potential 2013-2030 Demand Served by Current Allocation (mgd) | 1995 - 2005 Gross Per Capita (gpcd) | Primary GW Basin | AWS Participation Required in CUP (Y/N) | 2030 Projected Demand Deficit ⁽³⁾ | 2030 Potential Demand Deficit Low Range ⁽⁴⁾ | 2030 Potential Demand Deficit High Range ⁽⁵⁾ |
|------------|----------------------------------|------------|-----------------|---------------------------------------|-----------------------------|--|-----------------------------|---|---------------------------------------|-------------------------------------|---|-------------------------------------|------------------|---|--|--|---|
| 2478 | Clermont ⁽⁶⁾ | 9/11/2002 | 9/11/2022 | 3.47 | 5.21 | 8.58 | 9.86 | 3.78 | N | 4.80 | 0.00 | 216 | 3 | Y | 6.08 | 1.28 | 6.08 |
| 2634 | City of Eustis ⁽⁷⁾ | 3/13/2007 | 3/13/2012 | 2.80 | 3.08 | 3.61 | 5.09 | 3.80 | Y | 0.00 | 0.19 | 124 | 3 | Y | 1.29 | 1.29 | 1.48 |
| 2482 | City of Fruitland Park | 4/28/2006 | 6/13/2008 | 0.49 | 0.73 | 0.87 | 1.10 | 0.80 | N | 0.07 | 0.00 | 200 | 1 | Y | 0.30 | 0.23 | 0.30 |
| 2913/2796 | Groveland ⁽⁸⁾ | 3/13/2007 | 12/7/2014 | | 1.22 | 2.06 | 4.40 | 1.97 | N | 0.09 | 0.00 | 112 | 3 | Y | 2.43 | 2.34 | 2.43 |
| 2596 | Howey in the Hills | 8/27/2003 | 8/27/2008 | | 0.28 | 0.38 | 0.52 | 0.27 | N | 0.11 | 0.00 | 229 | 3 | N | 0.25 | 0.14 | 0.25 |
| 50049 | Town of Lady Lake | 6/26/2006 | 7/11/2026 | 0.46 | 0.55 | 0.66 | 0.73 | 1.19 | Y | 0.00 | 0.07 | 117 | 1 | Y | 0.00 | 0.00 | 0.07 |
| 94 | Leesburg ⁽⁹⁾ | Pending | | 5.75 | 5.69 | 8.19 | 12.48 | 9.13 | Y | 0.00 | 0.94 | 221 | 1 | N | 3.35 | 3.35 | 4.29 |
| 2453 | City of Mascotte ⁽¹⁰⁾ | Pending | | 0.34 | 0.41 | 0.61 | 1.49 | 0.37 | N | 0.24 | 0.00 | 69 | 1 | N | 1.12 | 0.88 | 1.12 |
| 2886 | City of Minneola | 09/22/05 | 02/09/10 | 1.07 | 1.49 | 2.16 | 3.96 | 2.51 | Y | 0.00 | 0.35 | 211 | 3 | Y | 1.45 | 1.45 | 1.80 |
| 2671 | Town of Montverde | 2/5/2007 | 2/5/2009 | 0.34 | 0.36 | 0.57 | 0.81 | 0.38 | N | 0.19 | 0.00 | 152 | 3 | Y | 0.43 | 0.24 | 0.43 |
| 50147 | City of Mount Dora | 11/8/2005 | 11/8/2025 | 2.60 | 3.74 | 4.30 | 6.47 | 5.05 | Y | 0.00 | 0.75 | 194 | 3 | Y | 1.42 | 1.42 | 2.17 |
| 2765 | City of Tavares | 12/14/2004 | 12/14/2011 | 1.76 | 2.73 | 3.26 | 4.53 | 3.57 | Y | 0.00 | 0.31 | 178 | 3 | Y | 0.96 | 0.96 | 1.27 |
| 2646 | Umatilla | 9/12/2001 | 2/13/2006 | | 0.57 | 0.73 | 1.14 | 0.53 | N | 0.20 | 0.00 | 155 | 3 | N | 0.61 | 0.41 | 0.61 |
| SUM | | | | 19.09 | 26.06 | 35.98 | 52.58 | 33.34 | 6 | 5.71 | 2.61 | | | 9 | 19.70 | 13.99 | 22.31 |

(1) Straight line interpolation between draft SJRWMD projected 2010 and 2015 demands.

(2) Groundwater allocations are shown. Reclaimed and surfacewater allocations are not included.

(3) Projected 2030 demand minus permitted allocation. Assumes that current groundwater allocations that exceed projected 2013 demands will not be withdrawn.

Does not include conservation and reuse options discussed in Tech Memo 2.

(4) Projected 2030 demand minus the greater of permitted allocation or projected 2013 demand. Assumes that current groundwater allocations that exceed projected 2013 demands will not be withdrawn.

Assumes that groundwater will be allocated to serve projected 2013 demands. Does not include conservation and reuse options discussed in Tech Memo 2.

(5) Projected 2030 demand minus the lesser of permitted allocation or projected 2013 demand. Assumes that current groundwater allocations that exceed projected 2013 demands will be withdrawn.

Does not assume that groundwater will be allocated to serve projected 2013 demands. Does not include conservation and reuse options discussed in Tech Memo 2.

(6) 2013 to 2022 allocation is shown. 2002 to 2012 allocation is 7.38 mgd.

(7) Required to investigate feasibility of withdrawing 2 mgd of surfacewater from Lake Eustis or Lake Yale.

(8) Does not include a 0.13 mgd surfacewater allocation for reuse supplementation.

(9) Application pending since 2004.

(10) Monthly temporary CUPs.

Summary of Table A-2

Table A-2 shows a tabulation of data by Non-Alliance or private utility.² Only utilities greater than 0.1 mgd were included in the tabulation. Key points from the table are listed below:

- CUP expiration dates vary from 2026 to present (e.g., 2 year renewals).
- The total estimated demand in 2005 is 11.88 mgd. The total projected demand in 2013 is 16.24 mgd, a difference of 4.36 mgd.
- The total permitted allocation of 11.60 mgd is 4.64 mgd less than the total projected demand in 2013.
- The total permitted allocation is 13.19 mgd less than the total projected demand of 24.79 mgd in 2030. The total projected 2013 demand is 8.55 mgd less than the total projected demand in 2030.

² No utility in Lake County is currently using surfacewater for potable supply.

Table A-2. Non-Alliance Groundwater Supply Data

| CUP # | CUP Name ⁽⁶⁾ | Issue Date | Expiration Date | Avg. Actual Pumpage (mgd) (2000-2005) | 2005 Estimated Demand (mgd) | 2013 Projected Demand ⁽¹⁾ (mgd) | 2030 Projected Demand (mgd) | Total Permitted Allocation ⁽²⁾ (mgd) | 2013 Projected Demand Allocated (Y/N) | 2013 Projected Demand Deficit (mgd) | Potential 2013-2030 Demand Served by Current Allocation (mgd) | 1995 - 2005 Gross Per Capita (gpcd) | Primary GW Basin | AWS Participation Required in CUP (Y/N) | 2030 Projected Demand Deficit ⁽³⁾ | 2030 Potential Demand Deficit Low Range ⁽⁴⁾ | 2030 Potential Demand Deficit High Range ⁽⁵⁾ |
|---------------|--|------------|-----------------|---------------------------------------|-----------------------------|--|-----------------------------|---|---------------------------------------|-------------------------------------|---|-------------------------------------|------------------|---|--|--|---|
| 20-069-2701-3 | Aqua Source Inc. -Kings Cove Subdivision | 4/21/2006 | 4/21/2026 | 0.08 | 0.12 | 0.12 | 0.13 | 0.14 | Y | 0.00 | 0.01 | 185 | 1 | N | 0.00 | 0.00 | 0.01 |
| 20-069-50178- | Astor Park Water Assoc | 5/7/1998 | 5/7/2013 | 0.30 | 0.31 | 0.39 | 0.48 | 0.44 | Y | 0.00 | 0.05 | 128 | 1 | Unkn ⁽⁸⁾ | 0.04 | 0.04 | 0.09 |
| 20-069-2810-3 | Lake Griffin Isles | 4/11/2003 | 4/15/2008 | 0.10 | 0.12 | 0.12 | 0.12 | 0.13 | Y | 0.00 | 0.00 | 691 | 1 | N | 0.00 | 0.00 | 0.00 |
| 2-069-2718 | Plantation at Leesburg ⁽⁷⁾ | 3/5/2007 | 8/13/2022 | 0.20 | 0.16 | 0.18 | 0.19 | 0.98 | Y | 0.00 | 0.01 | 47 | 1 | N | 0.00 | 0.00 | 0.01 |
| 2-069-2392 | Southlake Utilities | 6/7/2006 | 1/1/2009 | 1.03 | 1.53 | 2.82 | 6.53 | 2.85 | Y | 0.00 | 0.03 | 258 | 3 | Y | 3.68 | 3.68 | 3.71 |
| 20-069-2717-5 | Utilities inc. of Pennbrooke | 08/20/06 | 08/20/26 | 0.28 | 0.27 | 0.28 | 0.29 | 0.45 | Y | 0.00 | 0.01 | 101 | 3 | N | 0.00 | 0.00 | 0.01 |
| 20-069-2632-5 | Lake Utilities/Valencia Terrace | 7/2/2004 | 8/11/2020 | 0.08 | 0.76 | 1.23 | 1.37 | 0.12 | N | 1.12 | 0.00 | 132 | 1 | N | 1.25 | 0.14 | 1.25 |
| 20-069-6398-6 | Clerbrook Golf & RV Resort | 3/10/2002 | 3/10/2007 | 0.11 | 0.20 | 0.20 | 0.20 | 0.15 | N | 0.06 | 0.00 | 107 | 3 | N | 0.05 | 0.00 | 0.05 |
| 2-069-279-6 | Harbor Hills Utilities | 4/11/2005 | 4/12/2007 | 0.98 | 0.81 | 0.89 | 1.26 | 0.50 | N | 0.40 | 0.00 | 857 | 1 | N | 0.76 | 0.37 | 0.76 |
| 2-069-2860-4 | Hawthorne at Leesburg | 7/25/1997 | 7/25/2007 | 1.29 | 0.48 | 0.48 | 0.50 | 0.46 | N | 0.02 | 0.00 | 260 | 1 | N | 0.04 | 0.02 | 0.04 |
| 2-069-2700-26 | Lake Utility Services, Inc. | 4/12/2006 | 4/12/2011 | 1.66 | 5.39 | 7.77 | 11.87 | 3.89 | N | 3.88 | 0.00 | 248 | 3 | Unkn ⁽⁸⁾ | 7.98 | 4.10 | 7.98 |
| 20-069-2888-3 | Mid Florida Lakes | 9/2/2003 | 9/2/2008 | 0.19 | 0.42 | 0.44 | 0.46 | 0.43 | N | 0.00 | 0.00 | 250 | 3 | N | 0.03 | 0.02 | 0.03 |
| 20-069-2565-4 | Orange Lake MHP | 5/18/2005 | 5/25/2015 | | 0.12 | 0.12 | 0.12 | 0.09 | N | 0.03 | 0.00 | 558 | 3 | N | 0.03 | 0.00 | 0.03 |
| 20-069-2454-4 | Sunlake Estates | 9/12/2006 | 8/30/2026 | 0.27 | 0.52 | 0.52 | 0.52 | 0.35 | N | 0.17 | 0.00 | 668 | 3 | N | 0.17 | 0.00 | 0.17 |
| 20-069-282-5 | Water Oaks Estates | 9/27/2002 | 9/27/2007 | 0.22 | 0.46 | 0.46 | 0.53 | 0.45 | N | 0.02 | 0.00 | 357 | 3 | Y | 0.08 | 0.07 | 0.08 |
| 20-069-50152- | Wedgewood Homeowner's Assoc Inc. | 6/19/2003 | 6/19/2023 | 0.15 | 0.20 | 0.21 | 0.22 | 0.18 | N | 0.03 | 0.00 | 227 | 3 | N | 0.04 | 0.01 | 0.04 |
| SUM | | | | 6.93 | 11.88 | 16.24 | 24.79 | 11.60 | 6 | 5.72 | 0.04 | | | 3 | 14.16 | 8.44 | 14.27 |

(1) Straight line interpolation between draft SJRWMD projected 2010 and 2015 demands.

(2) Groundwater allocations are shown. Reclaimed and surfacewater allocations are not included.

(3) Projected 2030 demand minus total permitted allocation. Assumes that current groundwater allocations that exceed projected 2013 demands will not be withdrawn.

(4) Projected 2030 demand minus the greater of permitted allocation or projected 2013 demand. Assumes that current groundwater allocations that exceed projected 2013 demands will not be withdrawn.

Assumes that groundwater will be allocated to serve projected 2013 demands. Does not include conservation and reuse options discussed in Tech Memo 2.

(5) Projected 2030 demand minus the lesser of permitted allocation or projected 2013 demand. Assumes that current groundwater allocations that exceed projected 2013 demands will be withdrawn.

Does not assume that groundwater will be allocated to serve projected 2013 demands. Does not include conservation and reuse options discussed in Tech Memo 2.

(6) CUP 2-069-50280, Villages of Lake Sumter, is not shown. It is primarily an irrigation allocation.

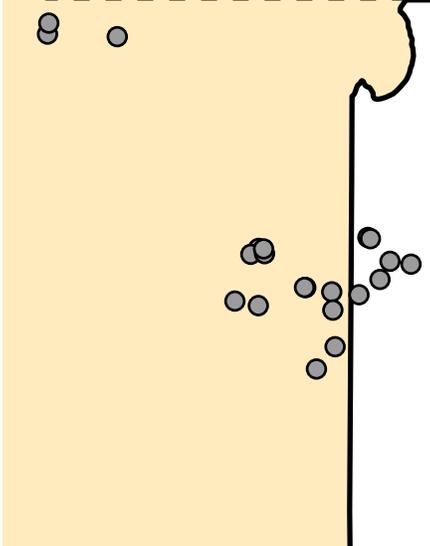
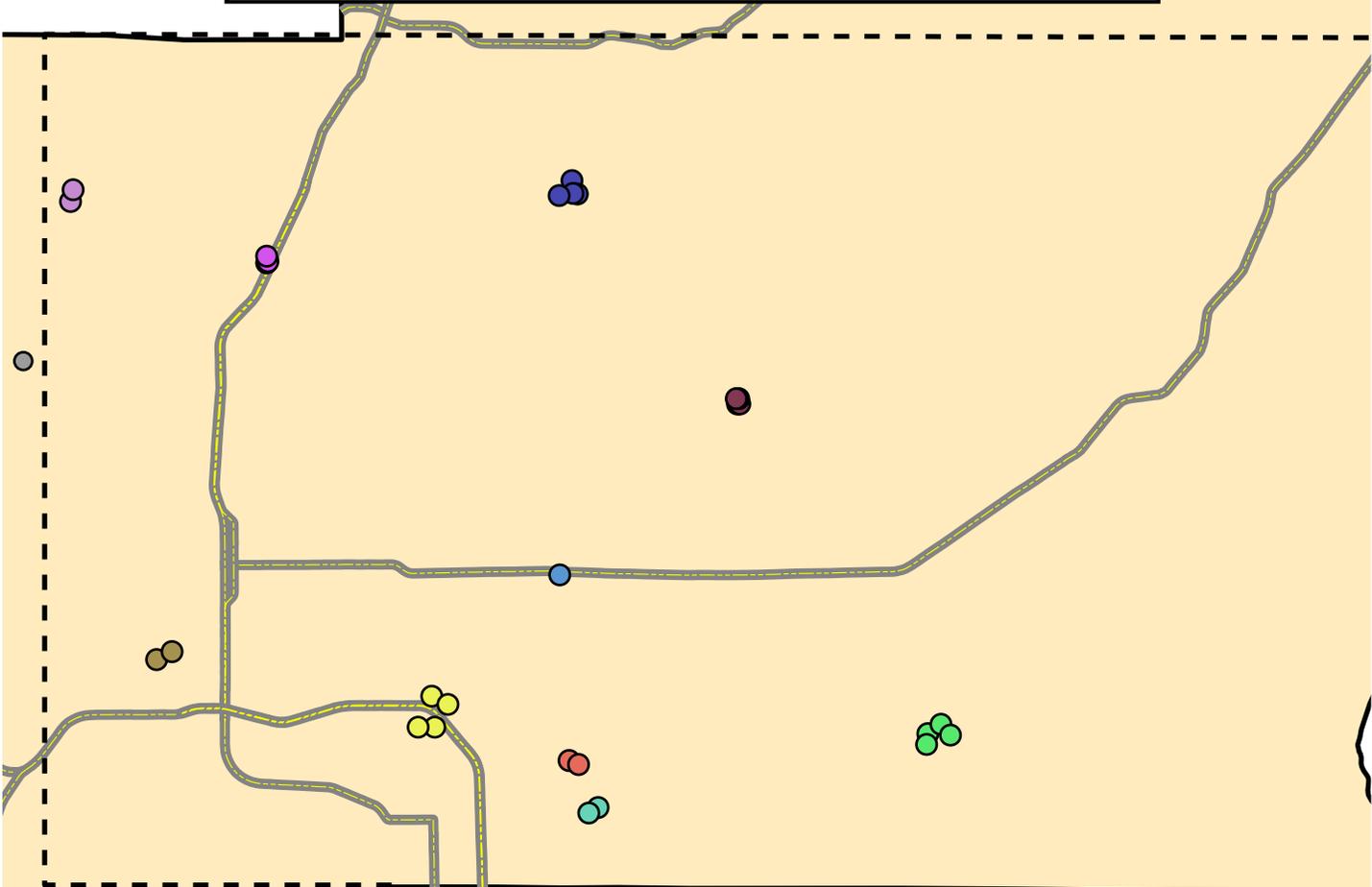
(7) Portion of CUP will be transferred to City of Leesburg after 2012. Allocation is 1.5 mgd from 2007 to 2012. Allocation is 0.98 mgd from 2013 through 2022, however, the allocation transferred to Leesburg will continue to serve Plantation at Leesburg.

(8) No Staff Report Available

APPENDIX B

Legend

-  Roads
-  County Boundary
-  Benjamin O Benham
-  Citrus World
-  Dye/Cooper Block
-  Home Grove
-  Lake Hermosa Village
-  Location-3-40
-  Robert Hart
-  Simpson Fruit Co.
-  Sunset Hill Groves Partnership
-  Taylor Home Grove



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 Development

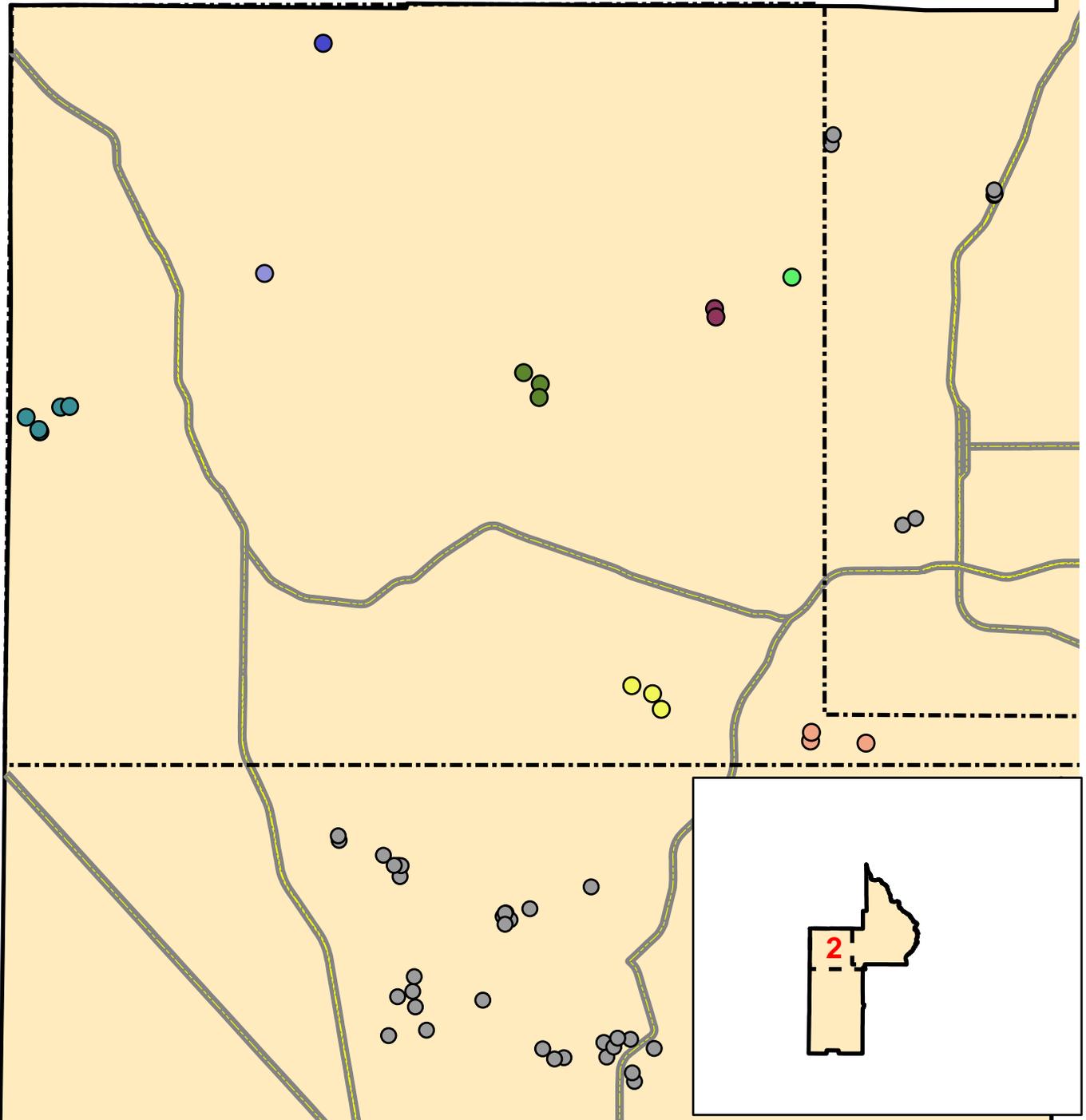
**Agricultural CUPs
 In Section 1 of
 Lake County**

ORIGINAL DATE: 06-15-07
 REVISION DATE: NA
 JOB NUMBER: 0407
 FILE NAME: 0407_Agricultural...mxd
 GIS OPERATOR: DR



Legend

-  Roads
-  County Boundary
-  Alan Bradley
-  Bartlett Groves
-  Far Reach Ranch
-  Gorgeous Groves
-  IGOU
-  Oak Grove Fernery
-  Parker
-  Pine Ridge Dairy Inc
-  See North Eastern Map



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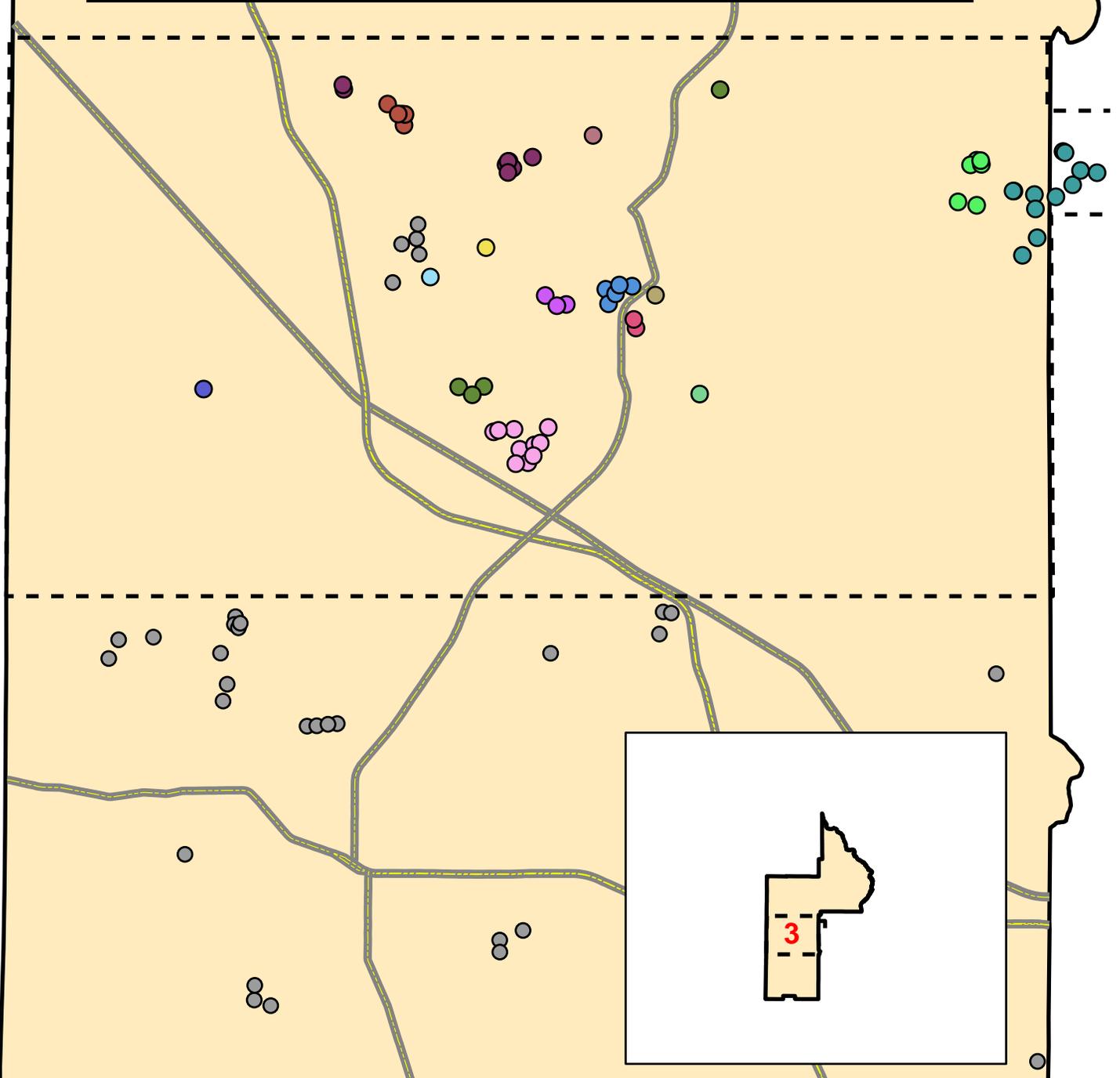
Agricultural CUPs In Section 2 of Lake County

ORIGINAL DATE: 06-15-07
 REVISION DATE: NA
 JOB NUMBER: 0407
 FILE NAME: 0407_Agricultural...mxd
 GIS OPERATOR: DR



Legend

- | | | |
|---|---|---|
|  Roads |  Drake Point |  Journey Circle M Ranch |
|  County Boundary |  Eagles Landing |  Loma Linda Corp |
|  See Northern Map |  Gissy Groves |  Long and Scott Farm |
|  7L Howey-in-the-Hills |  Greenacres Fernery & Citrus |  Maguire 455 |
|  Chris Blanton |  Howey Block |  O'Brien 1-6 |
|  Crabb Grove |  Hurley Peat Mine |  Serenby |



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**Agricultural CUPs
 In Section 3 of
 Lake County**

ORIGINAL DATE: 06-15-07

REVISION DATE: NA

JOB NUMBER: 0407

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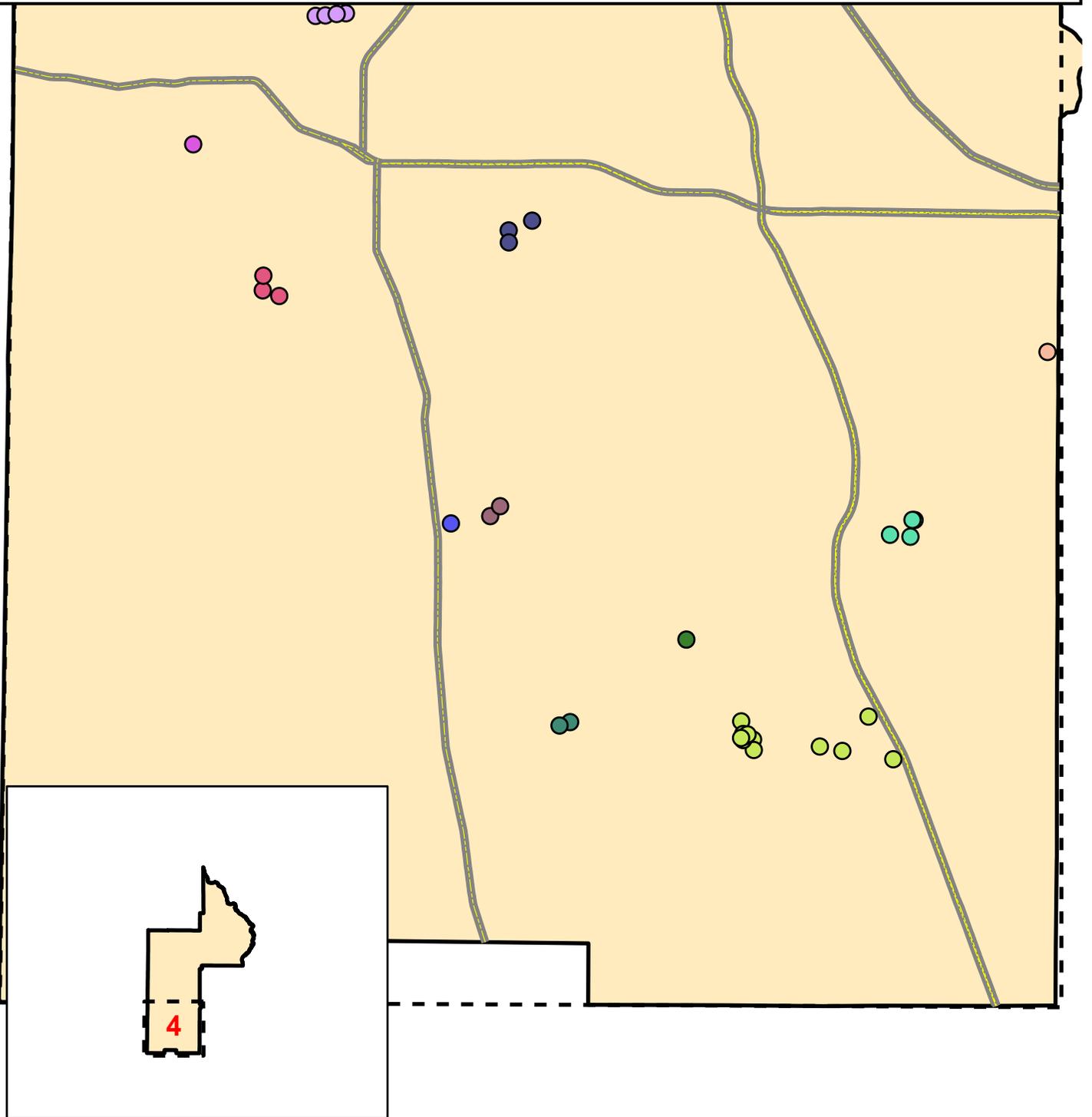
GIS OPERATOR: DR



1 Inch = 7 Miles

Legend

-  Roads
-  County Boundary
-  Banyan Construction
-  Beck Grove
-  Dockery Farms
-  Fakih Grove
-  Groveland Grove
-  Groveland Inc.
-  Hlochee WMA - Riddick Trust Grove
-  JOHN BECK
-  Jeff Boykin
-  L & E Grove
-  Lake Correctional Institution
-  Lake Pretty
-  McKinnon Groves
-  OSGOOD GROVE
-  Ridge Grove
-  Tuscanooga Lakes LLC
-  Twin Lakes
-  Villa City



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PROJECT: 0407 - Lake County Water Supply Development

Agricultural CUPs In Section 4 of Lake County

| |
|------------------------------------|
| ORIGINAL DATE: 06-15-07 |
| REVISION DATE: NA |
| JOB NUMBER: 0407 |
| FILE NAME: 0407_Agricultural...mxd |
| GIS OPERATOR: DR |

