APPENDIX A

POPULATION AND WATER DEMAND PROJECTIONS

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Introduction

This Appendix contains information on the methodology and data developed for use in the development of the water demand estimates and projections for the 2022 Joint North Florida Regional Water Supply Plan (NFRWSP) for six water use categories, as well as future reclaimed water supply and estimates of potential conservation. It also describes the methodologies used to determine the spatial distribution of projected groundwater withdrawals used in the groundwater flow model scenarios.

The North Florida Southeast-Georgia (NFSEG) groundwater flow model extends beyond the NFRWSP area into the Northwest and Southwest Florida Water Management Districts (NWFWMD / SWFWMD), Georgia, and South Carolina. This Appendix also includes sources and information pertaining to the water use data and demand projections within the NFSEG model boundary outside of the NFRWSP area.

Background and Water Use Categories

The planning horizon for the 2022 NFRWSP is 2020 to 2045. Population and water demand estimates and projections are a cornerstone for assessing the water needs and availability in regional water supply planning. The St. Johns River and Suwannee River Water Management District (SJRWMD/SRWMD)(Districts) develop water demand projections to evaluate "existing legal uses, anticipated future needs, and existing and reasonably anticipated sources of water and conservation efforts," as set forth in subparagraph 373.036(2)(b)4a, Florida Statutes (F.S.). The Districts' goals are to project water demands that are reasonable and based on the best information available at the time the projections were developed.

The baseline year, 2015 for the NFRWSP, is the year that acts as the starting point for water demand projections and is based on the best available data of reported and estimated water use. Water use in the baseline year is not a projection, but rather actual or estimated use. Five-Year Interval Intermediate Water Use Projections as required by subparagraph 62-40.531(1)(a), Florida Administrative Code (F.A.C.), must include water demand projections for five-year intervals during the planning period. The interval years should end on 5 or 0 (e.g., 2020, 2025, 2030, etc.) as directed by the state formats and guidelines for regional water supply planning (FDEP 2019).

Water demands for this 2022 NFRWSP are estimated in 5-year increments (subsection 62-40.531(1)(a), F.A.C.) for the following six water use categories established by the Florida

Department of Environmental Protection (FDEP) and the state's five water management districts:

1. Public Supply (PS) - This category includes water provided by any municipality, county, regional water supply authority, special district, public or privately-owned water utility, or multijurisdictional water supply authority for human consumption and other purposes with average annual permitted quantities of 0.1 million gallons per day (mgd) or greater.

2. Domestic Self-supply and Small Public Supply Systems (DSS)

    a. The DSS category consists of residential dwellings that are self-supplied water from a dedicated, on-site well and are not connected to a central utility.

    b. The DSS category also includes centralized Small Public Supply Systems (SPSS) that provide water for human consumption with average annual permitted quantities of less than 0.1 mgd.

3. Agricultural (AG) - The AG category consists of water use associated with the irrigation of crops and other miscellaneous water uses associated with agricultural production (e.g., aquaculture, livestock).

4. Landscape/Recreational (LR) - The LR category consists of self-supplied water use associated with the irrigation, maintenance, and operation of golf courses, cemeteries, parks, medians, attractions, common areas in residential areas, and other large green areas. This category also includes water use associated with ornamental or decorative purposes, such as fountains and waterfalls.

5. Commercial/Industrial/Institutional (CII) and Mining/Dewatering (MD)

    a. The CII category consists of self-supplied water use associated with the production of goods or provisions of services by CII establishments (e.g., general businesses, office complexes, commercial cooling and heating, bottled water, food and beverage processing, restaurants, gas stations, hotels, car washes, churches, hospitals, and prisons).

    b. The MD category consists of water use associated with mining (extraction and processing of subsurface materials and minerals) and long-term dewatering (removal of water to control surface or groundwater levels during construction or excavation activities).

6. Power Generation (PG) - The PG category consists of self-supplied water use associated with power plant and power generation facilities, including but not limited to water for steam generation, cooling, and replenishment of cooling reservoirs.

Other than the PS category, all other water use categories obtain water from dedicated, on-site wells and pumps and are not connected to a central utility. In addition to the six water

use categories listed above, projections are developed for future reclaimed water flows that could potentially be used to partially offset water demand. Reclaimed water is treated domestic wastewater that has received at least secondary treatment and basic disinfection and is reused for a beneficial purpose. Water demands, reclaimed water flows, and estimates of potential conservation are expressed in average mgd unless otherwise noted.

Data for the baseline year consists of reported and estimated water usage for 2015, whereas data for the years 2020 through 2045 are projected water demands. Water use estimates and demand projections for the six water use categories were calculated for the years 2015, 2020, 2025, 2030, 2035, 2040, and 2045 based on average rainfall conditions, in addition to a 1-in-10 year drought event for 2045. The 1-in-10 year drought event is defined as a year in which rainfall occurs at below normal levels whose frequency has a 10 percent probability of occurring in any given year. These below normal rainfall conditions result in an increase in water demands for four of the six water use categories. Future reclaimed water flows and estimates of potential conservation were also calculated for the year 2045.

Methodology

Data and Information Sources

The methodology to develop population and water demand estimates and projections uses many data sources such as:

1. Finished water supplied by PS and SPSS collected by FDEP through Monthly Operating Reports (MORs).
2. Water use estimates reported by permittees to the Districts through the respective Consumptive Use Permit (CUP) programs.
3. The Districts published annual water use reports (SJRWMD 2015-2016, 2017a, 2018b, 2019; SRWMD 2019, 2020a, 2020b, 2020c).
4. Agricultural water use estimates from the Florida Department of Agriculture and Consumer Services (FDACS) (FDACS 2017, 2020).
5. Permitted quantities and percentages of water use as reported in CUPs.
6. University of Florida's Bureau of Economic and Business Research (BEBR) publications (BEBR 2015-2016, 2017a, 2017b, 2018).
7. FDEP Annual Reuse Inventory Report (FDEP 2016 and FDEP 2020).
8. Power Plant 10-Year Site Plans collected by the Public Service Commission (PSC).

PS and DSS Population Estimates and Projections

In developing RWSPs, the Districts must consider BEBR medium population projections pursuant to section 373.709(2)(a)1a, F.S. The population projections developed by BEBR are commonly used in planning efforts throughout Florida. These projections are made at the county-level only (Rayer, S. and Y. Wang. 2020) and require distribution among PS (and SPSS) service area boundaries (PSABs) and parcels and DSS parcels.

SJRWMD

The SJRWMD has developed a model that distributes BEBR county-level estimates and projections to the individual parcel level (SJRWMD 2021). Using this model, the SJRWMD aggregated the parcel level population to each PS (and SPSS) service area in the NFRWSP area. This effort provided historic, future, and build-out permanent resident populations for each PS and SPSS. Because of the service area boundary characteristics, the estimated historic service area population may differ from estimates of utility population served. This difference can occur when a service area includes self-supplied populations that may be currently unserved by the respective utility.

DSS population was the population for all parcels outside of PS and SPSS PSABs, aggregated in five-year increments from 2015 to 2045. In some cases, a DSS population within PS and SPSS PSABs was identified through previously submitted account level billing data and well completion reports; this population was attributed to the DSS category. The DSS population by county (after adding the total population for each SPSS for each respective county) is shown in a Table A-6.

SRWMD

The SRWMD used BEBR county-level population estimates for 2014-2018. These estimates were distributed within the county based on data provided by PS and SPSS utilities, correctional institutions, and parcel level data (SRWMD, 2021). The SRWMD applied the population model created by the SJRWMD to distribute projected future population within the county (SJRWMD 2021). This population model also estimated the projected future served populations within PSABs. After meeting with utilities, estimates and projections were revised to include any feedback that was received.

The DSS population for 2014-2018 and projected years (2020-2045) was estimated by taking the total BEBR county-wide population estimate and subtracting institutional population, PS residential served population, and the SPSS residential served population (SRWMD, 2021). The DSS and small public supply population by county is shown in a Table A-6.

PS Water Demand

Gross Per Capita Water Use

For PS and SPSS, the gross per capita water use is defined as the total raw water withdrawn (including residential and non-residential uses) for each individual permittee or system divided by its respective service area residential population expressed in average gallons per capita per day (gpcd).

A PS/SPSS specific gross gpcd was applied to each respective PS/SPSS service area projected residential population to calculate future average-year water demands. The source of the data varied (metered/surveyed data or raw water withdrawals and MOR data or finished water withdrawals), however most of the treatment methods currently used in the NFRWSP area have minimal treatment losses and any differences are assumed to be negligible. Water demand projections were based on the most recent five-year (2014-2018) average gross per capita rate (at the time the projections were developed), which accounts for annual variations in water use with respect to rainfall and recent implementation of conservation programs. In cases where water use data were not available from the sources identified, the Districts estimated values from historical data and trends.

For this NFRWSP, it is assumed that current levels of water conservation and use of reclaimed water will continue through the year 2045 planning horizon; additional conservation and the use of additional reclaimed water will be effective in reducing future water demands.

The Districts have observed a reduction in per capita water use over the last decade that may be attributed to a variety of factors, including economic conditions, indoor and outdoor conservation, and source substitution with reclaimed water. The use of a five-year average gross per capita accounts for some variability in these factors.

Estimated and projected water demand for each individual PS is shown in Table A-5a (and by county in Table A-5) and includes five-year increments from 2015 to 2045. A water demand projection for 2045 during a 1-in-10 year drought is also shown. Water demand for SPSS (individually listed in Table A-6a) was aggregated for each county and was added to the respective county demand for the DSS category (shown in Table A-6).

To calculate the 1-in-10 year water demand projections, the average year water demands were multiplied by 1.06 (corresponding to a six percent increase). The 1-in-10 year Drought Subcommittee of the Water Planning Coordination Group (WPCG) concluded that a six percent increase in water demand would occur in such an event for the PS water use category (WDPS 1998).

Spatial Groundwater Distribution

For groundwater modeling purposes, the projected groundwater demand and associated location of withdrawal needed to be determined. For example, there is one PS utility within the NFRWSP area that has surface water withdrawals (Manufactured Home Communities in Flagler County). For this CUP with surface water withdrawals, groundwater demand was estimated as the total water demand minus the permitted surface water withdrawal. The projected groundwater demand, specific to each PS and SPSS, was distributed evenly to their respective active or proposed wells/stations contained in their CUP. For those PS systems with multiple wellfields and/or specific wellfield allocations, the associated water demand was divided proportionally amongst the respective wellfields and then further to the wellfields' respective wells/stations.

DSS Water Demand

As stated above, water demand and population projections for SPSS are calculated individually, but are combined with the DSS category for reporting purposes at the county level.

Residential Per Capita Water Use

For DSS, the residential per capita water use (also referred to as household) is defined as the water use for solely residential (indoor and outdoor) purposes. The residential gpcd was estimated from the county level residential population served and residential water use. To achieve this, the total water use for each year (2014-2018) for each PS and SPSS was reduced to reflect only the indoor and outdoor residential portion of the total PS and SPSS water use. This was calculated using data reported directly from PS and SPSS systems, as well as the percent of residential water use identified in a CUP. The resulting residential water use values for each PS and SPSS system were summed to the county level and divided by the total PS service area population (at county level) to obtain the county-level average 2014-2018 residential gpcd. The average 2014-2018 county level residential gpcd was then multiplied by the projected 2020, 2025, 2030, 2035, 2040, and 2045 DSS population (by county).

The DSS estimated and projected water demand by county (after adding the total water demand for SPSS) is shown in Table A-6 and includes five-year increments from 2015 to 2045. A water demand projection for 2045 during a 1-in-10 year drought is also included. Identical to PS, to calculate the 1-in-10 year water demand projections for DSS, the average year water demands were multiplied by 1.06.

Spatial Groundwater Distribution

Each SPSS future groundwater demand and location of withdrawal was spatially distributed as defined in the PS section.

Outside of PS and SPSS service areas, parcels with residential housing units were identified using FDOR data; for these parcels a point was added to the centroid of each identified parcel to represent a well/station. Within PS and SPSS service areas, where available, account level billing data and well completion reports were used to determine DSS within those respective PSABs. For these parcels a point was added to the centroid of each identified parcel to represent a well/station. The DSS water demand for each five-year increment was then distributed evenly among the identified DSS parcels, for each county respectively. For counties located in more than one water management district (e.g., Alachua County), the projected DSS water demand specific to each of the Districts was only applied to the DSS parcels identified within the respective Districts' portion of the county.

Agricultural Water Demand

Section 570.93, F.S., directs the FDACS to develop annual statewide agricultural acreage and water demand projections based on the same 20-year planning horizon used in water supply planning. Pursuant to section 373.709(2)(a), F.S., the Districts are required to consider AG water demand projections produced by FDACS and that any adjustment or deviation from data provided by FDACS must be fully described, and the original data must be presented along with the adjusted data. FDACS publishes 20-year AG acreage and associated water demand projections in the annual Florida Statewide Agricultural Irrigation Demand (FSAID) reports, through a contract with The Balmoral Group. The fourth annual report (referred to as FSAID IV), which was published in June 2017 (FDACS 2017), was used for 2015 AG acreage estimates for the Districts and for 2015 AG water use in the SRWMD. The seventh annual report (referred to as FSAID VII), which was published in June 2020 (FDACS 2020), contains estimated and projected agricultural acreage and water demand projections for the State of Florida for five-year increments from 2020 to 2045, as well as a water demand projection for 2045 during a 1-in-10 year drought. Detailed methodology can be found in the FSAID VII Report.

Acreage

As noted above, the 2015 acreage estimates and 2020-2045 acreage projections were taken directly from FSAID IV and FSAID VII, respectively. The estimated and projected irrigated agricultural acreage by county is shown in Table A-7 in five-year increments from 2015 to 2045. Acreage by crop type is included in Table A-7a.

Demand

As stated above, water use estimates and water demand projections were taken directly from FSAID IV and FSAID VII, respectively. One exception for 2015 AG water use is where SJRWMD supplemented FSAID IV water use data with metered data for CUPs. The estimated and projected agricultural water demand by county is shown in Table A-7 in five-year increments from 2015 to 2045. Water demand for 2045 during a 1-in-10 year drought is also included. Water demand by crop type and miscellaneous type uses are included in Tables A-7a and A-7b.

Spatial Groundwater Distribution

The FSAID IV and FSAID VII (FDACS 2017, 2020) deliverable contains the location, in polygon format, of all estimated future agricultural water demand in the five-year increments necessary for groundwater modeling. SJRWMD used the FSAID IV and FSAID VII (FDACS 2017, 2020) deliverables and refined the data to account for those agricultural areas using surface water and converted the delivered polygon layer to a point layer (tied to CUP station location) for use in groundwater modeling. Detailed methodology regarding the conversion of polygon water demands to point water demands and the conversion of total water demands to reflect groundwater and surface water demands is available from SJRWMD (SJRWMD 2018a).

Landscape/Recreational Water Demand

Water demand for the LR category was projected at the county level using a respective historic LR average gpcd. The county specific LR average gpcd was calculated from LR average water use for 2014-2018 and BEBR estimates of county population for 2014-2018 (BEBR 2015-2016, 2017a, 2017b, 2018).

The average LR gpcd was applied to the additional population projected by BEBR (Rayer, S. and Y. Wang. 2020) for each five-year increment and the associated water demand was added to the 2015 baseline year water use.

The estimated and projected LR water demand by county is shown in Table A-8 in five-year increments from 2015 to 2045. Water demand for 2045 during a 1-in-10 year drought is also included.

The 1-in-10 year Drought Subcommittee of the WPCG, as stated in their final report, determined that values using agricultural (irrigation) models, historic data, and net irrigation ratios are acceptable when calculating the 1-in-10 year water demand projection. A factor was developed for each county, using the highest year water use from 2014-2018 and the percent increase from the 2014-2018 LR water use. For example, if water use in 2016 was X percent higher than the 2014-2018 five-year average, X percent was applied to the average 2045 water demand to project a 2045 1-in-10 year water demand.

Spatial Groundwater Distribution

The projected water demand for the LR category is only estimated at the county level. For groundwater modeling purposes, the groundwater demand and associated location of withdrawal needed to be determined. Several LR CUPs have surface water withdrawals; future groundwater demand for the respective future years at the county level was calculated using the 2015 percent split between groundwater and surface water (via reported CUP data and the SJRWMD's published report (SJRWMD 2016)). The county level groundwater demand for future year scenarios was then distributed to the CUP level using a percent share method of permitted allocation. For example, if an LR CUP's groundwater allocation represented 10 percent of the county's total

groundwater allocation in 2015, then the LR CUP allocation also maintained 10 percent of the county groundwater allocation in 2045. The estimated projected groundwater demand specific to each LR CUP was then distributed evenly to their respective active or proposed stations. For counties located in more than one District (e.g., Alachua County), the projected LR water demand specific to each District was only applied to the respective LRA CUPs and stations identified within the respective Districts' portion of the county. While future land use and potential new locations of LR polygons was not taken into consideration, the method applied is generally accepted as a valid method for regional planning purposes.

Commercial/Industrial/Institutional and Mining/Dewatering Water Demand

Water demands for the CII/MD category were projected at the county level using a respective historic CII/MD average gpcd. The county specific CII/MD average gpcd was calculated from CII/MD average water use for 2014-2018. CII/MD historic water use and water demand consists of only consumptive uses; recycled surface water and non-consumptive uses were removed. For this NFRWSP, surface water use by mining operations represents 5 percent of total surface water use, to account for the loss of water in mining products and evaporation. The remaining surface water was assumed to be recirculated in the mining process and, therefore, is considered nonconsumptive. For clarification, consumptive use for planning purposes is defined by the Districts as any use of water that reduces the supply from which it is withdrawn or diverted.

The CII/MD average gpcd was applied to the additional population projected by BEBR (Rayer, S. and Y. Wang. 2020) for each five-year increment and the associated water demand added to the 2015 baseline year water use. Three counties in the NFRWSP and one county in the western part of SRWMD have large CII users (e.g., paper and pulp mills) that are not impacted by population increases (Nassau, Putnam, Hamilton, and Taylor counties). The water use associated with these permits were removed from the average per capita calculations for future CII/MD water demands.

The estimated and projected CII/MD water demand by county is shown in Table A-9 in five-year increments from 2015 to 2045.

The 1-in-10 year Drought Subcommittee of the WPCG, as stated in their final report, determined that drought events do not have significant effects on water use in the CII/MD category. Water use for the CII category is related primarily to processing and production needs and therefore, the average water demands and 1-in-10 water demands are assumed to be equal. Water use for the MD category is also not expected to increase during drought conditions.

Spatial Groundwater Distribution

See the LR spatial groundwater distribution explanation above. The methodology for spatial distribution of future groundwater for the CII/MD category for modeling purposes is the same, using the projected CII/MD future groundwater demands.

Power Generation Water Demand

Water demand was calculated for each PG facility and then summed to the county level for consumptive uses of water only; recycled surface water and non-consumptive uses were removed. Surface water use by PG facilities represents 2 percent of total surface water withdrawals to account for the loss of water due to evaporation and is included in the water demand projections. An example of this is surface water used for once-through cooling for power plants, which is recycled or returned to the withdrawal source.

The PSC requires that each PG facility produce detailed ten-year site plans for each of its facilities. These plans include planned facilities and generating capacity expansion. The 2020 ten-year site plans for each PG facility within the NFRWSP area were downloaded from the PSC website (http://www.psc.state.fl.us) and were used in developing the PG water demand projections.

In order to project future water demand, the NFRWSP utilized a methodology that incorporated historic and projected customers, historic and projected megawatts, and the average daily gallon per megawatt use for 2014-2018. Each ten-year site plan contains information regarding historic and projected customers and megawatts, as well as planned capacity expansions or facility closures. The majority of the ten-year site plans extended through year 2029. The average customer growth rate was used to extrapolate projected customers beyond the ten-year site plans through the planning period of 2045. Using the last year data in each ten-year site plan, a megawatt use per customer was calculated and then applied to the future customers to project future megawatts. Future groundwater demand for 2030-2045 was calculated by applying the (2014-2018) average gallons used per historic megawatt to the projected megawatts specific to each PG facility.

Water demands are very specific to each PG facility, as PG facilities are among the most efficient of fresh water users. The Districts contacted each PG facility located in the NFRWSP area to determine if the methodology employed and described above produced projections reflective of their future water needs. The Districts received responses back from both Duke and JEA; resulting in a reduction of the demand projections initially developed.

The estimated and projected PG water demand by county is shown in Table A-10 in five-year increments from 2015 to 2045. The projections for individual PG facilities is included in Table A-10a.

The 1-in-10 year Drought Subcommittee of the WPCG, as stated in their final report, determined that drought events do not have significant effects on water use in the PG category. Water use for this category is related primarily to processing and cooling needs and therefore, the average water demands and 1-in-10 water demands are assumed to be equal.

Spatial Groundwater Distribution

Similar to the PS category, future water demand was projected in five-year increments through 2045 for each PG facility in the NFRWSP area. However, groundwater and surface water was projected separately for each facility based on the five-year (2014-2018) average gallons used per historic megawatt. The future groundwater demand, specific to each PG facility, was distributed evenly to their respective active or proposed wells/stations in their CUP or FDEP power plant siting act plan.

Review of Population and Water Demand Projections

Water provider specific water use estimates and water demand projections were distributed to each water provider for review and comment. Changes and comments will be or have been incorporated where appropriate. Because this is a long-term planning effort, methodology changes based on short-term trends were not incorporated. However, additional refinements in the future may be considered as population and water use is continually monitored. Comments and suggested changes may be taken into consideration if they are justifiable, defensible, based on historical regression data and long-term trends, and supported by complete documentation.

Summary of Population and Water Demand Projections

The methodologies for calculating population and water demand projections for the six water use categories, as well as future reclaimed water flows and conservation potential (described below) are consistent with the specific plans of major water users at the time projections were made. The projections in this NFRWSP assume that the current levels of water conservation efforts and the use of reclaimed water will continue through the year 2045 planning horizon. If water conservation efforts and the use of reclaimed water within the NFRWSP area are implemented at rates higher than historic rates, then 2045 actual water use will be less than projected under average climatic conditions.

2045 Reclaimed Water Projections

Projections of future reclaimed water flows were made for domestic wastewater treatment facilities (WWTF) with 2018 permitted wastewater treatment capacities equal to or greater than 0.1 mgd (FDEP 2016).

Existing Flows

The 2018 flows were separated by total WWTF flow and beneficial reuse.

For this NFRWSP, beneficial reuse was considered to be only those uses in which reclaimed water takes the place of an existing or potential use of higher quality water for which reclaimed water is suitable, such as water used for landscape irrigation. Generally, delivery of reclaimed water to sprayfields, absorption fields, and rapid infiltration basins (RIBs) are not considered beneficial reuse, unless located in recharge areas.

FDEP has a statewide reuse utilization goal of 75 percent (FDEP 2003). Typically for planning purposes, the amount of WWTF flow in the baseline year not being utilized beneficially is multiplied by 75 percent and this amount is considered as potential existing additional reclaimed water that could be used for beneficial reuse. When determining how much WWTF flow can be utilized, it is recognized that each WWTF is unique and items such as system upgrades and treatment, additional storage, expansion of system, customer availability, and other factors have to be taken into consideration. Although 2015 is recognized as the base year, the Districts evaluated existing beneficial flows as of 2018 (FDEP 2019) because this was the most recent year of data that was within the scope of the plan. It was noted that many utilities in the NFRWSP area have implemented reclaimed water projects.

Future Flows

Using PSABs and CUPs, the Districts identified areas that have the potential to be connected to central sewer systems as a result of population growth. The 2018-2045 increase in population associated for each WWTF service area identified was obtained using the parcel-level projections, as described above. It was assumed that 95 percent of the identified population increase will receive sewer service and thereby return wastewater for treatment to a WWTF. It is acknowledged that the percentage of population growth and resulting wastewater flows will vary for individual service providers due to a number of factors.

According to empirical sources, increased population will generate approximately 73 gpcd of wastewater flows to the local WWTF. The 73 gpcd represents an average of 58.6 gpcd of wastewater generated by residential customers (indoor use; AWWA, 2016, Vickers 2001, Mayer, P and W. DeOreo, 1999), and 15 gpcd of wastewater return flows for employees at a commercial/industrial facility according to Chapter 64E-6, F.A.C., "Standards for Onsite Sewage Treatment and Disposal Systems", Rule 64E-6.008 System Size Determinations, Section (1)(B) Table I (effective date 6/25/2009) - System Design.

For the purposes of the NFRWSP, the Districts also created a future reclaimed water scenario using the 2018 percent beneficial reuse utilization for existing and future flows; which assumes that no changes to current treatment processes are made (e.g., WWTF upgrade).

Only a portion of the existing and future wastewater treated for reuse is actually used to offset water demands that would otherwise require the use of fresh groundwater. The amount of potable offset that is typically achieved utility-wide is approximately 65 percent to 75 percent; however, the potable offset can range from 50 percent to as much as 100 percent, depending on the type of use being replaced. While the amount of potable offset that is achieved by reuse is dependent upon the demographics of a particular WWTF's service area, the projected wastewater flows do not represent an amount equal to the water demand reduction due to system losses and inefficiencies of reuse by customers.

Reclaimed water systems are unique to each utility and the potential WWTF flow estimated for this NFRWSP may not necessarily represent the amount of reclaimed water that could be used in projects. Current treatment processes, WWTF capacities, storage and infrastructure, and inflow and infiltration reduction programs should be considered and could potentially impact the utilization cost of additional or currently available reclaimed water. Likewise, future and existing reclaimed water utilization may be higher than the scenarios presented if the WWTF provided reclaimed water for reuse to more efficient customers. In addition, potential future wastewater flows could be less if additional residential indoor water conservation is achieved. For example, AWWA has identified on their website (www.Drinktap.org) that if residences installed, for every instance, more efficient water fixtures and regularly checked for leaks, daily indoor water use (and associated wastewater flow) could potentially be reduced to 45.2 gpcd (Vickers 2001).

Detailed flows and projections for 2018 and 2045 for each identified WWTF and county are included in Tables A-13 to A-15.

Spatial Distribution

The Districts did not attempt to identify where future reclaimed water flows or beneficial reuse will occur.

2045 Estimated Water Conservation Potential

Current water conservation potential for the 2022 NFRWSP area was calculated in order to gauge the future benefit of effective water conservation. For the 2022 NFRWSP, all categories of water use, except agriculture, utilized the results in the 2020 Central Florida Water Initiative (CFWI) Regional Water Supply Plan (RWSP) as the basis for estimating water conservation potential (CFWI 2020). Table 1 is excerpted from page 50 of the 2020 CFWI RWSP which was developed in partnership with stakeholders and is based on an in-depth assessment of the conservation potential from implementing best management practices. More detailed information on how water conservation estimates were developed in the CFWI can be found can be found at https://cfwiwater.com/waterconservation.html and in the 2020 CFWI RWSP (CFWI 2020).

Table 1. CFWI projected 2040 water demand and water conservation savings

Category	Projected 2040 Water Demand (mgd)	Projected 2040 Water Conservation Savings (mgd)
Public Supply	592.28	41.50 – 44.16
Domestic and Small Public Supply	24.59	0.86
Agriculture	163.49	4.19
Landscape/Recreational	46.96	2.22
Commercial/Industrial/Institutional	69.00	1.55 – 4.40
Power Generation	11.27	1.55 – 4.40
Total	907.59	50.32 – 55.83

mgd = million gallons per day

For agriculture, water conservation savings were estimated from the Florida Department of Agriculture and Consumer Services (FDACS) — Florida Statewide Agricultural Irrigation Demand (FSAID) VII Final Report (FDACS 2020). Additionally, a second scenario of water conservation potential based on per capita rates was estimated for the public supply and domestic self-supply (DSS) water use categories.

For the first water conservation scenario, the Districts used the low-end estimates from the 2020 CFWI RWSP plus the FSAID VII estimates. For the 2022 NFRWSP, the resulting percentage savings derived from the 2020 CFWI RWSP in Table 1 will be applied to all of the water use categories (except agriculture). See Table 2 for the estimated percentage savings.

Table 2. Percentage Savings Calculated from the 2020 CFWI RWSP

Category	Estimated Percent Savings
Public Supply	7.0
Domestic Self Supply and Small Public Supply	3.5
Agriculture*	N/A*
Landscape/Recreational	4.7
Commercial Industrial/Institutional	2.2
Power Generation	13.8

*For agriculture, FSAID VII will be used to estimate water conservation potential.

The second water conservation scenario involved the public supply and DSS water use categories. For these two water use categories, the Districts calculated the average 2014-2018 gross per capita rates for the SJRWMD and SRWMD portions of the NFRWSP area. If a public supply utility gross per capita was greater than the average 2014-2018 gross per capita, it was revised to reflect the demand based on the respective Districts' average 2014-2018 gross per capita multiplied by the public supply utility's 2045 population projections. This revised demand represents the water conservation potential for the public supply utility based on meeting the lower gross per capita average. For DSS, the corresponding percent reduction in the total public supply water demand by county using the per capita rate average was then applied to DSS 2045 water demand; resulting in the second scenario of DSS water conservation.

NWFWMD and SWFMWD Water Use and Projections

The NWFWMD and SWFWMD provided their water use estimates and projections. These data were incorporated into the 2022 NFRWSP geodatabase. Details concerning the development of the NWFWMD and SWFWMD data and projections should be directed back to the respective water management districts.

Georgia and South Carolina Water Use

Districts obtained water use data and projections through 2050 from the Georgia Environmental Protection Division (GEPD). The data were spatially distributed by staff and provided to GEPD for review. In June 2021, GEPD staff provided comments concerning surface water distribution which were addressed and the resulting distribution was

incorporated into the 2022 NFRWSP geodatabase. Additional information on the Georgia data and projections can be obtained from the GEPD at: Georgia Water Planning. South Carolina data was obtained from the US. Geological Survey at: ScienceBase Catalog Home. Details on how the data were distributed can be found in the *Methodology for the Spatial Distribution of Historic Water Use and Projected Water Demand for Georgia and South Carolina* (SJRWMD 2020).

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