BEFORE THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
ORDER NO. SJR 2017-002
FOR 8013-0017

IN RE: NORTH FLORIDA REGIONAL WATER SUPPLY PLAN (2015-2035 Planning Horizon)
_____/

ORDER APPROVING THE NORTH FLORIDA REGIONAL WATER SUPPLY PLAN

THIS MATTER came before the Governing Board of the St. Johns River Water Management District ("District") on January 17, 2017. The Governing Board, having been fully advised of the matter, hereby approves the North Florida Regional Water Supply Plan with appendices (2015-2035)(NFRWSP), recognizing that the District's authority for water supply planning extends to water supply planning regions within the District's jurisdictional boundaries as established in section 373.069, F.S.

The NFRWSP is attached hereto:

DONE and ORDERED by the Governing Board of the St. Johns River Water Management District on January 17, 2017.

ST. JOHNS RIVER WATER
MANAGEMENT DISTRICT

By: _____
John A. Miklos, Chairman

Approved as to Legal Form and Content
_____
William Abrams, Deputy General Counsel

Attest: _____
Charles W. Drake, Secretary

(Seal)

Filed January 17, 2017

_____
for District Clerk

BEFORE THE SUWANNEE RIVER WATER MANAGEMENT DISTRICT
ORDER NO. ____2017-0001

IN RE: NORTH FLORIDA REGIONAL WATER SUPPLY PLAN (2015-2035)
_____/

ORDER APPROVING THE NORTH FLORIDA REGIONAL WATER SUPPLY PLAN

THIS MATTER came before the Governing Board of the Suwannee River Water Management District ("District") on January 17, 2017. The Governing Board, having been fully advised of the matter, hereby approves the North Florida Regional Water Supply Plan with appendices (2015-2035)(NFRWSP), recognizing that the District's authority for water supply planning extends to water supply planning regions within the District's jurisdictional boundaries as established in section 373.069, F.S.

The NFRWSP is attached hereto.

DONE and ORDERED by the Governing Board of the Suwannee River Water Management District on January 17, 2017.

SUWANNEE RIVER WATER MANAGEMENT DISTRICT

By: _____
Don Quincey, Chairman

Approved as to Legal Form and Content
_____
Tom Reeves, Board Counsel

Attest: _____
Virginia Johns, Secretary

Filed January 17, 2017
_____
District Clerk

North Florida Regional Water Supply Plan (2015 – 2035)

St. Johns River Water Management District
Palatka, Florida

Suwannee River Water Management District
Live Oak, Florida

January 13, 2017

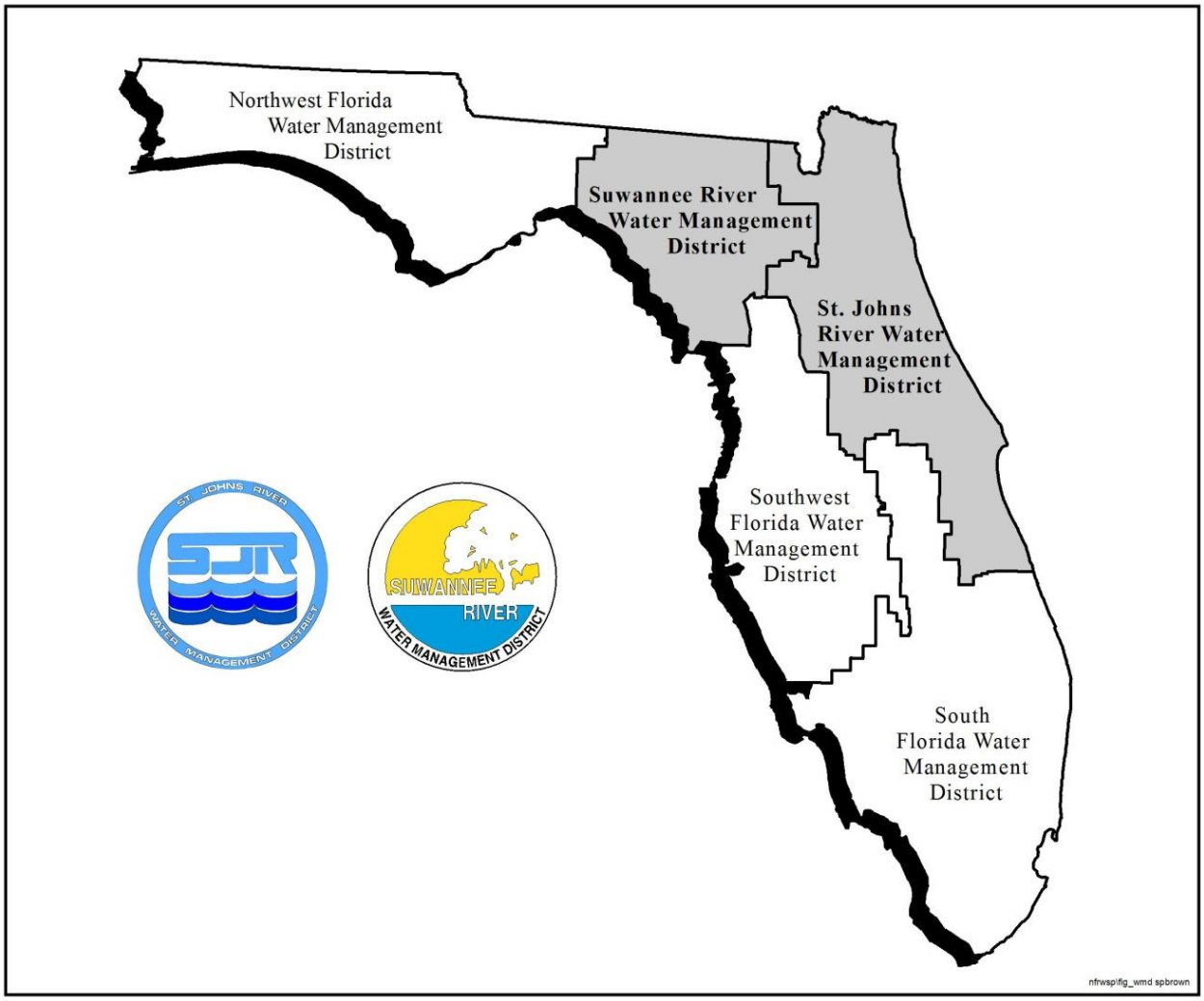

Figure 1: Location and Boundaries of the St. Johns River and Suwannee River Water Management Districts

Acknowledgements

The Florida Department of Environmental Protection (FDEP), St. Johns River Water Management District (SJRWMD) and Suwannee River Water Management District (SRWMD) recognize and thank the Stakeholder Advisory Committee, state agencies and other stakeholders for their contributions, comments, advice, information, and assistance throughout the development of the North Florida Regional Water Supply Plan. Furthermore, SJRWMD and SRWMD express their appreciation to all staff who contributed to the development and production of this collaborative regional water supply plan. For further information about this document, please visit northfloridawater.com.

Executive Summary

The North Florida Regional Water Supply Plan (NFRWSP) is the first-ever regional water supply plan for 14 north Florida counties and was developed through a highly collaborative process among the Suwannee River and St. Johns River water management districts and the Florida Department of Environmental Protection (FDEP), local governments, public supply utilities, environmental advocates and other stakeholders. Over the past four years, the water supply planning process included 36 Stakeholder Advisory Committee (SAC) meetings, more than 50 other stakeholder meetings and two public workshops to engage stakeholders to understand their individual perspectives as related to water resource issues in north Florida. This plan is a direct result of the collaboration between these groups who each share the common goals of preserving and extending our future water supply.

This water supply plan covers a 20-year planning period and is based on the best data and research available. A key component of the plan is the North Florida Southeast Georgia groundwater flow model (NFSEG), developed by the two districts in collaboration with the Southwest Florida Water Management District in a separate open-public process with stakeholder input. This groundwater flow model is the largest in the state and incorporates all elements of the water budget including: recharge, evapotranspiration, surface water flows, groundwater levels and water use. The development of the model utilized a state-of-the-art calibration process to incorporate the most current data and provides the best available approximation of all components of the water budget within the planning area and the model domain. This model provides the most technologically sophisticated picture of groundwater withdrawals on water resources in North Florida.

As a result of the collaborative process, the Districts determined fresh groundwater alone cannot supply the projected 117 million gallons per day increase in water demand during the 20-year planning horizon without causing unacceptable impacts to water resources. The NFRWSP identifies solutions to meet the current and future water use needs of the region while ensuring the natural resources of the area are protected.

One of the major highlights of this plan is its focus on conservation. In fact, the NFRWSP is the most comprehensive water conservation plan in the region. The plan illustrates water conservation efforts which could potentially reduce the projected 2035 water demand by as much 54 million gallons per day (mgd). This represents 46% of the projected 117 mgd increase in demand over the 20-year planning horizon and demonstrates the Districts' commitment to water conservation.

In addition to water conservation, the plan identifies an additional 160 mgd of potential project options to guide water users and suppliers in their efforts to meet the projected demand while protecting our natural resources. Project options range from aquifer recharge, rehydration of wetlands and potable reuse, to alternative water supply sources like reclaimed and stormwater. Both Districts are committed to working with local governments to share costs to help get these beneficial projects implemented.

Water supply planning is an ongoing process, with enhanced scientific methodologies and new data acquired all the time. District staff are already working on the science and data collection for the plan's five-year update. Through this process, the Districts have been able to create a roadmap that offers options to achieve sustainable water use through the planning horizon.

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List of Abbreviations and Acronyms

ASR Aquifer Storage and Recovery
AWS Alternative Water Supply(ies)
BEBR Bureau of Economic and Business Research

BMPs	Best Management Practices
CFS	Cubic Feet per Second
CFWI	Central Florida Water Initiative
CII/MD	Commercial/Industrial/Institutional and Mining/Dewatering Self-supply
CUP/WUP	Consumptive/Water Use Permit
Districts	St. Johns River and Suwannee River Water Management Districts
DSS	Domestic Self-supply and Small Public Supply Systems
EDR	Electrodialysis Reversal
EQIP	Environmental Quality Incentive Program
F.A.C.	Florida Administrative Code
FAS	Floridan Aquifer System
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Demand
FWCA	Florida Water and Climate Alliance
GIS	Geographic Information Systems
GPCD	Gallons Per Capita Per Day
LFA	Lower Floridan Aquifer
LRA	Landscape/Recreational/Aesthetic Irrigation Self-supply
LSFI	Lower Santa Fe and Ichetucknee Rivers and associated priority springs
LSFRB	Lower Santa Fe River Basin
M	Million (as expressed in million dollars)
MFLs	Minimum Flows and Minimum Water Levels
mgd	Million Gallons Per Day
mg/L	Milligram per Liter
mg/L/yr	Milligram per Liter per Year
NFRWSP	North Florida Regional Water Supply Plan
NFSEG	North Florida Southeast Georgia Regional Groundwater Flow Model
NRCS	Natural Resources Conservation Service
OAWP	Office of Agriculture Water Policy
OFS	Outstanding Florida Springs
Partnership	North Florida Regional Water Supply Partnership
PG	Thermoelectric Power Generation Self-supply
PSC	Florida Public Service Commission
RO	Reverse Osmosis
RWSP	Regional Water Supply Plan
s.	Section
SAC	Stakeholder Advisory Committee
SAS	Surficial Aquifer System
SDWS	Secondary Drinking Water Standard
SFWMD	South Florida Water Management District
SJRWMD	St. Johns River Water Management District
SRWMD	Suwannee River Water Management District
ss.	Subsection and further subdivisions
TDS	Total Dissolved Solids

UFA	Upper Floridan Aquifer
WIFIA	Water Infrastructure Finance and Innovation Act
WMDs	Florida's Five Water Management Districts
WPSP	Water Protection and Sustainability Program
WRCA	Water Resource Caution Area
WSA	Water Supply Assessment
WWTF	Wastewater Treatment Facility

Chapter 1: About the North Florida Planning Region

Introduction

The North Florida Regional Water Supply Plan (NFRWSP) area includes 14 counties in the St. Johns River Water Management District (SJRWMD) and the Suwannee River Water Management District (SRWMD) (Districts): Alachua, Baker, Bradford, Clay, Columbia, Duval, Flagler, Gilchrist, Hamilton, Nassau, Putnam, St. Johns, Suwannee, and Union (Figure 2).

The following statistics apply within the NFRWSP area.

Population (2010):

SJRWMD: approximately 1.7 million

SRWMD: approximately 223,000

Total NFRWSP: 1.9 million

Primary Surface Water Basins:

SJRWMD: Lower St. Johns River and Nassau River, Northern Coastal, portions of the St. Marys River, Orange Lake, and the Florida Ridge.

SRWMD: Upper Suwannee, Santa Fe, Alapaha, and Ichetucknee. (Over 90 percent of the Alapaha and over 55 percent of the Suwannee river basins are located in Georgia).

Springs (4th magnitude and larger):

SJRWMD: There are 16 documented springs, of which there are no Outstanding Florida Springs (OFS).

SRWMD: There are 125 documented springs. In the Lower Santa Fe River, the following springs are OFS: July, Devil's Ear (Ginnie Group), Poe, Columbia, Treehouse, and Hornsby. In the Ichetucknee River, the following springs are OFS: Blue Hole and the Ichetucknee Group.

Overview of the North Florida Regional Water Supply Partnership

Partnership History

The North Florida Regional Water Supply Partnership (Partnership) was established in 2011 via a formal agreement executed by the Florida Department of Environmental

Protection (FDEP) and the Districts. The NFRWSP area includes 14 counties in north Florida; five are located within SRWMD, six are located within SJRWMD and three are located in both Districts (Figure 2). In total, the Partnership covers more than 8,000 square miles. The purpose of the Partnership is to protect natural resources and water supplies in north Florida. This is being achieved through collaborative planning, scientific-tool development and related efforts. The agreement and other information about the Partnership can be found at northfloridawater.com.

North Florida Regional Water Supply Partnership Stakeholder Advisory Committee

The Stakeholder Advisory Committee (SAC) was a key component of the Partnership. Established by the Partnership in 2012, the SAC provided non-binding advisory recommendations to the Partnership regarding the NFRWSP. The twelve SAC members were appointed by the Districts to represent the following stakeholder groups: public water supply, commercial/power generation, industrial/mining, agriculture, environmental, and local governments. Each stakeholder group was represented by two members on the SAC, one appointed by each District. The SAC members were responsible for representing the concerns and opinions of their respective group and facilitating submittal of applicable project options. Additional information about the SAC, including membership and meeting documents, is available at northfloridawater.com.

The SAC met 36 times from 2012 through completion of the draft NFRWSP. The SAC focused on the NFRWSP and provided the Districts with meaningful discussion and recommendations from a stakeholders perspective as the NFRWSP components were brought forward for consideration. In addition, the results and methodologies employed for the NFRWSP were reviewed by the SAC, stakeholders and the Districts' water use regulation staff. The SAC members made many significant and positive contributions to the NFRWSP.

At the final meeting on November 2, 2016, the SAC unanimously, in a 12-0 vote, stated that: "SAC supports the Draft RWSP and recommends that the SRWMD and the SJRWMD Governing Boards approve the Joint North Florida Regional Water Supply Plan."

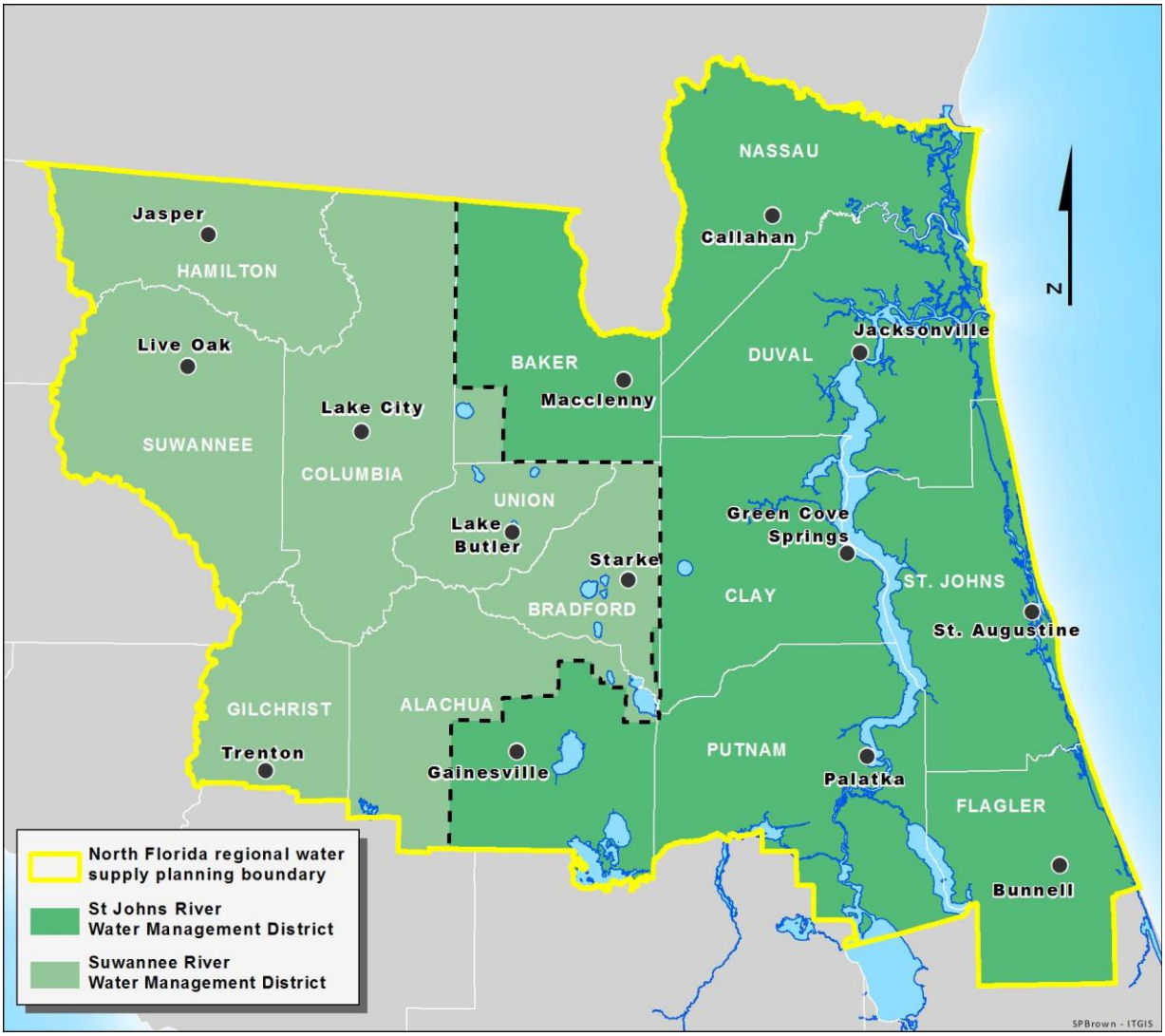

Figure 2: North Florida Regional Water Supply Planning Partnership

Plan Horizon

Subsection (ss.) 373.709(1), Florida Statutes (F.S.), requires that the Districts conduct water supply assessments to identify areas where sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period. Water supply planning is then required for such areas. Water supply plans identify water needs, sources and project options for at least a 20-year timeframe (ss. 373.709(2), F.S). With a 2035 planning horizon, the NFRWSP includes projected water demands, potential water resource impacts, and a combination of project options, water conservation and water sources that may be utilized to meet future water needs through the planning horizon and avoid unacceptable water resource impacts in the NFRWSP area.

Additional NFRWSP Outreach

Beginning in early January 2016, District staff held over 50 focused meetings with local governments, civic groups, advocacy groups, regional organizations, agricultural entities, environmental groups, media and other interested parties in the NFRWSP area. The purpose of the meetings was to share an overview of the NFRWSP process, provide background information of interest to particular stakeholders and answer questions. Staff also solicited feedback and project concepts. This effort provided a valuable means for stakeholders not involved in the SAC to engage with the NFRWSP development and share their perspective with the Districts. The Districts found the expanded input received during these discussions to be beneficial to the NFRWSP development.

In addition to participation from the SAC and the outreach meetings, the Districts held public workshops on October 25 and November 3, 2016, consistent with ss. 373.709(1), F.S. The draft NFRWSP was posted for 60 days of public comment on October 4, 2016. Comments received during the public workshops and comment period were incorporated, as appropriate, into the NFRWSP (see Appendix A for details regarding comments received and responses).

Chapter 2: Introduction to Water Supply Planning

Introduction

Florida's five water management districts (WMDs) develop water supply plans to identify sustainable water supplies for all existing and anticipated water uses while protecting water resources and related natural systems. Water supply plans provide a view of projected future water needs, potential water supply sources and avoidable water resource impacts to help all water users make informed decisions regarding how to meet their future water needs. The elements of water supply planning are:

- Identify projected water demands for all use types through the planning horizon
- Identify the water resource impacts that could occur as a result of meeting the projected increase in water demand with traditional sources
- Identify technically and economically feasible water resource and water supply development project options that could be implemented to meet future water demands and avoid unacceptable water resource impacts

For the purpose of the NFRWSP, fresh groundwater with less than 500 milligrams per liter (mg/L) total dissolved solids (TDS) has been the primary water supply source in the Districts because of its proximity to the desired location of use and relatively low cost for treatment. The majority (94%) of public supply, domestic self-supply, agriculture and commercial/industrial/institutional water use in 2010 in the NFRWSP area was fresh groundwater (Appendix B, Table B-2). Given this consistent pattern of historical and current utilization of fresh groundwater, the Districts recognize fresh groundwater as the only traditional water supply source in the NFRWSP area and designate all other water sources to be nontraditional (i.e., alternative water supplies; (ss. 373.019(1), F.S.)).

Legislative Mandates

Section (s.) 373.709, F.S., provides that the WMDs shall conduct water supply planning when it is determined that existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems. The WMDs must conduct planning in an open public process, in coordination and cooperation with local governments, regional water supply authorities, water and wastewater utilities, multijurisdictional water supply entities, self-suppliers, FDEP, the Florida Department of Agriculture and Consumer Services (FDACS), and other affected and interested parties. In addition, each regional water supply plan must be based on at least a 20-year planning period and must include the following:

- Water supply and water resource development components

- Funding strategies for water resource development projects

- Consideration of how water supply development project options serve the public interest or save costs overall by preventing the loss of natural resources or avoiding greater future expenditures for water resource or water supply development projects

- The technical data and information applicable to each planning region which are necessary to support the regional water supply plan

- The minimum flows and minimum water levels (MFLs) established for water resources within each planning region

- Minimum flows and minimum water levels prevention and recovery strategies, if applicable

- Reservations of water adopted by rule pursuant to ss. 373.223(4), F.S., within each planning region

- Identification of surface waters or aquifers for which MFLs are scheduled to be adopted

- An analysis, developed in cooperation with FDEP, of areas or instances in which the variance provisions of ss. 378.212(1)(g), F.S., or ss. 378.404(9), F.S., may be used to create water supply development or water resource development projects

Relationship to SJRWMD and SRWMD Regulatory Programs

Subsection 373.709(7), F.S., states that nothing contained in the water supply development component of the NFRWSP shall be construed to require any entity to select and/or implement a water supply development project identified in the component merely because it is identified in the plan. Pursuant to ss. 373.709(7), F.S., the NFRWSP may not be used in the review of consumptive/water use permits (CUPs/WUPs), unless the plan or an applicable portion thereof has been adopted by rule, with one exception. The one exception is in evaluating an application for the consumptive use of water which proposes the use of a water supply development project as described in the NFRWSP and provides reasonable assurances of the applicant's capability to design, construct, operate, and maintain the project; then it is presumed that the alternative water supply (AWS) use is consistent with the public interest.

It is important to note that, while the NFRWSP may not be used in the review of CUPs/WUPs, the Districts are allowed to use data or other information used to establish the plan in reviewing CUPs/WUPs.

Approval Process

As noted previously, the Districts held public workshops on October 25 and November 3, 2016, consistent with ss. 373.709(1), F.S., to highlight the results of the NFRWSP. The draft plan was posted for 60 days of public comment on October 4, 2016. The Districts asked the SAC for recommendations on the NFRWSP and incorporated comments and/or changes, as appropriate. In addition, on November 2, 2016, the SAC voted 12 to 0 to support the Draft NFRWSP and recommended that the Districts' governing boards approve the Draft NFRWSP. The Districts also presented the Draft NFRWSP to their respective governing boards on September 13, 2016, to solicit comments and feedback. Comments received during the public workshops and comment period were incorporated, as appropriate, into the NFRWSP.

Upon completion of the updates to the NFRWSP, the Districts presented the NFRWSP to their governing boards in a joint meeting on January 17, 2017, for approval. The Districts' governing boards approved the NFRWSP on January 17, 2017.

Requirements after Plan Approval

The water supply planning process of the Districts is closely coordinated and linked to the water supply planning efforts of local governments and utilities. Therefore, significant coordination and collaboration throughout the development, approval and implementation of the NFRWSP is necessary among all water supply planning entities.

Subsection 373.709(8)(a), F.S., requires the Districts to notify water supply entities identified in the NFRWSP as the parties responsible for implementing the various project options listed in the NFRWSP. When the notice is received by the water supply entity, the water supplier must respond to the Districts within 12 months about their intentions to develop and implement the project options identified by the NFRWSP or provide a list of other projects or methods to meet the identified water demands (ss. 373.709(8)(a), F.S.).

In addition to the requirements above, local governments are required to adopt water supply facilities work plans and related amendments into their comprehensive plans within 18 months following the approval of the NFRWSP. The work plans contain information to update the comprehensive plan's capital improvements element, which provides specifics about the need for and location of public facilities, principles for construction, cost estimates, and a schedule of capital improvements.

Local governments in the NFRWSP area are required by ss. 163.3177(6)(c)3, F.S., to modify the potable water sub-elements of their comprehensive plan by:

- Incorporating the water supply project or projects selected by the local government from those projects identified in the NFRWSP or proposed by the local government

- Identifying water supply projects to meet the water needs identified in the NFRWSP within the local government's jurisdiction

- Including a work plan, covering at least a 10-year planning period, for building public, private and regional water supply facilities, including the development of AWS, which are identified in the potable water sub-element to meet the needs of existing and new development

Chapter 3: Water Demand, Reclaimed Water and Water Conservation Projections

Purpose

The Districts develop water demand projections to determine existing legal uses, anticipated future needs, and existing and reasonably anticipated sources of water and water conservation efforts. The Districts' goal in projecting water demands is to develop estimates of projected need that appear to be reasonable based on the best information available and that are mutually acceptable to the water users and the Districts. The projected increase in water demand is used in water resource assessments to determine the potential for unacceptable impacts to groundwater quality, springs and surface water bodies, as well as adverse change to wetland function.

Water use and projected water demand in the Districts is grouped into six water use categories for water supply planning.

- Public Supply
- Domestic Self-supply and Small Public Supply Systems (DSS)
- Agricultural Irrigation Self-supply
- Landscape/Recreational/Aesthetic Irrigation Self-supply (LRA)
- Commercial/Industrial/Institutional and Mining Dewatering Self-supply (CII/MD)
- Thermoelectric Power Generation Self-supply (PG)

In addition to the six categories listed above, the Districts project future reclaimed water flows that can potentially offset future water demand.

Total water demand in the NFRWSP area is anticipated to increase from 551 million gallons per day (mgd) in 2010 to 667 mgd in 2035 (21%). Public supply represents the largest demand in the NFRWSP area (38%), followed by agriculture (23%) and CII/MD (20%), (Figures 3 and 4). The Districts also calculated a 1-in-10 year drought water demand for 2035, which represents an event that would result in an increase in water demand of a magnitude that would have a 10 percent probability of occurring during any given year. It is estimated that water demand in 2035 could increase by an additional six percent if a 1-in-10 year drought event occurred.

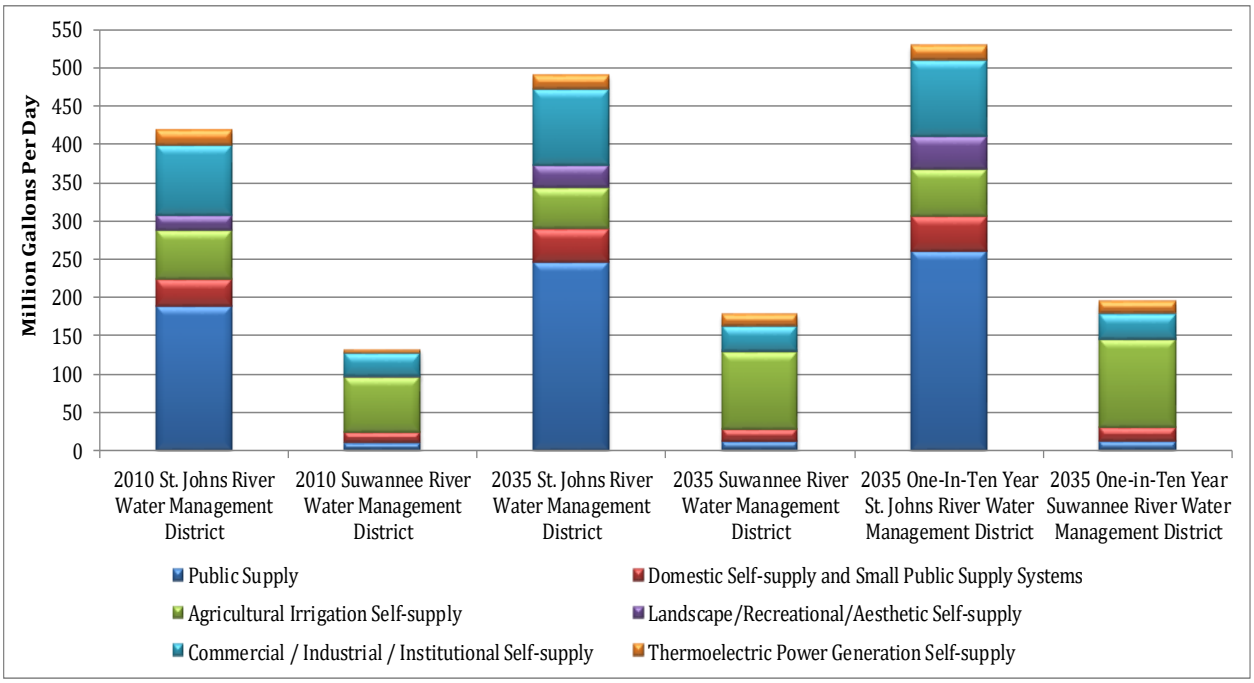

Figure 3: 2010 Water Use Estimates and 2035 Water Demand Projections in the NFRWSP by Category

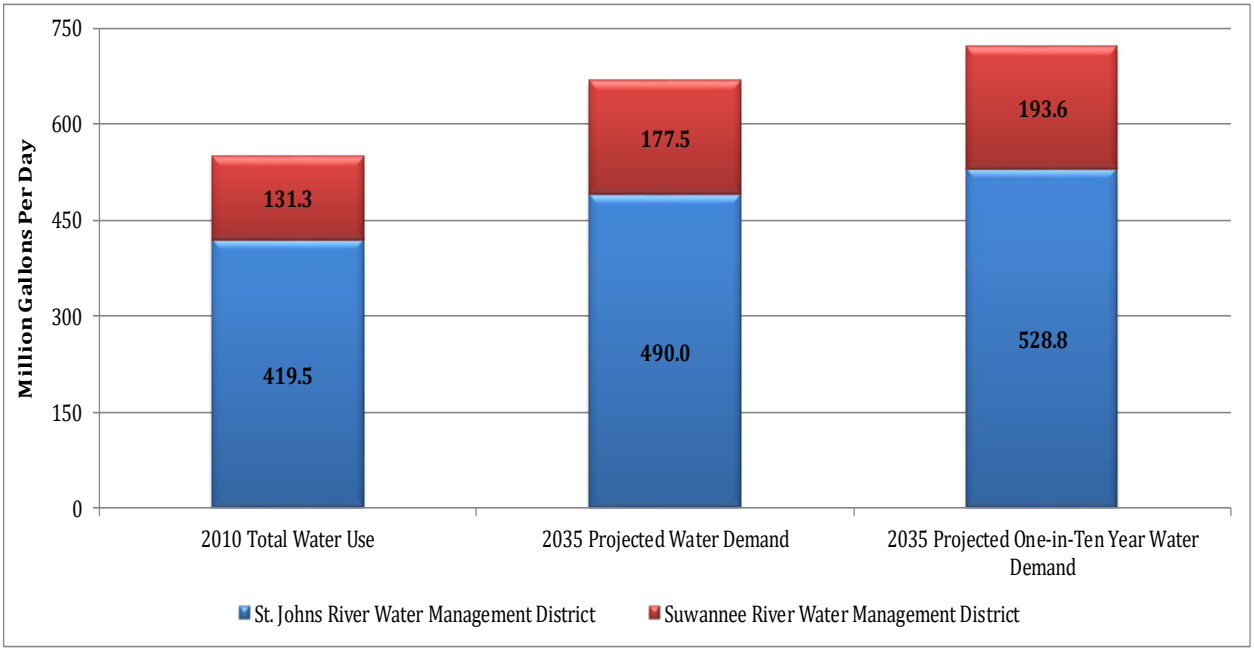

Figure 4: 2010 Total Water Use Estimates and 2035 Water Demand Projections in the NFRWSP

Future Water Demand Projections and Methodology

Assumptions

For the purposes of the NFRWSP, the Districts assume that projected increases in supply will come from the traditional source unless users have made a commitment to the development and use of other sources of supply. Public water supply utilities in Florida are in varying stages of transitioning exclusively from fresh groundwater sources to include alternative sources.

Guidance and minimum requirements for developing water demand and population projections are described in s. 373.709, F.S. Detailed methodology for all of the population and water demand projections, as well as spatial distribution, for the NFRWSP can be found in Appendix B.

Population Projections

Population projections yield the estimated population growth from 2010 to 2035 and the percent change. The Districts estimated the population projections for water supply utilities in two categories: public supply and small public supply systems. For these, the District used a standard percent share method, as described in Appendix B. For DSS, population projections were calculated as the difference between the Bureau of Economic and Business Research (BEBR) medium population projections for each county (Smith, 2015) and the public supply and small public supply systems population projections.

The Districts' total population for the NFRWSP area is expected to increase by 676,000 people (35% to approximately 2.63 million people) by 2035 (Figures 5 and 6). Public supply represents 75 percent of the 2035 total population projection, and domestic self-supply and small public supply systems represents the remaining 25 percent. The population served by public supply utilities in the NFRWSP area is expected to increase by 531,000 people (37% to approximately 2 million people) through 2035. Domestic self-supply and small public supply systems population in the NFRWSP area is expected to increase by 145,000 people (28% to approximately 660,000 people) through 2035.

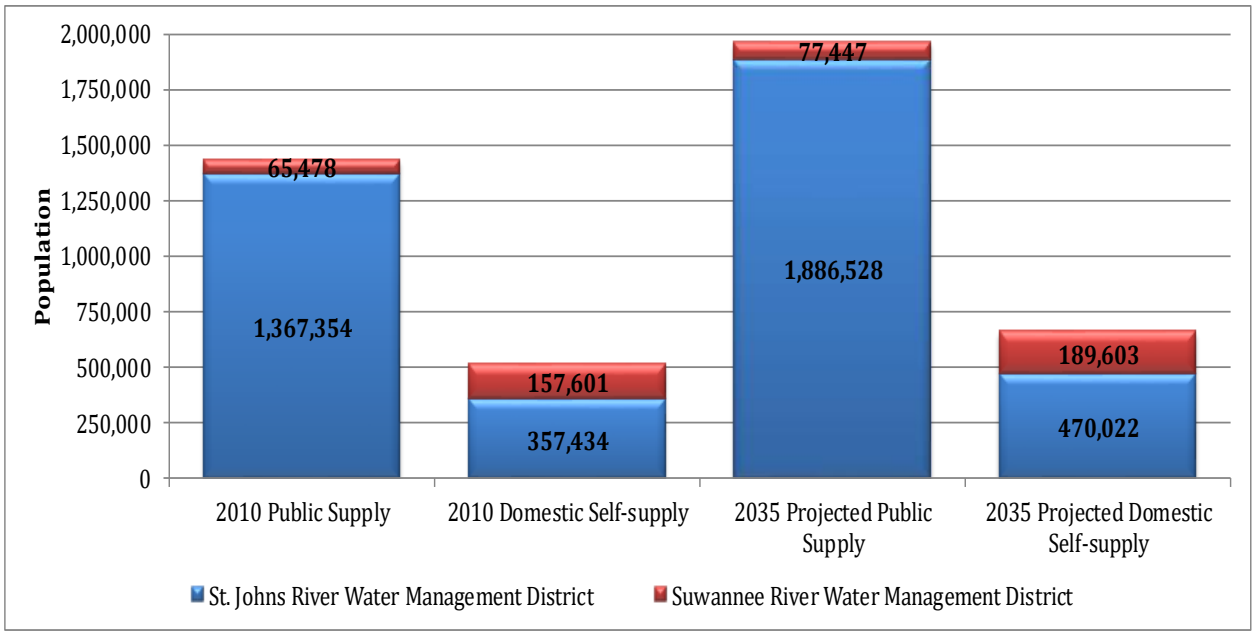

Figure 5: 2010 Population Estimates and 2035 Population Projections in the NFRWSP by Category

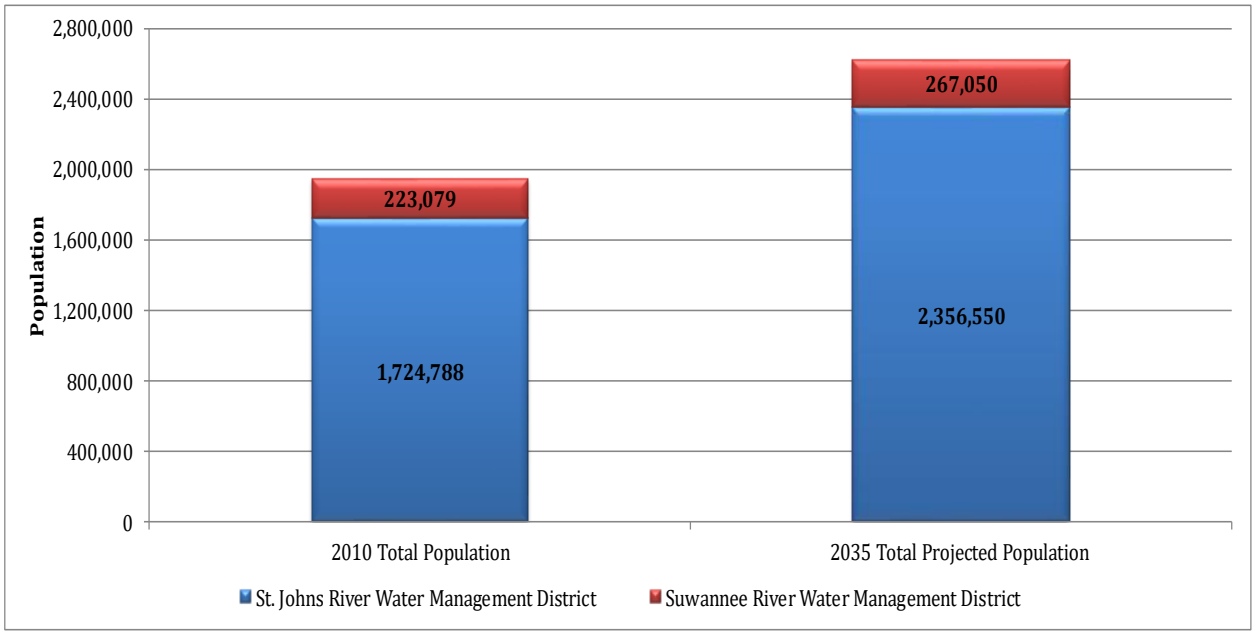

Figure 6: 2010 Total Population Estimates and 2035 Population Projections in the NFRWSP

Public Supply

The public supply category consists of residential and nonresidential uses supplied by public and private utilities that have permits to withdraw an annual average of 0.1 mgd or more.

The Districts calculated water demand for each public supply and small public supply system. The public supply category includes water use 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.

Demand

For the NFRWSP, the Districts based the public supply and small public supply systems water demand projections on the most recent five-year average gross per capita rate (2010-2014). The gross per capita water use rate is the factor applied to projected population to determine future water demand. This rate represents on average how much water one person uses in a day. For public supply and small public supply systems, the gross per capita rate is defined as the total water use (including residential and non-residential uses) for each individual permittee divided by its respective residential population served expressed in average gallons per capita per day (gpcd). A five-year average is used to address annual variations in water use due to climate variations and implementation of water conservation programs. The Districts calculated five-year average gross per capita water use rates for each individual public supply and small public supply system.

The use of a gross per capita is recognized as a national standard methodology for water supply planning. However, this practice assumes that past water use is predictive of future water use and incorporates the current economic conditions and current rates of reclaimed water use and water conservation into the future projections. Factors such as conservation, less landscape irrigation with potable water and increases in multifamily housing occupancy can decrease the gross per capita rates. Conversely, expanded tourism and other commercial development, larger irrigated lots, and increases in single family housing can increase the gross per capita rates. Factors affecting gross per capita rates and public supply water demands will be captured during future water supply plan updates. Of note, from 2010 to 2015 in the NFRWSP Area, reclaimed water flow has increased by almost 20 mgd or 15 percent and the beneficial use of reclaimed water has increased by almost 5 mgd or 12 percent. In addition, while public supply population for the NFRWSP Area has increased by 1 percent during the 2010 to 2015 time period, public supply water use has decreased by 5 percent; resulting in a reduction of gross per capita from 138 gpcd to 130 gpcd.

The Districts' total public supply water demand for the NFRWSP area is expected to increase by 58 mgd (29% to approximately 257 mgd) by 2035 (Figure 7). The Districts aggregated the projected water demand for the small public supply systems for each county and summed those values to the total respective county demand for the DSS category, shown below. Public supply represents 38 percent of the 2035 projected water demand in the NFRWSP area. Of note, public supply also represents 50 percent of the total increase in water demand in the NFRWSP area.

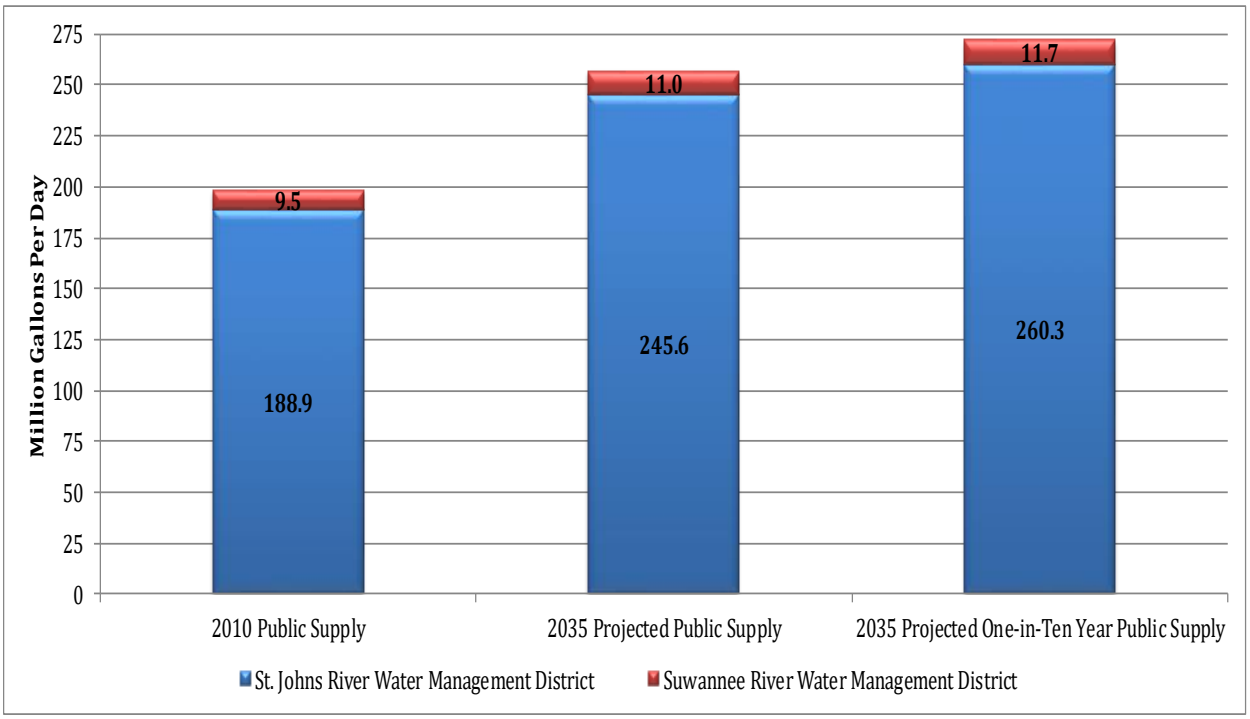

Figure 7: 2010 Public Supply Water Use Estimates and 2035 Water Demand Projections in the NFRWSP

Domestic Self-Supply

The DSS category consists of residential dwellings not served by a public supply or small public supply system (systems less than 0.1 mgd). Historic water use and population, and projected water demand and population for small public supply systems are calculated individually but are combined with the DSS category for reporting purposes at the county level.

Demand

For the NFRWSP, the Districts based the DSS water demand projections on the most recent five-year average residential per capita rate (2010-2014). For DSS, the residential per capita rate (also referred to as household use, both indoor and outdoor) is defined as the water used for solely residential purposes. Gross per capita is not used for this category as it includes more than just residential uses.

The Districts' total combined DSS water demand for the NFRWSP area is expected to increase by 12 mgd (24% to approximately 61 mgd) by 2035 (Figure 8). Of the 2035-combined DSS water demand, DSS wells represent 99 percent of the projected water demand.

The Districts also calculated a 1-in-10 year drought water demand for 2035 (shown in Figure 8). It is estimated that water demand in 2035 could increase by six percent if a 1-in-10 year drought event occurred.

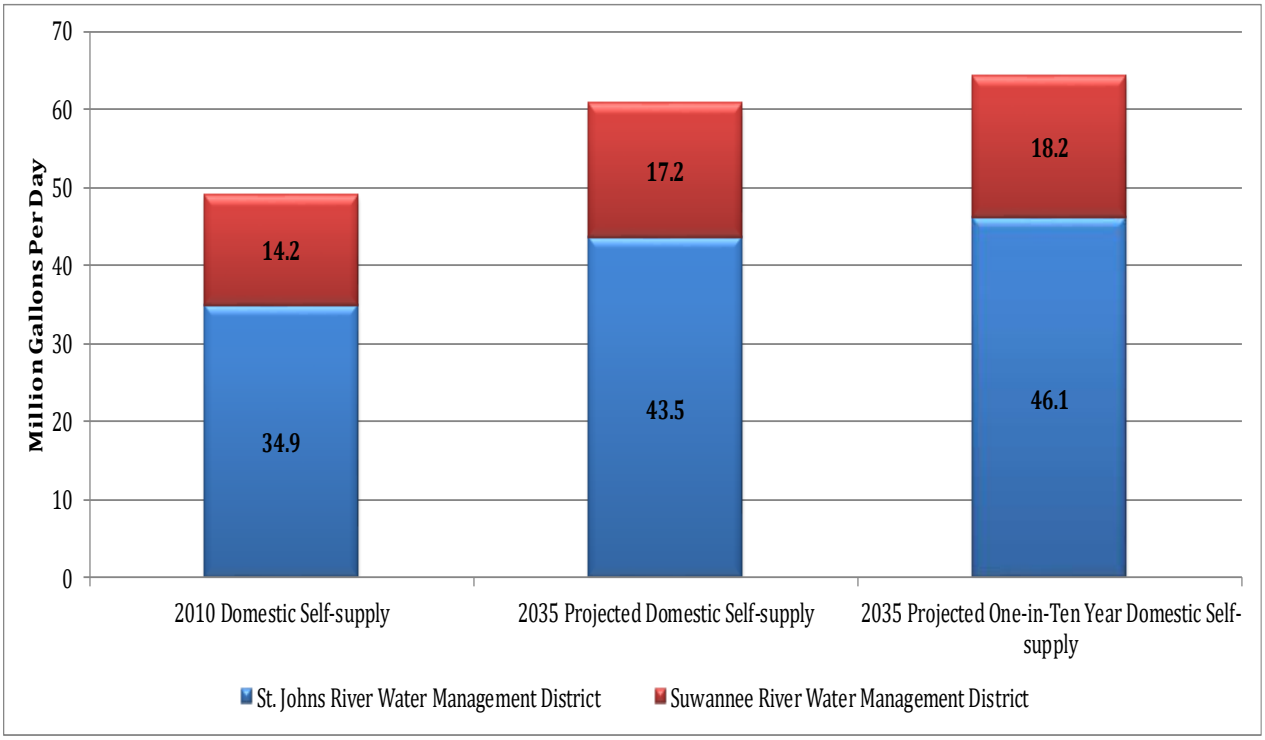

Figure 8: 2010 Domestic Self-supply Water Use Estimates and 2035 Water Demand Projections in the NFRWSP

Agriculture

The agricultural irrigation self-supply category includes the irrigation of crops and other miscellaneous water uses associated with agricultural production. Irrigated acreage and projected water demands were determined for a variety of crop categories, including citrus, vegetables, melons, berries, field crops, greenhouse/nursery, sod, and pasture. In addition, projected water demands associated with other agriculture uses were estimated and reported as miscellaneous type uses, such as aquaculture, dairy/cattle, poultry and swine.

In 2013, legislation was passed that required the Districts to consider agricultural demand projections provided by FDACS (ss. 373.709(2)(a)1b, F.S.) when developing Regional Water Supply Plans (RWSPs). FDACS developed future agricultural acreage and water demand projections in five-year increments for the State of Florida for the years 2015-2035, as well as a water demand for a 2035 1-in-10 drought year and delivered the final draft to the Districts on June 5, 2015 (FDACS, 2015). This product is known as the Florida Statewide Agricultural Irrigation Demand (FSAID) and the June 5, 2015 version is identified as FSAID II.

The Districts used the final draft FSAID II agricultural acreage and water demand projections (FDACS, 2015) for the NFRWSP. Detailed methodology can be found in the June 5, 2015 FSAID II Final Report (FDACS, 2015).

Acreage and Demand

The Districts' total agricultural water demand for the NFRWSP area is expected to increase by 19 mgd (14% to approximately 154 mgd) by 2035 and acreage is expected to increase by 34,000 acres (33% to approximately 138,000 acres) (Figures 9 and 10) by 2035.

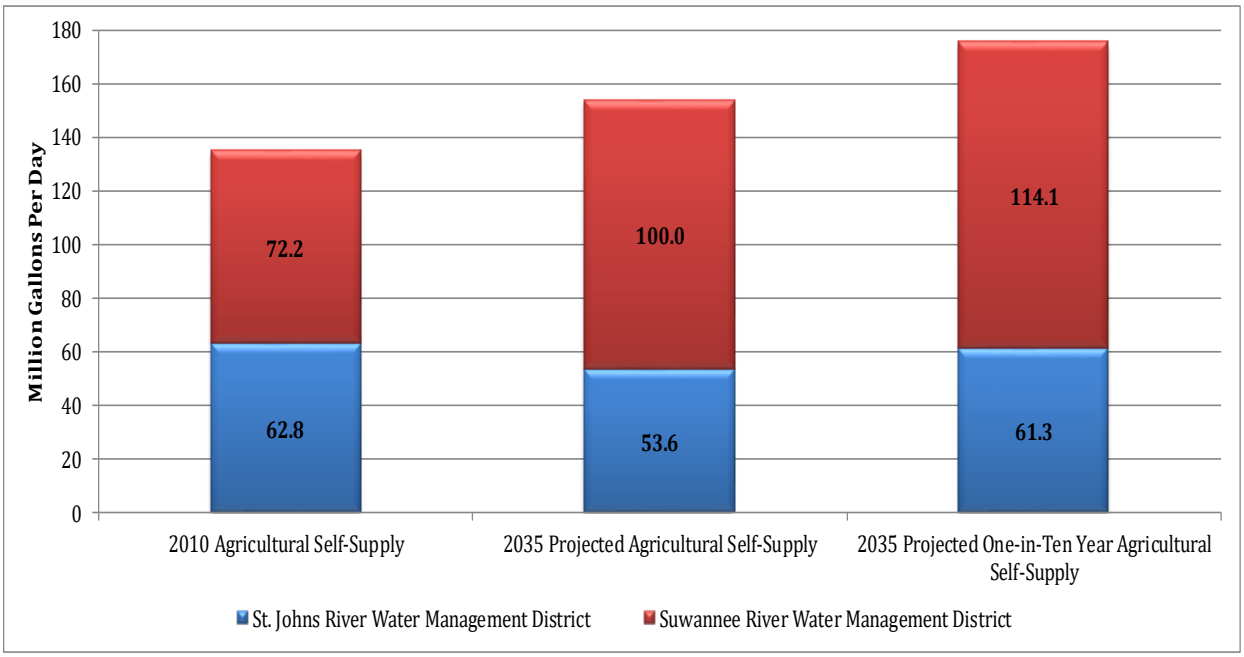

Figure 9: 2010 Agriculture Self-supply Water Use Estimates and 2035 Water Demand Projections in the NFRWSP

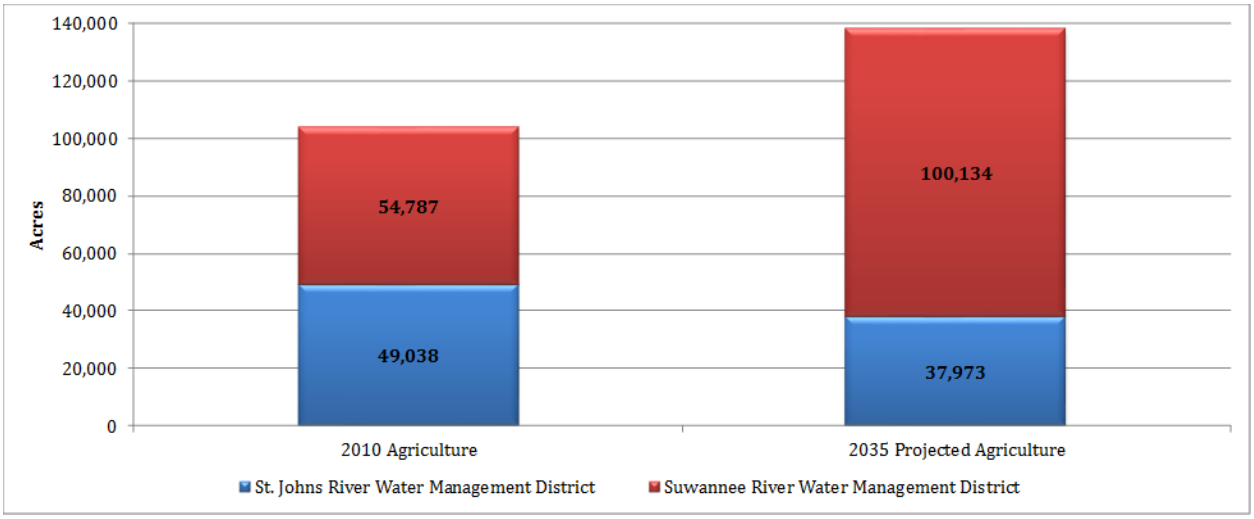

Figure 10: 2010 Agriculture Self-supply Acreage Estimates and 2035 Acreage Projections in the NFRWSP

Commercial/Industrial/Institutional and Mining/Dewatering

The CII category represents water use associated with the production of goods or provisions of services by CII establishments. Commercial uses include general businesses, office complexes, commercial cooling and heating, bottled water, food and beverage processing, restaurants, gas stations, hotels, car washes, laundromats, and water used in zoos, theme parks and other attractions. Industrial uses include manufacturing and chemical processing plants and other industrial facilities, spraying water for dust control, maintenance, cleaning, and washing of structures and mobile equipment and the washing of streets, driveways, sidewalks, and similar areas. Institutional use includes hospitals, group home/assisted living facilities, churches, prisons, schools, universities, military bases, etc. Mining uses include water associated with the extraction, transport and processing of subsurface materials and minerals. Dewatering uses includes the long-term removal of water to control surface or groundwater levels during construction or excavation activities.

Demand

Water demand for the CII/MD categories was projected at the county level using a respective CII/MD historic average gpcd. Commercial/Industrial/Institutional and Mining/Dewatering historic water use and projected water demand consists of only consumptive uses; recycled surface water or non-consumptive uses were removed. For the NFRWSP, the Districts use the loss of water in the mining operations due to evaporation and water removed in the product in calculating demand. The amount of water lost is represented by 5 percent of the total surface water withdrawals of the mine operation. The remaining surface water was assumed to be recirculated in the mining process and, therefore, is considered nonconsumptive. For further clarification, the Districts define consumptive use 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 (Smith, 2015) for each five-year increment and the associated water demand was added to the base year, 2010 water use. Water demands for large commercial and industrial facilities (e.g., pulp and paper mills) that are not impacted by population growth were held constant.

The Districts' total combined CII/MD water demand for the NFRWSP area is expected to increase by 11 mgd (9% to approximately 132 mgd) by 2035 (Figure 11). The Districts determined that drought events (1-in-10 year) do not have significant impacts on water use in the CII/MD category. Water use for these categories are related primarily to processing and production needs.

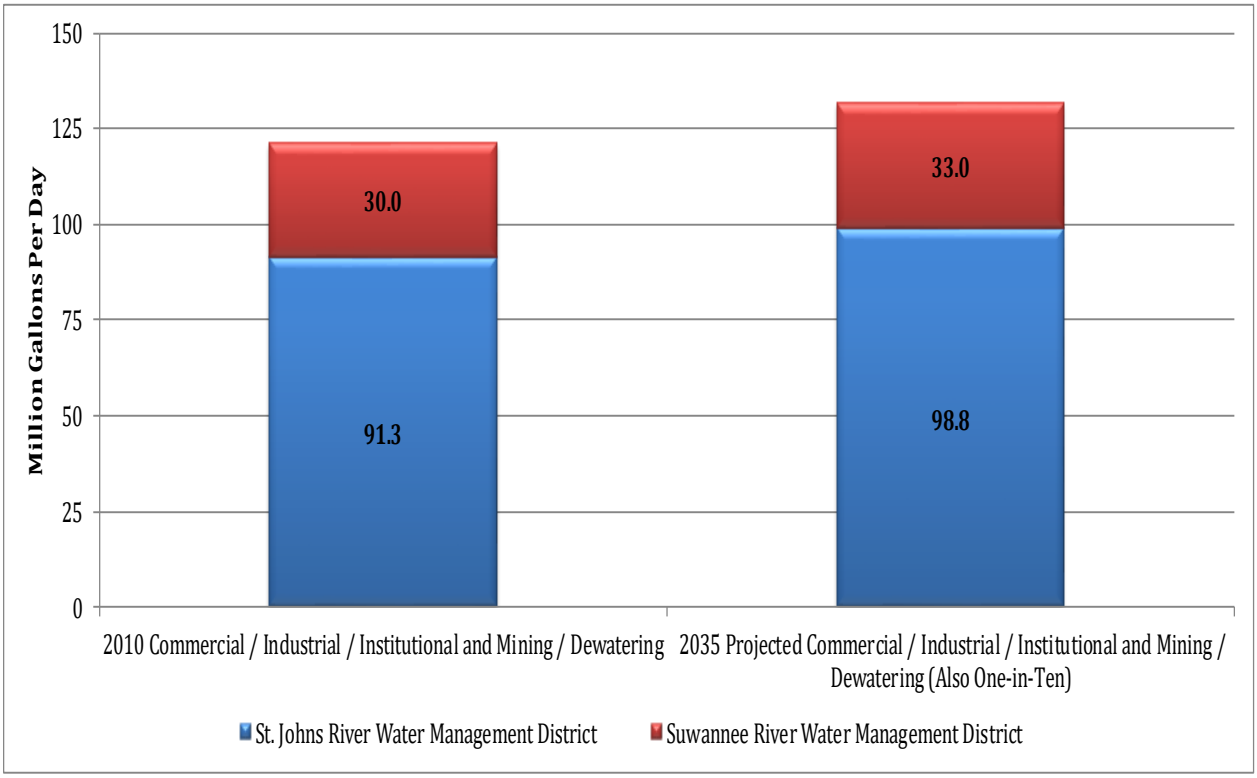

Figure 11: 2010 Commercial/Industrial/Institutional and Mining/Dewatering Self-supply Water Use Estimates and 2035 Water Demand Projections in the NFRWSP

Landscape/Recreation/Aesthetic

The LRA category represents water use associated with the irrigation, maintenance, and operation of golf courses, cemeteries, parks, medians, attractions and other large self-supplied green areas. Landscape use includes the outside watering of plants, shrubs, lawns, ground cover, trees and other flora in such diverse locations as the common areas of residential developments and industrial buildings, parks, recreational areas, cemeteries, public right-of-ways and medians. Recreational use includes the irrigation of recreational areas such as golf courses, soccer, baseball and football fields and playgrounds. Water-based recreation use is also included in this category, which includes public or private swimming and wading pools and other water-oriented

recreation such as water slides. Aesthetic use includes fountains, waterfalls and landscape lakes and ponds where such uses are ornamental and decorative.

Acreage and Demand

Water demand for the LRA category was projected at the county level using a respective LRA historic average gpcd. The average LRA gpcd was applied to the additional population projected by BEBR (Smith, 2015) for each five-year increment and the associated water demand was added to the 2010 base-year water use. Future acreage estimates were interpolated from 2010 acreage and 2010 water use ratios.

The Districts' total LRA water demand for the NFRWSP area is expected to increase by 9 mgd (44% to approximately 31 mgd) by 2035 (Figure 12).

The Districts determined that historic data and net irrigation ratios are acceptable when calculating the 1-in-10 year LRA water demand projection. In addition, agricultural irrigation models have supplemental irrigation values for LRA that can also be used. A 1-in-10 year drought factor was developed for each county, using the highest year water use from 2006-2014 and the percent increase from the average 2006-2014 LRA water use. For example, if water use in 2007 was 5 percent higher than the 2006-2014 average, 5 percent was applied to the average 2035 water demand to project a 2035 1-in-10 year water demand.

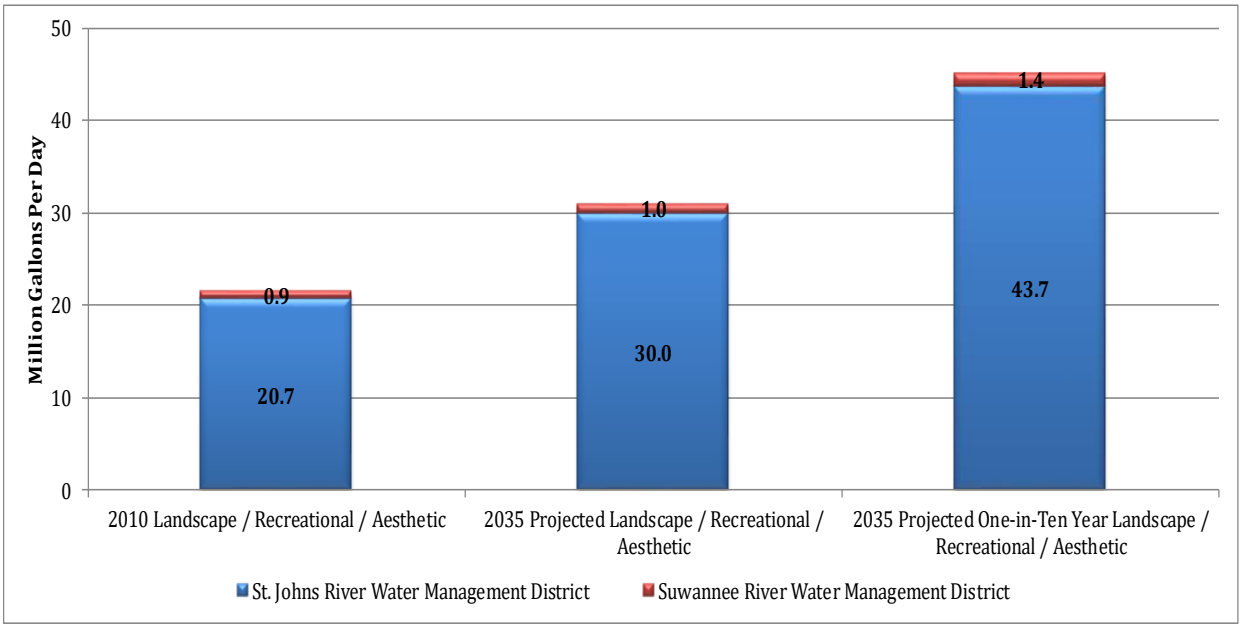

Figure 12: 2010 Landscape/Recreational/Aesthetic Self-supply Water Use Estimates and 2035 Water Demand Projections in the NFRWSP

Power Generation

The PG category represents the water use associated with power plant and power generation facilities. PG water use includes the consumptive use of water for steam generation, cooling and replenishment of cooling reservoirs.

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 or non-consumptive uses were removed. For this NFRWSP, surface water use by PG facilities represents 2 percent of total surface water withdrawals, to account for the loss of water due to evaporation. An example of this nonconsumptive use is surface water used for once-through cooling for power plants, which is recycled.

The Florida Public Service Commission (PSC) requires that each PG entity produce detailed ten-year site plans for each of its facilities. These plans include planned facilities and generating capacity expansion, as well as decommission of facilities and reductions associated with more efficient processes. The 2015 ten-year site plans for each PG facility within the NFRWSP counties were downloaded from the PSC website (http://www.psc.state.fl.us/utilities/electricgas/10yrsiteplans.aspx) and were used in developing the PG water demand projections.

For each PG facility with a planned capacity expansion, PG consumptive use capacity projections were interpolated between the existing capacity and the planned capacity, as detailed in the ten-year site plans. The projection of PG consumptive water demand beyond the planned expansion in the ten-year site plans was calculated for each facility using a linear extrapolation of the existing and planned expansion dates and data and BEBR medium population projection rates (Smith, 2015). In addition, the average daily gallon per megawatt use was estimated for 2010-2014 and used as a proxy to project future water demand beyond the ten-year site plans and when projected water demand (for the ten-year site plan period) was not included.

The Districts' total PG water demand for the NFRWSP area is expected to increase by 8 mgd (33% to approximately 34 mgd) by 2035 (Figure 13).

The Districts determined that drought events do not have significant impacts on water use in PG category. Water use for these categories are related primarily to processing and production needs.

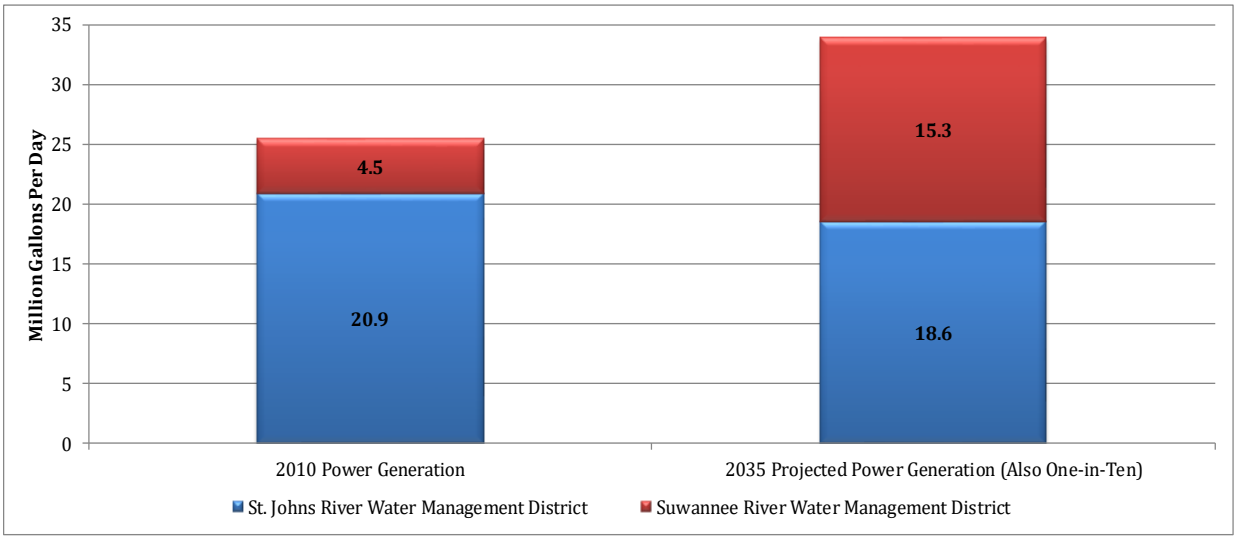

Figure 13: 2010 Power Generation Self-supply Water Use Estimates and 2035 Water Demand Projections in the NFRWSP

Reclaimed Water Projections

Projections were made for domestic wastewater treatment facilities (WWTF) with 2010 permitted wastewater treatment capacities equal to or greater than 0.1 mgd. Detailed methodology for reclaimed water projections can be found in Appendix B.

Existing Flows

The Districts considered existing 2010 reclaimed water flows for future use that were not considered to be used beneficially. The Districts consider beneficial reuse to be only those uses in which reclaimed water takes the place of a pre-existing or potential use of higher quality water for which reclaimed water is suitable, such as water used for landscape irrigation. Delivery of reclaimed water to sprayfields, absorption fields and rapid infiltration basins are not considered beneficial reuse, unless located in recharge areas.

The FDEP has a statewide reuse utilization goal of 75 percent (FDEP, 2003). The difference between the 2010 WWTF flow at 75 percent utilization and 2010 beneficial reuse was considered the potential existing additional reclaimed water that could be used for reuse. This method ensured existing flows would not exceed the 75 percent utilization goal. It is recognized that each WWTF is unique and items such as system upgrades and treatment, additional storage, system expansion, customer availability, etc., have to be taken into consideration.

Figure 14, below, reflects the most recent (2015) reclaimed water flows, both beneficial and disposal. The size of the pie charts represents the total flow. The yellow represents disposal and purple represents beneficial use of reclaimed water. Numbers in the

graphic are related to Table B-18 in Appendix B. Arrows in the graphic show the location of the WWTF.

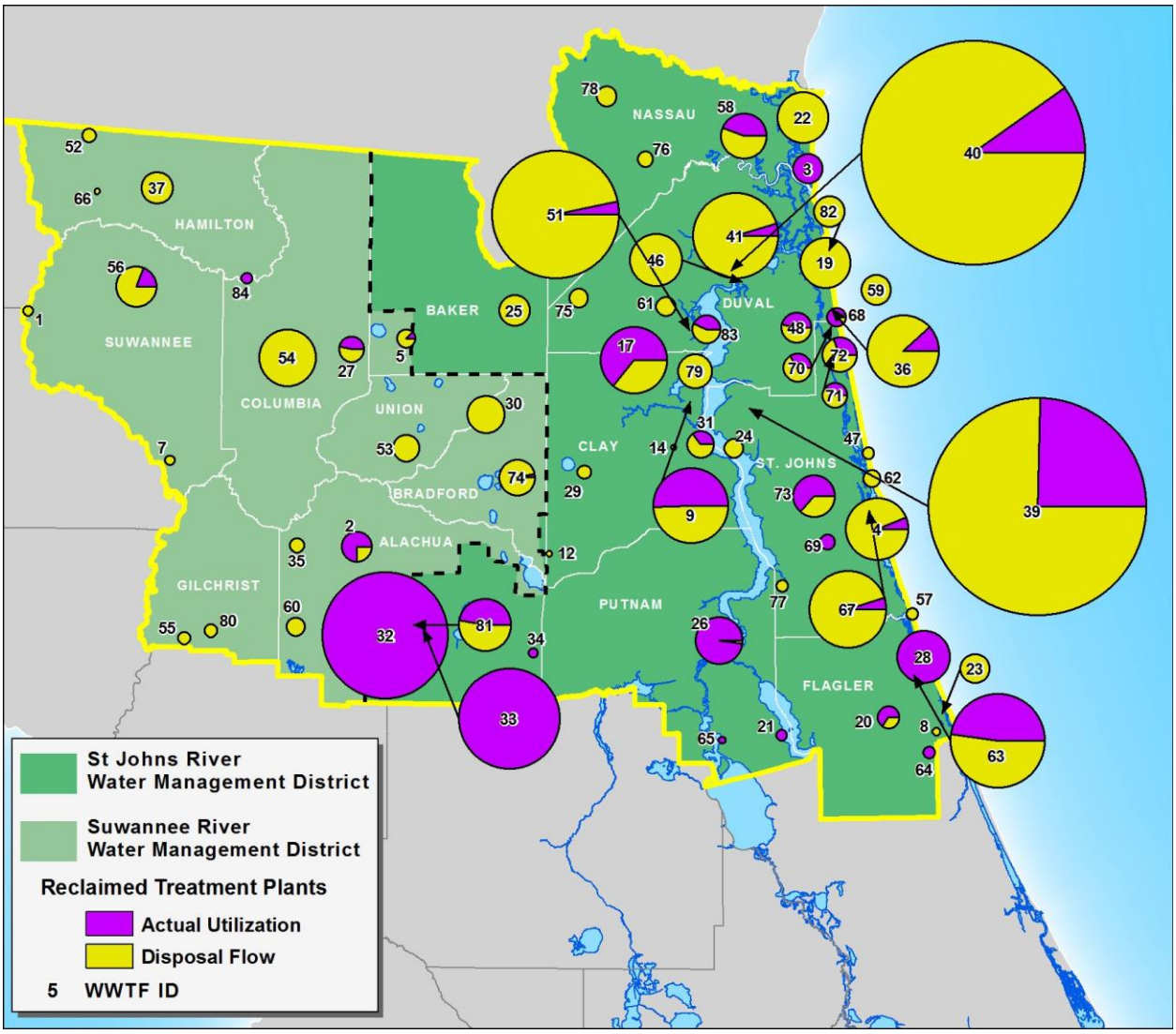

Figure 14: Summary of 2015 Reclaimed Water Flows in the NFRWSP

Future Flows

The Districts identified WWTFs that could potentially receive additional sewered flow as a result of population growth. It was assumed that 95 percent of the population increase identified will receive sewer service and thereby return wastewater for treatment. It is acknowledged that the percentage of sewered population growth and resulting wastewater flows will vary for individual service providers due to a number of factors.

It was further assumed that the increased sewered population will generate approximately 84 gpcd of wastewater to the local WWTF (sources are identified in

Appendix B). The estimated future flow was then multiplied by the FDEP utilization goal of 75 percent (FDEP, 2003) to generate a 2035 quantity of potential new additional reclaimed water available for reuse.

The Districts recognize that only a portion of the existing and future wastewater treated for reuse is actually utilized to offset 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, but can range from 50 percent to as much as 100 percent, depending on the type of use being replaced. The projected wastewater flows do not represent an amount equal to the demand reduction due to system losses, inefficiencies of its reuse customers and timing of availability relative to demand.

Reclaimed water systems are unique to each utility and the potential WWTF flow estimated for this NFRWSP may not necessarily represent the reclaimed water that could be used in projects. Current treatment processes, WWTF capacities, storage, and infrastructure have to be considered, which could potentially have a financial impact associated with utilization of additional or currently available reclaimed water. Likewise, the Districts realize that future and existing utilization may be higher than estimated if the WWTF provided reclaimed water for reuse to more efficient customers.

For the purposes of this NFRWSP, the Districts also created a future reclaimed water scenario using the 2010 percent beneficial reuse utilization for existing and future flows; which would assume that no changes to current treatment processes are made (e.g., WWTF upgrade). In addition, the Districts recognize potential future wastewater flow could be less if additional residential indoor water conservation is achieved. For example, the American Water Works Association has noted on their website (Drinktap.org) that if all residences installed more efficient water fixtures and regularly checked for leaks, daily indoor water use and associated wastewater flows could potentially be reduced to 45.2 gpcd (Vickers, 2001).

The Districts estimated that increased future reclaimed water flows between 27 mgd and 103 mgd, as described above, could be used for beneficial purposes, potentially offsetting withdrawals from traditional water sources and predicted impacts within the NFRWSP area.

Water Conservation and Irrigation Efficiency

Current water demand projections and the water conservation potential for the NFRWSP area were calculated in an effort to gauge the future impact of water conservation. It is important to note that reductions in water use resulting from current and historical water conservation efforts are reflected in the 2035 water demand projections that were calculated for this plan. Current water demand projections are lower than projections that were previously developed for this NFRWSP area, in part, because of the effects of existing water conservation.

For this NFRWSP, the Districts created two scenarios of potential water conservation for the public supply and DSS categories. Irrigation efficiency estimates for agriculture can be found in the FSAID II Final Report (FDACS, 2015). For the remaining water use categories, the Districts employed the methodology developed during the Central Florida Water Initiative (CFWI) RWSP process (CFWI, 2015).

For the first scenario for the public supply and DSS categories, as well as all other categories excluding agriculture, the Conserve Florida Water Clearinghouse conservation planning tool, the EZ Guide (Switt, 2011), was used to calculate water savings for specific best management practices (BMPs) and to summarize estimates of indoor residential, outdoor residential and publicly supplied CII water use. Using the EZ Guide analysis output and separate estimates of agricultural irrigation efficiency, it is estimated that approximately 41 mgd of the projected demand for 2035 can be eliminated by water conservation. Estimates of water conservation potential for DSS, CII, LRA and PG were based on various segments of the EZ Guide outputs for public supply.

For the second scenario for the public supply and DSS categories, the Districts analyzed the average 2010-2014 gross per capita rate for the entire NFRWSP area. If all public supply systems and DSS residents achieved the average 2010-2014 gross per capita rate for the NFRWSP area, water conservation could be increased by 13 mgd, potentially offsetting future demand.

Table 1: 2035 Water Conservation and Irrigation Efficiency Potential (in million gallons per day)

Category	2035 Low Conservation Potential	2035 High Conservation Potential
Public Supply	11	21
Domestic Self-supply	2	5
Agriculture	25	25
Landscape/Recreation/Aesthetic Self-supply	1	1
Commercial/Industrial/Institutional Self-supply	2	2
Power Generation Self-supply	0	0
Total	**41**	**54**

Chapter 4: Assessment of Groundwater Conditions Associated with Future Water Demand Projections (NFSEG Modeling Simulations)

Purpose

The North Florida-Southeast Georgia regional groundwater flow model (NFSEG) is a tool developed as a requirement of the Partnership. In order to develop consistency in planning and permitting decisions, the Districts agreed to develop a joint regional groundwater flow model. The Districts agreed that the use of one model would enhance efficiency and effectiveness for the NFRWSP process. Technical experts from the Districts and other key stakeholders worked collaboratively to develop the next generation regional-scale groundwater flow model for north Florida. The technical team's mandate was to ensure appropriate science is applied to the modeling and data analysis to support decision-making, and that the work completed is defensible, understood by the team, and collaboratively developed, as described in the Partnership's charter, available at northfloridawater.com.

NFSEG Overview

The NFSEG is a porous-equivalent, three-dimensional, steady-state, groundwater flow model covering approximately 60,000 square miles (Figure 15). The model is vertically discretized into seven layers representing, from top to bottom: (1) the surficial aquifer system, (2) the intermediate confining unit/aquifer system, where present; (3) the Upper Floridan aquifer (UFA); (4) the middle semi-confining unit, where present; (5) the Lower Floridan aquifer (LFA) where present; (6) the lower semi-confining unit; and (7) the Fernandina permeable zone of the LFA, where present. The model is horizontally discretized into uniform grid cells measuring 2,500 feet by 2,500 feet. Calibration of the NFSEG was based on hydrologic conditions occurring during calendar years 2001 and 2009 (Draft, SJRWMD 2016).

Prior to development of the NFSEG, the groundwater models of the Floridan Aquifer System (FAS) in north Florida and southeast Georgia used by staff focused on specific geographic regions relative to each WMD. The primary design objective of the NFSEG model was to develop a tool capable of making assessments that span WMD and state boundaries at required levels of accuracy and reliability. To this end, a considerable effort has been expended in the development and compilation of required data sets, in the model calibration, and in collaboration between affected WMDs and other stakeholders.

The following, which comes from USGS Scientific Investigations Report 2016-5116 (Kuniansky, 2016), is a general statement regarding modeling of the Floridan Aquifer System using porous-equivalent media models.

> The USGS, multiple State water management districts, and other agencies and consultants have frequently used porous-equivalent media models for water-

management problems to simulate the Biscayne aquifer and the FAS in Florida. The Biscayne aquifer and FAS are composed of karstified carbonate rocks that can be characterized as dual porosity continua. As of 2015, more than 30 models developed by the USGS have used a single-continuum porous-equivalent (SCPE) model approach to meet necessary calibration criteria for the study objectives. Many of the water management districts in Florida use a SCPE model approach for groundwater management and resource evaluation. Most of these SCPE models are applied to water-supply studies and are regional or subregional in scale and water budgets are desired; this is an appropriate application of such models.

NFSEG version 1.0 meets the requirements to be used in water supply planning in the NFSEG domain. Version 1.0 of the model will not be utilized in regulatory evaluations or in the establishment of MFLs. However, the model may be used to determine the status of MFLs. NFSEG version 1.0 does not meet the requirements outlined in Rule 62-42.300(1)(e), Florida Administrative Code (F.A.C.), requiring the re-evaluation of the established Lower Santa Fe and Ichetucknee Rivers and associated priority springs (LSFI) MFLs that will occur prior to the end of 2019. It is anticipated that a future peer reviewed version of the model will be used in planning, regulatory and MFLs programs.

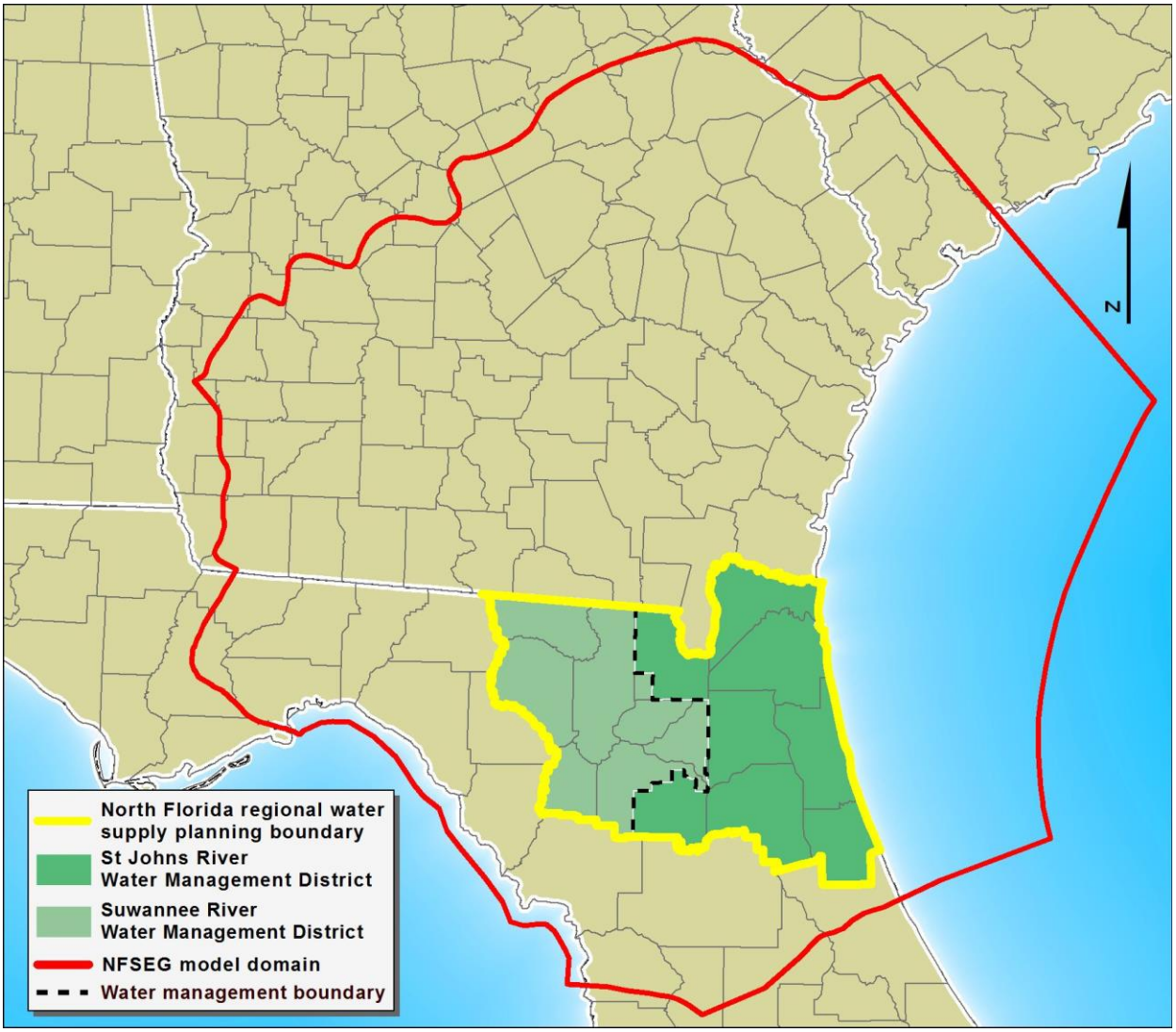

Figure 15: NFSEG Domain

Methodology

The Districts completed a water resource assessment using the NFSEG version 1.0 to estimate the potential impacts through the planning horizon. The assessments addressed the potential impacts of groundwater withdrawals with respect to wetlands, adopted MFLs including OFS and non-MFLs priority water bodies in the NFRWSP boundary and throughout the extent of the NFSEG domain.

Six modeling scenarios and four comparisons, listed below, were performed as part of the NFRWSP resource assessment and water resource development projects benefit. The pumps off simulation does not represent a historic or predevelopment condition. It was utilized as a reference condition for comparison with the 2035 projected water demands to estimate potential impacts to natural systems. It is an approximation of a no groundwater pumping condition.

Scenarios

- Scenario 1: 2009 estimated water use - calibrated baseline condition
- Scenario 2: 2035 projected water demand in the NFRWSP area only with pumping held at 2009 estimated water use outside NFRWSP area
- Scenario 3: Scenario 2 with water resource development projects included
- Scenario 4: Pumps off within the entire NFSEG domain
- Scenario 5: 2035 projected water demand within the entire NFSEG domain
- Scenario 6: Scenario 5 with water resource development projects included

Comparisons

Comparisons 1 and 2 were performed for the purpose of assessing impacts due to projected increases in groundwater withdrawals within the NFRWSP area.
Results of these comparisons are described in Chapter 5.

- Comparison 1: MFLs lakes, wetlands and the LSFI including OFS (Scenario 2 minus Scenario 1)
- Comparison 2: Upper Santa Fe River and non-MFLs priority water bodies (Scenario 2 minus Scenario 4)

Comparisons 3 and 4, listed below, were performed for the purpose of assessing the impacts of projected increases in groundwater withdrawals throughout the NFSEG domain.
Results of this comparison are shown in Appendices C, F, H, and I.

- Comparison 3: MFLs lakes, wetlands and the LSFI (Scenario 5 minus Scenario 1)
- Comparison 4: Upper Santa Fe River and non-MFLs priority water bodies (Scenario 5 minus Scenario 4)

Chapter 5: Evaluation of Potential Effects of Projected Water Demand on Water Resources (Water Resource Assessment)

Purpose

The purpose of the NFRWSP water resource assessment is to evaluate the extent to which water resources and related natural systems may be impacted by projected increases in groundwater use within the NFRWSP area through 2035. Assessment components evaluated include groundwater quality, MFLs, non-MFLs priority waterbodies, wetlands, and water reservations. It should not be inferred from the results that these impacts would happen in the future. Actually, just the opposite is expected as the results from the evaluation were used to identify water resource development, water supply development and water conservation project options that can be implemented in order to avoid the impacts and delineate water resource caution areas (WRCA) within the NFRWSP area.

Water Resource Assessment Methods and Results

Groundwater Quality (Saline Water Intrusion)

An evaluation was conducted to assess the potential for saline water intrusion within the NFRWSP area resulting from withdrawals of groundwater. The purpose of this evaluation was to identify wells within the NFRWSP area where potential degradation of groundwater quality from saline water intrusion will constrain the availability of fresh groundwater. Saline water intrusion can affect productivity of existing infrastructure, resulting in increased treatment and infrastructure costs. Although saline water intrusion poses a challenge for all affected water users, the issue is particularly acute for small public supply systems and self-supply water users that may have fewer options for infrastructure modifications.

The Florida Safe Drinking Water Act (s. 403.850 - 403.864, F.S.) directs the FDEP to develop rules that reflect national drinking water standards. Chapter 62-550, F.A.C., lists quality standards for finished drinking water that include concentration limits for chloride (250 mg/L) and TDS (500 mg/L), both Secondary Drinking Water Standards (SDWS). Increasing trends in chloride and TDS concentrations can be indicators of saline water intrusion and, once concentrations exceed the SDWS, groundwater is no longer considered fresh.

The groundwater quality evaluation consisted of a statistical analysis of observed monitoring data through 2014. The Districts evaluated groundwater quality data from 406 monitored production wells located in the SJRWMD along with 23 monitoring wells in the SRWMD. Collectively, these 429 wells (Figure 16) provide information on groundwater quality in the Surficial Aquifer System (SAS) and FAS. Trends in chloride and TDS concentrations were quantified and interpreted using nonparametric statistical methods with statistically significant trends identified at a 95% significance level. For those wells exhibiting statistically significant increasing trends in chloride

and TDS concentration, the Districts calculated the year in which the SDWS would be exceeded if current trends continue. The results identified locations where saline water intrusion may constrain groundwater availability within the 20-year planning horizon.

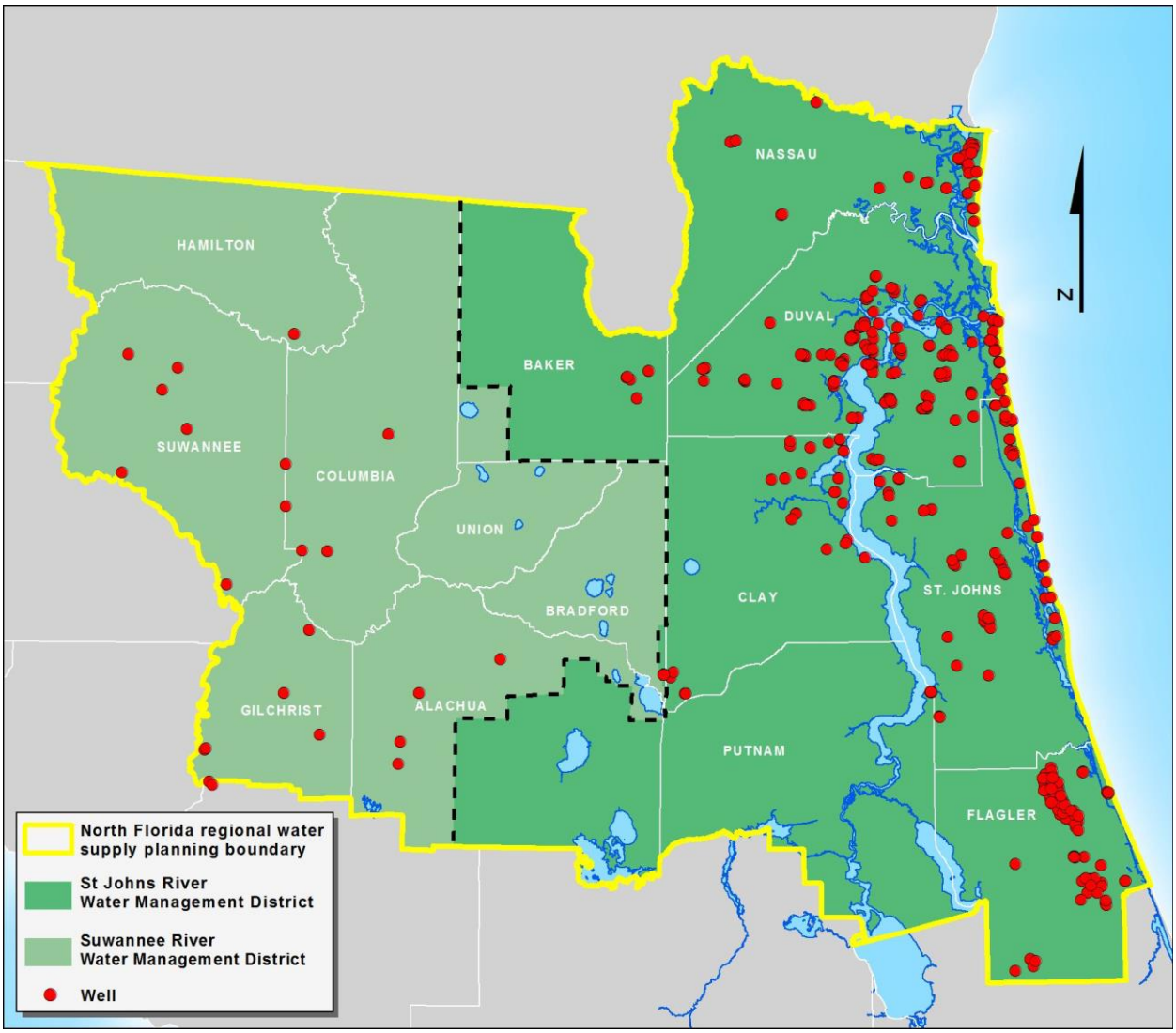

Figure 16: Wells Included in the NFRWSP Groundwater Quality Analysis

Thirty-three wells showed increasing chloride concentrations at rates ≥ 3 milligrams per liter per year (mg/L/yr) (high rate of change, Table 2), and 35 wells showed increasing chloride concentrations at rates within the range ≥ 1 and < 3 mg/L/yr (medium rate of change, Table 2). These 68 wells with high and medium rates of chloride change occurred within four counties in the SJRWMD portion of the NFRWSP area and were generally clustered along the St. Johns River and the Atlantic coastline. Sixty-five of these were FAS wells and three were SAS wells. Of these wells, 75%, or 51, were projected to still meet the chloride SDWS in 2035. For the remaining 25% (17 wells), groundwater quality could present a constraint on groundwater availability due to a current or projected exceedance of the SDWS (Figure 17). Statistically significant

increasing trends of TDS were consistent with the results of the chloride trend analysis. The SDWS for TDS (500 mg/L) was projected to be exceeded at 24 wells by 2035 (see Appendix D for additional information).

Saline water intrusion appears to be localized due to upconing in response to withdrawals of groundwater from a single well and/or combined withdrawals from a wellfield. When viewed in total, the primary conclusion of this analysis is that groundwater quality may constrain the availability of fresh groundwater in a relatively limited area within Duval, Flagler, Nassau and St. Johns counties. However, these concerns can be managed through appropriate well construction, wellfield management or development of AWS.

Additional detailed information about individual wells, including detailed geochemistry analyses, is provided in Appendix D.

Table 2: Summary of NFRWSP Groundwater Quality Analysis – Chloride Trends

Chloride Trend Category	**Number of Wells that Currently Exceed 250 mg/L**		**Number of Additional Wells Projected to Exceed 250 mg/L by 2035**	
	# of wells	Location	# of wells	Location
High Rate of Change (33 wells)	5	St. Johns County	11	Duval, Flagler, Nassau and St. Johns counties
Medium Rate of Change (35 wells)	0	---	1	Duval County

Note: mg/L = milligrams per liter

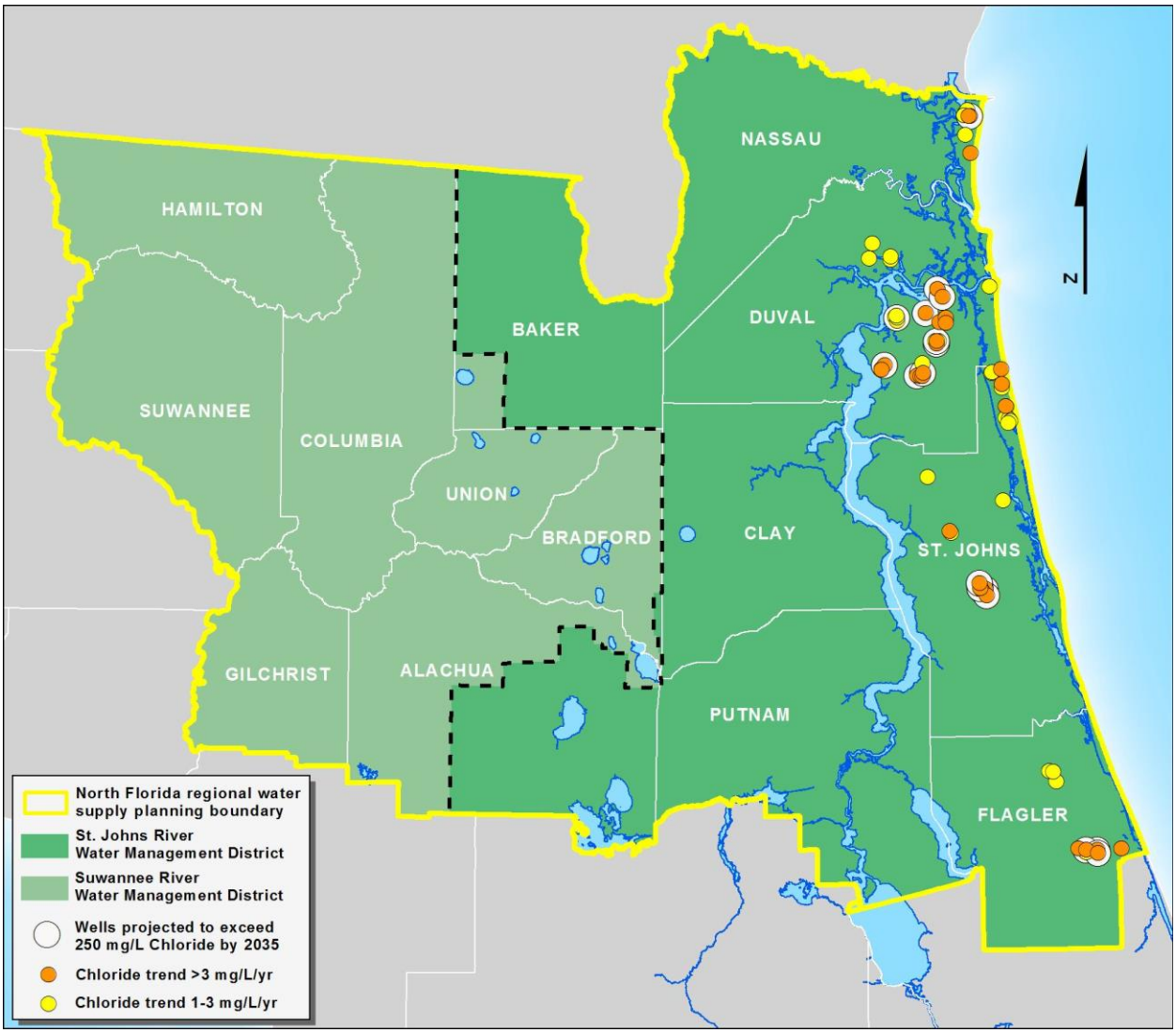

Figure 17: Wells with Increasing Trends in Chloride Concentration

Minimum Flows and Minimum Water Levels

Section 373.042, F.S., directs FDEP or the Districts to establish MFLs for lakes, rivers, springs, wetlands, and aquifers. Minimum flows and minimum water levels represent the flow(s) and/or level(s) at which further withdrawals would be significantly harmful to the water resources or ecology of the area. As such, MFLs provide quantitative metrics for water resource assessments and criteria for evaluating CUP/WUP applications. If analyses determine that a waterbody is not currently meeting its MFLs or is projected to fall below its MFLs during a 20-year planning horizon, that waterbody is said to be in recovery or prevention, respectively, with regards to its MFLs. In both cases, the Districts are required to formulate a strategy to ensure achievement of the MFLs throughout the planning horizon.

Each District is required to submit to FDEP an annual priority list and schedule for the establishment of MFLs. The priority list is based on the importance of waters to the state or region and the existence of, or potential for, significant harm to the water resources or ecology of the region. Appendix E includes a summary of the most recent priority lists for the Districts.

Information on all the adopted MFLs within the Districts can be found in chapters 40B-8, 40C-8 and Rule 62-42.300, F.A.C. Within the NFRWSP area, SJRWMD assessed the status of 19 lakes with MFLs and the SRWMD assessed the status of 19 MFLs for three rivers and 16 springs (see Appendix F for additional details).

Lakes with Minimum Flows and Minimum Water Levels

In order to determine whether the SJRWMD-adopted lake MFLs will be achieved through the 20-year planning horizon, the compliance status of the most constraining MFLs for each evaluated lake was determined using NFSEG-derived aquifer drawdown beneath the waterbody under existing and 2035 simulated withdrawal conditions within the NFRWSP area. Lake-specific surface water models were used to quantify the relationship between the change in aquifer level and water level within the lake. Projected aquifer levels were then compared to the aquifer levels needed to achieve the most constraining MFLs. Results of the analysis of the lake MFLs indicate that projected aquifer levels beneath the evaluated lakes were in excess of the levels needed to achieve the MFLs at 2035 conditions within the NFRWSP area (Table 3).

Analyses indicate that the adopted MFLs for lakes Brooklyn (Clay County), Cowpen (Putnam County) and Geneva (Clay County) are not met under existing conditions. However, MFLs for these waterbodies were developed and adopted in the 1990s using methods that current science indicates are not applicable to sandhill lakes with extremely high ranges of stage fluctuation. As such, re-evaluation of these MFLs is in progress so that the revised MFLs reflect current methods and the best available science. The Lake Cowpen Notice of Proposed Rule was approved for publication in December 2016; Lakes Brooklyn and Geneva are scheduled for 2017.

Rivers and Springs with Minimum Flows and Minimum Water levels

The Lower Santa Fe and Ichetucknee Rivers and associated priority springs are in recovery (Rule 62-42.300, F.A.C.). The flow deficit is estimated at 17 cubic feet per second (cfs) for the Lower Santa Fe River near Ft. White and 3 cfs for the Ichetucknee River at Highway 27 (SRWMD, 2014) under 2010 conditions. The impact of additional demand projections in the NFRWSP area through the 20-year planning horizon (2035) was evaluated using Comparison 1 (see Chapter 4). The additional predicted decrease in discharge was then added to the 2010 flow deficit. This planning evaluation is separate from the re-evaluation of the established MFLs that will occur prior to the end of 2019 (Rule 62-42.300(1)(e), F.A.C.). If all projected water demands are met using fresh groundwater, modeling results

predict that an additional 21 cfs of flow reduction in the Lower Santa Fe River and 13 cfs in the Ichetucknee River will result from 2035 pumping conditions in the NFRWSP area. Therefore, the estimated total amount of recovery needed to achieve the Lower Santa Fe and Ichetucknee River MFLs at 2035 conditions is 38 cfs (17 cfs at 2010 and an additional 21 cfs by 2035) and 16 cfs (3 cfs at 2010 and an additional 13 cfs by 2035), respectively.

The Upper Santa Fe River MFLs were established in 2007 (Rule 40B-8.061, F.A.C., Minimum Surface Water Levels and Flows for the Santa Fe River). The predicted reductions in flow between the reference condition and the 20-year planning horizon (2035) at both MFLs reaches of the Upper Santa Fe River were evaluated using NFSEG scenario Comparison 2. These flow reductions were then compared to the available water as determined by the MFLs to determine whether the MFLs were achieved. The analysis indicates that the Upper Santa Fe River MFLs will be met at the 2035 planning horizon based on projected increase in demand within the NFRWSP area (Table 3).

Additional information regarding the MFLs analysis, including the impact of NFSEG domain-wide increases in pumping through 2035 (Scenario 5), is included in Appendix F.

Table 3: Status of Assessed MFLs within the NFRWSP Area

Type	Name	County/Basin	WMD	MFLs Status at 2035[1]
Lake	Banana	Putnam	SJR	Met
Lake	Bell	Putnam	SJR	Met
Lake	Brooklyn	Clay	SJR	Under Re-Evaluation
Lake	Broward	Putnam	SJR	Met
Lake	Como	Putnam	SJR	Met
Lake	Cowpen	Putnam	SJR	Under Re-Evaluation
Lake	Dream Pond	Putnam	SJR	Met
Lake	Geneva	Clay	SJR	Under Re-Evaluation
Lake	Georges	Putnam	SJR	Met
Lake	Gore	Flagler	SJR	Met
Lake	Grandin	Putnam	SJR	Met
Lake	Little Como	Putnam	SJR	Met
Lake	Orio	Putnam	SJR	Met
Lake	Silver	Putnam	SJR	Met

Table 3: Status of Assessed MFLs within the NFRWSP Area

Type	Name	County/Basin	WMD	MFLs Status at 2035[1]
Lake	Stella	Putnam	SJR	Met
Lake	Swan	Putnam	SJR	Met
Lake	Tarhoe	Putnam	SJR	Met
Lake	Trone	Putnam	SJR	Met
Lake	Tuscawilla	Alachua	SJR	Met
River	Upper Santa Fe	Santa Fe	SR	Met
River/Spring System	Ichetucknee River and Priority Springs (5)	Santa Fe	SR	Recovery
River/Spring System	Lower Santa Fe River and Priority Springs (11)	Santa Fe	SR	Recovery

[1] Refers to 2035 conditions within the NFRWSP area with the remainder of the NFSEG domain held at 2009 conditions

Minimum Flows and Minimum Water Levels Prevention and Recovery Strategies

Regional Water Supply Plans shall include prevention and recovery strategies which have been developed and approved pursuant to ss. 373.042(2), F.S. The Lower Santa Fe River Basin (LSFRB) Recovery Strategy, which addresses MFLs for the LSFI, was accepted by the SRWMD Governing Board on March 11, 2014 and is included in Appendix G. Rule 62-42.300, F.A.C., proposed by FDEP on March 7, 2014, and subsequently ratified by the Legislature, in part, mirrors the regulatory components of the LSFRB Recovery Strategy, which apply to areas within both Districts, pursuant to ss. 373.042(4), F.S., and Rule 62-42.300(1)(e), F.A.C. The rule requires that FDEP and the Districts re-evaluate the minimum flows and minimum water levels, present status of the LSFI MFLs, and re-propose for adoption the LSFI MFLs and any associated recovery or prevention strategies "[n]o later than three years from the publication of the final peer review report on the North Florida Southeast Georgia Regional Groundwater Flow Model, or by December 31, 2019, whichever is earlier."

Recovery Strategy for the Lower Santa Fe River Basin

Since the formation of the Partnership, MFLs were set on the LSFI. A status assessment at the time of MFLs adoption determined these resources to be in recovery. Based on the potential for cross-boundary withdrawals to impact flow in the river basin, the MFLs and associated LSFRB Recovery Strategy (Appendix G) were adopted by FDEP with input from the Districts. The LSFRB Recovery Strategy was broken into two phases. Phase I included implementation of preliminary recovery strategy regulatory

measures, development of the NFSEG, identification of water resource development and water supply development projects to contribute to resource recovery, and development of the NFRWSP. Phase II focuses on implementation of long-term regulatory measures to address regional water supply goals and will re-evaluate the magnitude of recovery needed to achieve the MFLs.

The LSFRB is in Phase I of the recovery strategy (Appendix G). Section 6.0 of the LSFRB Recovery Strategy was adopted by FDEP in Chapter 62-42, F.A.C. Water resource and water supply development projects have been identified and implementation of projects has begun. In addition, the NFSEG version 1.0 was used to assess resource constraints. In compliance with Chapter 62-42, F.A.C., the NFSEG version 1.0 will undergo peer review, and the LSFI MFLs will be re-evaluated using the best available scientific or technical data, methodologies and models. Phase II of the LSFRB Recovery Strategy will follow this re-evaluation and ensure long-term regulatory measures are in place to achieve the LSFI MFLs.

Priority Waterbodies without Minimum Flows and Minimum Water Levels

The purpose of this assessment is to provide water users with a sense of the potential for water resource impacts in portions of the planning area where MFLs have not yet been adopted. Within the NFRWSP area, there are two river reaches, eight springs and 13 lakes on the Districts' priority lists for future MFLs development. Of these priority waterbodies, only the river reaches and springs were evaluated in this analysis (Table 4) due to the current lack of a meaningful screening threshold available for the lakes. Upon MFLs adoption, the 13 lakes will be assessed in a subsequent RWSP.

Baseline conditions for the priority rivers and springs were calculated using Scenario 4. Flow under the baseline condition was compared to modeled flow using Scenario 2. Waterbodies that showed more than a 10 percent decrease in flow from a no-pumping condition were identified in this analysis. Note that a threshold of 10 percent reduction in flow does not necessarily correspond to an ecological threshold beyond which significant harm would occur. Conversely, waterbodies experiencing less than a 10 percent reduction in flow may still experience significant harm. The 10 percent threshold does, however, highlight areas where resource constraints may occur upon upcoming MFLs adoption. It is during MFLs development that the unique hydrologic and ecological conditions for individual waterbodies are accounted for with changes in flow linked to a quantitative significant harm threshold. Subsequent versions of the NFRWSP will incorporate any newly adopted or reevaluated MFLs in the water resource assessment in order to utilize the best available information gathered during MFLs development.

Both priority rivers and four priority springs showed flow reductions less than 10 percent at 2035 conditions within the NFRWSP area. The remaining four priority springs showed greater than 10 percent reduction in flow under these same conditions (Table 4). Per the SRWMD priority list, MFLs will be set on the Upper Suwannee River

Basin in 2017. The impact of NFSEG domain-wide increases in pumping through 2035 (Scenario 5) on the priority waterbodies without MFLs is included in Appendix H.

Table 4: Priority Waterbodies without MFLs Assessment Summary

Type	Name	County/Basin	WMD	MFLs Priority List Year	Reduction in Flow at 2035 >10%
River	Alapaha River	Alapaha	SR	2017	No
River	Upper Suwannee River at White Springs	Upper Suwannee	SR	2016	No
Spring	Alapaha Rise	Upper Suwannee	SR	2016	No
Spring	Holton Creek Rise	Upper Suwannee	SR	2016	Yes
Spring	SUW923973 (Stevenson)	Upper Suwannee	SR	2016	No
Spring	SUW1017972 (unnamed)	Upper Suwannee	SR	2016	Yes
Spring	Suwannee	Upper Suwannee	SR	2016	Yes
Spring	White	Upper Suwannee	SR	2016	Yes

Wetlands

Wetland vegetative communities can be affected by water level changes in the SAS due to unique combinations of soil type, vegetative species and hydrogeology. The wetlands assessment estimated the magnitude of potential adverse change to wetland function that may occur due to the projected increase in groundwater withdrawals through 2035. Many factors other than groundwater withdrawals (e.g. modification of surface water hydrology) can result in significant alterations of wetlands relative to predevelopment conditions. Therefore, this analysis focused exclusively on assessing the potential for additional adverse changes to existing wetlands from projected increases in groundwater withdrawals within the NFRWSP area. The potential for adverse change was assessed using the Kinser-Minno method (Kinser and Minno, 1995; Kinser et. al., 2003) in the portions of the NFRWSP area where the UFA is confined and the modified Kinser-Minno method (Dunn et. al., 2008) in portions of the NFRWSP area where the UFA is unconfined. Both methods utilize a geographic information system (GIS) matrix analysis of soil permeability, sensitivity of the existing plant species, and projected declines in aquifer level predicted from NFSEG simulations. The analysis yielded a spatial identification of areas with moderate and high potential for adverse change to wetland function.

The wetland assessment identified 20,175 acres at a moderate or high potential for adverse change based on 2035 conditions within the NFRWSP area. Changes to

wetlands from groundwater pumping tend to be local issues and are primarily addressed via the Districts' regulatory programs and through the development of water supply and water resource development projects.

Additional detailed information regarding the wetlands assessment methodology and analysis results for NFSEG domain-wide increases in pumping through 2035 (Scenario 5) are included in Appendix I.

Table 5: Wetland Acreage Identified as Having a Moderate or High Potential for Adverse Change to Wetland Function

County	**WMD**	**Potential Wetland Adverse Change at 2035[1] (acres)**
Alachua	SJR	1,392
Alachua	SR	209
Baker	SJR	0
Baker	SR	0
Bradford	SJR	8
Bradford	SR	116
Clay	SJR	3,879
Columbia	SR	54
Duval	SJR	955
Flagler	SJR	3,532
Gilchrist	SR	798
Hamilton	SR	998
Nassau	SJR	389
Putnam	SJR	5,392
St. Johns	SJR	63
Suwannee	SR	13
Union	SR	2,377
Total		**20,175**

[1] Refers to 2035 conditions within the NFRWSP area with the remainder of the NFSEG domain at held at 2009 conditions

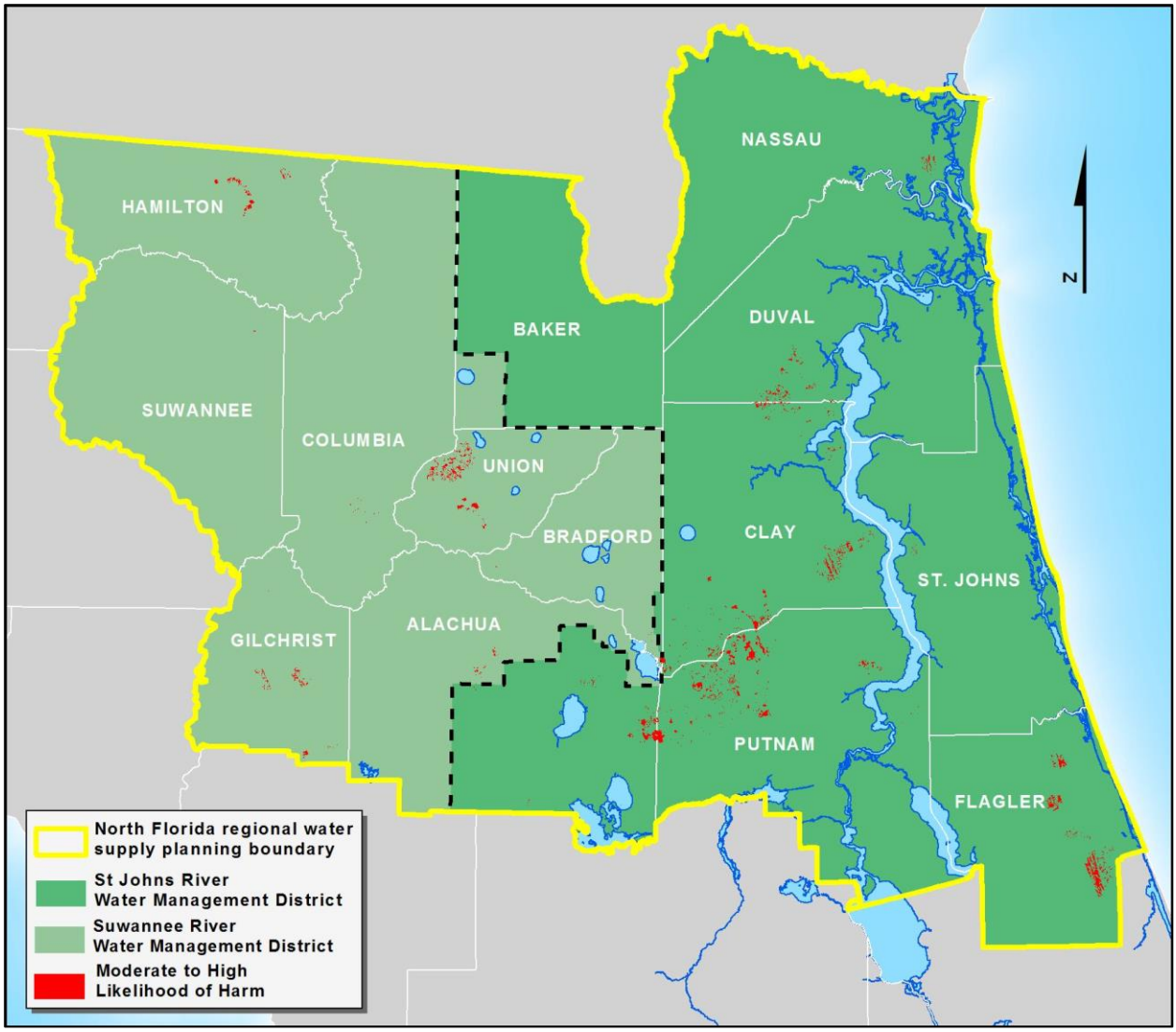

Figure 18. Wetlands at Risk of Adverse Change Due to 2035 Projected Withdrawals within the NFRWSP Area

Reservations

Subsection 373.223(4), F.S., authorizes the Districts and FDEP to reserve water from use by permit applicants for the protection of fish and wildlife or public health or safety. When a water reservation is in place, volume and timing of water quantities at specific locations are protected and maintained for the natural system ahead of new consumptive uses. The only water reservation in the NFRWSP area was adopted by the SJRWMD Governing Board in 1994 (Rule 40C-2.302, F.A.C.). A portion of flow in Prairie Creek was reserved in order to support fish and wildlife in Paynes Prairie. Historically, Prairie Creek discharged into Paynes Prairie. In the 1920s, however, flow into the Prairie was diverted through Camps Canal into Orange Lake to provide better conditions for grazing cattle. When the State of Florida purchased Paynes Prairie in the 1970s, the Camps Canal dike was breached to allow flow back into Paynes Prairie in

Alachua County. The water reservation was adopted to balance the need to restore flow to the Prairie while also retaining a portion of flow that was being artificially diverted to Orange Lake through Camps Canal. Approximately half of the flow from Prairie Creek is reserved for Paynes Prairie with the remainder allowed to divert to Orange Lake.

Climate Change

Uncertainties associated with climate change complicate the challenge of how to meet future water supply demands while avoiding unacceptable water resource impacts (Misra, 2011). Climate change affects both the availability of water supply and projected water demands. As noted previously in this chapter, localized saline water intrusion from upconing is already an issue for some coastal communities in North Florida. Existing water users along the coast will be further challenged should sea level rise exacerbate saline water intrusion, accelerating the timeframe and magnitude of enhanced management practices and/or infrastructure that will be needed to mitigate potential increased salinity. Although solutions are available to some water suppliers experiencing increased salinity, such actions can increase the cost associated with providing potable water to existing and future users. An increase in the intensity of rainfall events and the duration of drought are additional projected impacts of climate change that are of particular concern to water supply planning.

Despite these challenges, many of the same practices that are implemented to address water resource constraints also mitigate the impacts of climate change:

- Decrease groundwater demand (e.g., increase utilization of reclaimed water; water conservation)
- Improve efficiency (e.g., upgrade agricultural irrigation technology; replace aging public supply distribution systems to reduce losses)
- Improve infrastructure capacity and flexibility (e.g., interconnect water supply systems)
- Diversify water supply sources

Collaboration will also be necessary to meet the challenges posed by climate change and provide reliable water supply for all water users. The Florida Water and Climate Alliance (FWCA) provides a venue for collaboration to address water supply challenges associated with climate change. The FWCA is a "stakeholder-scientist partnership committed to increase the relevance of climate science data and tools at relevant time and space scales to support decision-making in water resource management, planning and supply operations in Florida (floridawca.org)." FWCA collaborators include public water supply utilities, WMDs, academic institutions, and other stakeholders from throughout Florida. Collaborators share information and ideas that inform local and regional decisions regarding integration of climate science in water supply management. Although climate

change poses significant challenges to water supply availability, local management actions and regional collaborations will help mitigate the associated impacts and enhance the continued reliability of water supply in North Florida.

Chapter 6: Alternative Water Supply Needs Assessment and Delineation of Water Resource Caution Areas (Sufficiency Analysis)

Purpose

Pursuant to s. 373.709(2), F.S., a RWSP must include sufficient water resource and water supply development project options to meet projected water demands without causing unacceptable water resource impacts and must support MFLs recovery or prevention strategies. This chapter discusses the approach used to demonstrate sufficiency of the NFRWSP project options. In addition, this chapter discusses the technical basis used for delineation of WRCAs, identifies differences between the Districts' delineation methodologies and identifies existing and proposed WRCAs pertinent to the NFRWSP (Rule 62-40.520(2), F.A.C.).

Sufficiency Analysis

The Districts determination that the suite of project options was adequate to address the potential water resource impacts are based on the following; 1) that the 117 mgd of future demand identified in Chapter 3 can be addressed by over 200 mgd of projects that do not withdraw water from the Floridan Aquifer, thereby the future impacts identified in Chapter 5 would not occur, and 2) as required by Chapter 373.709, F.S., the Districts have included the LSFRB Recovery Strategy into the NFRWSP.

The LSFRB Recovery Strategy, as incorporated by Rule 62-42.300, F.A.C., has several important components that must be considered in the NFRWSP. These components are:

1. As required by Rule 62-42.300(1)(e), F.A.C., the re-evaluation and reassessment of the LSFI MFLs must occur no later than December 31, 2019. However, this re-evaluation and reassessment will not be complete prior to the approval of the NFRWSP.

2. Rule 62-42.300(1)(d), F.A.C., references supplemental regulatory measures for the LSFI MFLS and specifically states that "Existing permitted uses shall be considered consistent with the Recovery Strategy provided the permittee does not exceed its permitted quantity. Such permits shall not be subject to modification during the term of the permit due to potential impacts to the MFL water bodies unless otherwise provided for in rule revisions pursuant to Rule 62-42.300(1)(e), F.A.C."

The sufficiency analysis acknowledges these rule requirements while recognizing that the NFRWSP is a plan for the future.

The following approach is based on the technical work conducted for LSFRB Recovery Strategy and the associated water resource conditions are adequately comparable in order

to demonstrate that the NFRWSP contains sufficient project options to meet future water needs and avoid unacceptable water resource impacts.

The NFRWSP recognizes that the specific analysis in the LSFRB Recovery Strategy (Appendix G) provides the framework for recovering the LSFI MFLs. The LSFRB Recovery Strategy identified 92.3 mgd of projects would provide the 31.9 cfs (20.6 mgd) flow required to recover the system and meet the 2030 demand. Implementation of projects identified in the recovery strategy is under way. Fourteen projects identified in the LSFRB Recovery Strategy are complete or in progress, with more projects under development. The NFRWSP identified an additional 124.1 mgd of projects beyond those detailed in the LSFRB Recovery Strategy to ensure project options are available to meet regional demands.

The Districts used the ratio of the mgd of projects required to produce the desired recovery flow documented in the LSFRB Recovery Strategy to evaluate whether sufficient projects were listed in the NFRWSP. The Districts estimated the quantity of water produced by projects to recover each projected cfs of recovery needed (92.3 mgd in water of projects identified ÷ 31.9 cfs[1] of recovery = 2.89 mgd of projects per cfs of recovery). As discussed in Chapter 5, and shown in the calculation below, results indicate that under 2035 projected pumping conditions within the NFRWSP area, the Lower Santa Fe River flow, as measured at the Ft. White gage, will need a recovery of 38.0 cfs.

> 2009 Lower Santa Fe River Flow (708.5 cfs) – 2035 Lower Santa Fe River Flow (687.5 cfs) + 2010 Lower Santa Fe River Flow Recovery (17.0 cfs) = Lower Santa Fe River Flow Starting Recovery Goal (38.0 cfs)

The Districts evaluated the benefits of using 59.7 mgd of water resource development projects using the NFSEG, which provided 8.4 cfs of potential recovery to the Lower Santa Fe River flow. This would reduce the projected recovery of the Lower Santa Fe River flow to 29.6 cfs. Using the conversion of cfs to mgd above, the Districts have estimated that 85.5 mgd of potential projects are needed to avoid unacceptable water resource impacts and support MFLs recovery strategies.

The Districts have identified a high water conservation range potential of 54.0 mgd, further reducing the quantity of water supply development projects needed to approximately 31.5 mgd. Of the projects identified in Table 6, there is 5 mgd of water resource development projects that were not used in the evaluation of project benefits. In addition, Table 7 identifies 97.2 mgd of water supply development projects. This amounts to 70.7 mgd more projects than are needed to recover the LSFI MFLs and meet future demands.

[1] The original draft of the plan was developed using 20.6 cfs instead of the 20.6 mgd listed in the LSFRB Recovery Strategy. When converted from mgd to cfs, the recovery for the Lower Santa Fe River at Fort White in the LSFRB Recovery strategy is 31.9 cfs.

The NFRWSP identifies 216.4 mgd of projects to meet the increased demand of 117 mgd in 2035. The majority of these projects meet the projected water demand and offset water resource impacts without using any additional water from the UFA.

Water Resource Caution Areas

Water Resource Caution Areas are geographic areas identified by a District as having existing water resource problems or areas in which water resource problems are projected to develop during the next twenty years. Water Resource Caution Areas are established pursuant to Rule 62-40.520(2), F.A.C., which provides "[w]ithin one year of the determination that a regional water supply plan is needed for a water supply planning region, the region shall also be designated as a water resource caution area." Once a planning region is designated as a WRCA, domestic wastewater treatment facilities which are located within, serve a population located within, or discharge within a water resource caution area, shall be subject to the reuse requirements of s. 403.064, F.S.

SRWMD 2010 Water Supply Assessment

In 2010, the SRWMD completed a Water Supply Assessment (WSA; SRWMD, 2010). Based on technical analyses in the 2010 WSA, which predicted unacceptable impacts to river and springs flows within the northeastern part of the SRWMD for the 2010 – 2030 planning period, the SRWMD Governing Board authorized designation of four WRCAs on October 11, 2011 (Figure 19): Alapaha River Basin, Upper Suwannee River Region, Upper Santa Fe River Basin, and the LSFRB. This action identified the need for SRWMD to develop a RWSP for the designated WRCAs. The NFRWSP is the RWSP for these designated WRCAs.

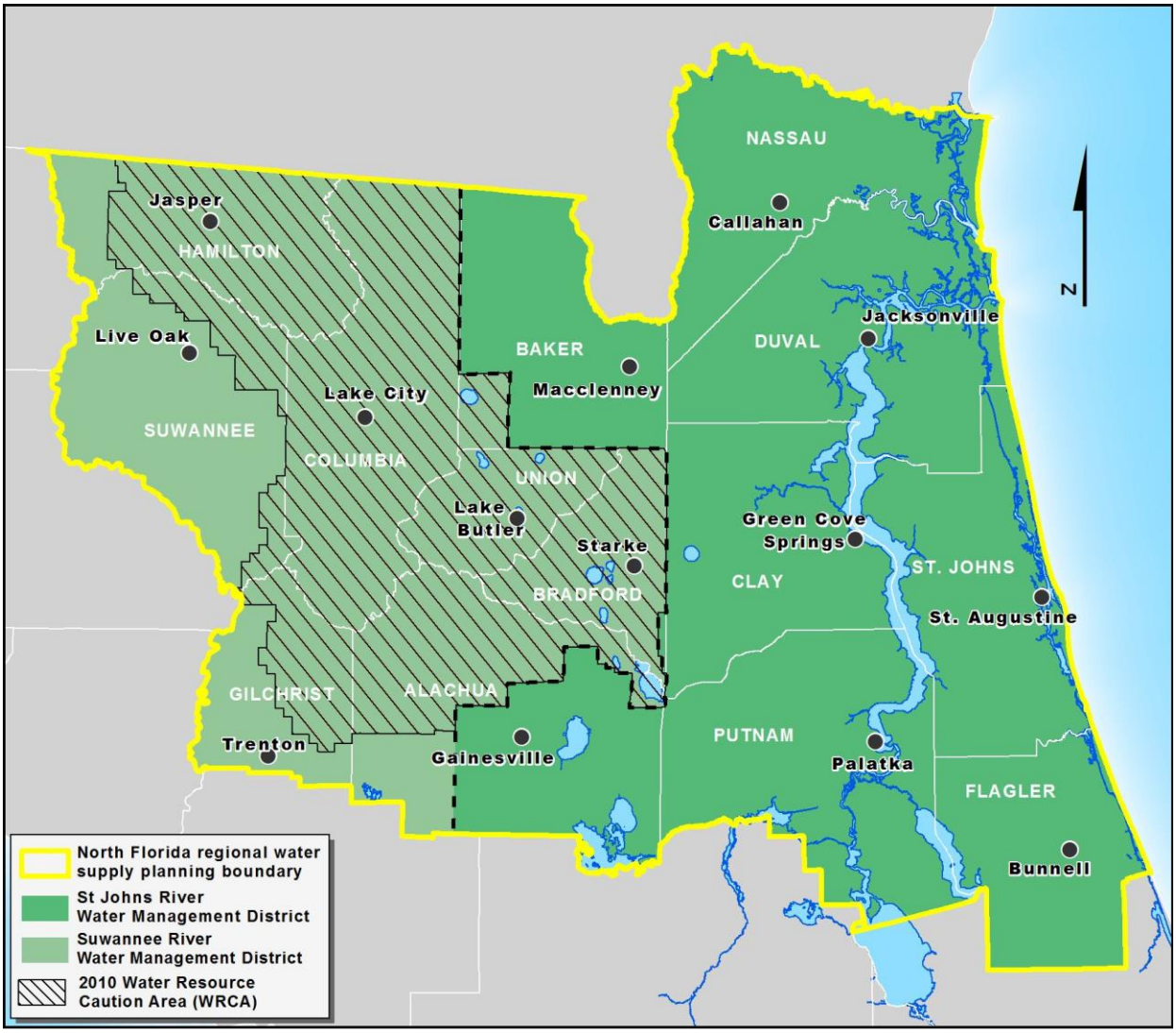

Figure 19: Existing Water Resource Caution Areas in the SRWMD

NFRWSP Water Resource Caution Area Delineation

The presence of a recovery strategy signifies MFLs are not being met and therefore water resource problems exist within a specific area. The LSFRB Recovery Strategy constrains the availability of groundwater throughout the NFRWSP area and provides a technical basis for the constraint. Because the regulatory components and associated technical analyses within the LSFRB Recovery Strategy are applicable to the entire planning area, the entire NFRWSP area is proposed for designation as a WRCA (Figure 20).

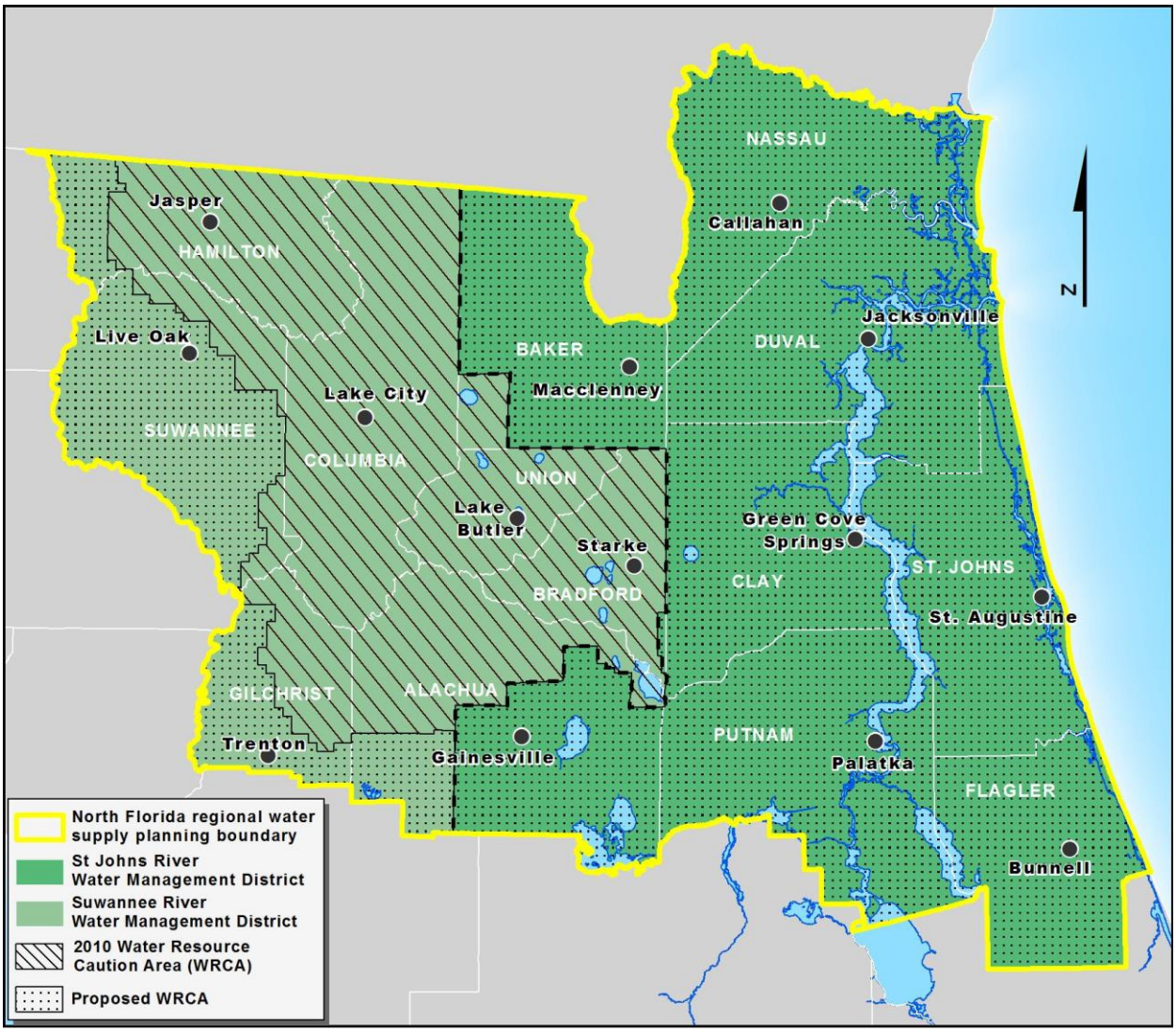

Figure 20: Proposed NFRWSP Water Resource Caution Area

The existing WRCA designation in SRWMD does not cover the entire SRWMD portion of the NFRWSP area as delineated in Figure 20. Formal modification of the WRCAs in the SRWMD portion of the NFRWSP area will be addressed in the SRWMD 2015 WSA, when completed. As such, the NFRWSP serves as the RWSP for only those areas designated in the SRWMD 2010 WSA; the Alapaha River Basin, Upper Suwannee River Region, Upper Santa Fe River Basin, and the LSFRB WRCAs.

The SJRWMD intends to utilize the NFRWSP as the WSA to designate that portion of the SJRWMD located in the NFRWSP area as a WRCA based on the constraints dictated by the LSFRB Recovery Strategy. The SJRWMD portion of the NFRWSP area identified in this plan shall be considered a WRCA for the purposes of s. 403.064, F.S., and affected parties may challenge the designation pursuant to s. 120.569, F.S.

Additional Analyses Supporting the WRCA Delineation

In addition to the presence of waterbodies with the NFRWSP area whose MFLs are currently violated, results from analyses of non-MFLs priority water bodies, groundwater quality, and wetland impact evaluations identify geographic areas that have additional existing or projected water resource problems. These analyses further support the WRCA designation of the planning region. Details regarding the groundwater quality and wetland analyses are provided in Chapter 5.

Impacts to Non-Minimum Flows and Minimum Water Levels Priority Waterbodies

The analysis of non-MFLs priority waterbodies identified four springs within the SRWMD portion of the NFRWSP area with projected declines greater than 10 percent due to 2035 projected demand. All of these springs are scheduled to have MFLs set in 2017. As MFLs are set on these and other priority water bodies within the NFRWSP area, achieving and/or maintaining MFLs could provide an additional constraint on resources within the planning region.

Groundwater Quality

The groundwater quality analysis for the NFRWSP indicated that groundwater quality may constrain the availability of fresh groundwater in portions of Duval, Flagler, Nassau, and St. Johns counties, east of the St. Johns River (Figure 17), based on water quality monitoring data from existing production wells. Although a number of coastal public supply utilities in the NFRWSP area currently implement management actions to mitigate increasing salinity in their production wells, management actions to address elevated salinity levels increase the cost of obtaining potable water. Such costs represent a challenge for public supply utilities and pose a significant constraint for smaller water users who have more limited financial resources. Groundwater quality is a current concern for coastal water users in particular and is projected to further degrade over the next twenty years. As such, the groundwater quality analyses support the designation of that portion of SJRWMD in the NFRWSP area as a WRCA.

Potential Adverse Change to Wetlands

The wetland analysis identified 20,175 acres within the NFRWSP area potentially at high or moderate risk of adverse change if the projected increase in water demand was met with fresh groundwater. As shown in Figure 18, many of these areas are located in the interior portions of the NFRWSP area. Although adverse change to wetland function can be mitigated through management actions such as wellfield optimization and system interconnections, such actions can increase the cost of obtaining potable water. Smaller water users may not have the financial resources or infrastructure that allow for implementation of such management actions. Thus,

adverse changes to wetlands pose a potential constraint on the availability of fresh groundwater in the NFRWSP area. This analysis provides further support for the WRCA designation of that portion of SJRWMD in the NFRWSP area.

Chapter 7: Project Options

Purpose

This chapter provides an overview of the water source options available to water users located within the NFRWSP area as a means to avoid water resource constraints identified in chapters 5 and 6. Where possible, planning-level estimates of the potential available yield for each source are provided. These estimates address a number of factors including consideration of any established MFLs, potential impacts to water and environmental resources, the results of previous water resource evaluations, permittability, water source quality, consideration of existing legal uses, and known engineering limitations.

Fresh groundwater sources are considered traditional water sources whereas nontraditional or AWS include brackish groundwater, surface water/stormwater, seawater, reclaimed water, and water stored in Aquifer Storage and Recovery (ASR) systems and reservoirs. In addition, there are a number of management tools that can enhance the source of supply, sustain the water resources and related natural systems, or otherwise optimize supply yield. Examples of management tools include ASR, storage tanks and ponds/reservoirs, land-use transitions, wellfield optimization, water resource augmentation, and aquifer recharge.

Groundwater sources within the NFRWSP area include the fresh and brackish portions of the FAS, the Intermediate Aquifer System and the SAS. Groundwater from the UFA and some select zones in the LFA is the traditional source of water supply for all water use categories in the NFRWSP area. In 2010, an estimated 490 mgd of groundwater was used within the NFRWSP area to meet demands. Because future groundwater withdrawals were found to be constrained, the NFRWSP focused on water conservation and implementation of projects to meet future demand.

Project Cost and Volume Estimation Methodology

All projects submitted to, or proposed by, the Districts can be found in Appendices J, K, L, and M. Projects were evaluated and are summarized into four categories: water resource development projects (Appendix J), water supply development projects (Appendix K), potential water supply development, water resource development and water conservation projects (Appendix L), and water conservation projects (Appendix M). Development of these projects will serve the public interest or save costs by preventing the loss of natural resources or avoiding greater future expenditures for water resource or water supply development projects. The potential projects are included in order to provide a broader suite of potential project options. These projects may become feasible if they address environmental, technical or permit criteria. Examples include projects where:

- The source water was not available and/or there was an unmitigated impact

- The location of a project was not viable to the property owner or there were ownership or property control issues with the proposed project location

- There was not a defined water resource benefit

- There was not a fully developed cost estimate

Water Resource Development Project Options

Water resource development projects are typically implemented by the WMDs or by the WMDs in conjunction with other agencies or local governments (ss. 373.705(1)(a); F.S.). These include projects that increase the amount of water available for water supply, collect and analyze data for water supply planning, and study the feasibility and benefits of new techniques. This section provides an overview of these projects.

Brackish Groundwater

Brackish groundwater, for AWS planning purposes, is generally defined as water with a TDS concentration of greater than 500 mg/L. Brackish groundwater exists in the FAS in portions of the NFRWSP area, specifically in coastal areas and near the St. Johns River. Brackish groundwater can be utilized to meet water demands but may require treatment by methods such as low pressure reverse osmosis (RO) or electrodialysis reversal (EDR). Treatment generally requires disposal of concentrate or reject water. Both RO and EDR treatment costs are higher than the treatment costs of fresh water sources. Additionally, the hydrologic connection between the brackish and fresh portions of the local aquifer horizons requires evaluation and may not offer sufficient hydrologic confinement to protect overlying aquifer systems from possible drawdown and saline water intrusion.

Surface Water/Stormwater

Opportunities exist for the development of water supplies from the lakes and rivers in the NFRWSP area that could supplement traditional groundwater supplies. Smaller, local lakes are generally considered a limited resource and often provide the local landowners with water for irrigation purposes. The capture and storage of water from river/creek systems and runoff can supply significant quantities of water and could be a component of multi-source water supply development projects. Larger lakes may represent an opportunity for development of supplies, as they have larger, regional drainage basins to buffer the effects of withdrawals.

Seawater

The use of desalinated seawater from the Atlantic Ocean and Gulf of Mexico is an additional water source option in the NFRWSP area. Seawater is an essentially unlimited source of water. However, desalination is required before seawater can be

used for water supply purposes and concentrate from the desalination process must be managed to meet regulatory and environmental criteria. In addition to treatment facilities, pump stations and pipelines would be required to transport finished water from the coast to the interior portions of the NFRWSP area.

The use of seawater to meet public supply demands requires advanced treatment of the water by desalination technologies, which include distillation, RO or EDR as options. Significant advances in treatment and efficiencies in seawater desalination have occurred over the past decade. While seawater treatment costs are decreasing and capital costs are becoming competitive with above ground reservoir options, operational costs remain moderately higher than other water supply options.

Reclaimed Water

Reclaimed water is wastewater that has received at a minimum secondary treatment and basic disinfection and is reused after leaving a domestic WWTF. Reuse is the deliberate application of reclaimed water, in compliance with FDEP and the Districts' rules, for beneficial purposes. Reclaimed water utilization is a key component of water resource management in the NFRWSP area. Reclaimed water is used for non-potable purposes such as landscape irrigation, agricultural irrigation (where applicable), aesthetic uses, groundwater recharge, industrial uses, environmental enhancement, and fire protection purposes. Reclaimed water is also being investigated for indirect potable reuse, which is the process of purifying reclaimed water to state and federal drinking water standards so that it can be utilized for recharge and water supply uses. Although direct potable reuse is not currently being implemented in the Districts, this method is being investigated in Florida and is being used in other states and countries to meet potable demands.

Storage Capacity – Aquifer Storage and Recovery and Reservoirs

Aquifer Storage and Recovery

Aquifer storage and recovery is the underground injection and storage of water into an acceptable aquifer (typically the FAS) and stored for withdrawal at a later date to meet demands when insufficient traditional supplies are available. The aquifer acts as an underground reservoir for the injected water. Aquifer storage and recovery provides for storage of large quantities of water for both seasonal and long-term storage and ultimate recovery that would otherwise be unavailable due to land limitations, loss to tides, or evaporation. While ASR is not in itself a new supply source, it provides for system reliability allowing for increased development of other sources of water. Some sources of supply, including many surface water supply options, can be intermittent and therefore unreliable. Other supply options such as reclaimed water have variable demand issues but have relatively consistent supply. In these instances, ASR systems play an important role to store large quantities of water for distribution in cases where the source or demand is variable.

Reservoirs

Surface water reservoirs provide storage of water, primarily during wet weather conditions, for use in the dry season. Water typically is captured, pumped from rivers or canals and stored in above or in-ground reservoirs. Small-scale (local) reservoirs/ponds that can hold several hundred thousand gallons or more are used by farms and golf courses to store recycled irrigation water or collect local stormwater runoff. These reservoirs may also provide water quality treatment before off-site discharge. Large-scale (regional) reservoirs may hold up to several billion gallons and are used for stormwater attenuation, water quality treatment in conjunction with stormwater treatment areas, and storage of seasonally available water for use during dry periods. The potential yield of such reservoirs is directly related to the size of the reservoir and the size of the surface water capture area.

A summary of water resource development project options are shown in Table 6.

Table 6: Summary of Water Resource Development Project Options

Type	Number of Projects	Quantity Water Produced (mgd)	Estimated Cost ($M)
Groundwater (LFA)	2	10.3	3.8
Surface Water	11	47.39	153.59
Seawater	0	N/A	N/A
Reclaimed Water	3	7.5	9.65
ASR and Reservoirs	0	N/A	N/A
Total	**16**	**65.19**	**167.04**

Water Supply Development Project Options

An important part of the NFRWSP process is identifying water supply development project options necessary to meet the anticipated water needs of the planning area through 2035 planning horizon. While water users are not limited to the projects listed in the NFRWSP plan, the list represents a set of projects that could supply a sufficient quantity of water to meet the projected water demands if implemented.

Water supply development is defined in ss. 373.019 (26), F.S. as the planning, design, construction, operation, and maintenance of public or private facilities for water collection, production, treatment, transmission, or distribution for sale, resale, or end use.

A list of water supply project options for the NFRWSP area was developed in coordination with water suppliers and users. In preparation of the NFRWSP, the Districts circulated a questionnaire to solicit information from public supply utilities, agricultural and other water users regarding the traditional and AWS projects planned to meet water needs through 2035. This process allowed water users to provide input on the proposed water supply project options included in the NFRWSP (Appendix K and L).

In compiling the list of water supply project options, there was a consideration of how the public interest is served by the project or how the project will save costs overall by preventing the loss of natural resources or avoiding greater future expenditures for water resource development or water supply development. The identified projects will serve the public interest by providing, in an affordable manner, water to meet basic public health, safety, and welfare needs, as well as, providing water for agricultural, CII, recreational, and other typical public supply system needs within the NFRWSP area.

Pursuant to ss. 373.709(7), F.S., nothing contained in the water supply component of a RWSP should be construed as a requirement for local governments, public or privately owned utilities, special districts, self-suppliers, multi-jurisdictional entities, and other water suppliers to select that identified project. If the projects identified in the NFRWSP are not selected by a water supplier, the entity may need to identify another source to meet its future needs and advise the Districts of the alternate project(s). In addition, the associated local government will need to include such information in its water supply facilities work plan (see Chapter 2).

To best manage the water resources in the NFRWSP area, the NFRWSP promotes the diversification of sources for the water supply projects. Proposed project options in this plan were evaluated for inclusion based on factors such as the potential to not adversely impact MFLs and the capability of the source water to supply the project.

Table 7, below, identifies 102 water supply development project options for the NFRWSP area. The quantity of water produced listed in the table expresses the project's ability to deliver "new" water as a result of project construction. For example, a pipeline constructed to deliver water to a new area would not generate water by itself and, therefore, would not be considered new water. Two projects consist of Upper FAS wellfield management strategies. Other project options include development of previously unused sources which would add new supplies to the water user.

For each water supply development project option identified, the following information is provided (and listed in Appendix K):

- An estimate of the amount of water made available by the project
- A timeframe for project implementation
- An estimate of planning-level costs for capital investment and operating and maintaining the project
- Identification of the likely entity responsible for implementing each project

Table 7: Summary of Water Supply Development Project Options

Type	Number of Projects	Quantity Water Produced (mgd)	Estimated Cost ($M low range)
Groundwater	4	3.00	5.43
Stormwater/Surface Water	5	5.37	50.68
Reuse of RO Concentrate	1	0.75	1.24
Seawater	0	N/A	N/A
Reclaimed Water	92	88.05	251.78
Total	**102**	**97.16**	**309.12**

Water Conservation Project Options

Effective water conservation efforts have been implemented in the NFRWSP area, the benefits of which are reflected in decreased historical per capita use (both gross and residential). Continued investment in water conservation is critical to help the NFRWSP area meet its future water needs and avoid unacceptable water resource impacts. Water conservation includes any action, which reduces the demand for water including those that prevent or reduce wasteful or unnecessary uses and those that improve efficiency of use. Achieving long-term improvements in water use efficiency will require a combination of advanced technologies, BMPs and behavioral changes. Education, outreach and public engagement are essential for accomplishing a measurable change in water conservation and maintaining a lasting commitment to efficient water use in north Florida. Conservation strategies and projects are recognized as being the most economically feasible. Implementing projects to meet the high conservation potential (an additional 13 mgd of savings) as described in Table 1, will likely be a more cost-effective option than implementing some of the water supply and water resource development projects discussed above. However, the Districts anticipate that a conservation only strategy will not completely offset the predicted shortfall in fresh groundwater supplies.

The following water conservation strategies have been, are or can be implemented within the NFRWSP area by non-agricultural water users:

- Tiered public supply billing rates: Tiered rates are an essential aspect of any successful program as they provide direct and clear feedback to individual water users who can then take action to improve efficiency. Analyses of historical billing rates and per capita use in north Florida demonstrate a reduction in gross and residential per capita use after implementation of tiered rate structures.

- Implementation of landscape irrigation restrictions: As of March 2016, thirty local governments in the NFRWSP area have adopted ordinances to enforce the irrigation restrictions contained in Chapter 40C-2, F.A.C. This local action encourages outdoor water conservation and provides for more consistent implementation of the rule.

- Landscape and irrigation design codes: Many jurisdictions in the NFRWSP area have land development codes with provisions that encourage efficient outdoor water use.

- Outreach and Education: Water conservation outreach is common throughout the NFRWSP area, regarding both indoor and outdoor water use. Water conservation outreach occurs via websites, utility bill stuffers, events, and other approaches implemented by local governments, utilities, the Districts, and other partners. Outreach messages include general recommendations for efficient water use as well as advertising for existing programs such as Florida Friendly Landscaping™, Florida Water Star℠ and the Florida Green Building Coalition.

- Water use audits for residential customers: This strategy has been very effective in this region when employed by a public supply utility because it provides customized recommendations, includes direct contact with landowners, and can be targeted to water users with the greatest potential for savings.

- Meter reading technology: Automatic Meter Reading and Advanced Metering Infrastructure are used by several utilities in the NFRWSP area to identify high water users or unusual increases in water use relative to historical patterns for individual customers. This technology provides a significant opportunity for water conservation savings when used to identify individual homeowners/businesses that public supply utility staff can then contact to provide technical assistance identifying and resolving the cause(s) of high water use and/or unusual increases.

- Water conservation rebate programs: This strategy offers customers either a reduced price or free replacement of a variety of indoor plumbing fixtures and outdoor irrigation devices (e.g., replacement rain sensors, soils moisture sensors, evapotranspiration controllers). Water savings is achieved one of two ways; either when the replacement fixtures and devices are more efficient than the older fixtures or when broken/malfunctioning fixtures and devices are replaced. Fixture replacement occurs in both residential households and commercial facilities.

- Innovative practices: Public supply utilities are also experimenting with utilization of new technology as well as data-driven approaches for targeted implementation of existing programs and technology to maximize their effectiveness.

In addition to the non-agricultural water conservation programs and practices highlighted above, savings can also be gained by improving agricultural irrigation efficiency. This includes rainwater harvesting, tailwater recovery, center pivot retrofits, and other irrigation efficiency practices and technologies. In recent years, the Districts have provided funding to more than 120 agricultural stakeholders in the NFRWSP area for implementation of agricultural BMPs. Many of these projects also provide water quality benefits. In addition, 1,059 agricultural operations (400,240 acres) throughout the NFRWSP area are currently enrolled in applicable FDACS BMP programs. In addition to

water quality benefits, many BMPs implemented through the FDACS program also improve irrigation efficiency. For more information see freshfromflorida.com.

Phosphate Land Reclamation Variances

The FDEP provides guidelines for the reclamation of lands mined or disturbed by the severance of phosphate rock via rules, criteria and standards for reclamation that are mandatory for most mines. The FDEP rules and criteria provide for a variance of the criteria and standards in certain circumstances. One circumstance is when a variation would accommodate reclamation that provides water supply development or water resource development consistent with the applicable RWSP approved pursuant to s. 373.709, provided adverse impacts are not caused to the water resources of the basin (ss. 378.212(1)(g), F.S.).

Subsection 373.709(2)(j), F.S. requires WMDs to include an analysis, developed in cooperation with FDEP, of areas or instances in which the variance provisions of ss. 378.212(1)(g) or ss. 378.404(9), F.S., pertaining to reclamation of lands mined for phosphate, may be used to create water supply or water resource development projects. FDEP and SRWMD, through a public/private partnership with PotashCorp, the only phosphate mine currently in existence in the NFRWSP area, developed and implemented the Eagle Lake/Upper Suwannee River Springs Enhancement Project. However, this project did not require a variance in order to permit and construct the water quality improvement and water resource development project at the mine site. For the purpose of the NFRWSP, the Districts will continue to coordinate with FDEP regarding any requests to use such variances or of any future opportunities the Districts become aware of where such variance provisions may be used to create water supply or water resource development projects.

Chapter 8: Funding

Purpose

Subsection 373.709(2)(a)3.c., F.S., requires WMDs to include an analysis of the funding needs and to identify possible sources of funding for the projects in RWSPs. This chapter addresses potential funding sources for water supply and water resource development projects.

Florida water law identifies two types of projects to assist in ensuring an adequate water supply for reasonable and beneficial uses and to ensure that natural systems are protected. Water resource development projects are generally the responsibility of WMDs, while water supply development projects are generally the responsibility of the local entities and/or water suppliers. Currently, the WMDs provide funding for both water resource and water supply development projects. In addition, the WMDs also provide funding for conservation projects and strategies.

Water Utility Revenue Funding Sources

Increased water demand generally results from new customers that help to finance source development through impact fees and utility bills. The financial structure of utility fees can be highly variable and reflect the needs of each utility. Water utilities draw from a number of revenue sources such as connection fees, tap fees, impact fees, base and minimum charges, and volume charges. Connection and tap fees generally do not contribute to water supply development or treatment capital costs. Impact fees are generally devoted to the construction of source development, treatment and transmission facilities. Base charges generally contribute to fixed customer costs such as billing and meter replacement. However, a base charge or a minimum charge, which also covers the cost of the number of gallons of water used, may contribute to source development, treatment, and transmission construction cost debt service. Volume charges contribute to both source development/treatment/transmission debt service and operation and maintenance.

Community development districts and special water supply and/or sewer districts may also develop non-ad valorem assessments for system improvements to be paid at the same time as property taxes. Community development districts and special district utilities generally serve a planned development in areas not served by a government-run utility. In general, all utilities have the ability to issue and secure construction bonds backed by revenues from fees, rates, and charges.

Regional water supply authorities are wholesale water providers to utilities. An authority's facilities are funded through fixed and variable charges to the utilities they supply, which are in turn paid for by the retail customers of the utilities. Funding is also obtained through state appropriations, federal and state grants and funding from WMDs. Counties, municipalities and special districts have the legislative ability to create regional water supply authorities in a manner that is cost effective and reduces the environmental effects

of concentrated groundwater withdrawals. Regional water supply authorities are granted multiple rights and privileges including the ability to levy taxes, issue bonds, and incur debt to develop water supplies. Authorities may also receive preferred funding assistance from the state and Districts for the capital costs of new alternative water supplies and regional infrastructure.

Water Management District Funding Options

The Districts provide financial assistance for water conservation, water supply and water resource development projects through cooperative (or cost-share) funding programs. Financial assistance is provided primarily to governmental entities, but private entities are also eligible to participate in these programs. Funding options and programs for the Districts are described below.

SRWMD Funding Options

The SRWMD promotes water conservation and the implementation of measures that produce significant water savings beyond those required in a CUP/WUP. The SRWMD provides cost share funding for projects that foster its core mission. The Regional Initiative Valuing Environmental Resources cost-share program provides funding assistance to government entities for projects that decrease water consumption, implement water savings programs, provide alternative water supplies, protect water supply, improve water quality, restore natural systems, and provide flood protection.

The SRWMD partners with other agencies and associations as part of the Suwannee River Partnership to provide cost share funding to agriculture producers to help implement BMPs that protect and conserve water. Cost-share funding is available to producers to maximize irrigation system efficiency, for tools to manage irrigation scheduling and for irrigation system remote monitoring and control. Also, the SRWMD provides funding along with FDACS to support mobile irrigation lab services that delivers technical assistance to producers for evaluating system efficiency and making recommendations for improvements.

Water Resource Development Work Program

The SRWMD will prepare and annually update a 5-year Water Resource Development Work Program following the approval of the 2017-2018 annual budget. This 5-year Water Resource Development Work Program will describe the implementation strategy and funding plan for water resource, water supply and AWS development components.

SJRWMD Funding Options

The SJRWMD primarily provides funding assistance through a competitive cost-share program, which is administered annually and supports AWS, water resource

development, water conservation, and agricultural related projects. Water resource development projects may also be funded solely by the SJRWMD or in cooperative arrangement with a local partner. Additionally, the SJRWMD accepts water supply related funding from state sources for implementation through cost-share programs.

Water Resource Development Work Program

The SJRWMD annually updates its 5-year Water Resource Development Work Program, which describes the implementation strategy and funding plan for water resource, water supply and AWS development components. The following projects are identified for potential funding opportunities: artesian well plugging; investigation of the augmentation of public supply systems with local surface water/stormwater sources; RWSP; Upper St. Johns River Basin Project; water conservation programs; water resource development components of water supply development projects; water resource development; MFLs prevention/recovery strategy projects; and water resources information (formerly hydrologic data collection).

State Funding Options

Agricultural Conservation

The FDACS' Office of Agricultural Water Policy (OAWP) works with multiple partners, including the Natural Resources Conservation Services (NRCS), FDEP, the WMDs, and Soil and Water Conservation Districts, to provide funds that assist farmers in implementing BMPs. Cost-share programs through the FDACS OAWP vary regionally based upon the resource concerns and appropriate practices. Funds are provided to cost-share irrigation system efficiency improvements, and irrigation system management tools like soil moisture sensors.

Springs Protection

Over the past three years, the SJRWMD has partnered with the state of Florida via FDEP, local governments and public supply utilities to collectively invest approximately $100 million in over 50 springs protection and restoration projects. During this same time period, the SRWMD has received 17 springs grants from the FDEP totaling nearly $23 million for projects to protect and restore springs.

These projects address either water quality or water quantity, although many often provide dual benefits. Typical water quality projects include WWTF upgrades, conversion of septic systems to central sewer and enhanced stormwater treatment. Typical water quantity projects include water conservation, reclaimed water system enhancements or expansions, and AWS development. Recent innovative projects include use of biologically active media in rapid infiltration basins and indirect and direct potable reuse. This also includes springs protection funding from FDEP for

crop, dairy and nursery irrigation system efficiency improvements and enhanced water recycling components for dairies.

The future of springs funding looks particularly bright given the passage of the 2016 Legacy Florida legislation that earmarks $50 million per year from the Land Acquisition Trust Fund for springs restoration for the next 20 years. It is anticipated that the Districts, local governments and public supply utilities will continue to partner with the state of Florida through FDEP to aggressively implement projects well into the future.

State of Florida Water Protection and Sustainability Program

The Water Protection and Sustainability Program (WPSP) was created by the Florida Legislature in 2005. The program funded several environmental programs including the AWS program. In the WPSP, AWS included reclaimed water, brackish water, seawater, and surface water captured during wet season flows. This program is not currently funded, however funding has been discussed by the legislature over past years. Contingent on future funding of this program, the State of Florida's WPSP could serve as a source of matching funds to assist in the development of AWS.

Drinking Water State Revolving Fund Program

The Drinking Water State Revolving Fund Program provides low interest loans to eligible entities for planning, designing and constructing public water facilities. Cities, counties, authorities, special districts, and other privately owned, investor-owned, or cooperatively held public water systems that are legally responsible for public water services are eligible for loans. Loan funding is based on a priority system, which takes into account public health considerations, compliance and affordability. Affordability includes the evaluation of median household income, population affected and consolidation of very small public water systems, which serve a population of 500 people or fewer.

Funds are made available for pre-construction loans to rate-based public water systems, constructions loans of a minimum of $75,000, and pre-construction grants and construction grants to small, financially disadvantaged communities. The loan terms include a 20-year (30-year for financially disadvantaged communities) amortization and low interest rates. Community assistance is available for small communities having populations less than 10,000. Fifteen percent of the annual funds are reserved exclusively for small communities. In addition, small communities may qualify for loans from the unreserved 85 percent of the funds.

Florida Forever Program

Florida Forever is Florida's conservation and recreation lands acquisition program. The Florida Forever Act, passed in 1999, was a 10-year statewide program. The Florida Forever Program was extended in 2008 for 10 more years. Eligible projects

under the Florida Forever Program include land acquisition, land and water body restoration, ASR facilities, surface water reservoirs, and other capital improvements. Subject to annual appropriation, the Florida Forever Program could be a source of project funding.

Water and Land Conservation Amendment

In 2014, the Water and Land Conservation Amendment was passed by the Legislature. It could provide funding for land acquisition/management, springs and water resource protection.

Federal Funding

Environmental Quality Incentive Program

The United States Department of Agriculture's NRCS provides technical and financial assistance to agricultural producers through the Environmental Quality Incentive Program (EQIP) for the installation or implementation of structural and management practices to improve environmental quality on agricultural lands. Water supply and nutrient management through detention/retention or tailwater recovery ponds can also be implemented through this program.

State and Tribal Assistance Grants

Another partnership with states involves funding assistance through cooperative agreements, referred to as State and Tribal Assistance Grants. These funds are available through the Environmental Protection Agency, which historically required 45 percent in matching funds from local government cooperators.

Water Infrastructure Finance and Innovation Act

The Water Infrastructure Finance and Innovation Act (WIFIA) establishes a new financing mechanism to accelerate investment in our nation's water infrastructure. The WIFIA program will provide loans for up to 49 percent of eligible project costs for projects that will cost at least $20 million for large communities and $5 million for small communities (population of 25,000 or less).

Public-Private Partnerships, Cooperatives and other Private Investment

Another source of funding that is becoming more common, as well as a means to reduce financial burden for public entities are public-private partnerships. These partnerships can require technical expertise and financial risk beyond the expertise and risk tolerance of many utilities and water supply authorities. A range of public/private partnerships and risk options is available to provide this expertise. These options range from all-public ownership to all-private ownership of facility design, construction and operation.

Competition among private firms desiring to fund, build or operate water supply development projects with assistance from government entities could reduce project costs, potentially resulting in lower customer charges.

Summary of Funding Mechanisms

There are many potential institutions and sources of funding for water resource and water supply development, although some past sources are currently limited by economic conditions. Public supply utilities and water supply authorities will likely have the least difficulty in securing funding due to their large and readily identifiable customer bases and associated revenue streams to service any debt. Funding mechanisms are already established for many of the Districts' water supply and water resource development projects. A continuing challenge will be identifying cost-effective and economically efficient methods of meeting the needs of existing rural economic development initiative communities and new self-supplied users (whose ability to pay ranges widely) when the traditional, lower cost sources of water are no longer readily available.

Chapter 9: Conclusions

Summary

The NFRWSP was prepared by the Districts in coordination with stakeholders and is consistent with the water supply planning requirements of Chapter 373, F.S. The NFRWSP concludes that the current and future water demands of the NFRWSP area can be met through the 2035 planning horizon, while sustaining the water resources and related natural systems, through water conservation, implementation of management measures, and implementation of water resource and water supply development projects identified in the NFRWSP.

Challenges in water resource development and natural resource protection require concerted efforts to monitor, implement and characterize current hydrologic conditions and project future conditions. Successful implementation of the NFRWSP requires close coordination with regional and local governments, utilities, agriculture, commercial, industrial, and other water users. Collaboration among stakeholders is also essential for directing implementation of NFRWSP recommendations and guidance. Public and private partnerships can ensure that water resources in the NFRWSP area are prudently managed and available to meet future demands.

Total water demands by all water use categories are projected to increase from an estimated current use in 2010 of 551 mgd to approximately 667 mgd in 2035. The Districts determined that fresh groundwater alone cannot supply the projected 117 million gallons per day increase in water demand without causing unacceptable impacts to water resources. Under the 2010 hydrologic conditions, it was determined that the MFLs for the LSFI were in recovery, which indicates the current distribution of water use has already exceeded the fresh groundwater sustainable yield of the system. In addition, analysis of priority water bodies without MFLs, groundwater quality and wetlands identify potential constraints on increased groundwater withdrawals during the 20-year planning horizon.

Limited localized opportunities may exist for additional traditional groundwater withdrawals to meet future water demands through 2035. The few opportunities for increased traditional groundwater withdrawals generally include local areas where groundwater withdrawals have not been fully optimized. Options for obtaining new water supplies to meet existing and future water demands from both conventional and alternative sources must comply with applicable CUP/WUP rules and conditions. In addition, there may be limited opportunities to utilize traditional groundwater seasonally in conjunction with alternative supplies such as above ground and below ground storage ASR.

Primary solutions identified for meeting the future water demands while protecting the environment include enhanced water conservation, recharge, additional use and implementation of reclaimed water, surface water, seawater, and brackish groundwater projects. With all of these options, the Districts have identified between 203 and 216 mgd

potentially available to offset the projected increase in water demand of approximately 117 mgd by 2035.

A Note About Uncertainty

Uncertainty is inherent in the resource analyses associated with the NFRWSP. The Districts have considered major sources of uncertainty including water use estimates and water demand projections, groundwater models, climate variability, and water resource constraints. At a regional level, the best strategy for dealing with this uncertainty is the implementation of water demand management strategies and a diversity of AWS development project options.

Uncertainty also exists regarding the degree to which the proposed solutions contained in the NFRWSP may be implemented. The variety of options used in the NFRWSP to address impacts and unmet water demands does not include agreements or commitments between users and the agencies. Current permits and laws limit the scope of regulatory actions that can be taken to impose specific solutions on users. Budgetary constraints and uncertainties of both users and agencies are challenges to assuring specific solutions will be economically feasible and affordable. Finally, there is uncertainty associated with the actual performance of many of the options in meeting the NFRWSP objectives. Examples include some aspects of water conservation where voluntary behavioral changes of large populations of end users are involved and the supplementation of reclaimed water with conventional water supply sources.

The projects provided in this water supply plan were developed as a planning level assessment to show that sufficient options are available to address potential water resource impacts in the NFRWSP area. These assessments were developed using available information and the NFSEG, which has yet to be peer reviewed, so limitations are inherent in the analysis as discussed in Chapter 4.

To overcome some of these limitations, and as required by the FDEP adopted LSFRB recovery strategy, the LSFI MFLs will be re-evaluated, the status presented and be reproposed for adoption prior to December 31, 2019. These re-evaluated MFLs will serve as the basis for development of updated recovery strategies, which will rely on updated tools, methods and data. These actions will be subject to statutory timelines and requirements.

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