Central Springs/East Coast Regional Water Supply Plan (2020–2040)

St. Johns River Water Management District
Palatka, Florida

February 7, 2022

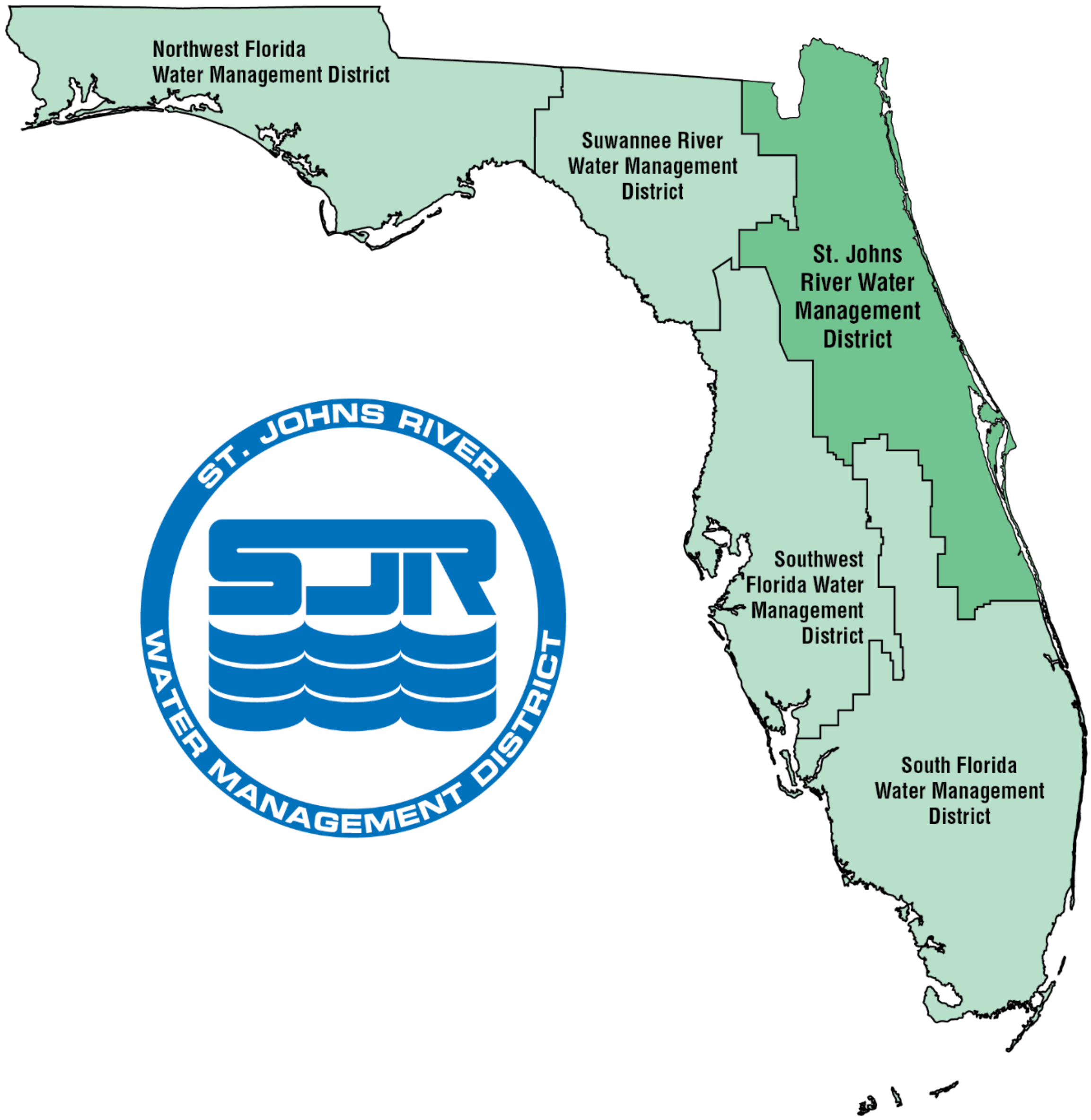

Figure 1: Location and boundary of the St. Johns River Water Management District

Acknowledgements

The St. Johns River Water Management District (SJRWMD, Figure 1) recognizes and thanks stakeholders, local governments, and other water management districts for their contributions, comments, advice, information, and assistance throughout the development of the Central Springs/East Coast Regional Water Supply Plan. Furthermore, SJRWMD expresses its appreciation to all staff who contributed to the development and production of this collaborative regional water supply plan.

Executive Summary

The St. Johns River Water Management District (SJRWMD) Central Springs/East Coast (CSEC) planning region includes all or part of six counties; Volusia, Marion, Lake, Brevard, Indian River, and Okeechobee. Notable surface water features within the planning region include the Upper, Middle, and a portion of the Lower St. Johns River, the Indian River Lagoon, and the Ocklawaha River. Six Outstanding Florida Springs (OFS) are located in the region: Blue, De Leon, and Gemini in Volusia County, Silver and Silver Glen springs in Marion County, and Alexander Springs in Lake County.

The CSEC Regional Water Supply Plan (RWSP) was developed through a collaborative process among SJRWMD, local governments, public supply utilities, environmental advocates, and other stakeholders. The CSEC water supply planning process included more than 38 meetings and four public workshops to assist stakeholders in understanding the technical methodologies employed in plan development and the water supply issues in the CSEC RWSP area.

This RWSP covers a 20-year planning period (2020 through 2040) and is based on the best data available at the time of plan development. Key components of the CSEC RWSP are the groundwater flow models: the 2015 Volusia model, the Northern District Model Version 5, and the East-Central Florida Transient Expanded Model Version 1.0. These groundwater flow models incorporate elements of the water budget, including recharge, evapotranspiration, surface water flows, groundwater levels, and water use. The development of these models utilized calibration processes to incorporate the most current data and provide the best available approximation of all components of the water budget within the CSEC RWSP area. These models constitute the best available toolset for evaluation of the effects of groundwater withdrawals on water resources in the CSEC RWSP area.

The population within the CSEC RWSP area during the 2015 base year was approximately 1.5 million people. The area's population is projected to reach approximately 2 million by 2040, which represents a 30 percent increase. The total average water use in the CSEC RWSP area is projected to increase 21 percent from approximately 353.2 million gallons per day (mgd) in the base year to 427.9 mgd in 2040.

Based on the results of the CSEC water resource assessment, SJRWMD determined that water supply planning pursuant to section 373.709, *Florida Statutes*, was necessary since traditional water sources alone cannot supply the projected 75 mgd increase in water demand while at the same time sustaining water resources and related natural systems during the 20-year planning horizon. The water resource assessment projected that adopted minimum flows and levels would not be achieved and predicted an increased potential for degradation of water quality resulting from saltwater intrusion. The CSEC RWSP identifies projects and measures that, when implemented, will meet the current and future water use needs of the region, while avoiding harm to water resources.

One of the major components of the CSEC RWSP is a focus on water conservation. The CSEC RWSP describes water conservation efforts which could potentially reduce the projected 2040 water demand by as much as 38.2 mgd. This represents approximately 51 percent of the projected 75 mgd increase in demand over the 20-year planning horizon. Implementation of water conservation measures can be more cost effective than constructing alternative water supply projects and is encouraged by SJRWMD.

In addition to water conservation, the CSEC RWSP identifies an additional 191 mgd of potential water resource and water supply development project options to assist water users and suppliers in their efforts to meet projected water demands while protecting natural resources. Project options range from aquifer recharge and potable reuse to alternative water supply sources like reclaimed, surface water, and stormwater. The integrated approach outlined in the CSEC RWSP includes:

- Continued implementation of water conservation measures and other demand management strategies
- Development of alternative water supplies
- Optimization of groundwater withdrawals through a cooperative approach between water users
- Additional evaluation and modeling of identified projects to implement the most cost-effective options
- Continued implementation of identified water resource and water supply development projects

The CSEC RWSP provides a roadmap that offers options to achieve sustainable water use through the planning horizon. SJRWMD will continue to encourage and support project implementation within the CSEC RWSP area to ensure a sufficient water supply to meet 2040 water demand, while protecting water resources and associated natural systems.

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List of Acronyms

ASR	Aquifer Storage and Recovery
AWS	Alternative Water Supply(ies)
BEBR	Bureau of Economic and Business Research
BMPs	Best Management Practices
CSEC	Central Springs/East Coast
cfs	Cubic Feet per Second
CFWI	Central Florida Water Initiative
CII	Commercial/Industrial/Institutional Self-supply
CUP	Consumptive Use Permit
Districts	Florida's Five Water Management Districts
DOWN	District Observation Well Network (SJRWMD)
DSS	Domestic Self-supply and Small Public Supply Systems
ECFTX	East-Central Florida Transient Expanded Model Version 1.0
EDR	Electrodialysis Reversal
EQIP	Environmental Quality Incentives Program
ET	Evapotranspiration
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
FY	Fiscal Year
GIS	Geographic Information Systems
GPCD	Gallons Per Capita Per Day
LFA	Lower Floridan Aquifer
LRA	Landscape/Recreational/Aesthetic Irrigation Self-supply
M	Million (as expressed in million dollars)
MD	Mining/Dewatering Self-supply
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
NDMv5	Northern District Model Version 5
NRCS	Natural Resources Conservation Service
OAWP	Office of Agriculture Water Policy
OFS	Outstanding Florida Spring(s)
PG	Power Generation Self-supply
PSC	Florida Public Service Commission
RO	Reverse Osmosis
RWSP	Regional Water Supply Plan
s.	Section within Florida Statutes and Florida Administrative Code
SAS	Surficial Aquifer System

SCPE	Single-Continuum Porous-Equivalent
SDWS	Secondary Drinking Water Standard
SFWMD	South Florida Water Management District
SJRWMD	St. Johns River Water Management District
SWFWMD	Southwest Florida Water Management District
ss.	Subsection and Further Subdivisions within Florida Statutes and Florida Administrative Code
TDS	Total Dissolved Solids
UFA	Upper Floridan Aquifer
WIFIA	Water Infrastructure Finance and Innovation Act
WPSP	Water Protection and Sustainability Program
WRCA	Water Resource Caution Area
WWTF	Wastewater Treatment Facility

Central Springs/East Coast Regional Water Supply Plan (2020–2040)

Chapter 1: The Central Springs/East Coast Regional Water Supply Plan Area

Introduction

Subsection (ss.) 373.709(1), *Florida Statutes* (F.S.), requires that the state's five water management districts (Districts) conduct water supply assessments to identify areas where traditional sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses while sustaining the water resources and related natural systems for the planning period. If such areas are identified, water supply planning is then required for those areas. Water supply plans identify water needs, sources, and project options for at least a 20-year time frame (i.e., planning horizon)(ss. 373.709(2), F.S.) The St. Johns River Water Management District (SJRWMD) is represented by three regional water supply planning regions; the North Florida Regional Water Supply Plan Partnership, the Central Florida Water Initiative (CFWI), and the Central Springs/East Coast (CSEC) planning area (Figure 2). This document serves as the regional water supply plan (RWSP) for the CSEC planning area and 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 2040 and avoid unacceptable water resource impacts.

The CSEC RWSP area includes all or part of six counties in SJRWMD; Volusia, Lake, Marion (the SJRWMD portion), Brevard (excluding the City of Cocoa which is included in the CFWI), Indian River, and the small section of Okeechobee County that falls within SJRWMD jurisdiction (Figure 3). The CSEC RWSP area is different from other SJRWMD planning areas as it includes portions of SJRWMD that are currently covered by three different groundwater flow models and, therefore, requires three distinct water resource assessments. The CSEC RWSP discusses general methodologies and assessment results summarized for the planning region as a whole. Additional information specific to the three sub-regions covered by different groundwater models is provided in Appendix A. These sub-regions include:

- Volusia County
- SJRWMD-portion of Marion County and the northern, or non-CFWI, portion of Lake County (defined as North Lake County throughout the document)
- Brevard (excluding the City of Cocoa service area) and Indian River counties along with the SJRWMD-portion of Okeechobee County

Persons interested in additional material from that provided in the CSEC RWSP should refer to the detailed information offered in the appendices.

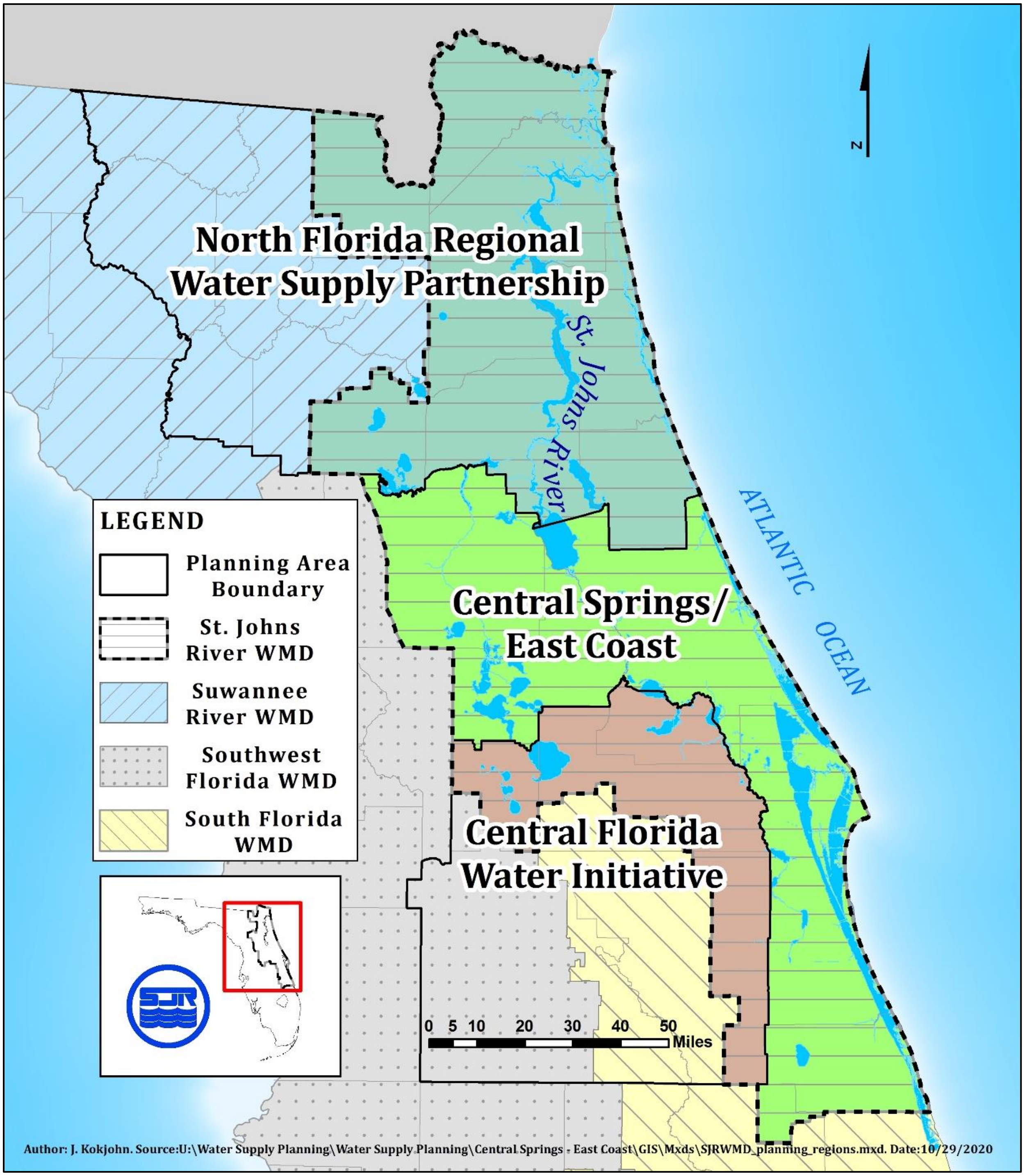

Figure 2: Location of SJRWMD water supply planning regions

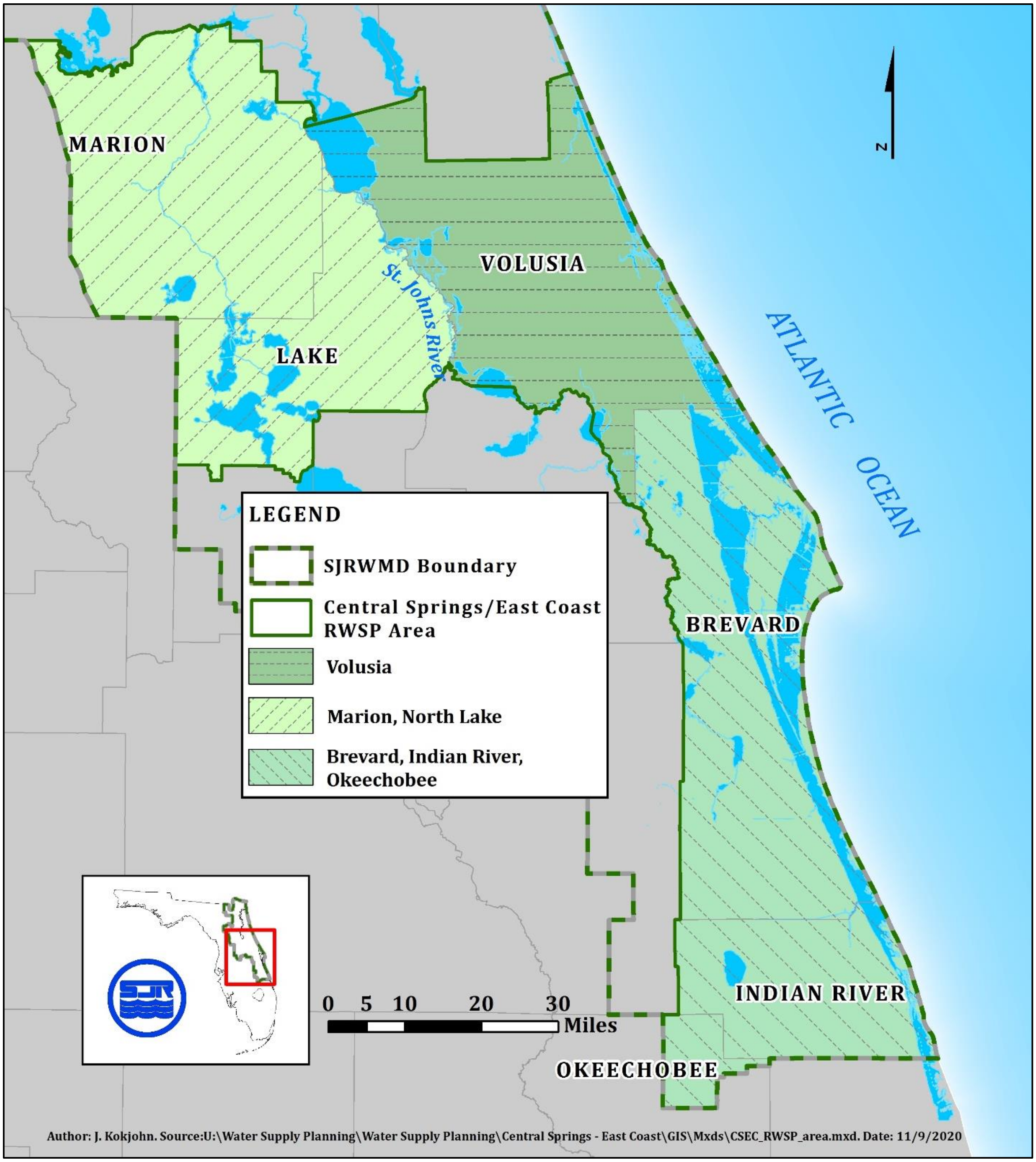

Figure 3: The Central Springs/East Coast Regional Water Supply Plan area

Base Year

Population and water demand projections are essential components to regional water supply plan development. In developing population and water demand projections, a base year comprised of actual population and water use data is needed. The base year is the "starting point" to which projected changes in population and water demand are applied.

For the CSEC RWSP, the base year is 2015, which was the most current year with population and water use data at the time projections were developed. Population and water demand were then projected at five-year intervals throughout the 20-year planning horizon, 2020 through 2040, per statewide regional water supply planning guidelines.

Population

The estimated population in the CSEC RWSP area during the base year, 2015, was just over 1.51 million people. In 2019, population was estimated at 1.65 million.

Primary Surface Water Basins

The primary surface water basins within the CSEC RWSP area include the Indian River Lagoon, portions of the Lower, Middle and Upper St. Johns River, Ocklawaha River, Lake George, Northern Coastal, and Florida Ridge basins. Significant surface water features include the St. Johns River and associated lakes (Washington, Poinsett, Harney, and Monroe), the lakes within the Upper Ocklawaha chain, portions of the Lower Ocklawaha River, and the Indian River Lagoon.

Groundwater Resources

Groundwater resources in the CSEC RWSP area include the Floridan Aquifer System (FAS), which is comprised of the Upper Floridan aquifer (UFA) and the Lower Floridan aquifer (LFA), the Intermediate Confining Unit (ICU)/Intermediate Aquifer System (IAS), and the Surficial Aquifer System (SAS). Figure 4 shows a representative diagram of the SAS, ICU/IAS, and the FAS while Figure 5 shows their spatial extent in Florida. These aquifer systems are discussed below.

Floridan Aquifer System (FAS)

The FAS underlies the entire state of Florida and is the predominant source of water in the CSEC RWSP area because of good water quality (in most of the region), high productivity, and wide-spread accessibility. The FAS is composed of sequential layers of limestone and dolostone and is traditionally subdivided into the Upper and Lower Floridan aquifers (UFA and LFA), which are separated by a less productive or nonproductive horizon called the middle confining unit. The degree of confinement between the UFA and LFA is variable across the CSEC RWSP area (Miller 1986) as well as the water quality, which can vary from fresh to brackish.

Surficial Aquifer System (SAS)

The SAS is composed primarily of unconsolidated, sandy and shelly sediments. The SAS is a source for public supply in Brevard and Indian River counties. It is also used for domestic self-supply in the coastal counties within the CSEC RWSP area. Utilities who have historically relied on the SAS to meet all or a portion of their demand, have been transitioning to alternate sources to mitigate for wetland and water quality impacts.

Use of the SAS for public supply is expected to continue to decline and be replaced in many cases with brackish water from the FAS.

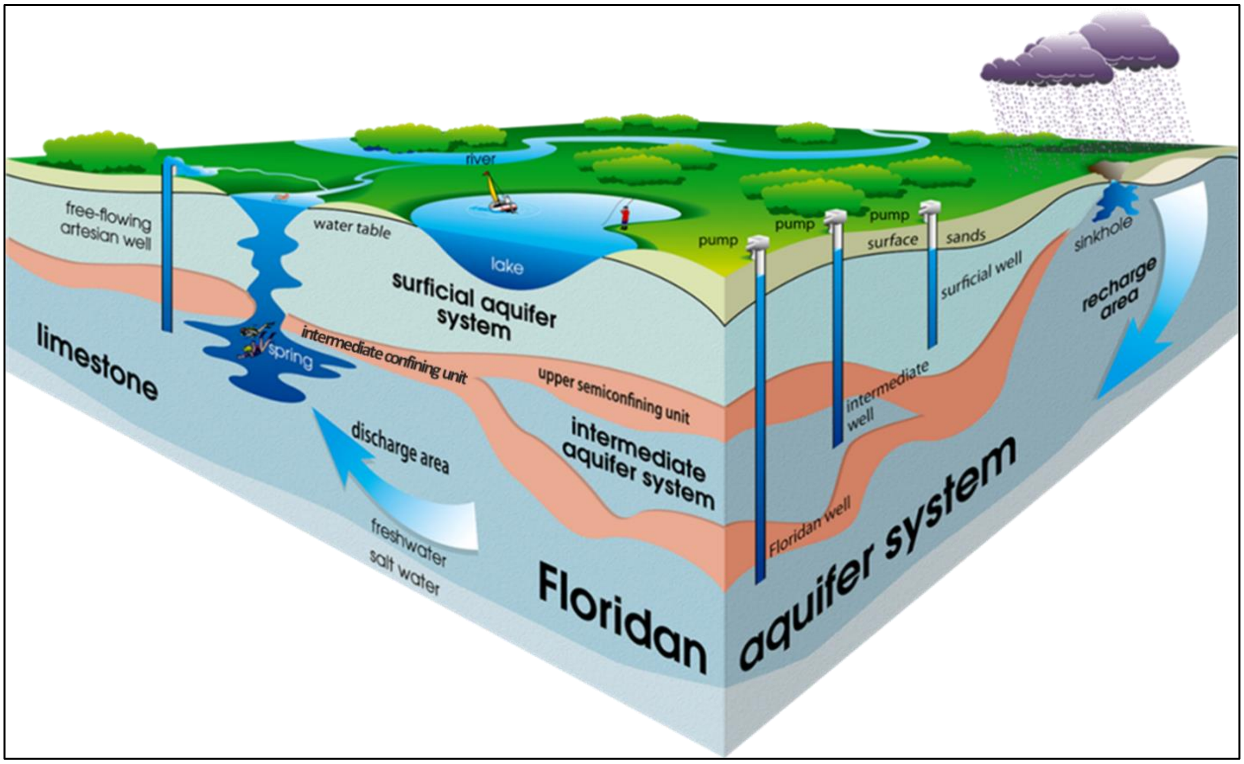

Figure 4: Representative diagram of the aquifer systems within the CSEC RWSP area

Intermediate Confining Unit (ICU)/Intermediate Aquifer System (IAS)

The ICU is a confining layer between the SAS and the FAS consisting of clayey sand and clay, which can contain layers of water bearing zones of permeable deposits such as limestone. In areas where the ICU is regionally productive (mostly in Southwest Florida Water Management District (SWFWMD); see Figure 5), the ICU may be referred to as the Intermediate Aquifer System (IAS). In the CSEC RWSP area, the ICU yields little or no significant amount of water, although there may be localized use (for domestic self-supply and private irrigation) where pockets of permeable material exist within. Due to its comparatively low yields and limited spatial extent, the ICU will not have a significant role in meeting future water demands in the CSEC RWSP area.

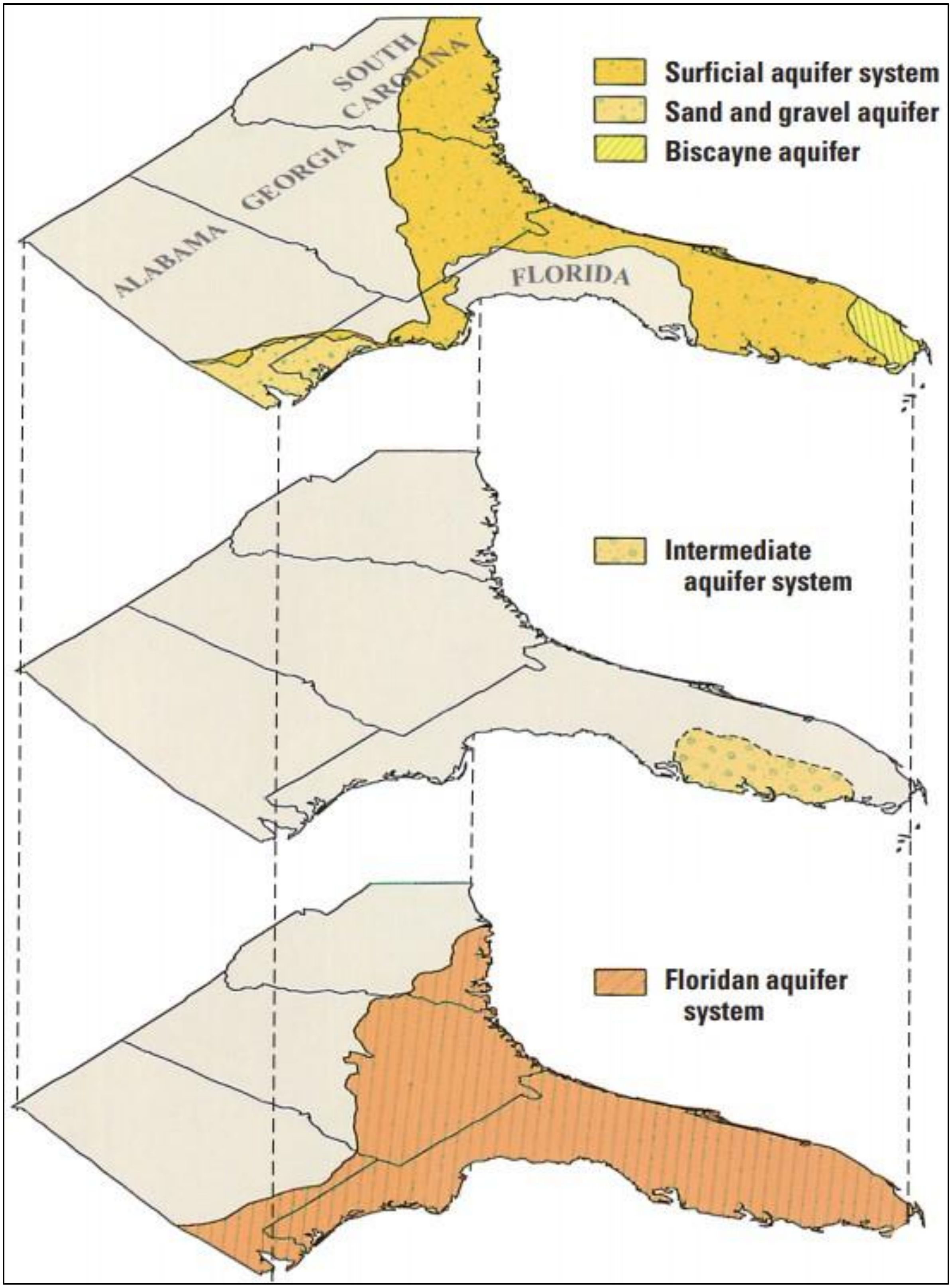

Figure 5: Diagram of the spatial extent of aquifer systems in Florida (adapted from Williams et al. 2016)

Springs

There are numerous springs within the CSEC RWSP area, including six that are classified as Outstanding Florida Springs (OFS) per ss. 373.802(4), F.S.: Alexander Springs in North Lake County; Silver and Silver Glen springs in Marion County; and Blue, DeLeon, and Gemini springs in Volusia County (Figure 6). Four of these springs (Alexander, Silver, Silver Glen, and Blue) are classified as first-magnitude springs, defined as having flows of at least 100 cubic feet per second (cfs). The remaining two OFS, DeLeon and Gemini springs, are classified as second-magnitude springs, defined as having flows between 10 and 100 cfs. There are seven additional second magnitude springs within the CSEC RWSP area including Bugg, Messant, and Seminole springs in North Lake County and Fern Hammock, Juniper, Salt, and Sweetwater springs in Marion County.

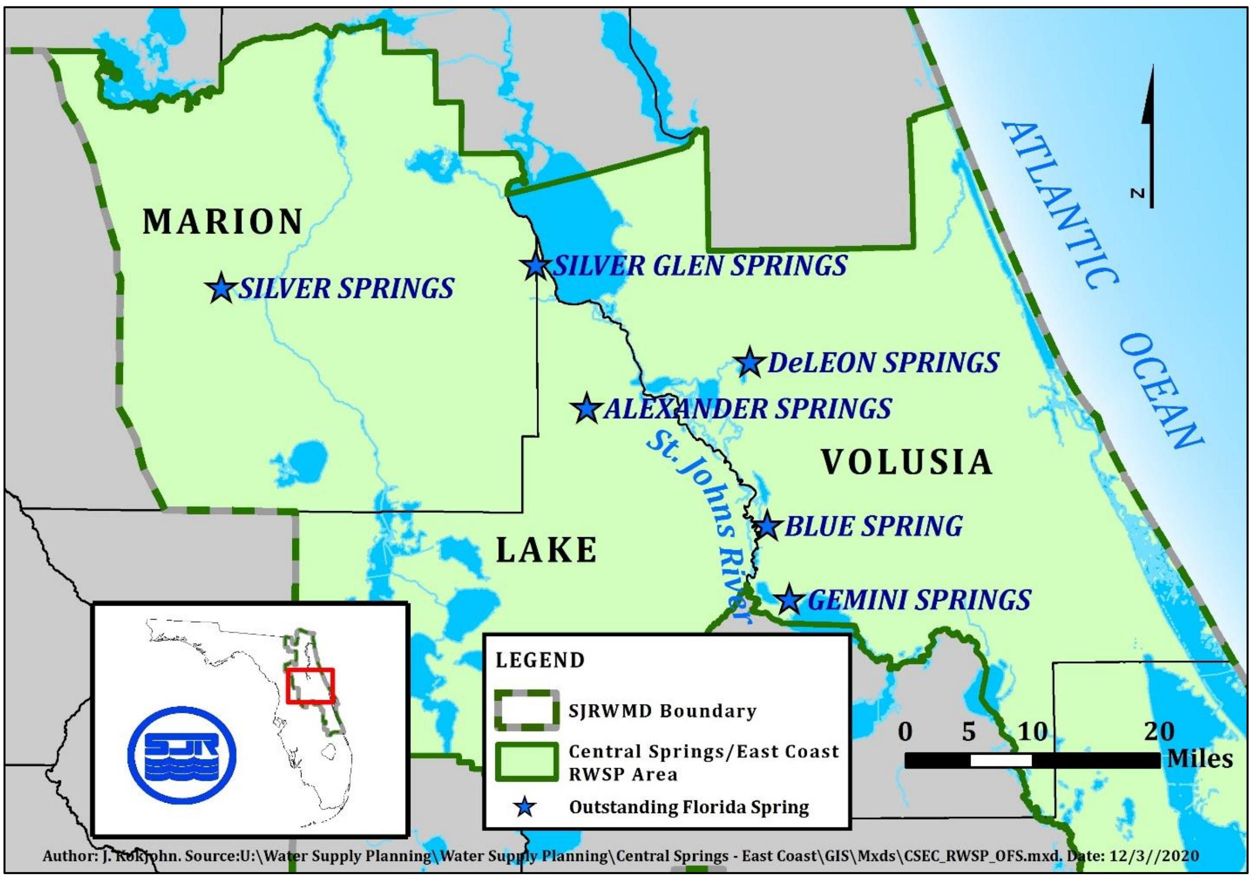

Figure 6: Location of Outstanding Florida Springs in the CSEC RWSP area

Traditional Water Sources

Fresh groundwater with less than 500 milligrams per liter (mg/L) total dissolved solids (TDS), 250 mg/L chloride, and 250 mg/L sulfate has been the primary water supply source in the CSEC RWSP area 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 the CSEC RWSP area was from fresh groundwater during 2015. Given a consistent pattern of historic and current utilization of fresh groundwater, SJRWMD recognizes fresh groundwater as the only traditional water supply source in the CSEC RWSP area and designates all other water sources to be nontraditional (i.e., alternative water supplies (AWS); (ss. 373.019(1), F.S.)). Nontraditional or alternative sources include brackish groundwater, seawater, surface water, reclaimed water, stormwater, or water stored in aquifer storage and recovery facilities or reservoirs. In Marion and North Lake counties, the LFA is also considered a nontraditional source, so long as site-specific hydrogeologic investigations confirm adequate confinement between the UFA and LFA.

Chapter 2: Introduction to Water Supply Planning

Introduction

Florida's five Districts 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 major components of a water supply plan include:

- Projected water demands for all use types through the planning horizon
- Potential water resource impacts that could occur as a result of meeting the projected increase in water demand with traditional sources
- Technically and economically feasible water resource and water supply development project options that could be implemented to meet future water demands while preventing the loss of natural resources

Legislative Mandates

Section (s.) 373.709, F.S., provides that the Districts 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 Districts 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, the Florida Department of Environmental Protection (FDEP), the Florida Department of Agriculture and Consumer Services (FDACS), and other affected and interested parties. In addition, each RWSP 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

Relationship to SJRWMD Regulatory Programs

Subsection 373.709(7), F.S., states that nothing contained in the water supply development component of the CSEC RWSP 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 RWSP. Pursuant to ss. 373.709(7), F.S., the CSEC RWSP may not be used in the review of consumptive use permit (CUP) applications, unless the RWSP 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 CSEC RWSP and provides reasonable assurances of the applicant's capability to design, construct, operate, and maintain the project; then it is presumed that the AWS use by the applicant is consistent with the public interest (ss. 373.223(5), F.S.).

It is important to note that, while the CSEC RWSP may not be used in the review of CUP applications, SJRWMD may use data or other information used to develop the RWSP for regulatory purposes.

CSEC RWSP Outreach

During plan development beginning in 2016, SJRWMD held more than 38 focused meetings with local governments, regional organizations, utilities, the agricultural community, and other interested parties in the CSEC RWSP area. The purpose of the meetings was to share an overview of the CSEC RWSP process, provide background information of interest to stakeholders, and answer questions. SJRWMD also solicited feedback and project concepts. This effort provided a valuable means for stakeholders to engage with the CSEC RWSP development and share their perspectives with SJRWMD. In cases where feedback from local governments included updated or revised data, the data was considered during development of the CSEC RWSP pursuant to ss. 373.709(1), F.S. SJRWMD found the expanded input received during these discussions to be beneficial to the development of the CSEC RWSP.

In order to promote coordination and collaboration with state and regional agencies, once a draft of the CSEC RWSP was complete, it was provided to FDEP, FDACS, SWFWMD, South Florida Water Management District (SFWMD), and the Withlacoochee Regional Water Supply Authority for their review and comment prior to public release.

Approval Process

A total of four public workshops were held in July 2021 to discuss information pertaining to the CSEC RWSP consistent with ss. 373.709(1), F.S. A technical methods workshop to present the technical data and modeling tools used to support the CSEC RWSP was held on July 21, 2021. Three additional public workshops — held on July 26, July 28, and July 29, 2021 — communicated the status, overall conceptual intent, and impacts of the CSEC RWSP on existing and future reasonable-beneficial uses and related natural systems. The draft CSEC RWSP was posted for 47 days for public comment beginning on July 12, 2021. Comments received during the public workshop and comment period were incorporated, as appropriate, into the CSEC RWSP. All received public comments and SJRWMD responses are provided in Appendix M.

SJRWMD presented the CSEC RWSP to its Governing Board on February 8, 2022, at which time they voted unanimously for approval.

Requirements after Plan Approval

The SJRWMD water supply planning process is closely coordinated and linked to the water supply planning efforts of local governments and utilities. Significant coordination and collaboration throughout the development, approval, and implementation of the CSEC RWSP is necessary among all water supply planning entities.

Subsection 373.709(8)(a), F.S., requires SJRWMD to notify water supply entities identified in the CSEC RWSP as the parties responsible for implementing the various project options listed in the CSEC RWSP. When the notice is received by the water supply entity, the water supplier must respond to SJRWMD within 12 months about their intentions to develop and implement the project options identified by the CSEC RWSP 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 CSEC RWSP. 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 CSEC RWSP 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 CSEC RWSP or proposed by the local government;
- Identifying water supply projects to meet the water needs identified in the CSEC RWSP within the local government's jurisdiction; and

- 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: Overview of Water Demand Components and Methods

Purpose

SJRWMD develops water demand projections to estimate future water needs, identify viable existing and reasonably anticipated sources of water to meet those needs, and identify water conservation potential. SJRWMD's goal in projecting water demands is to develop estimates that are reasonable, based on the best information available, and that are agreed to by both the water users and SJRWMD. 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, during the planning horizon.

Water use and projected water demand in SJRWMD 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 Self-supply (CII) and Mining/Dewatering Self-supply (MD)
- Power Generation Self-supply (PG)

Definitions for these water use categories are provided in Appendix B. SJRWMD also projects future reclaimed water flows, which can potentially offset future water demand.

Assumptions

For the purposes of the CSEC RWSP, SJRWMD assumed that projected increases in demand will be met from traditional sources, unless users are authorized via their consumptive use permit to develop and utilize other sources. Many public water supply utilities in Florida are in varying stages of transitioning exclusively from traditional 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 methodologies utilized in the CSEC RWSP for all population and water demand projections, as well as their spatial distribution, are provided in Appendix B.

Population

Population projections yield the estimated population growth throughout the 2040 planning horizon and the percent change. SJRWMD estimates the population projections for water supply utilities in two categories; public supply and small public supply systems. For both categories, SJRWMD used a parcel-level population distribution method, as described in Appendix B. For domestic self-supply (DSS), SJRWMD also used a parcel-level population distribution method, as described in Appendix B, aligning the county-level growth rates to the Bureau of Economic and Business Research (BEBR) medium population projections for each county (Rayer and Wang 2017).

SJRWMD's total population for the CSEC RWSP area is expected to increase by more than 456,000 people (30% to approximately 1.96 million people) by 2040 (Figure 7). Public supply represents 84 percent of the 2040 total population projection, and DSS and small public supply systems represent the remaining 16 percent. The largest percent increase in population is projected to occur in Brevard, Indian River, and Okeechobee counties (34%), followed by Marion and North Lake counties (30%), and Volusia County (27%).

SJRWMD evaluated the 2019 population for the CSEC RWSP area to determine if realized population growth is in line with 2020 projected population. The 2019 population was 1.65 million whereas the 2020 projected population shows 1.67 million, or a 1.2 percent increase from 2019. The total projected increase in population from the base year to 2040 also represents a 1.2 percent increase per year. Therefore, it appears that realized population remains on track with projections when using 2015 as the base year.

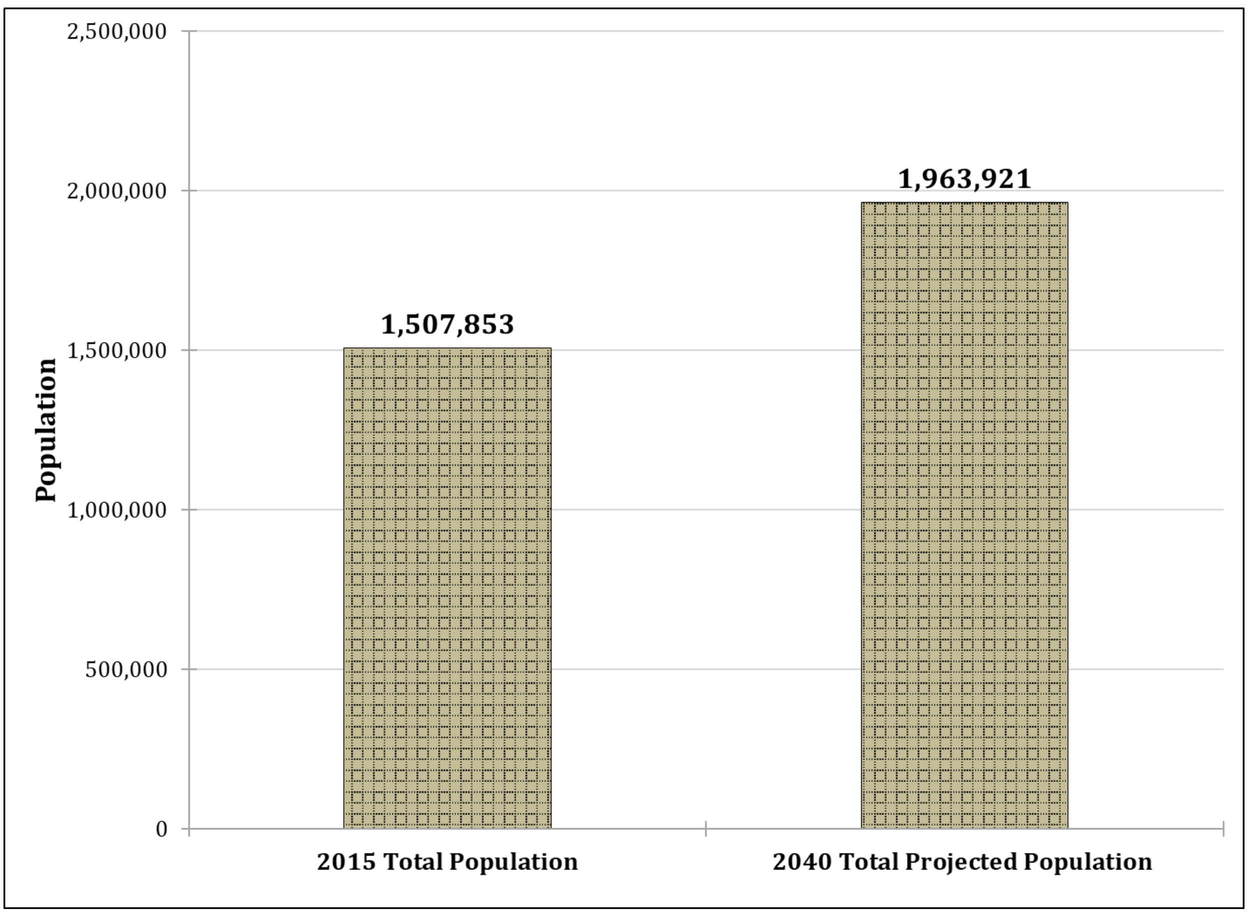

Figure 7: 2015 Population and 2040 projected population in the CSEC RWSP area

Water Demand Projections

Total water demand in the CSEC RWSP area is anticipated to increase from 353.2 million gallons per day (mgd) in 2015 to 427.9 mgd in 2040 (21%)(Figure 8). Public supply represents the largest demand in the CSEC RWSP area (45%), followed by agriculture (29%), LRA (13%), DSS (7%), CII/MD (4%), and PG (3%)[1]. SJRWMD also calculated a 1-in-10 year drought water demand for 2040, 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 total water demand in 2040 could increase by an additional 19 percent (81 mgd) if a 1-in-10 year drought event occurred.

SJRWMD compiled water use data for 2016 through 2019 for the CSEC RWSP area to determine if significant changes in water use had occurred since the base year. Total water use for these years fluctuated between 6 and 20 percent of the 2015 total. Agricultural water use showed the greatest variation, which can be directly linked to precipitation timing and quantity. The average water use within the CSEC RWSP area from 2016 to 2019 was approximately 365.0 mgd. This average falls within the range bracketed by 2015 water use and 2020 projected water demand.

[1] Due to rounding to whole percent values, total does not equal 100.

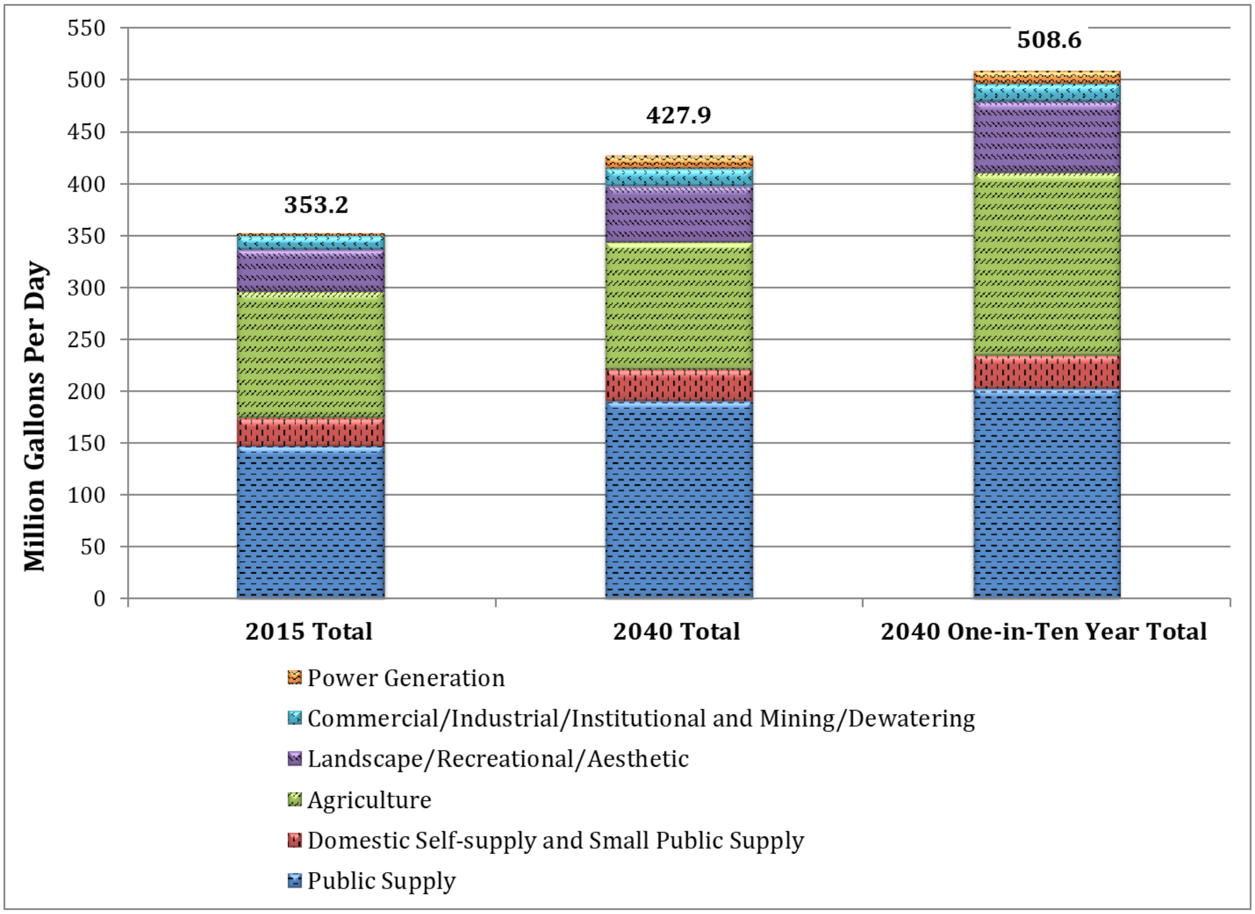

Figure 8: 2015 Water use and 2040 water demand projections in the CSEC RWSP area by category

Public Supply

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

SJRWMD calculated water demand for each public supply and small public supply (defined below with DSS) 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 water uses served by the water supplier (e.g., commercial facilities, schools, parks, industrial complexes, etc.).

Demand

For the CSEC RWSP, SJRWMD based the public supply and small public supply systems water demand projections on the 2011 to 2015 five-year average gross per capita rate, which was the most current five-year period at the time projections were developed. The gross per capita water use rate is the factor applied to projected population to determine future water demand. Gross per capita is the appropriate rate to utilize when projecting public supply demand since public supply provides water for other uses in addition to residential, whereas residential per capita does not include these other uses. 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 public supply system 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. SJRWMD 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 water conservation, decreases in potable water used for landscape irrigation, 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 occupancy can increase the gross per capita rates. Changes to the factors affecting gross per capita rates and public supply water demands that occur over time are captured during the five-year water supply plan updates.

Total public supply water demand for the CSEC RWSP area is expected to increase by 43 mgd (29% to approximately 191.0 mgd) by 2040 (Figure 9). Public supply represents 45 percent of the 2040 projected water demand in the CSEC RWSP area. Of note, public supply also represents 58 percent of the total projected increase in water demand in the CSEC RWSP area.

SJRWMD also calculated a 1-in-10 year drought water demand for 2040 (shown in Figure 9). It is estimated that public supply water demand in 2040 could increase by an additional 6 percent (11.5 mgd) if a 1-in-10 year drought event occurred.

Projected demand for small public supply systems (systems less than 0.1 mgd) is not included in the public supply category. SJRWMD 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, discussed next.

SJRWMD evaluated public supply and DSS water use compared to population for the five-year period of 2015 to 2019 to determine if there had been any significant changes in per capita (from the 2011 to 2015 average) that may impact public supply and DSS projections. The results show a difference of less than one percent when compared to values used for projections. Therefore, the use of 2011 to 2015 average per capita water use for public supply and DSS demand projections continues to be appropriate.

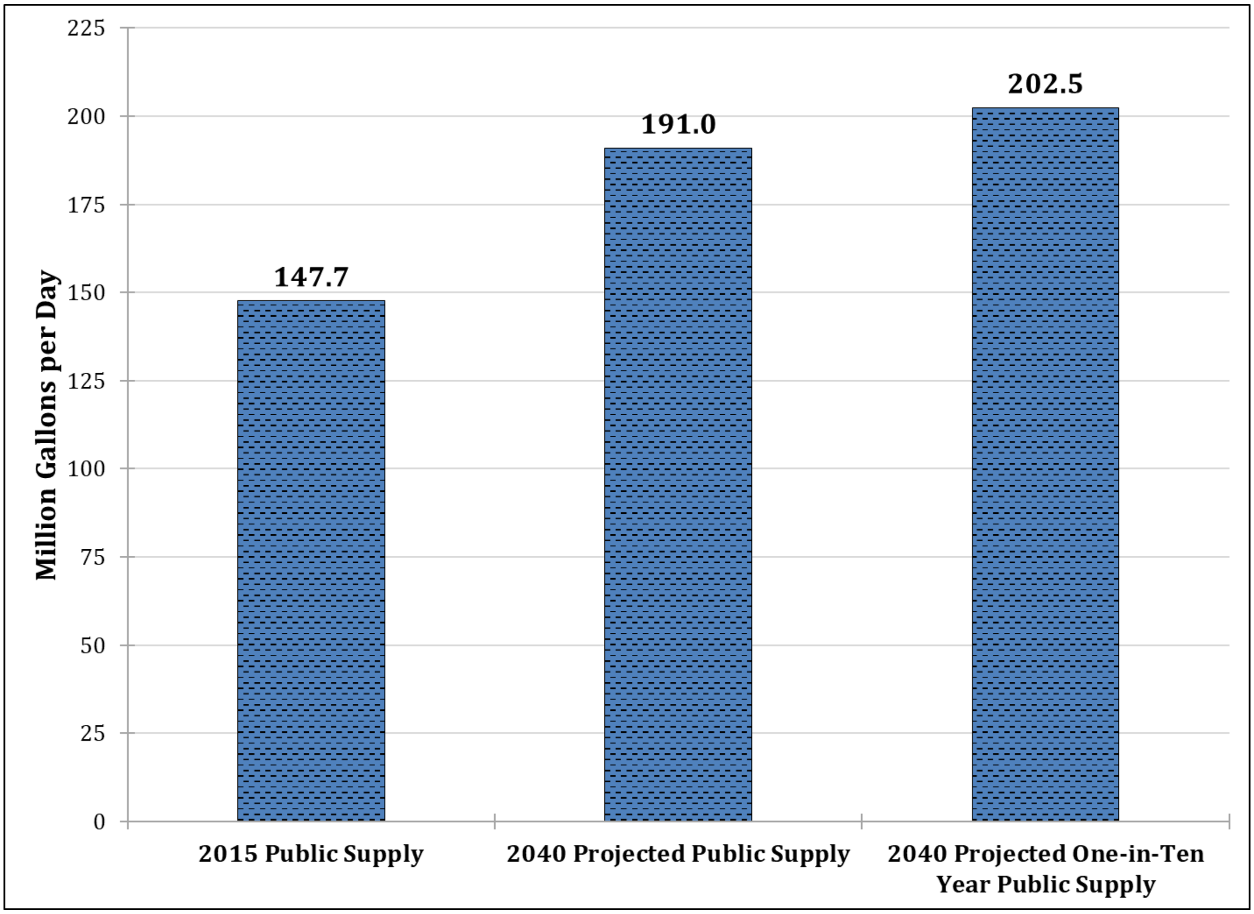

Figure 9: 2015 Public supply water use and 2040 water demand projections in the CSEC RWSP area

Domestic Self-Supply

The DSS category consists of residential dwellings not served by a public supply and small public supply systems (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 CSEC RWSP, SJRWMD based the DSS water demand projections on the 2011-2015 five-year average residential per capita rate for each county. The residential per capita rate is defined as the water used solely for residential purposes (both indoor and outdoor) divided by the total population in the category. Gross per capita is not used for this category since it includes uses other than residential.

Total DSS and small public supply system water demand for the CSEC RWSP area is expected to increase by 3.5 mgd (13% to approximately 30.3 mgd) by 2040 (Figure 10). In this water use category, domestic self-supply represents 87 percent of the 2040 projected water demand, with the remaining 13 percent representing small public supply systems.

SJRWMD also calculated a 1-in-10 year drought water demand for 2040 (shown in Figure 10). It is estimated that water demand in 2040 would increase by an additional 6 percent (1.8 mgd) if a 1-in-10 year drought event occurred.

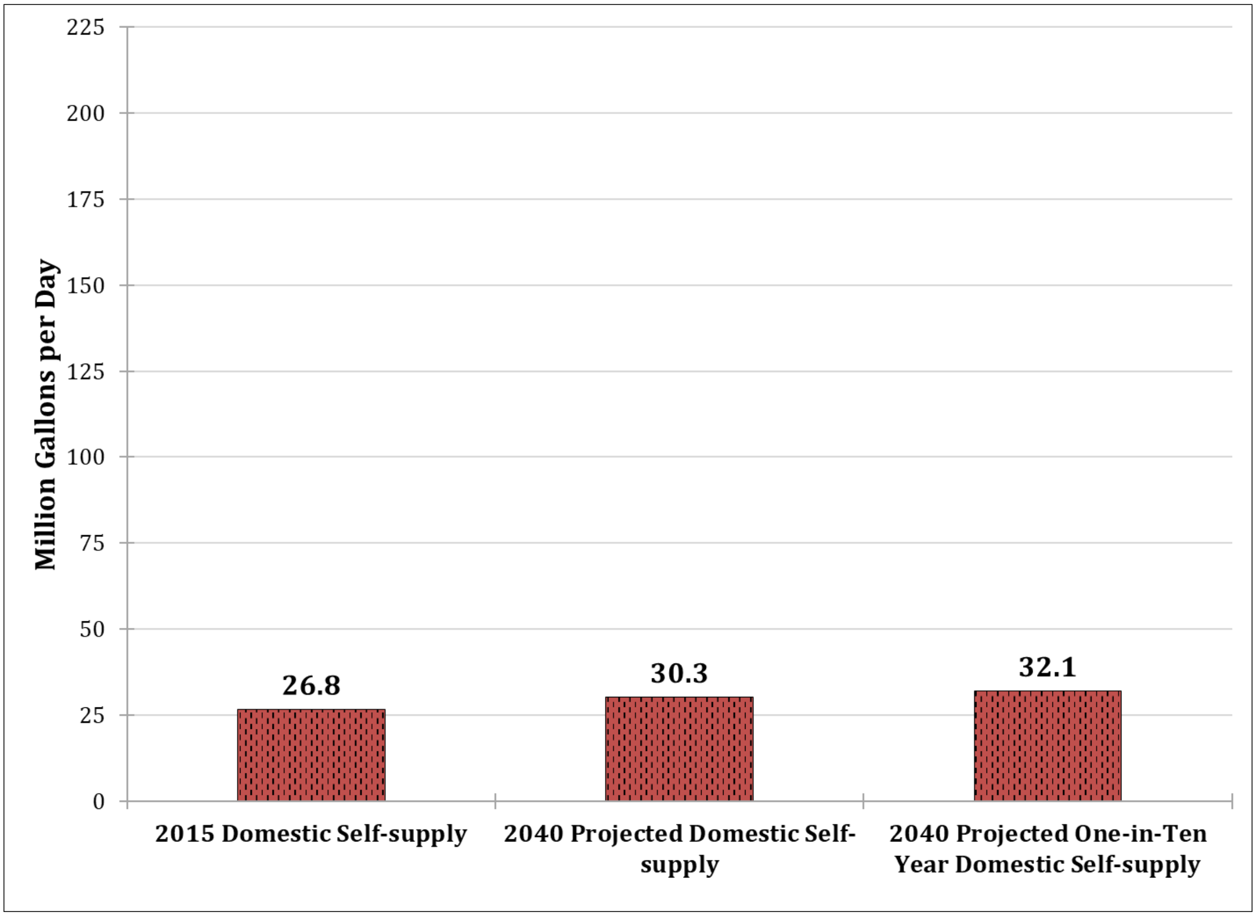

Figure 10: 2015 Domestic self-supply (combined) water use and 2040 water demand projections in the CSEC RWSP area

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 RWSPs. FDACS developed future agricultural acreage and water demand projections in five-year increments for the state of Florida for the years 2020-2040, as well as a water demand for a 1-in-10 drought year and delivered the final draft to SJRWMD on June 30, 2017 (FDACS 2017). This product is known as the Florida Statewide Agricultural Irrigation Demand (FSAID) and the June 30, 2017 version is identified as FSAID IV.

SJRWMD used the FSAID IV agricultural acreage and water demand projections (FDACS 2017) for the CSEC RWSP. Detailed methodology can be found in the June 30, 2017, FSAID IV Final Report (FDACS 2017).

Acreage and Demand

By 2040, SJRWMD's total agricultural water demand for the CSEC RWSP area is expected to increase by 1.2 mgd (1% to approximately 122.9 mgd) and acreage is expected to decrease by 7,500 acres (7% to approximately 97,000 acres) (Figures 11 and 12). Although agricultural acreage is projected to decrease, water demand is projected to increase due to crop intensification (e.g., double and triple cropping) related to industry trends. Citrus is projected to account for 45 percent of the 2040 agricultural acreage in the CSEC RWSP area, followed by hay at 18 percent and fresh vegetables at 10 percent.

According to FSAID IV, projected water demand in 2040 (which was based on a 5-in-10 year, or average, drought condition) could increase by an estimated 44 percent (53.6 mgd) if a 1-in-10 year drought event occurred (Figure 11).

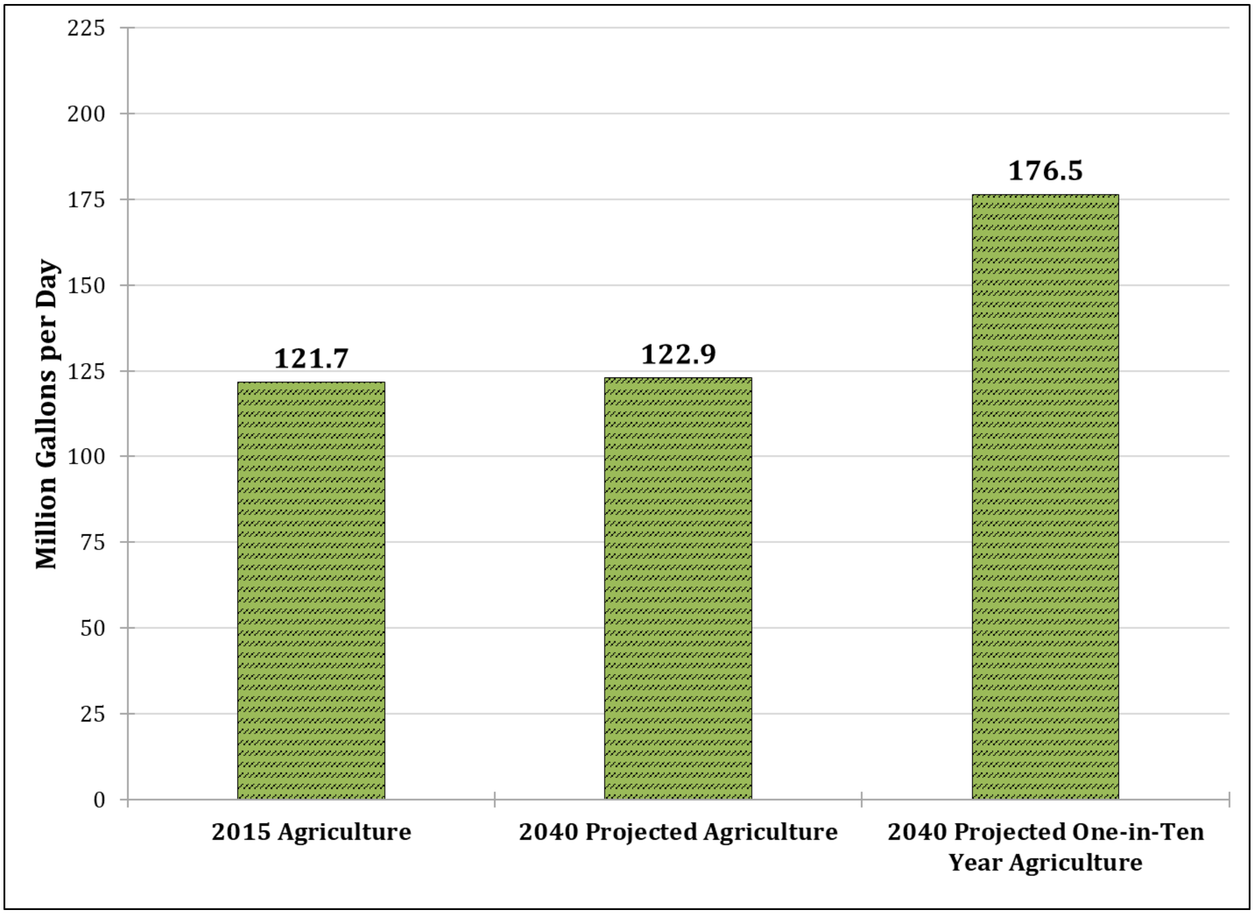

Figure 11: 2015 Agriculture water use and 2040 water demand projections in the CSEC RWSP area (FDACS 2017)

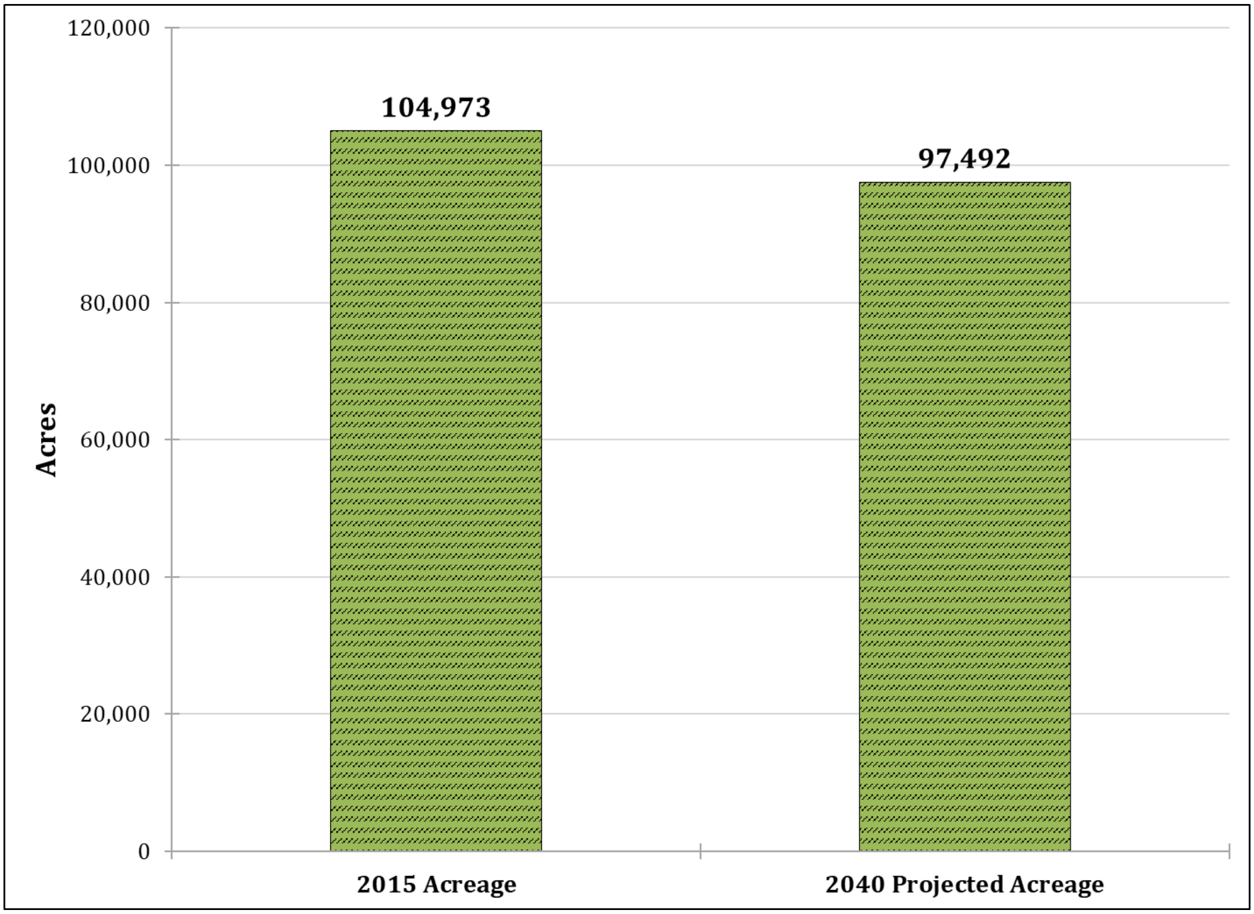

Figure 12: 2015 Agriculture acreage estimates and 2040 acreage projections in the CSEC RWSP area (FDACS 2017)

Commercial/Industrial/Institutional and Mining/Dewatering

The Commercial/Industrial/Institutional (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. The Mining/Dewatering (MD) category includes water uses associated with the extraction, transport, and processing of subsurface materials and minerals and dewatering for 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. CII/MD historic water use and projected water demand consist of only consumptive uses; recycled surface water or non-consumptive uses were not included. For the CSEC RWSP, SJRWMD used the loss of water in the mining operations due to evaporation and water removed in the product to calculate demand. The amount of water lost is represented by 5 percent of the total surface water withdrawn by the mine operation. The remaining surface water was assumed to be recirculated in the mining process and, therefore, is considered nonconsumptive. For further clarification, SJRWMD defines 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 (Rayer and Wang 2017) for each five-year increment and the associated water demand was added to the 2015 base-year water use. Water demands for large commercial and industrial facilities that are not impacted by population growth (e.g., pulp and paper mills) were held constant.

Total combined CII/MD water demand for the CSEC RWSP area is expected to increase by 3.1 mgd (22% to approximately 16.9 mgd) by 2040 (Figure 13).

Since the majority of water use in this category is related to processing and production needs, SJRWMD did not quantify drought event (1-in-10 year) water use projections, which is consistent with state planning guidelines. It was assumed that CII/MD water use would remain fairly constant with varying climatic conditions.

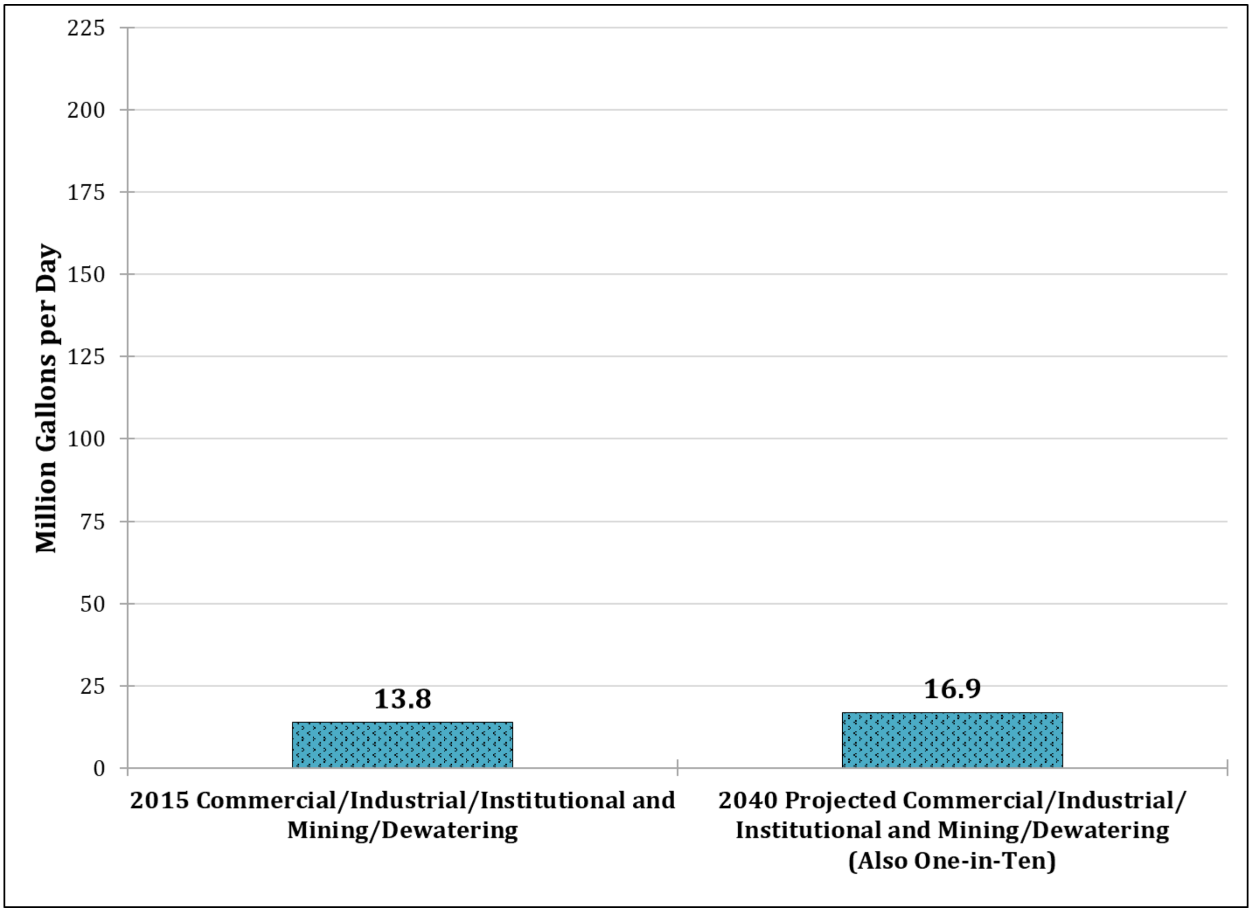

Figure 13: 2015 Commercial/Industrial/Institutional and Mining/Dewatering water use and 2040 water demand projections in the CSEC RWSP area

Landscape/Recreation/Aesthetic

The LRA category represents self-supplied water use associated with the irrigation, maintenance, and operation of golf courses, cemeteries, parks, medians, attractions, and other large, irrigated areas. Landscape use includes the outdoor irrigation 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 rights-of-way, 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.

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 (Rayer and Wang 2017) for each five-year increment and the associated water demand was added to the 2015 base-year water use. Future acreage estimates were interpolated from 2015 acreage and 2015 water use ratios.

Total LRA water demand for the CSEC RWSP area is expected to increase by 13.2 mgd (32% to approximately 54.2 mgd) by 2040. It is estimated that water demand in 2040 could increase by 26 percent (13.8 mgd) if a 1-in-10 year drought occurred (Figure 14).

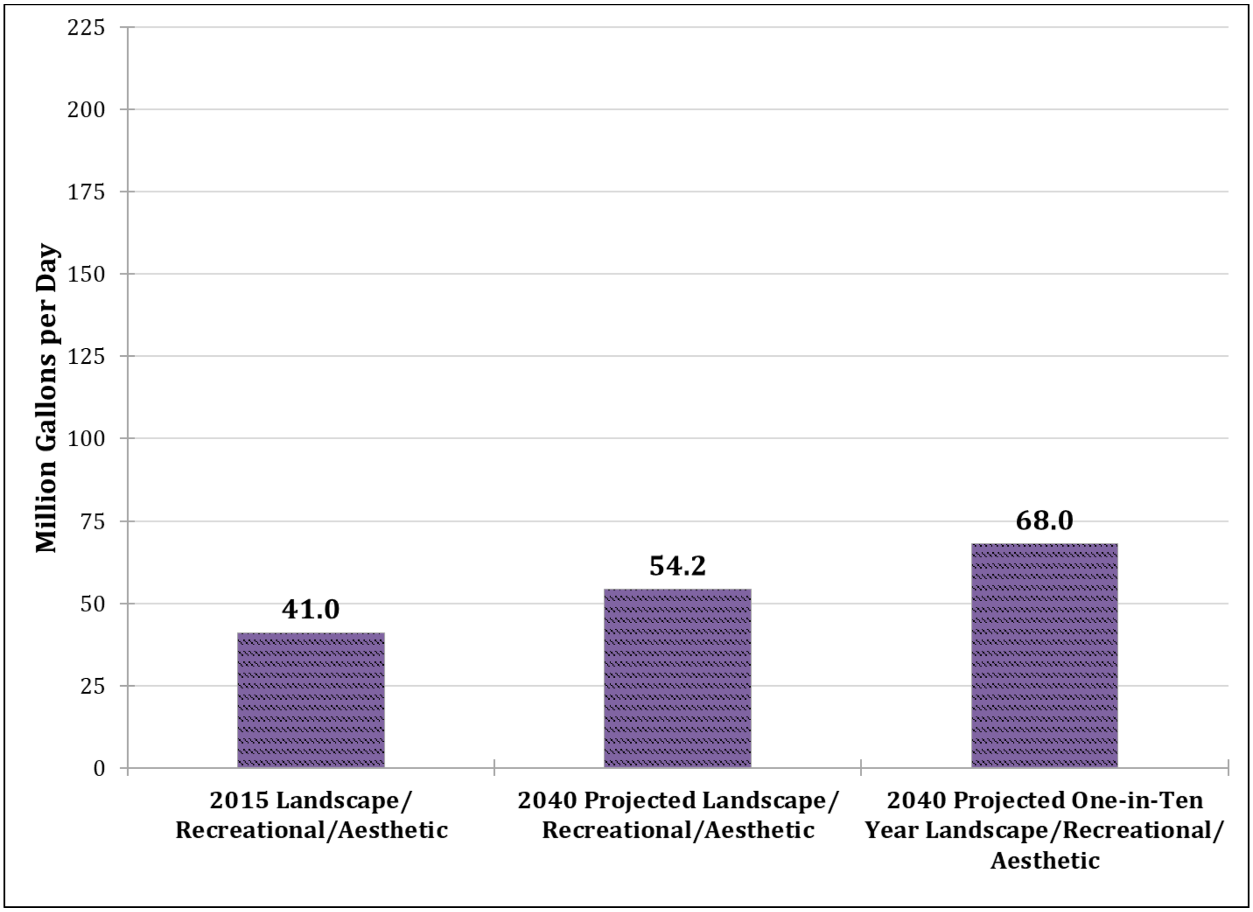

Figure 14: 2015 Landscape/Recreational/Aesthetic water use and 2040 water demand projections in the CSEC RWSP area

Power Generation

The power generation (PG) category represents the water use associated with power plant and power generation facilities. Power generation 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. An example of this nonconsumptive use is surface water used for once-through cooling for power plants, which is recycled. For the CSEC RWSP, consumptive surface water use by PG facilities represents 2 percent of total surface water withdrawals to account for the loss of water due to evaporation.

The Florida Public Service Commission (PSC) requires that each PG entity produce detailed 10-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 10-year site plans for each PG facility within the CSEC RWSP area were downloaded from the PSC website and were used in developing the PG water demand projections (http://www.floridapsc.com/ElectricNaturalGas/TenYearSitePlans).

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 10-year site plans. The projection of PG consumptive water demand beyond the planned expansion in the 10-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 (Rayer and Wang 2017). In addition, the average daily gallon per megawatt use was estimated for 2011–2015 and used as a proxy to project future water demand beyond the 10-year site plans and when projected water demand (for the 10-year site plan period) was not included.

Total PG water demand for the CSEC RWSP area is expected to increase by 10.3 mgd (456% to approximately 12.6 mgd) by 2040 (Figure 15). This increase is due largely to a new power generation facility located in Okeechobee County.

SJRWMD determined that drought events do not have significant impacts on water use in the PG category. Water use for this category is related primarily to processing and production needs.

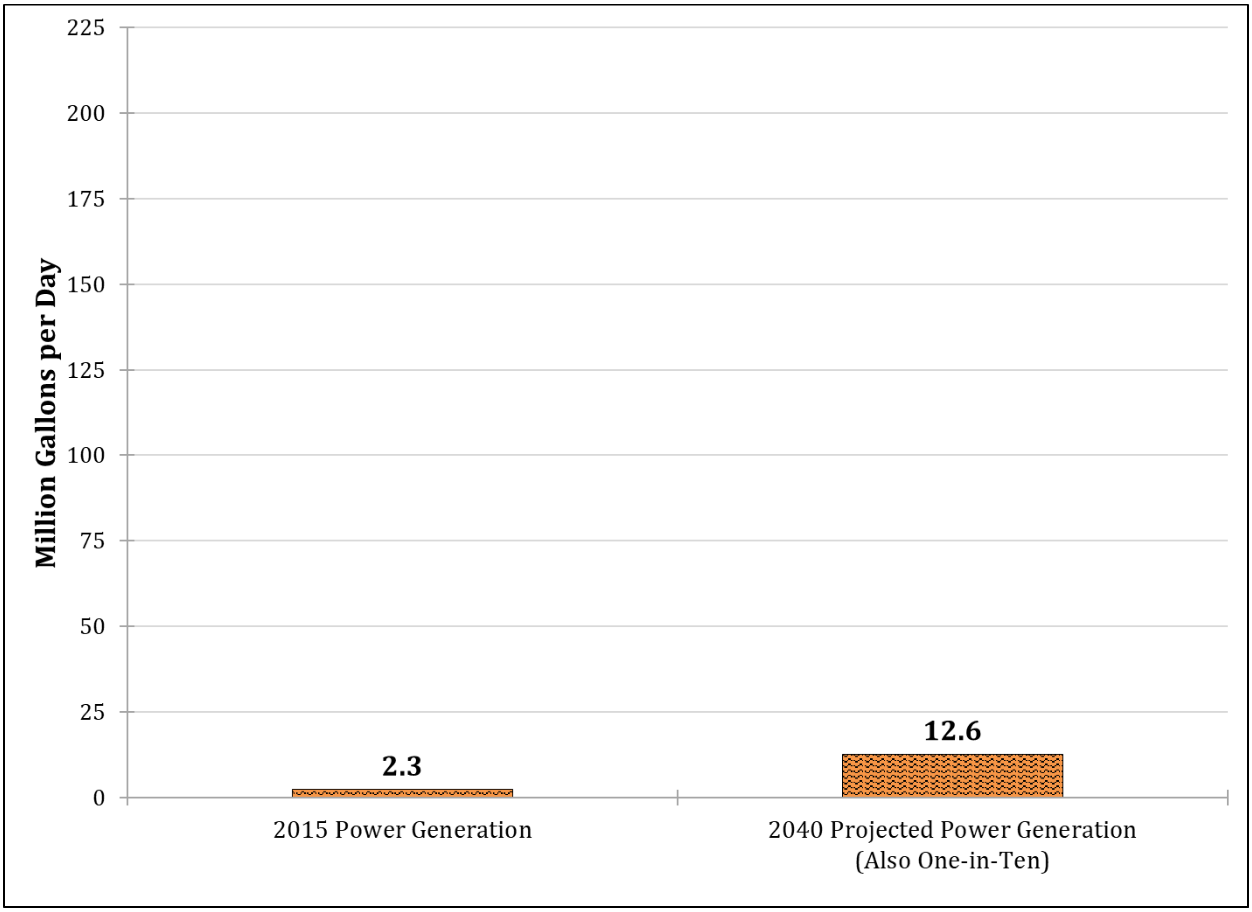

Figure 15: 2015 Power generation water use and 2040 water demand projections in the CSEC RWSP area

Reclaimed Water Projections

Projections were made for domestic wastewater treatment facilities (WWTF) with 2015 permitted wastewater treatment capacities equal to or greater than 0.1 mgd. A detailed methodology for reclaimed water projections is provided in Appendix B.

Existing Flows

SJRWMD considered base year (2015) reclaimed water flows that were not used beneficially to be available for future use. SJRWMD considers 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 by SJRWMD, unless located in recharge areas. Reclaimed water flows in 2015, including both beneficial use and disposal, totaled 83.2 mgd in the CSEC RWSP area. Overall, 47.2 mgd (57%) of reclaimed water was used beneficially in 2015.

Recognizing the potential for increased beneficial reuse of existing flows, SJRWMD employed two methodologies for estimating a reasonable quantity that could be utilized. The first method used the FDEP statewide reuse utilization goal of 75 percent (FDEP 2003). For the CSEC RWSP, the amount of WWTF flows not being utilized beneficially in 2015 was multiplied by 75 percent, and the result (27.0 mgd) was considered as additional existing reclaimed water that could be used for beneficial reuse.

For the second method, SJRWMD applied the 2015 percent beneficial utilization for each facility to the quantity of 2015 wastewater flows that was not utilized beneficially. For example, if a facility treated 5 mgd of wastewater in 2015 and utilized 4 mgd beneficially (80%), the percent beneficial utilization (80%) was applied to the amount not beneficially reused (1.0 mgd) providing an estimated 0.8 mgd of reclaimed water currently available from that facility. The resulting quantity of potential existing reclaimed water in the CSEC RWSP area that could be used beneficially was 13.7 mgd. 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.

Future Flows

SJRWMD identified WWTFs that could potentially receive additional wastewater flow as a result of population growth. It was assumed that 95 percent of the population increase identified within each public supply service area will receive sewer service and thereby return wastewater for treatment (CFWI 2015). It is acknowledged that the actual 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 (Vickers 2001, Mayer and DeOreo 1999, AWWA 1999). The estimated future flow was then multiplied by the FDEP utilization goal of 75 percent (FDEP 2003) and the 2015 beneficial utilization percentage by utility to generate a range of potential 2040 quantities of new additional reclaimed water available for reuse, 21.5 mgd and 16.6 mgd, respectively (Appendix B).

In total, SJRWMD estimated that between 30.3 mgd and 48.5 mgd of additional reclaimed water, including current and future flows, could be reused for beneficial purposes by 2040, potentially offsetting withdrawals from traditional water sources and reducing predicted impacts within the CSEC RWSP area.

SJRWMD recognizes that only a portion of the existing and future wastewater treated for reuse actually 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 CSEC RWSP 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, SJRWMD realizes that future and existing utilization may be higher than estimated if the WWTF provided reclaimed water for reuse to more efficient customers.

SJRWMD also recognizes that potential future wastewater flow could be less if additional residential indoor water conservation is achieved. For example, the American Water Works Association has noted (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).

Water Conservation and Irrigation Efficiency

Current water demand projections and the water conservation potential for the CSEC RWSP area were calculated in an effort to gauge the future benefit of effective water conservation. It is important to note that reductions in water use resulting from current and historical water conservation efforts are reflected in the 2040 water demand projections that were calculated for the CSEC RWSP. Current water demand projections are lower than previously developed for this area, in part, because of the effects of existing water conservation.

For the CSEC RWSP, SJRWMD 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 IV Final Report (FDACS 2017). For the remaining water use categories, SJRWMD employed the methodology developed during the 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 conservation potential was derived from the percent reduction in water use by category associated with the implementation of specific best management practices (BMPs) as calculated within the 2015 CFWI Final RWSP (CFWI 2015). With the percent reductions applied to the 2040 CSEC projected water demand along with FDACS estimates of agricultural irrigation efficiency, it is estimated that approximately 27.0 mgd of the projected demand for 2040 could be reduced if water conservation BMPs were implemented (Table 1). Estimates of water conservation potential for DSS, CII, LRA, and PG were based on the implementation of relevant public supply BMPs.

For the second public supply and DSS conservation scenario, SJRWMD calculated the average 2011-2015 gross per capita rate for each of the three sub-regions in the CSEC RWSP area. For the utilities whose gross per capita was greater than their sub-region average, the sub-region average gross per capita was multiplied by the utility's 2040 population projections to calculate a revised demand. The corresponding percent reduction in public supply demand by county was then applied to DSS. If all public supply systems achieved the average 2011–2015 gross per capita rate for their respective sub-region of the CSEC RWSP area and the same percent savings was applied to DSS demand, water conservation could be increased by an additional 42 percent for a total of 38.2 mgd (Table 1).

Table 1: 2040 Water conservation and irrigation efficiency potential

Category	2040 Low Conservation Potential (mgd)	2040 High Conservation Potential (mgd)
Public Supply	7.8	18.1
Domestic Self-supply	1.2	2.3
Agriculture	16.0	16.0
Landscape/Recreation/Aesthetic Self-supply	1.5	1.5
Commercial/Industrial/Institutional Self-supply	0.2	0.2
Power Generation Self-supply	0.2	0.2
Total[1]	**27.0**	**38.2**

Note: mgd = million gallons per day

[1] Totals may be slightly different due to rounding of individual values.

Chapter 4: Evaluation of Potential Effects of Projected Water Demand on Water Resources within the CSEC RWSP Area (Water Resource Assessment)

Purpose

The purpose of the CSEC RWSP water resource assessment was to evaluate the extent to which water resources and related natural systems may be impacted by projected increases in groundwater withdrawals within the CSEC RWSP area through 2040. This chapter provides information regarding the evaluations for the entire CSEC RWSP area. Details regarding the evaluations performed for the each of the three sub-regions are provided in Appendix A. Evaluated assessment components included MFLs, groundwater quality, and wetlands. The results of the assessment identified potential impacts that could occur absent implementation of projects and measure identified within the water supply plan and were used to support the delineation of the CSEC RWSP area as a water resource caution area (Chapter 5).

Modeling within the CSEC RWSP Area

Three groundwater flow models (Figure 16) were used to evaluate the potential for resource impacts on natural systems in the CSEC RWSP area from 2040 projected water demand; the Northern District Model Version 5 (NDMv5)(HGL et al. 2016), the 2015 Volusia Groundwater Flow Model (Volusia model)(Williams 2006), and the East-Central Florida Transient Expanded Model Version 1.0 (ECFTX)(CFWI 2020a). These groundwater flow models incorporate all elements of the water budget including recharge, evapotranspiration, surface water flows, groundwater levels, and water use. The models are the best available tools for simulation of the groundwater systems and groundwater withdrawal impacts on water resources within the CSEC RWSP area. SJRWMD is partnering with SWFWMD in the development of a new regional groundwater flow model, the Central Springs model, which will replace both the NDMv5 and the Volusia model in the next CSEC RWSP five-year update.

In support of the SJRWMD modeling approach, the following, which comes from the United States Geological Service (USGS) Scientific Investigations Report 2016-5116 (Kuniansky 2016), is a general statement regarding modeling of the Floridan Aquifer System (FAS) 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 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.

Minimum Flows and Minimum Water Levels (MFLs)

Section 373.042, F.S., directs FDEP or the Districts to establish MFLs for lakes, rivers, springs, wetlands, and aquifers. A premise of MFLs determinations is that by identifying all relevant environmental metrics and protecting the most constraining (i.e., most sensitive to water withdrawals), the basic structure and function of a given ecosystem will also be protected. Therefore, MFLs represent the limits 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 CUP application evaluations. If an analysis determines that a water body is not currently meeting its MFLs or is projected to fall below its MFLs during a 20-year planning horizon, the water body is said to be in recovery or prevention, respectively. In both cases, the Districts are required to formulate a strategy to ensure the MFLs are achieved throughout the planning horizon.

The Districts are 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 SJRWMD 2020 Priority List and Schedule.

Information on all the adopted MFLs within SJRWMD can be found in Chapter 40C-8, *Florida Administrative Code* (*F.A.C.*). Within the CSEC RWSP area, SJRWMD assessed the status of 25 lakes, six springs, and two river reaches with MFLs (Figure 17). A summary of the assessment methodologies and results are provided below. See Appendix A for a more detailed discussion by sub-region and Appendix F for additional information concerning the methodologies and analyses.

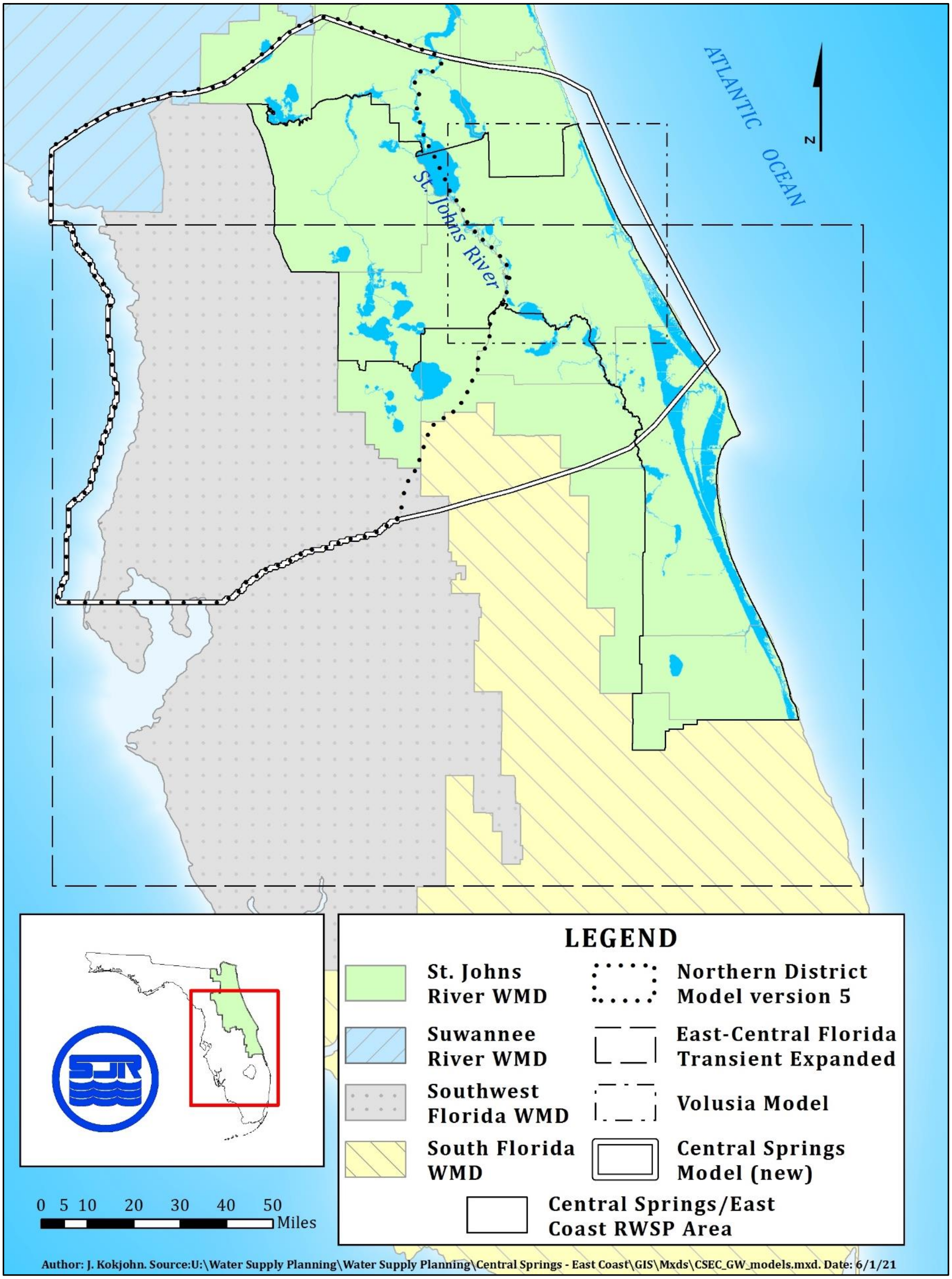

Figure 16: Groundwater flow models within the CSEC RWSP area

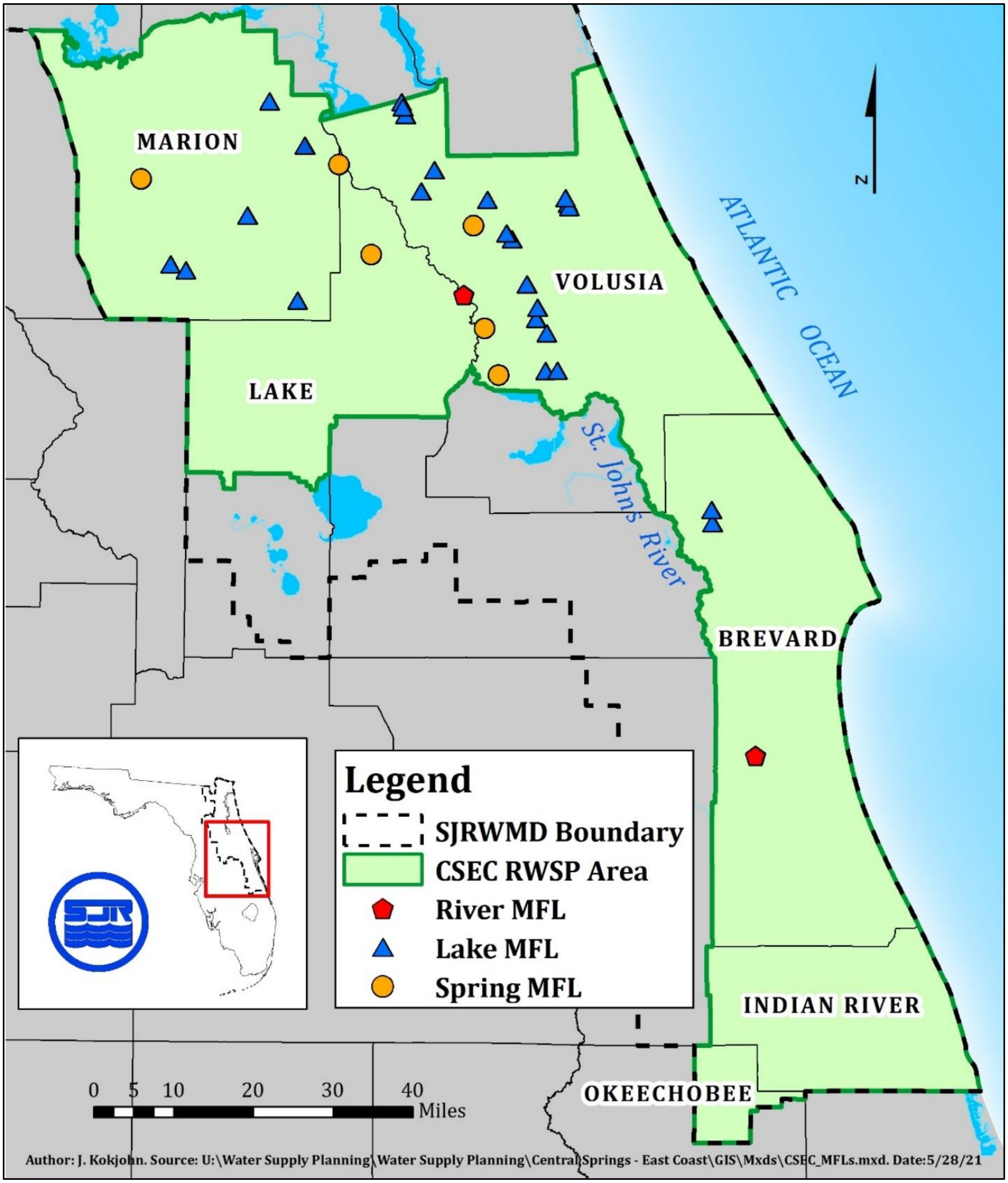

Figure 17: Location of MFL water bodies assessed in the CSEC RWSP area

Lakes with MFLs

Methodology

When lake MFLs are adopted, an Upper Floridan aquifer (UFA) freeboard value associated with a lake's surface water model year is typically quantified. The freeboard provides the maximum amount of additional UFA drawdown that can occur beneath the lake to ensure that its most constraining environmental metric is met. Model-derived UFA drawdown from the appropriate groundwater flow model was used to update the UFA freeboard under each lake to current conditions (2015, or 2014 for the ECFTX) to determine current MFL status and to projected 2040 conditions to determine MFL status at the planning horizon.

Results

The MFL status evaluation determined that all 25 evaluated MFL lakes were meeting their adopted MFLs under current conditions. Four lakes, all located in Volusia County, were projected to not meet their MFLs by 2040. These lakes (Butler, Indian, Scoggin, and Shaw) are classified as being in prevention.

Springs with MFLs

Methodology

All six of the MFL springs assessed within the CSEC RWSP area are designated as OFS pursuant to subsection 373.802(4), F.S. For each spring system, the amount of flow available for consumptive uses (freeboard) was previously identified in a status assessment of each spring's MFLs. Freeboard values were brought forward to 2015 conditions by evaluating changes in model-derived spring flow (from the initial status assessment year to 2015) to evaluate current MFL status. To determine MFL status at the planning horizon, model-derived flow reductions predicted as a result of increased water demand from 2015 to 2040 were compared to 2015 freeboard quantities.

Results

The springs MFL status evaluation determined that four of the six springs (Alexander, De Leon, Gemini, and Silver Glen) were meeting their adopted MFLs under current and 2040 projected conditions. Silver Springs, in Marion County, was determined to be meeting its MFLs under current conditions but was not projected to meet its MFLs under 2040 conditions; therefore, Silver Springs continues to be classified as being in prevention.

The MFLs for Blue Spring are unique in that they prescribe a minimum flow regime that increases over time with the final minimum flow effective in 2024 (40C-8, *F.A.C.*). A Blue Spring MFL status assessment was performed in 2018 that demonstrated the minimum flow regime at that time (142 cfs) was being achieved at current pumping conditions, and the MFL status remained in prevention (SJRWMD 2019; see *MFL Prevention/Recovery Strategies* below). In 2019, the Blue Spring minimum flow increased to 148 cfs, pursuant to the adopted MFL. A status determination showed that the higher minimum flow was not being met under current pumping conditions and, therefore, the status of the Blue Spring MFL shifted to recovery. Pursuant to 40C-8.031(13)(a), *F.A.C.*, SJRWMD will perform a causation analysis to evaluate the potential impacts of various stressors on Blue Spring, including whether groundwater pumping is a factor. Based on the results of this analysis, SJRWMD will evaluate existing MFL criteria and may adjust any existing prevention/recovery strategies, if necessary, to ensure the protection of Blue Spring from significant harm due to consumptive uses of water. In addition, SJRWMD staff may request Governing Board authorization to include Blue Spring on the MFL Priority List and Schedule for re-evaluation prior to the next CSEC RWSP. Currently, there are sufficient projects and measures identified in the MFL prevention/ recovery strategy documents to ensure achievement of the final Blue Spring MFL at 2040 projected water demand.

Rivers with MFLs

Methodology

River reach MFLs were assessed by comparing published surface water availability quantities with permitted surface water withdrawals and, in UFA discharge areas, modeled changes in groundwater contributions to river flow from 2015 to 2040.

Results

Both river reaches were determined to be in compliance with their adopted MFLs based on current and projected 2040 conditions.

MFL 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. SJRWMD has three approved prevention/recovery strategies. The Prevention/Recovery Strategy for Implementation of Minimum Flows and Levels for Volusia Blue Spring and Big, Daugharty, Helen, Hires, Indian, and Three Island Lakes (2013 Volusia Strategy; SJRWMD 2013) was approved by the SJRWMD Governing Board on November 12, 2013. In 2018, the first five-year strategy assessment (2018 Volusia Strategy Assessment; SJRWMD 2019) was performed to ensure the continued success of this strategy through 2040. The Prevention Strategy for the Implementation of Silver Springs Minimum Flows and Levels (SJRWMD 2017) was approved by the SJRWMD Governing Board on April 11, 2017. Finally, the Prevention Strategy for the Implementation of Lake Butler Minimum Levels was approved by the Governing Board on August 11, 2020 (2020 Lake Butler Strategy; SJRWMD 2020). The three strategies and the five-year assessment are discussed in Appendix A by applicable sub-region and the final strategy documents are included in Appendix G.

Groundwater Quality (Saltwater Intrusion)

Saltwater intrusion can occur from saltwater moving inland from the ocean (i.e., lateral intrusion) or from relict seawater migrating vertically near a pumping well (i.e., upconing). Saltwater intrusion can affect productivity of existing infrastructure, resulting in increased treatment and infrastructure costs. Although saltwater 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. An evaluation was conducted to assess the potential for saltwater intrusion within the CSEC RWSP area resulting from withdrawals of groundwater. The purpose of this evaluation was to identify wells within the CSEC RWSP area where potential degradation of groundwater quality from saltwater intrusion may constrain the availability of groundwater sources.

The Florida Safe Drinking Water Act (s. 403.850 - 403.864, F.S.) directs 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), a secondary drinking water standard (SDWS). Increasing trends in chloride concentration can be an indicator of saltwater intrusion and, once concentrations exceed the SDWS, groundwater is no longer considered potable. The CSEC RWSP groundwater quality analysis was performed using existing water quality trends resulting from historic and current groundwater withdrawals and climatic conditions. Increases in groundwater withdrawals and sea level rise may accelerate degrading water quality trends over time. SJRWMD is developing additional tools that will predict water quality changes based on various withdrawal and sea level scenarios (see *Climate Change* below).

Methodology

The groundwater quality evaluation consisted of a statistical analysis of observed monitoring data. SJRWMD evaluated groundwater quality data from 300 permitted public supply and agricultural wells and 89 District Observation Well Network (DOWN) monitoring wells located in the CSEC RWSP area (Figure 18). Collectively, these 389 wells provide information on groundwater quality in the UFA and limited areas within the SAS. Trends in chloride concentrations were quantified and interpreted using nonparametric statistical methods with statistically significant trends identified by a p value less than or equal to 0.05[2]. For those wells exhibiting statistically significant increasing trends in chloride concentration, SJRWMD calculated the year in which the SDWS would be exceeded if current trends continue. An expanded explanation of the water quality analysis methodology and well-specific results are provided in Appendix D.

Results

Of the 89 UFA DOWN wells evaluated in the CSEC RWSP area, nine showed increasing chloride concentrations at rates ≥ 3 mg/L/yr (high rate of change), and two showed increasing chloride concentrations at a rate within the range ≥ 1 and < 3 mg/L/yr (medium rate of change)(Table 2). Ten of the eleven wells with a high or medium rate of chloride change currently exceed the chloride SDWS and are generally located in the St. Johns River valley in Volusia County or along the Indian River Lagoon or the Atlantic coastline in Brevard and Indian River counties. Finally, six DOWN wells showed a statistically significant decreasing rate of change, three of which currently exceed the chloride SDWS.

Table 2: Analyzed UFA DOWN wells with statistically significant high, medium, or decreasing trends in chloride concentration in the CSEC RWSP area

Chloride Trend Category	Number of Wells Currently Exceeding 250 mg/L	Number of Additional Wells Projected to Exceed 250 mg/L by 2040
High Rate of Change (9 wells)	9	---
Medium Rate of Change (2 wells)	1	0
Decreasing Rate of Change (6 wells)	3	NA

Note: mg/L = milligrams per liter

[2] A p value is a predetermined statistical threshold that indicates the probability of obtaining the same test result randomly. When p values are small (e.g., less than or equal to 0.05 or 5%), there is evidence that the test result is not random (and one can reject the null hypothesis that there is no trend).

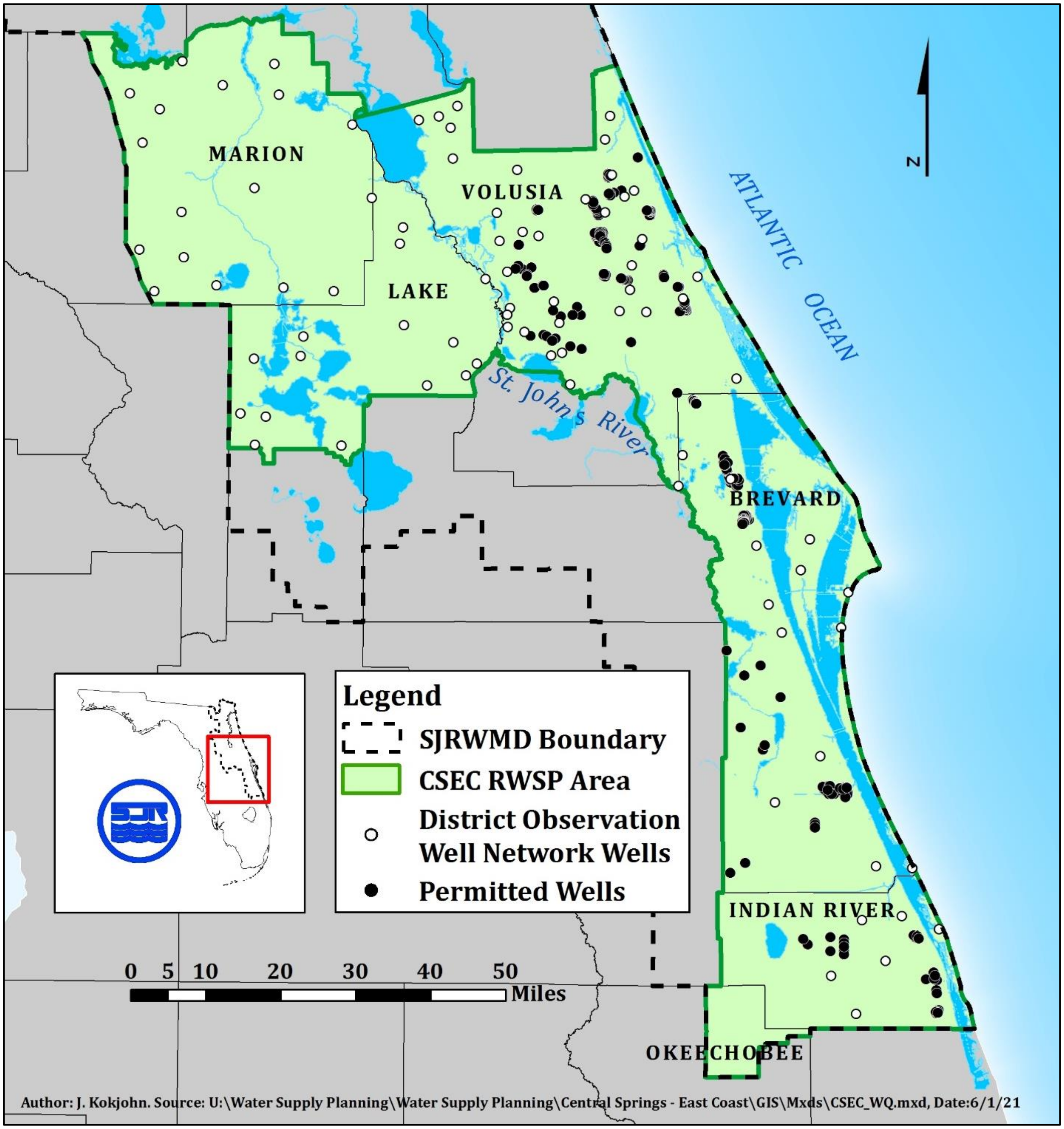

Figure 18: Wells included in the CSEC RWSP groundwater quality analysis

Of the 179 UFA public supply wells evaluated in the CSEC RWSP area, 29 showed increasing chloride concentrations at a high rate of change, and three showed increasing chloride concentrations at a medium rate of change (Table 3). Fifteen of the 32 wells with a high or medium rate of chloride change currently exceed the chloride SDWS and an additional 10 wells are projected to exceed the SDWS by 2040. The majority of these 32 well are generally located in the St. Johns River valley in Volusia County or along the Indian River Lagoon or the Atlantic coastline of Brevard and Indian

River counties. Finally, 75 public supply wells showed a statistically significant decreasing rate of change, two of which currently exceed the chloride SDWS.

Table 3: Analyzed UFA public supply wells with statistically significant high, medium, or decreasing trends in chloride concentration in the CSEC RWSP area

Chloride Trend Category	Number of Wells Currently Exceeding 250 mg/L	Number of Additional Wells Projected to Exceed 250 mg/L by 2040
High Rate of Change (29 wells)	15	10
Medium Rate of Change (3 wells)	0	0
Decreasing Rate of Change (75 wells)	2	NA

Note: mg/L = milligrams per liter

The CSEC water quality analysis evaluated 101 SAS public supply wells, all of which were located in Brevard and Indian River counties. Of the 101 wells, 22 showed increasing chloride concentrations at a high rate of change, and nine showed increasing chloride concentrations at a medium rate of change (Table 4). Eight of the 31 wells displaying a high or medium rate of chloride change currently exceed the chloride SDWS and an additional 13 are projected to exceed the SDWS by 2040. These 31 wells are all located just west of the Indian River Lagoon with the majority occurring in Brevard County. Thirty-four wells showed a statistically significant decreasing rate of chloride change, four of which currently exceed the chloride SDWS.

Table 4: Analyzed SAS public supply wells with statistically significant high, medium, or decreasing trends in chloride concentration in the CSEC RWSP area

Chloride Trend Category	Number of Wells Currently Exceeding 250 mg/L	Number of Additional Wells Projected to Exceed 250 mg/L by 2040
High Rate of Change (22 wells)	8	12
Medium Rate of Change (9 wells)	0	1
Decreasing Rate of Change (34 wells)	4	NA

Note: mg/L = milligrams per liter

Twenty agricultural wells were analyzed for statistically significant chloride trends with only one well, located in southern Volusia County, showing an increasing chloride trend at the high rate of change (Table 5). Two of the agricultural wells showed a statistically significant decreasing rate of change, both of which currently exceed the chloride SDWS.

Table 5: Analyzed UFA agricultural wells with statistically significant high, medium, or decreasing trends in chloride concentration in the CSEC RWSP area

Chloride Trend Category	Number of Wells Currently Exceeding 250 mg/L	Number of Additional Wells Projected to Exceed 250 mg/L by 2040
High Rate of Change (1 well)	1	---
Medium Rate of Change (0 wells)	---	---
Decreasing Rate of Change (2 wells)	2	NA

Note: mg/L = milligrams per liter

Additional details and spatial depictions of the water quality results for each CSEC RWSP sub-region are provided in Appendix A.

Wetlands

Methodology

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 2040. 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 CSEC RWSP 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 CSEC RWSP area where the UFA is confined and the modified Kinser-Minno method (Dunn et al. 2008) was used in portions of the CSEC RWSP 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 groundwater model simulations. The analysis yielded a spatial identification of areas with moderate and high potential for adverse change to wetland function. Additional details regarding the wetland analysis methodology are provided in Appendix H.

The CSEC RWSP wetland analysis is intended to provide a regional picture of wetland acreage at a moderate or high potential for adverse change resulting from increased demand in 2040. The potential for adverse change does not necessarily correspond to realized adverse change due to the uncertainty with the analysis. Therefore, field verification and monitoring, typically carried out for the SJRWMD regulatory program, is required when it is determined to be necessary to ensure the prevention of impacts from groundwater pumping. The CSEC RWSP wetland analysis is not a replacement for the analysis of the specific potential of a proposed consumptive use to individually or cumulatively impact wetland systems. However, the spatial coverage of wetland acreage identified in the CSEC RWSP as being at risk for change can be utilized by regulatory staff as a screening tool to locate general areas within the CSEC RWSP area where potential wetland impacts are more likely to occur.

Results

The wetland analysis identified 34,091 acres of wetlands (or 4% of total wetland acreage) within the CSEC RWSP area that have a moderate or high potential for adverse change as a result of the projected increase in groundwater demand through 2040. A breakdown of acreage by county and maps of the identified acreage are provided in Appendix A.

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. There are no water reservations within the CSEC RWSP area.

Climate Change

In order to provide a reliable and economical supply of water that is necessary for a strong Florida economy while ensuring protection of water resources, climate change and its effects on hydrologic conditions are considered in water supply planning. Climate change has the potential to significantly impact the sustainability of water supplies throughout the state. While climate change is occurring across the globe, effects vary, and the degree and rate of change remain uncertain. Long-term data indicate changes in parameters such as temperature, rainfall, and sea level. Increased air temperatures and changes in precipitation regimes and storm frequency could result in greater evaporation, longer drought periods, and higher risk of flooding.

Recent predictions from multiple climate models summarized by the Intergovernmental Panel on Climate Change indicate global mean surface temperatures will likely increase over the next 20 years, leading to longer and more frequent heat waves over land areas (Southeast Florida Regional Climate Change Compact 2011). These heat wave changes could increase evapotranspiration (ET) in the CSEC RWSP area, resulting in lower surface water levels, increased irrigation demand, reductions in soil moisture, diminished aquifer recharge, and degradation of water quality. By identifying sufficient project options to meet the water demand associated with a 1-in-10 year drought, the CSEC RWSP addresses many of the concerns associated with increased surface temperatures during the planning horizon. However, if drought frequency increases in the future as a result of climate change, water demand associated with a 1-in-10 year drought will also increase.

Additionally, more frequent, intense rainfall events with longer interim dry periods could increase total annual rainfall but decrease effective rainfall as more water may be lost to runoff. This may prompt the need for increased storage alternatives to augment decreased aquifer recharge. Several proposed projects would increase capture and storage of rainfall and stormwater in the CSEC RWSP area and therefore would address water resource constraints while helping to mitigate the impacts of increased flooding events. Improvements in infrastructure capacity, flexibility, and redundancy (such as interconnected water supply systems) could assist in mitigating the uncertainty in local and regional climate prediction and compensate for prolonged drought cycles. Local aquifer storage and recovery (ASR) projects could offset predicted decreases or variability in effective rainfall by capturing excess surface water or reclaimed water during rainy periods for use during extended dry periods. Since more extreme droughts are expected in the future as a result of global warming, SJRWMD will consider analyzing the impact of climate change on severity and frequency of droughts and water supply availability in future updates of the CSEC RWSP.

As noted previously in this chapter, localized saltwater intrusion is a concern for coastal communities as potential solutions will likely increase the cost associated with providing potable water to existing and future users and take time to implement. The CSEC RWSP saltwater intrusion analysis identified wells that are currently, or projected to be, vulnerable to saltwater intrusion. This analysis, however, was limited to current conditions including the current rate of sea-level rise and groundwater withdrawals. Additional climate changes will likely exacerbate saltwater intrusion, accelerating the time frame and magnitude of enhanced management practices and/or infrastructure that will be needed to mitigate potential increased salinity. SJRWMD will be developing a water quality model to evaluate potential water quality impacts resulting from sea-level rise. This tool will predict the magnitude of saltwater intrusion for various rates of sea-level rise and projected groundwater withdrawals, providing valuable information to water suppliers along SJRWMD's Atlantic Coast.

SJRWMD assists communities and utilities become more resilient in preparing for and adapting to climate change impacts. Through the offering of cost-share dollars (see Chapter 7), SJRWMD helps to fund projects which alleviate flooding, enhance stormwater capture, develop alternative water supplies, and otherwise lessen climate change impacts while meeting SJRWMD core missions. SJRWMD continues to offer technical assistance to communities which can include flood modeling preparation, inclusion of sea-level and temperature rise in SJRWMD model scenarios, establishment of MFLs to protect water resources, and participation in regional, local, and statewide resilience groups. Finally, the SJRWMD's data collection efforts continue to provide water resource-related data available for use by communities in their resilience planning activities.

Local management actions and regional collaborations will help mitigate climate change impacts and enhance the continued reliability of water supply in the CSEC RWSP area. As part of a collaborative effort to address climate and water resource issues, Brevard, Volusia, and North Lake counties, along with other Florida counties, are members of the

East Central Florida Regional Resilience Collaborative, which serves as a structure and framework for regional resilience activities. In addition, communities and stakeholders in Volusia and Brevard counties developed the East Central Florida Regional Resiliency Action Plan, which provides a matrix of resilience actions for various levels of government and stakeholders. Some communities within the CSEC planning area, such as Indian River County and the City of Satellite Beach, are implementing Adaption Action Areas as part of their comprehensive planning activities. Adaptation Action Areas are a policy tool that allows local governments to plan for sea-level rise, designate vulnerable areas, and prioritize adaptation strategies so a community can become more resilient to climate change impacts.

Despite the challenges of climate change, many of the same practices implemented to address water resource constraints may also delay some of its impacts. For example:

- Decrease groundwater demand (e.g., increase use of reclaimed water or other alternative water supplies; improve water conservation)
- Improve water use efficiency (e.g., upgrade agricultural irrigation technology; replace aging public supply distribution systems to reduce losses)
- Increase infrastructure storage, capacity, and flexibility (e.g., ASR, interconnect water supply systems)

Additional information regarding these practices is provided in Chapter 6.

Chapter 5: 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 while preventing the loss of natural resources and must support MFL recovery or prevention strategies. This chapter summarizes the approach used to demonstrate the sufficiency of the CSEC RWSP project options and provides the technical basis used for the delineation of a water resource caution area (WRCA; Rule 62-40.520(2), *F.A.C.*).

Sufficiency Analysis

The water resource assessment identified projected harm to water resources in the CSEC RWSP area resulting from 75 mgd of additional demand from traditional sources. Since traditional water sources alone are not sufficient to meet projected water demands through 2040, water resource and water supply development projects must be developed and implemented. The purpose of performing a sufficiency analysis is to determine whether the implementation of specific water resource and water supply project options will allow for projected water demands to be met and prevent the loss of natural resources. SJRWMD determined that the suite of project options identified within the CSEC RWSP was sufficient to address the potential water resource impacts based on the following; 1) the 75 mgd of additional future demand identified in Chapter 3 can be met with 228.5 mgd of water conservation and water supply and water resource development project options; 2) SJRWMD has included the CSEC RWSP area approved MFL prevention and recovery strategies and associated projects, and 3) when 41.1 mgd of projects are modeled in Volusia County and 36.7 mgd of projects are modeled in Marion and North Lake counties, all of the MFL water bodies identified as being in prevention or recovery are projected to achieve their MFLs at 2040. Sufficiency analyses were performed using groundwater models and other tools described in the CSEC RWSP and appendices. Specific analyses for each sub-region of the CSEC RWSP area are discussed in detail in Appendix A.

Minimum Flows and Levels

Implementation of the projects summarized in Chapter 6 (and detailed in the appendices) is sufficient to ensure the achievement of CSEC RWSP area MFLs at the 2040 planning horizon. Table 6 shows those water bodies identified as being in prevention or recovery with regard to their MFLs. The amount of flow or UFA level rebound needed for the MFL water bodies to meet their MFLs at 2040 conditions is listed along with the modeled benefits of the identified projects. For each water body, there was sufficient benefit projected through implementation of the projects to ensure the achievement of MFLs at 2040 (see positive 2040 freeboard values in Table 6).

Table 6: MFL water body rebound requirements, project benefits, and revised freeboard[1]

County	Water Body	Rebound Needed at 2040 Conditions (ft or cfs)	Benefit of projects (ft or cfs)	2040 Freeboard with projects (ft or cfs)
Marion	Silver Springs	3.6	19.7	16.1
Volusia	Blue Spring	17.0	17.8	0.8
Volusia	Lake Butler	0.4	1.3	1.0
Volusia	Indian Lake	1.0	2.0	0.9
Volusia	Scoggin Lake	0.4	1.4	1.0
Volusia	Shaw Lake	0.6	0.6	<0.1

[1] For springs, rebound, benefit, and freeboard are expressed in cubic feet per second (cfs); for lakes, in feet (ft) of UFA level change.

Water Quality

Twelve percent of the analyzed UFA DOWN wells, 18 percent of the UFA public supply wells, 31 percent of the SAS public supply wells, and 5 percent of the UFA agricultural wells in the CSEC RWSP area displayed increasing chloride concentrations at the high or medium rate of change. All of these wells are located in Volusia, Brevard, or Indian River county. A spatial evaluation of the trending UFA wells suggests that upconing may be the cause of increasing chlorides in the majority of cases, which can often be mitigated through enhanced wellfield management strategies or well modifications. However, increasing trends in two UFA wells located on coastal barrier islands may be indicative of lateral saltwater intrusion. All the SAS public supply trending wells are located in Brevard and Indian River counties where 70 percent of DSS users rely on the surficial aquifer for potable water.

Certain projects summarized in Chapter 6 directly address potential water quality issues resulting from possible saltwater intrusion, however, there are additional listed projects that will reduce groundwater pumping in vulnerable areas, some of which are susceptible to saltwater intrusion. Wellfield management plans that move withdrawals away from critical water resources and the further development of alternative water supplies such as reclaimed water, surface water, and brackish groundwater will reduce the potential for upconing and lateral intrusion. The SJRWMD Regulatory Program will continue to evaluate the potential for harmful upconing and lateral intrusion during CUP application review to ensure all permitting criteria are met prior to permit issuance. In addition, SJRWMD will investigate instances of unforeseen harmful water quality impacts potentially resulting from consumptive uses of water, and if verified, will require mitigation by the responsible permittee(s).

Wetlands

The CSEC wetland analysis is meant to be a screening tool to identify wetland acreage that may be at risk for harm. Since the potential for adverse change does not necessarily correspond to realized adverse change, water supply and water resource development project development did not focus on reducing the wetland acreage identified in the CSEC RWSP area as having the potential for adverse change. However, implementation of the projects specified in the CSEC RWSP will reduce the acreage of potentially impacted wetlands, although these benefits were not quantified as part of the plan. The SJRWMD Regulatory Program will continue to thoroughly evaluate the potential of harm to wetlands resulting from consumptive uses of water and will require mitigation where harm has occurred. Through their continued use of enhanced wetland assessment protocols in conjunction with the spatial review of wetland acreage identified in the CSEC RWSP, SJRWMD regulatory staff will ensure the protection of wetland acreage throughout the planning region by preventing, or requiring mitigation for, adverse impacts to wetlands from both individual and cumulative permit-related groundwater withdrawals.

Water Resource Caution Area Delineation

In 1996, the SJRWMD Governing Board designated the entire district as a water resource caution area (WRCA)(40C-23, F.A.C). Water resource caution areas are geographic areas identified by the Districts as having existing water resource problems or areas in which water resource problems are projected to develop during the next 20 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. These requirements mandate domestic wastewater treatment facilities to prepare detailed reuse feasibility studies, which help ensure the maximized reuse of reclaimed water in areas with limited traditional water supplies. This mandate has been in effect in SJRWMD since the 1996 designation of the entire district as a WRCA (40C-23, *F.A.C.*)

In 2015, SJRWMD began designating WRCAs in approved RWSPs. The 2020 CFWI RWSP verified the prior designation of the entire CFWI planning region as a WRCA (CFWI 2020b). The 2017 North Florida RWSP designated the SJRWMD-portion of the planning region as a WRCA (SJRWMD et al. 2017). Since potential water resource problems have been identified in the CSEC planning area, including MFLs that are not projected to be achieved and areas of degrading water quality, the CSEC RWSP supports the designation of the CSEC planning region as a WRCA.

The 2013 Volusia Strategy identified MFL constraints that were reaffirmed in the 2018 Volusia Strategy Assessment and the 2020 Lake Butler Strategy. The Silver Springs Prevention Strategy (2017) classified Silver Springs as being in prevention at 2035 conditions, which is extended through 2040 as part of the CSEC RWSP water resource assessment. Currently, five MFL water bodies in the CSEC RWSP area are identified as being in prevention (including one OFS), and one MFL water body (also an OFS) is identified as being in recovery. Projects identified in the strategies have been incorporated in the CSEC

RWSP, as they are necessary to ensure the achievement of MFLs at 2040 projected water demand.

Results of the water quality analysis suggest that water quality constraints may exist in the coastal counties of the CSEC RWSP area. Statistically significant chloride trends, specifically in Brevard and Indian River counties, may indicate a stressed fresh aquifer system, in the case of the surficial aquifer, or saltwater intrusion resulting from upconing and the lateral encroachment of seawater, in the case of the Upper Floridan aquifer. Although there are land use changes and projects that may lessen or mitigate current trends, sea-level rise is expected to accelerate the degradation in the future.

The CSEC RWSP, along with the 2013 Volusia Strategy, the 2018 Volusia Strategy Assessment, the 2020 Lake Butler Strategy, and the 2017 Silver Springs Prevention Strategy, constrain the availability of groundwater throughout the CSEC RWSP area and provide a technical basis for the constraints. As a result of these constraints, the CSEC RWSP area is proposed for continued designation as a WRCA. SJRWMD identifies WRCAs in its regional water supply planning process following guidelines established by FDEP (2013).

The CSEC RWSP proposes to designate the entire planning region as a water resource caution area based on the constraints identified by the supporting analyses and approved MFL prevention and recovery documents. Upon Governing Board approval of the CSEC RWSP, the CSEC planning 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.

Concurrent with the approval of the CSEC RWSP, SJRWMD staff will request that the Governing Board repeal 40C-23, *F.A.C.,* since the entire SJRWMD will be designated as a WRCA via the North Florida, CFWI, and the CSEC RWSPs.

Chapter 6: Project Options

Purpose

This chapter provides an overview of the water source options available to water users located within the CSEC RWSP area as a means to overcome water resource constraints. Fresh groundwater sources have historically been considered traditional water sources in the CSEC RWSP area, whereas nontraditional or AWS included brackish groundwater, surface water/stormwater, seawater, reclaimed water, and water stored in ASR systems and reservoirs. In the CSEC RWSP, the Lower Floridan aquifer is also being designated as a nontraditional source in Marion and North Lake counties (see Other Nontraditional Sources below). In addition, management tools 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, wellfield optimization, water resource augmentation, and aquifer recharge.

All projects submitted to, or proposed by, SJRWMD are provided in Appendices I, J, and K. Projects were evaluated and are summarized into three categories: water resource development projects (Appendix I), water supply development projects (Appendix J), and water conservation projects (Appendix K). Implementation of these projects will serve the public interest or save costs by preventing the loss of natural resources or avoiding greater future expenditures for alternative water resource or water supply development projects. Pursuant to ss. 373.709(2)(a)2., F.S., SJRWMD considered the technical and financial feasibility and permittability of water supply development project options (at a planning level of analysis) when developing the CSEC RWSP. The use of mining reclamation sites for potential water supply or water resource development projects, as referenced in ss. 373.709(2)(j), F.S., was not considered in the CSEC RWSP as more cost-efficient and feasible project options were identified.

Water Supply Development Project Options

An important part of the CSEC RWSP process is identifying water supply development project options necessary to meet the anticipated water needs of the planning area through the 2040 planning horizon. While water users are not limited to the projects listed in the CSEC RWSP, the provided lists represent 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. Unlike water resource development projects, water supply projects are typically implemented by a single entity. These projects can involve a variety of sources, which are described below. In cases where the development of these sources provides a regional benefit and is funded by water management districts or other state agencies, they are categorized as water resource development projects (see Water Resource Development Project Options presented later in this chapter).

Fresh Groundwater

The amount of additional fresh groundwater development, especially within the SAS and UFA, is limited within the CSEC RWSP area. The UFA plays a key role in supporting regional surface water systems including springs, lakes, rivers, and wetlands. Excessive withdrawals from the UFA can adversely impact these systems by lowering water levels. Opportunities sometimes exist to manage and mitigate local impacts, but future fresh groundwater development within the CSEC RWSP area will require evaluation during consumptive use permit review to ensure that unacceptable impacts to MFL water bodies, water quality, and wetlands are not projected to occur.

Brackish Groundwater

Brackish groundwater from the FAS represents a key potential alternative source for water supply development in the CSEC RWSP area. For SJRWMD alternative water supply planning purposes, brackish water is generally defined as water that does not always meet federal and state drinking water standards for chloride, sulfate, or total dissolved solids. Brackish groundwater exists in the FAS in portions of the CSEC RWSP area, specifically in Brevard and Indian River counties, other coastal areas, and within the St. Johns River valley in Volusia County. 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 saltwater intrusion. Several brackish groundwater treatment facilities currently exist in Brevard and Indian River counties.

Surface Water/Stormwater

Opportunities exist for the additional development of water supplies from the lakes and rivers in the CSEC RWSP area that could supplement traditional groundwater supplies. Smaller, local lakes are generally considered a limited resource and often provide local landowners with water for irrigation purposes. The capture and storage of available 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 can have larger, regional drainage basins that may help buffer the effects of withdrawals.

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 CSEC RWSP area. Reclaimed water is used for non-potable purposes such as landscape irrigation, agricultural irrigation, aesthetic uses, groundwater recharge, industrial uses, environmental enhancement, and fire protection purposes. Reclaimed water can also be utilized for 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 or recycled for potable water supply uses (also referred to as direct potable reuse). SJRWMD is a partner of One Water Florida, which is an initiative to highlight the benefits of recycled water and how it will safely support Florida's future. Although direct potable reuse (DPR) is not currently providing potable supply in SJRWMD, DPR methods have been tested and found to be successful in Florida. Once statewide DPR guidelines are developed, several utilities are expected to move forward with implementation of DPR to meet a portion of their water demand.

Aquifer Storage and Recovery

Aquifer storage and recovery is the underground injection and storage of water into an acceptable aquifer (typically the FAS) with the water withdrawn 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 a new supply source, it provides for system reliability allowing for increased development and utilization 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 can play an important role to store large quantities of water for distribution in cases where the source or demand is variable.

Other Nontraditional Sources

Historically, the UFA has been the traditional water source for public supply uses in Marion and North Lake counties. However, water resource constraints are projected to limit the availability of UFA withdrawals as water demand continues to increase as a result of population growth. Utilities may decide to pursue alternative sources as a means to meet increased future demand and avoid or lessen their impacts to water resources. The CSEC RWSP designates the LFA in Marion and North Lake counties as a nontraditional water source, which utilities may wish to consider as an alternative water supply to the UFA.

A list of water supply project options for the CSEC RWSP area was developed in coordination with water suppliers and other permitted water users. In preparation of the CSEC RWSP, SJRWMD circulated a questionnaire to solicit information from public supply utilities regarding the traditional and AWS projects planned to meet their water needs through 2040. This process allowed public supply utilities to provide input on the proposed water supply project options included in the CSEC RWSP (Appendix J). Water supply development projects that received SJRWMD cost-share dollars and that were completed post 2015 or that are currently underway or proposed through the fiscal year 2020 cost-share cycle are also included in Appendix J.

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 a cost-effective 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 CSEC RWSP 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 CSEC RWSP are not selected by a water supplier, the entity would need to identify another source to meet its future needs and advise SJRWMD 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 CSEC RWSP area, the CSEC RWSP 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 economic feasibility, the potential to not adversely impact MFLs, and the capability of the source water to supply the project. In the case of agricultural self-suppliers, SJRWMD recognizes the limited AWS options available and has incorporated this limitation in the list of project options pursuant to ss. 373.709(2)(a)2, F.S.

The projects presented in this plan identify 53 water supply development project options for the CSEC RWSP area (Table 7). The quantity of water produced listed for each project 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. Several projects consist of UFA wellfield management strategies. Other project options include development of previously unused sources which would add new supplies of water upon project completion.

For each water supply development project option identified, the following information is provided in Appendix J:

- An estimate of the amount of water made available by the project
- A time frame for project implementation
- An estimate of planning-level costs for capital investment and operating and maintaining the project
- An analysis of funding needs and sources of possible funding options
- Identification of the likely entity responsible for implementing each project

Table 7: Summary of water supply development project options in the CSEC RWSP area

Type	Number of Projects	Quantity Water Produced (mgd)	Estimated Cost (Million dollars)
Groundwater (fresh)	5	14.3	$89.5
Groundwater (AWS[1])	9	31.1	$160.6
Reclaimed Water	34	26.4	$172.3
Surface Water	3	3.6	$10.5
Multi-source[2]	2	12.1	$11.6
Total	**53**	**87.5**	**$444.6**

Note: mgd = million gallons per day

[1] Includes brackish groundwater and groundwater from the Lower Floridan aquifer in Marion and North Lake counties.

[2] Combined source that can include reclaimed water, surface water, and stormwater.

In addition to the 87.5 mgd of water supply development projects identified above, SJRWMD determined that there will be an additional 44.8 mgd of reclaimed water (including planned augmentation quantities) available for additional water supply development projects by 2040. This quantity of additional reclaimed water was considered during the sufficiency analysis (Chapter 5).

Water Resource Development Project Options

Water resource development projects provide regional benefits and are typically implemented directly by the Districts or by the Districts 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 project types.

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.

Aquifer Recharge

Aquifer recharge projects can be used to increase the amount of water in an aquifer to help offset declines caused by groundwater withdrawals. Methods for aquifer recharge include land application in a high recharge area, direct injection via recharge wells, or use of other recharge techniques such as rapid infiltration basins. Sources of water for aquifer recharge can include surface water, reclaimed water, or stormwater. For recharge through injection wells, stringent construction, operation, and permitting regulations must be adhered to as required by Florida's Aquifer Protection Program. In addition, if the water is injected into zones of an aquifer designated as an underground source of drinking water, additional treatment may be required to meet state and federal drinking water standards.

Seawater

The use of desalinated seawater from the Atlantic Ocean is an additional water source option in the CSEC RWSP 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 CSEC RWSP 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 viable water supply options within the region. Seawater projects costs can be higher than other alternative water supply options and, therefore, proposed projects would benefit from partnerships with other water suppliers, SJRWMD, and possibly other state agencies.

Abandoned Artesian Well Plugging Program

The SJRWMD's abandoned artesian well plugging program assists property owners in properly abandoning or back-plugging unused, free-flowing wells or substandard wells that impact groundwater quality. This program helps to conserve groundwater resources and improve groundwater quality.

Hydrologic Data Collection and Analysis

The data collection and analysis activities conducted by SJRWMD support the health of natural systems and the development of water supplies. Data collection programs allow SJRWMD to monitor the status of water resources, observe trends, identify and analyze existing or potential resource issues, and develop programs to support water resource projects that will assist in correcting existing problems and preventing future problems. Data collection also supports the CUP and MFL programs and provides information required for the accurate modeling of surface and groundwater systems.

Innovative Project Cost-Share Funding Program

SJRWMD realizes the importance of developing new techniques to facilitate development of alternative water supplies. Since 2015, SJRWMD's annual Rural Economic Development Initiative (REDI)/Innovative Project Cost-Share Program has provided a funding opportunity for innovative projects that use emerging or proven technology in a unique way. Qualifying projects provide alternative water supply quantities or expand available quantities to offset groundwater withdrawals, improve water quality, or otherwise improve the water resources of SJRWMD in support of its core missions. The continuation of this program demonstrates SJRWMD's commitment to exploring new opportunities to enhance protection of water resources.

A list of water supply development options within the CSEC RWSP area is summarized in Table 8 with additional details provided in Appendix I. The CSEC RWSP identifies a total of 12 water resource development projects; seven projects that will provide 21.6 mgd of water for aquifer recharge, two regional alternative water supply projects that will redivert approximately 14.9 mgd of water to the upper St. Johns River for possible use downstream, and three co-funded well abandonment programs that will eliminate 22.5 mgd of flowing groundwater.

Table 8: Summary of water resource development project options in the CSEC RWSP area

Type	Number of Projects	Quantity Water Produced (mgd)	Estimated Cost (Million dollars)
Groundwater (brackish)	3	22.5	$0.3
Reclaimed water	1	6.0	$5.3
Surface water	2	14.9	$38.7
Stormwater	1	3.0	$0.3
Multi-source[1]	5	12.6	$30.0
Total	**12**	**59.0**	**$74.6**

Note: mgd = million gallons per day

[1] Combined source that can include reclaimed water, surface water, and stormwater.

Water Conservation Project Options

Effective water conservation efforts have been implemented in the CSEC RWSP 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 CSEC RWSP 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 use and those that improve efficiency of use. Achieving long-term improvements in water use efficiency will require implementing a variety of water conservation measures, including basic measures such as education and outreach, irrigation restriction enforcement, leak prevention and more advanced measures such as advanced metering, indoor retrofit programs, irrigation efficiency programs, landscape ordinances, and water budgeting. 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 the CSEC RWSP area. Conservation strategies and projects are often recognized as being the most economically feasible.

Estimates for the CSEC RWSP area show the high estimate of 2040 water conservation potential at 38.2 mgd (Chapter 3) at a cost of approximately $63.0 million. Forty-one water conservation projects are completed or currently underway in the CSEC RWSP area with an estimated savings of 3.1 mgd of water at a total cost of $6.7 million (Appendix K). Implementing additional projects to meet the high conservation potential (an additional 35.1 mgd of savings) may be a more cost-effective option than implementing some of the water supply and water resource development projects discussed above. However, SJRWMD anticipates that a conservation only strategy will not offset the predicted shortfall in fresh groundwater supplies.

The following water conservation strategies have been, are, or can be implemented within the CSEC RWSP 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 demonstrate a reduction in gross and residential per capita use after implementation of tiered rate structures.
- Implementation of landscape irrigation restrictions: As of August 2020, 23 local governments in the CSEC RWSP 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. Enforcement of the irrigation restrictions year-round should be prioritized by local governments to realize needed conservation savings.
- Landscape and irrigation design codes: Many jurisdictions in the CSEC RWSP area have land development codes with provisions that encourage efficient outdoor

water use. Consistent implementation and enforcement of these design codes will contribute to long-term conservation savings.

- Outreach and education: Water conservation outreach is common throughout the CSEC RWSP area, regarding both indoor and outdoor water use. Water conservation outreach occurs via websites, utility bill stuffers, webinars and in-person events, and through other collaborative approaches implemented by local governments, utilities, SJRWMD, and other partners. The SJRWMD WaterLess campaign launched in 2019 and SJRWMD has successfully partnered with a number of local governments and utilities in the region to expand the public reach and promote decreasing irrigation water use. The SJRWMD Utility Conservation Coordinator group meets quarterly and offers members in the region an opportunity to learn more about specific conservation strategies relevant to their service areas. Other conservation messaging includes 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. Consistent and collaborative messaging in the region is essential to the success of conservation measures.
- Water use audits for residential customers: When employed by a public supply utility, this strategy has been very effective in this region as 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 CSEC RWSP 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 and commercial customers.
- 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, micro-irrigation installation, and other irrigation efficiency practices and technologies. In recent years, SJRWMD has provided funding to 37 agricultural stakeholders in the CSEC RWSP area for implementation of agricultural BMPs. Many of these projects also provide water quality benefits. In addition, 174,022 acres of agricultural land within the CSEC RWSP area are currently enrolled in applicable FDACS BMP programs. For more information see fdacs.gov.

Chapter 7: Funding

Purpose

A summary of funding sources to assist in meeting the water supply and water resource development project needs identified in this plan, is outlined below, as required by ss. 373.709(2)(a)3.c., F.S. 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 the Districts, while water supply development projects are generally the responsibility of the local entities and/or water suppliers. Currently, SJRWMD provides funding for both water resource and water supply development projects. In addition, SJRWMD also provides 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 the Districts. 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.

SJRWMD Funding Options

Cost-share Programs

SJRWMD currently provides funding assistance through competitive cost-share programs, which have been administered annually and support AWS, water resource development, water conservation, and agricultural-related projects. When available, state funds can complement SJRWMD cost-share awards. In addition to the general cost-share program, funding opportunities have been available for innovative projects (i.e., projects that use emerging or proven technologies in a unique way) and projects submitted by REDI communities. Financial assistance is provided primarily to governmental entities, but private entities are also eligible to participate in these programs. Water resource development projects may also be funded solely by SJRWMD or in a cooperative arrangement with a local partner or partners. Through the SJRWMD cost-share program from FY 2014 through FY 2020, SJRWMD has provided more than $91 million for 167 projects within the CSEC RWSP area that have been completed or are under construction. Upon completion, these projects will make approximately 43 mgd of alternative water supplies available, reduce consumption by more than 6 mgd through water conservation, and provide more than 11 mgd of water to benefit natural systems. Project details are provided in Appendix L.

Water Resource Development Work Program

SJRWMD annually updates its five-year Water Resource Development Work Program (Work Program), which describes the implementation strategy and funding plan for water resource, water supply, and AWS development components. The following programs and project types are identified in the SJRWMD 2021 Work Program: abandoned artesian well plugging; hydrologic and water quality data collection, monitoring, and analysis; MFLs development; components of the Upper St. Johns River Basin Project; and water conservation, water supply development, and water resource development projects that support SJRWMD RWSPs or MFL prevention/recovery strategies.

State Funding Options

Agricultural Conservation

The FDACS Office of Agricultural Water Policy (OAWP) works with multiple partners, including the Natural Resources Conservation Service (NRCS), FDEP, the Districts, 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

During FY 2014 through FY 2020, SJRWMD partnered with the state of Florida via FDEP, local governments, public supply utilities, and agricultural interests to collectively invest more than $185 million in 114 springs protection and restoration projects across SJRWMD. These efforts will reduce or offset groundwater withdrawals by more than 79 mgd and reduce total nitrogen loading by approximately 1 million pounds per year.

These projects address either water quality or water quantity, although many provide dual benefits. Typical water quality projects include WWTF upgrades, conversion of traditional septic systems to enhanced systems or to central sewer, and improved stormwater treatment. Typical water quantity projects include water conservation, reclaimed water system enhancements or expansions, and AWS development. Innovative projects benefiting springs include use of biologically active media in rapid infiltration basins and indirect and direct potable reuse. FDEP springs protection funding has also been awarded for agricultural irrigation system efficiency improvements and enhanced water recycling components for dairies.

With the passage of the 2016 Legacy Florida legislation, $50 million per year from the Land Acquisition Trust Fund was earmarked for springs restoration, protection, and management projects for the next 20 years. It is anticipated that SJRWMD, local governments, and public supply utilities will continue to partner with the state of Florida through FDEP to aggressively implement springs protection projects.

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. Within the WPSP, AWS includes reclaimed water, brackish water, seawater, and surface water captured during wet season flows. This program was modestly funded in FYs 2020 and 2021. Future funding of the WPSP would serve as a source of matching funds to assist in the development of AWS.

State of Florida Alternative Water Supply and Development Program

In both FY 2020 and FY 2021, the governor and Florida Legislature allocated $40 million statewide for water resource development and water supply projects to help protect the state's water resources and ensure the needs of existing and future users are met. The funding supported implementation of water conservation programs, AWS projects, and water resource development projects. Priority funding was considered for regional projects in areas that were determined to have water resource constraints and that provide the greatest resource benefit. Projects in SJRWMD were awarded more than $32 million from this program, however future funding is not guaranteed.

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, construction 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 a low interest rate. 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 the 10-year, $3 billion statewide successor to the $3 billion Preservation 2000 Program that was effective from 1999 through 2000. The initial Florida Forever Program ran from 2000 through 2010 and was extended in 2008 for 10 more years (through 2020) with an additional $3 billion. Eligible projects under the Florida Forever Program include land acquisition, land and water body restoration, ASR facilities, surface water reservoirs, and other capital improvements. Historically funded by annual appropriations, land acquisitions recommended by the Florida Forever Program may now be funded through document stamp taxes as described below.

Water and Land Conservation Amendment

Approved by voters in 2014, the Water and Land Conservation Amendment to the Florida Constitution dedicated 33 percent of collected document stamp taxes for land acquisition/management, springs, and water resource protection for 20 years. Since 2016, the Legacy Florida legislation has allocated funds for springs protection in SJRWMD consistent with this amendment.

Federal Funding

Environmental Quality Incentives Program

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

Water Infrastructure Finance and Innovation Act

The Water Infrastructure Finance and Innovation Act of 2014 (WIFIA) established a new financing mechanism to accelerate investment in our nation's water infrastructure. Administered by the EPA, the WIFIA program provides 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 while offering public entities a means to reduce financial burden, is 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.

Chapter 8: Conclusions

The CSEC RWSP was prepared by SJRWMD in coordination with stakeholders and is consistent with the water supply planning requirements of Chapter 373, F.S. Total water demand in the CSEC RWSP area is projected to increase from 353.2 mgd to approximately 427.9 mgd in 2040. SJRWMD has determined that traditional sources alone cannot supply the projected 74.7 mgd increase in water demand while sustaining water resources and related natural systems. Although there may be localized opportunities for additional withdrawals from traditional sources where groundwater withdrawals have not been fully optimized, these opportunities may be limited.

The CSEC RWSP offers solutions for meeting the future water demands while protecting the environment, which include enhanced water conservation, aquifer recharge, additional use and implementation of reclaimed water, and surface water, stormwater, and brackish groundwater projects. Specifically, SJRWMD has identified up to 229.4 mgd of projects potentially available to offset the projected increase in water demand at 2040 under average climate conditions (74.7 mgd) and under a 1-in-10 year drought scenario (155.4 mgd). The breakdown of projects by type includes:

- 38.2 mgd of water conservation potential
- 44.7 mgd of additional reclaimed water supplies
- 87.5 mgd of water supply development projects, and
- 59.0 mgd of water resource development projects

Through implementation of these projects, the CSEC RWSP concludes that future water demand can be met through the 2040 planning horizon, while sustaining water resources and related natural systems.

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