BEFORE THE SUWANNEE RIVER WATER MANAGEMENT DISTRICT

ORDER NO. SR 24-002

SRWMD FILE OF RECORD NO. 2024-02

IN RE: 2024 WESTERN WATER SUPPLY PLAN
(2020-2045 Planning Horizon)

ORDER APPROVING THE 2024 WESTERN WATER SUPPLY PLAN

THIS MATTER came before the Governing Board of the Suwannee River Water Management District ("District") on March 12, 2024. The Governing Board, having been fully advised of the matter, hereby approves the 2024 Western Water Supply Plan with appendices (2024 WWSP), recognizing that the District's authority for water supply planning extends to water supply planning regions within the District's jurisdictional boundaries as established in section 373.069, F.S.

The 2024 WWSP is attached hereto:

DONE and ORDERED by the Governing Board of the Suwannee River Water Management District on March 12, 2024.

SUWANNEE RIVER WATER
MANAGEMENT DISTRICT

By: ______________________
Virginia Johns, Chair

Attest: ______________________
Charles Keith, Secretary

Filed March 12, 2024

____
District Clerk

ATTACHMENT

2024 Western Water Supply Plan (2020-2045)

SUWANNEE RIVER WATER MANAGEMENT DISTRICT
Live Oak, Florida
March 2024

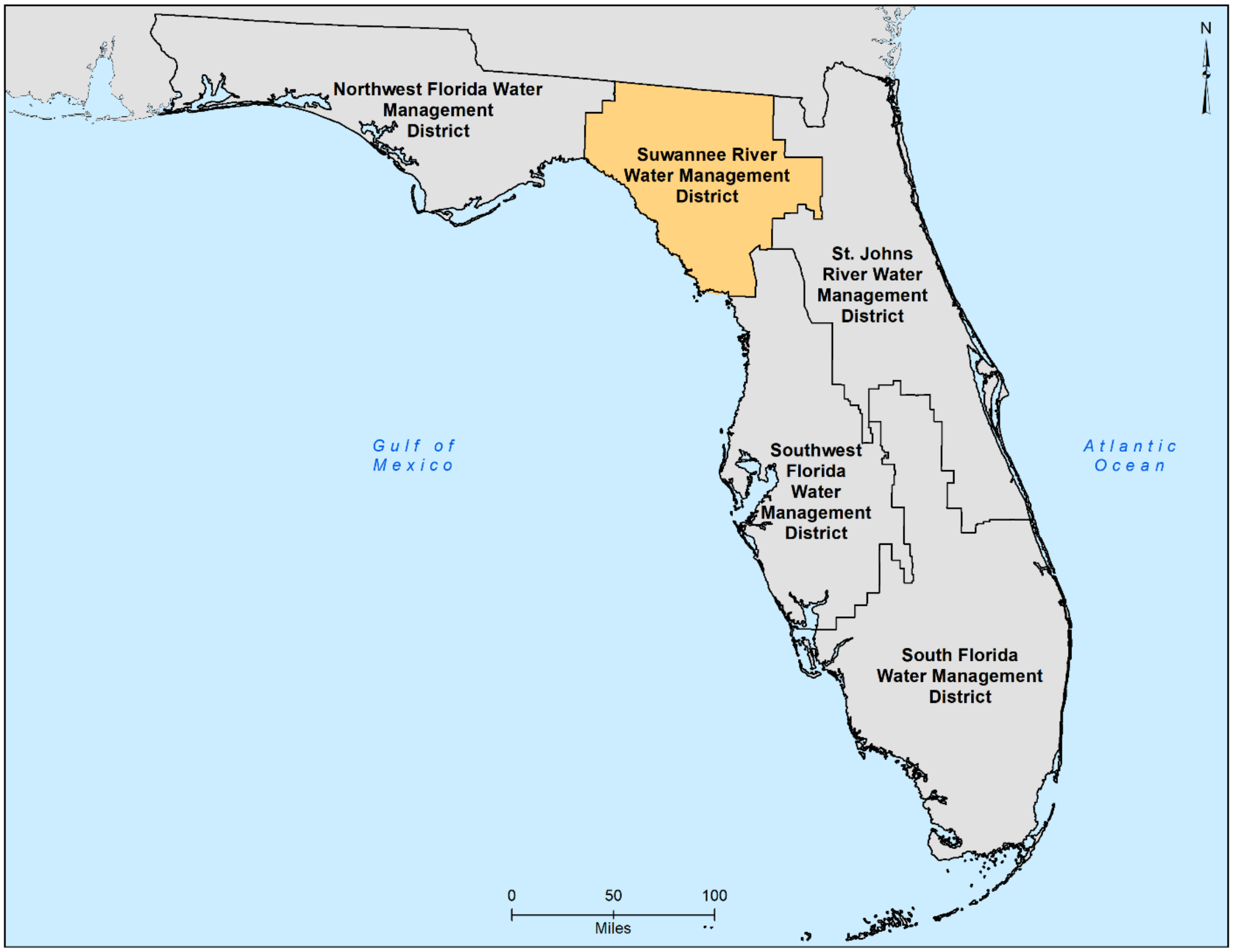

Figure 1. Location and boundary of the Suwannee River Water Management District

Acknowledgements

The Suwannee River Water Management District (District) recognizes and thanks our stakeholders for their contributions, comments, advice, information, and assistance throughout the development of the Western Water Supply Plan. Furthermore, the District expresses their appreciation to all staff who contributed to the development and production of this regional water supply plan. For further information about this document, please visit MySuwanneeRiver.com.

Executive Summary

In Florida, the state's five water management districts (districts) (Figure 1) develop regional water supply plans (RWSPs) to identify sustainable water supplies for all water uses while protecting water resources and related natural systems. The Western Water Supply Plan (WWSP) region encompasses the Suwannee River Water Management District's (District) Western Planning Region, which includes Dixie, Lafayette, Madison, Taylor, and portions of Jefferson and Levy counties (Figure 2). This 2024 WWSP is consistent with the water supply planning requirements of Chapter 373, Florida Statutes (F.S.). The 2024 WWSP was developed through a collaborative process among the District, local governments, public supply utilities, environmental advocates, and other stakeholders.

This RWSP covers a planning period through 2045 and is based on the best data and research available. A key component of the plan is the North Florida-Southeast Georgia groundwater flow model (NFSEG), developed by the Suwannee River and St. Johns River Water Management Districts (SRWMD, SJRWMD) in collaboration with the Southwest Florida Water Management District (SWFWMD) in a separate open-public process with stakeholder input. This groundwater flow model incorporates all elements of the water budget including recharge, evapotranspiration, surface water flows, groundwater levels, and water use. It also provides the most technologically sophisticated picture of the influence of groundwater withdrawals on water resources in North Florida.

The population within the WWSP region during the 2015 base year was approximately 90,119 people (Figure 10). The area's total population is projected to reach approximately 97,500 by 2045, which represents an 8% increase. Irrigated agricultural land is also expected to increase by approximately 23,595 acres, a 28% increase. The total water use in the WWSP region, which includes groundwater and surface water, is projected to increase 16%, from approximately 109 million gallons per day (mgd) in 2015 to 127 mgd in 2045 (18 mgd increase). Additionally, over 99% of the water use in the WWSP region comes from groundwater.

This 2024 WWSP concludes that fresh groundwater may be able to supply some, but not all of the projected increase in demand during the planning horizon, while also sustaining natural systems. There are waterbodies that are exceeding the screening criteria under current and future conditions, portions of the region where groundwater quality may constrain the availability of fresh groundwater that is suitable for drinking without supplemental treatment, and wetlands with a moderate to high potential for adverse change. To meet current and future water demands while protecting water resources, the 2024 WWSP identifies water supply development (WSD) and water resource development (WRD) project options, as well as water conservation efforts.

Water conservation is an important and cost-effective strategy in meeting future demands. Potential water savings through the implementation of public supply, agricultural, and other self-supply water conservation measures ranges from 13.3 mgd to 14.6 mgd. This demonstrates the District's commitment to water conservation throughout the planning horizon.

The WWSP identifies an additional 4.1 mgd of estimated benefit from WSD and WRD project options to assist water users and suppliers in their efforts to meet the projected groundwater demand while protecting our natural resources. The project options are mainly focused on conservation, however there are opportunities which include wellfield optimization, data collection and evaluation, and groundwater recharge. The District is committed to working with local governments to identify funding options to help facilitate implementation of these beneficial projects.

The 2024 WWSP provides a roadmap that offers options to achieve sustainable water use through the planning horizon. The District will continue to encourage and support project development and implementation within the WWSP region to ensure a sufficient water supply to meet 2045 water demand, while protecting water resources and related natural systems. Water supply planning is an ongoing process, with continuous adoption of enhanced scientific methodologies and collection of new data. District staff are already working on the science and data collection for the next five-year update.

The 2024 WWSP has been prepared in accordance with the Florida Department of Environmental Protection's (DEP) Format and Guidelines for Regional Water Supply Planning (DEP, 2019). This Plan also serves as the District's 2024 Water Supply Assessment (WSA).

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List of Abbreviations

Abbreviation	Description
μmhos/cm	Micromhos per centimeter
AG	Agricultural irrigation self-supply
AMI	Advanced metering infrastructure
AMR	Automatic meter reading
ASR	Aquifer storage and recovery
AWS	Alternative water supply
BEBR	Bureau of Economic and Business Research
BMP	Best management practice
cfs	Cubic feet per second
CFWI	Central Florida Water Initiative
CII/MD	Commercial/industrial/institutional and mining dewatering self-supply
CP	Current pumping
CUP	Consumptive use permit
DEP	Florida Department of Environmental Protection
District	Refers to SRWMD
districts	Refers to all Florida water management districts
DPR	Direct potable reuse
DSS	Domestic self-supply and small public supply systems
EDR	Electrodialysis reversal
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
ET	Evapotranspiration
F.A.C.	Florida Administrative Code
F.S.	Florida Statute
FAS	Floridan aquifer system
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FFL	Florida Friendly Landscaping
FSAID	Florida Statewide Agricultural Irrigation Demand
FWCA	Florida Water and Climate Alliance
FY	Fiscal year
GIS	Geographic information system
gpcd	Gallons per capita per day
H_2OSAV	Water Savings, Analytics, and Verification
IAS	Intermediate aquifer system
ICU	Intermediate confining unit
IFAS	Institute of Food and Agricultural Sciences
IPCC	International Panel on Climate Change
IPR	Indirect potable reuse
LFA	Lower Floridan aquifer
LR	Landscape/recreational irrigation self-supply

MCU	Middle confining unit
MFLs	Minimum flows and levels
mg/L	Milligrams per liter
mgd	Million gallons per day
MHHW	Mean higher high water
MOR	Monthly operating report
NFRWSP	North Florida Regional Water Supply Plan
NFSEG	North Florida Southeast Georgia Regional Groundwater Model
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Services
OAWP	Office of Agricultural Water Policy
OFS	Outstanding Florida Spring
OFW	Outstanding Florida Water
Partnership	North Florida Regional Water Supply Partnership
PG	Power generation
PO	Pumps-off
PS	Public supply
PSAB	Public service area boundary
REDI	Rural Economic Development Initiative
RIB	Rapid infiltration basin
RIVER	Regional Initiative Valuing Environmental Resources
RO	Reverse osmosis
RWSP	Regional Water Supply Plans
SAS	Surficial aquifer system
SJRWMD	St. Johns River Water Management District
SLR	Sea level rise
SMCL	Secondary maximum contaminant level
SPSS	Small public supply system
SRP	Suwannee River Partnership
SRWMD	Suwannee River Water Management District
SWAP	Save Water Add Plants
SWCD	Soil and Water Conservation District
SWFWMD	Southwest Florida Water Management District
TDS	Total dissolved solids
UF	University of Florida
UFA	Upper Floridan aquifer
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VA	Vulnerability assessment
VFD	Variable frequency drive
W3C	Waccasassa Water and Wastewater Cooperative
WIFIA	Water Infrastructure Finance and Innovation Act
WMA	Wildlife Management Area
WRCA	Water resource caution area
WRD	Water resource development

WRDWP	Water resource development work program
WSA	Water Supply Assessment
WSD	Water supply development
WSPA	Water supply planning area
WTP	Water treatment plant
WUP	Water use permit
WWSP	Western Water Supply Plan
WWTF	Wastewater treatment facility
WWTP	Wastewater treatment plant

Chapter 1: Introduction to Water Supply Planning

Introduction

The 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 elements of water supply planning are:

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

Base Year and Projected Years

Population and water demand projections are essential components to the development of regional water supply plans. While 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 Western Water Supply Plan (WWSP), 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 projected at five-year intervals throughout the planning horizon, 2020 through 2045, per statewide regional water supply planning guidelines.

The 2024 WWSP has been prepared in accordance with the Florida Department of Environmental Protection’s (DEP) Format and Guidelines for Regional Water Supply Planning (DEP, 2019). This Plan also serves as the District’s 2024 Water Supply Assessment (WSA).

Legislative Mandates

Section 373.709, Florida Statutes (F.S.), provides that the districts shall conduct water supply planning for a water supply planning region within the district identified in the appropriate district water supply plan under section 373.036, F.S., where it determines 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 for the planning period. 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, reuse utilities, the DEP, the Florida Department of Agriculture and Consumer Services (FDACS), and other stakeholders (subsection 373.709(1), F.S.). In addition, subsection 373.709(2), F.S., requires each Regional Water Supply Plan (RWSP) to be based on at least a 20-year planning period and to 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 WRD or WSD projects.
- The technical data and information applicable to each planning region, which are necessary to support the RWSP.
- The minimum flows and minimum water levels (MFLs) established for water resources within each planning region.
- MFLs prevention and recovery strategies, if applicable.
- Reservations of water adopted by rule pursuant to subsection 373.223(4), F.S., within each planning region.
- Identification of surface waters or aquifers for which MFLs are scheduled to be adopted.
- An analysis, developed in cooperation with DEP, of areas or instances in which the variance provisions of paragraph 378.212(1)(g), F.S., or subsection 378.404(9), F.S., may be used to create WSD or WRD projects.
- An assessment of how the RWSP and the projects identified in the funding plans prepared support the recovery or prevention strategies for implementation of adopted MFLs or water reservations, while ensuring that sufficient water will be available for all existing and future reasonable-beneficial uses and identified natural systems, while avoiding the adverse effects of competition.

Regulatory Program

Subsection 373.709(7), F.S., states that nothing contained in the water supply development component of the WWSP shall be construed to require any entity to select or implement a water supply development project identified in the component merely because it is identified in the plan. Pursuant to subsection 373.709(7), F.S., the WWSP may not be used in the review of consumptive/water use permits (CUPs/WUPs), unless the plan or an applicable portion thereof has been adopted by rule, with one exception. The one exception is for the evaluation of an application for the use of water which proposes the use of an alternative water supply (AWS) project as described in the WWSP and provides reasonable assurances of the applicant's capability to design, construct, operate, and maintain the project (subsection 373.223(5), F.S.). It is then presumed that the AWS use is consistent with the public interest under paragraph 373.223(1)(c), F.S.

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

Outreach and Approval Process

The District met with utilities and local governments in the spring of 2021 to discuss the draft population and water demand estimates and projections that were developed. Edits were made to the population and water demand projections based on the feedback received and were incorporated into the draft datasets. A technical methods public workshop, which discussed the technical data, methods, and modeling tools used to support the development of the WWSP, was held at District headquarters in December 2021. Additionally, a water resource constraint assessment public workshop was held in July 2023, which presented the status, overall intent, and impact of the WWSP on existing and future water users and related natural systems. Staff sent out a solicitation for project options to be included in the WWSP and presented the water resource assessment results at the Governing Board meeting on August 8, 2023. Lastly, a public workshop providing an outline of the Draft WWSP was held in January 2024. There were no comments submitted during the public workshops or comment periods. All public workshops were held in accordance with subsection 373.709(1), F.S. These efforts provided a valuable means for stakeholders to engage with the WWSP development and share their perspectives with the District.

The Draft 2024 WWSP was posted for 29 days of public comment on January 9, 2024. Upon completion of the updates to the WWSP, the District presented the 2024 WWSP to the Governing Board on February 13, 2024. The order approving the 2024 WWSP reflects the final approval date, which is attached at the beginning of this document.

Requirements for Plan Approval

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

Paragraph 373.709(8)(a), F.S., requires the District to notify water supply entities identified in the WWSP as the parties are responsible for implementing the various project options listed in the WWSP. When the notice is received by the water supply entity, the water supplier must respond to the District within 12 months informing the District of their intention to develop and implement the project options identified by the WWSP or provide a list of other projects or methods to meet the identified water demands (paragraph 373.709(8)(b), 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 WWSP (subparagraph 163.3177(6)(c)3., F.S.). 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 WWSP region are required by subparagraph 63.3177(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 WWSP or proposed by the local government;

- Identifying water supply projects to meet the water needs identified in the WWSP 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 2: About the Western Water Supply Planning Region

Background

The District's most recent Water Supply Assessment (WSA) was accepted by the Governing Board in 2018. The 2018 WSA was conducted to determine whether water supplies in the District were adequate to satisfy water demands for the 2015-2035 planning period while protecting natural systems. It was recommended that the District be split into two water supply planning regions to "increase efficiency for planning and project implementation" (SRWMD, 2018), which created the Western Planning Region. The District also recommended that water supply planning be initiated to include portions of the planning region that contribute groundwater or surface water to the Withlacoochee, Suwannee, and Waccasassa rivers. This portion, shown in the hatched area in Figure 2, was designated a Water Supply Planning Area (WSPA).

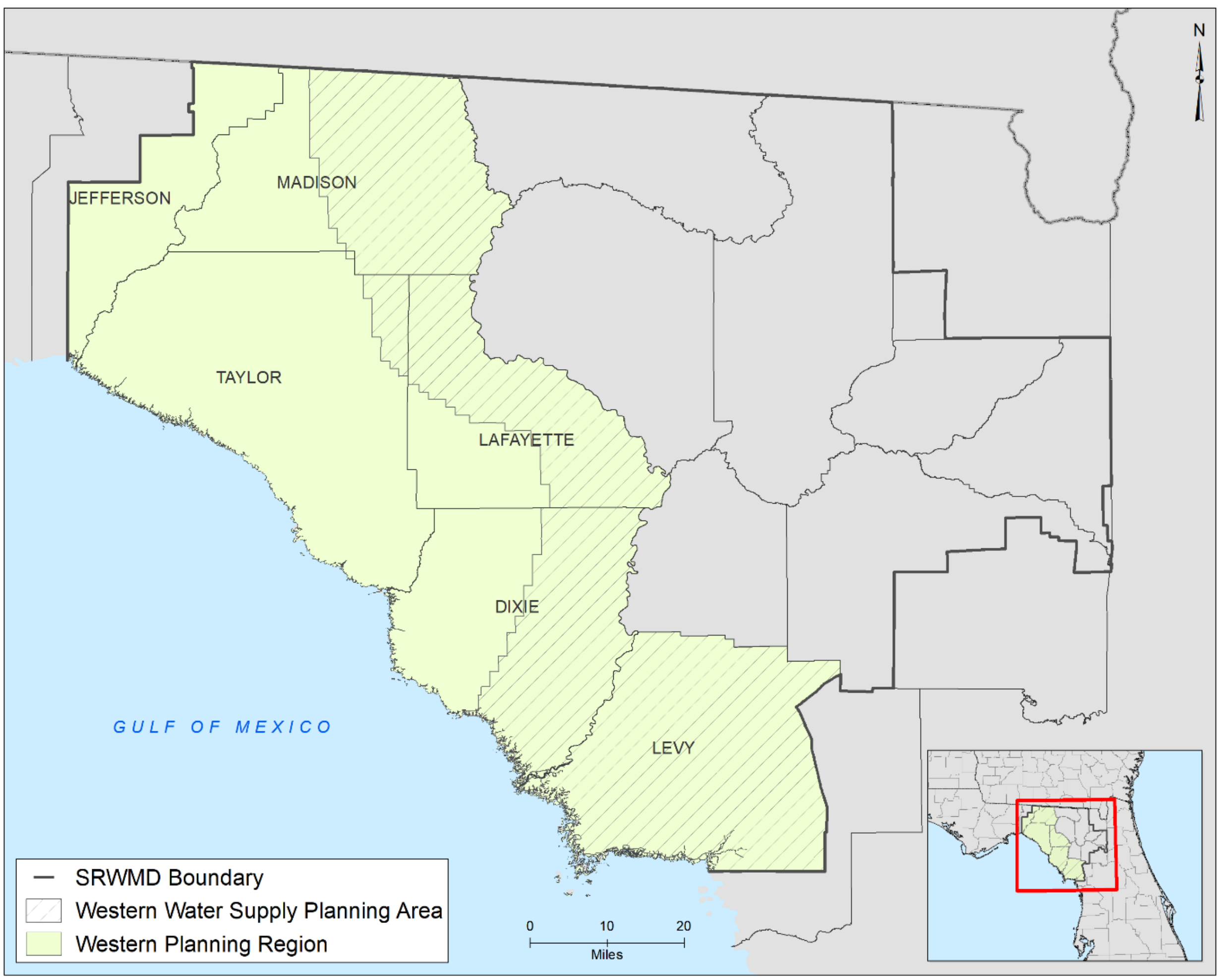

Figure 2. Western Water Supply Plan Region

Introduction

The District's WWSP region encompasses the Western Planning Region, which includes Dixie, Lafayette, Madison, Taylor, and portions of Jefferson and Levy counties. The estimated population in 2015 was 90,119 people, which is just over 25% percent of the District's total population. The region spans 4,128 square miles and includes five contributing river basins, with major rivers such as the Aucilla, Econfina, Fenholloway, Steinhatchee, Suwannee, Waccasassa, Wacissa, and Withlacoochee rivers. A map of the watersheds is displayed in Figure 3. The region is also home to hundreds of documented springs. Approximately 166 springs are categorized as being 4th magnitude or greater (one cubic foot per second [cfs]), with many springs being considered first magnitude springs, meaning the discharge is 100 cfs or greater. Additionally, seven springs and one spring group in the region have been designated as Outstanding Florida Springs (OFS) in subsection 373.802(5), Florida Statute (F.S.) either because they were historically first magnitude or of other importance. A map of the rivers and springs in the WWSP region is displayed in Figure 4.

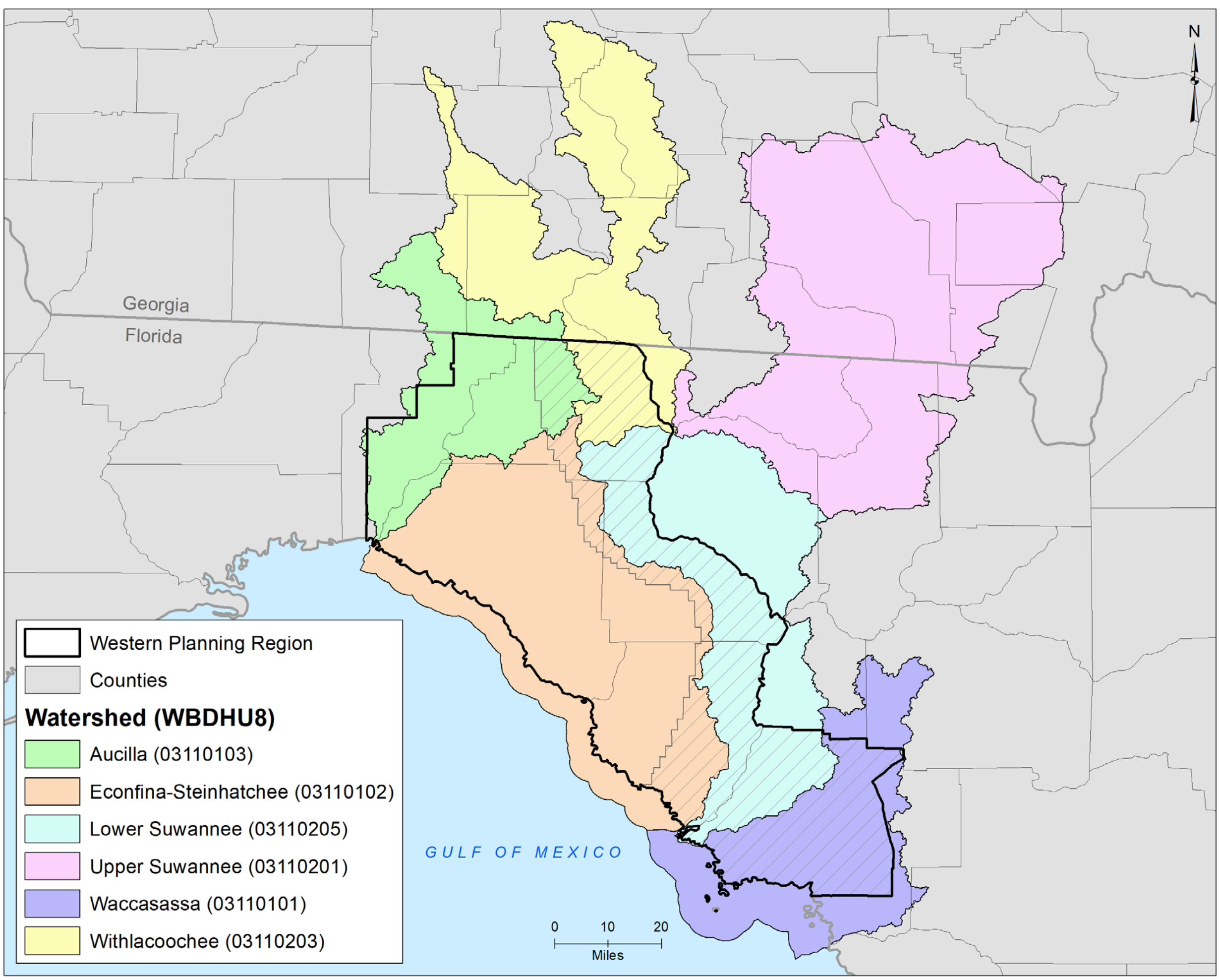

Figure 3. Watersheds (8-digit hydrologic unit code) in the WWSP region (USGS, 2023b)

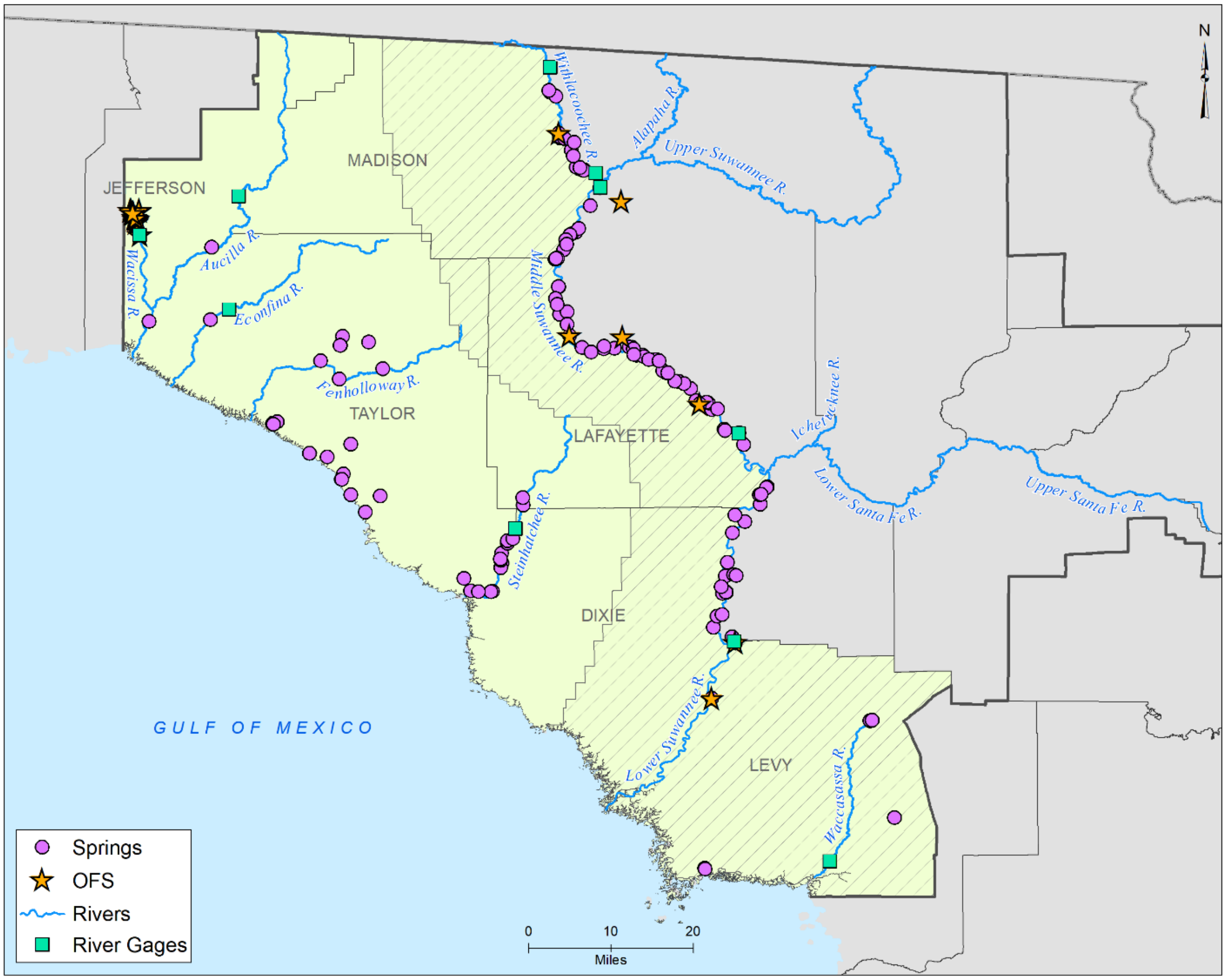

Figure 4. Springs (fourth magnitude or greater), OFS, rivers, and river gages in the WWSP region

Land Use

The largest portion of land in the WWSP region is upland forest, covering about 43% of the total acreage. A majority of the upland forest acreage is in Levy County with 205,888 acres, followed by Madison County with 188,020 acres. Wetlands also occupy a significant share of the total land use (39%) with substantial coverage in Taylor County (310,457 acres) followed by Dixie County (194,887 acres). Agricultural land accounts for almost 10% of the land use (DEP, 2022). The main crop categories are field crops, vegetables, and hay, which make up almost 95% of the agricultural crops in the region. Madison County has the highest acreage of agricultural land at 96,253 acres, followed by Levy County with 62,972 acres (FDACS, 2020). Other land use categories consist of barren land; rangeland; transportation, communication, and utilities; urban and built-up; and water. Together, these use types account for just under 8% of the total land use. Figure 5 and Table 1 show the land use types in the WWSP region.

Table 1. Land use types in the WWSP region

Land Use Type	Total Acres	Percent
Agriculture	259,873	9.9
Barren Land	15,980	0.6
Rangeland	65,221	2.5
Transportation, Communication, and Utilities	17,041	0.6
Upland Forest	1,127,785	42.8
Urban and Built-Up	88,234	3.3
Water	23,028	0.9
Wetlands	1,040,203	39.4
Total	2,637,364	100

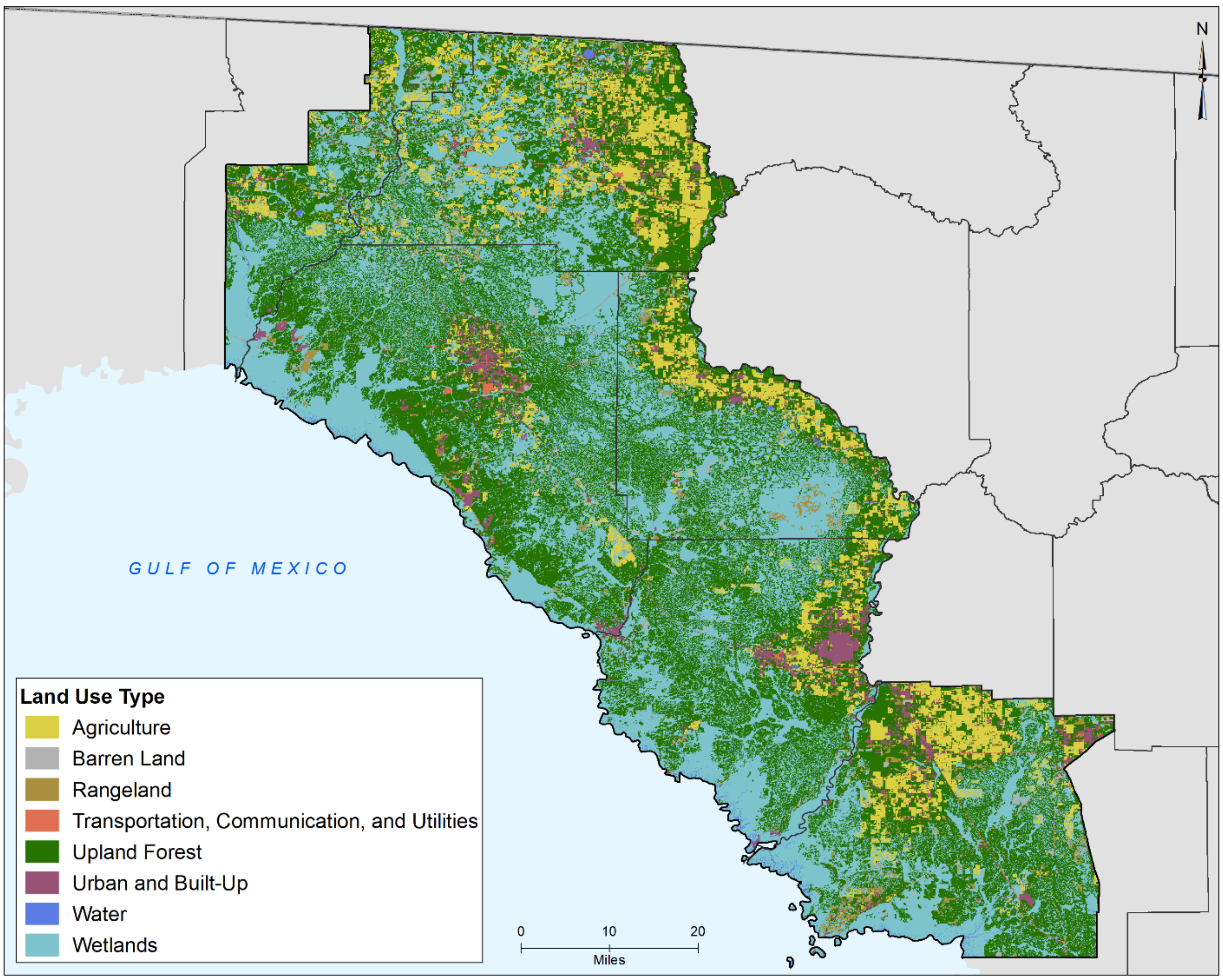

Figure 5. Land use types (Level I) in the WWSP region (DEP, 2022)

Hydrology

This section describes the characteristics of the rivers and springs, lakes, and wetlands that are unique to the WWSP region.

Aucilla River

The Aucilla River, originating in central Georgia, travels about 89 miles south to the Gulf of Mexico, passing through diverse landscapes including marshes, limestone areas, and sinks. Absorbing tannins from decomposing vegetation, the river darkens as it progresses southward. Upon resurfacing at Nutall Rise, which is a first magnitude resurgence, the river eventually flows into the Gulf of Mexico (SRWMD, n.d.).

Econfina River

The Econfina River headwaters begin in San Pedro Bay and the river flows 40 miles through Taylor County before emptying into the Gulf of Mexico. Because it flows through swampy lowlands and lacks substantial springs, the river darkens as it absorbs tannins, giving it a unique black water quality (SRWMD, n.d.).

Middle and Lower Suwannee River

Stretching about 246 miles, the Suwannee River ranks as Florida's second-largest river system. Originating in Georgia's Okefenokee Swamp, it flows south and southwest before emptying into the Gulf of Mexico. The river derives its tannic color from decaying vegetation within the Okefenokee Swamp, retaining a dark color as it flows south. The river's unique mix of water sources and habitats led to its division into three reaches for minimum flows and levels (MFL) assessment, with the Middle Suwannee reach covering 92 miles and the Lower Suwannee reach covering 33 miles (SRWMD, n.d.). This waterway holds an "Outstanding Florida Water" (OFW) designation (chapter 62-302.700[9][i][34], F.A.C.) due to its “exceptional recreational or ecological significance” (chapter 62-302.700[3], F.A.C.).

Over 300 springs have been documented within the Suwannee River Basin, with 124 springs 4th magnitude or greater. A substantial number of the springs are situated along the Middle Suwannee River reach. The springs of importance for the WWSP include Allen Mill Pond Springs, Anderson Spring, Bell Spring, Bonnet Spring, Branford Spring, Charles Spring, Falmouth Spring (OFS), Guaranto (Gornto) Spring, Hart Springs, Lafayette Blue Spring (OFS), Lime Sink Rise, Lime Spring, Little River Spring, Otter Spring, Peacock Springs (OFS), Pothole Spring, Rock Bluff Springs, Rock Sink Spring, Royal Spring, Ruth Spring, Telford Spring, Troy Spring (OFS), Turtle Spring, and Suwanacoochee Spring. Springs on the Lower Suwannee River reach include Fanning Spring (OFS), Little Fanning Spring, and Manatee Spring (OFS).

Steinhatchee River

Originating in Lafayette County from Mallory Swamp near Mayo, the Steinhatchee River is a black water river that spans about 35 miles before reaching the Gulf of Mexico. It gains its dark hue from tannins absorbed during its southern course, while being sustained by significant springs like Steinhatchee Rise and TAY76992. The river serves both commercial and sport fishing, as well as recreational scalloping activities along the coastal region (SRWMD, n.d.).

Waccasassa River

The Waccasassa River begins in the Waccasassa Flats which is located in northern and central Gilchrist County. This region is characterized by swamps and pine flatwoods and features intricate channels and areas of sheet flow. The river flows southwestward for approximately 30 miles, becoming tidally influenced along the way, before flowing into the Gulf of Mexico. Its watershed encompasses diverse habitats, ranging from freshwater swamps and marshes to tidal salt flats, fostering a rich biodiversity. The river's high conservation value is acknowledged by state designations, including its status as an OFW due to its exceptional ecological significance. Levy Blue Spring, also known as Bronson Blue Spring, discharges into the Little Waccasassa River upstream from the confluence of the Waccasassa River (SRWMD, 2006).

Wacissa River

The Wacissa River is a significant tributary to the Aucilla River, playing a vital role in augmenting the Aucilla's overall flow, particularly during times of low flow. Fed by 13 first and second magnitude springs and passing through marshy areas within the Aucilla Wildlife Management Area (WMA), the Wacissa River spreads into multiple channels before merging with the Aucilla River. The springs along the Wacissa River are known as the Wacissa Springs Group, which is considered an OFS (SRWMD, n.d.). The springs included are Big Blue Spring, Buzzard Log Spring, Cassidy Spring, Garner Spring, JEF63991, JEF63992, JEF63993, Jefferson Blue Spring, Little Blue Spring, Log Spring, Minnow Spring, Thomas Spring, and Wacissa Headspring.

Withlacoochee River

The Withlacoochee River originates in Georgia flowing southward. It briefly enters Florida before looping back into Georgia and then re-entering Florida, serving as a boundary for Madison and Hamilton counties. The river, spanning 115 miles, eventually converges with the Suwannee River in Suwannee River State Park (USGS, 2023a). There are over a dozen known springs on the Withlacoochee River, with Madison Blue Spring (OFS) being the only known first magnitude spring. Others springs to note include Hardee (Rosseter) Spring and Pot Spring.

Lakes

Cherry Lake is a 479-acre lake in northern Madison County, near the Florida-Georgia border. Its drainage was altered in the 1940s to power a grist mill, and beavers occasionally build dams in the canal, affecting lake levels. At its maximum depth, the lake is only around 14 feet deep. The lake's watershed covers about 964.6 acres, with land use primarily consisting of water (50.4%), followed by urban areas (23.8%) and upland forests (17.2%). Agricultural and range land make up 4.2%, and wetlands account for 4.1% (SRWMD, n.d.).

Wetlands

Wetlands in North Florida are ecologically diverse and play a crucial role in the region's environment, serving as an essential habitat for a wide range of plant and animal species. They also contribute significantly to water purification, flood control, and the recharge of groundwater resources. As stated above, wetlands account for 39% of the land use in the WWSP region and range from saltwater to freshwater types. The wide variety of types include bay swamps, mangrove swamps, gum swamps, titi swamps, stream and lake swamps, mixed wetland hardwoods, cabbage palms, cypress, hydric pine flatwoods, wetland forested mixed, freshwater marshes, saltwater marshes, wet prairies, emergent aquatic vegetation, mixed scrub-shrub wetland, non-vegetated wetlands, tidal flats, and intermittent ponds (Figure 6). The majority of wetlands in the area are classified as mixed wetland hardwoods (38%), followed by mixed scrub-shrub wetlands (16%) (DEP, 2022). Of the wetlands shown, approximately 66,702 acres are protected through District fee ownership and approximately 52,396 are protected by District conservation easements.

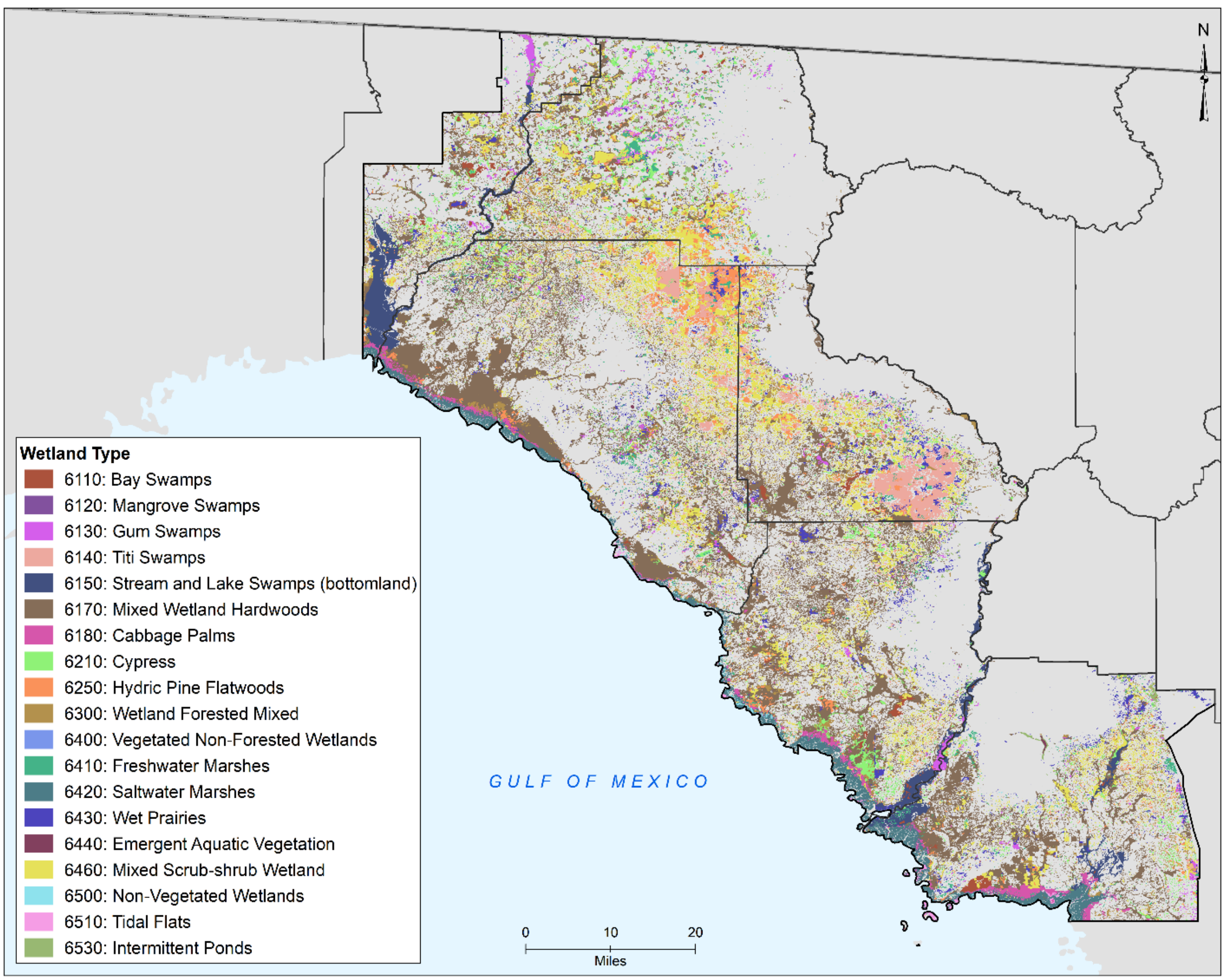

Figure 6. Wetland types (Level III) in the WWSP region with identification (DEP, 2022)

Geology

A majority of the WWSP region is in the Gulf Coastal Lowlands, which have elevations between sea level and about 100 feet above sea level. The terrain in the region is flat with karstic features like sinkholes, sinking streams, and springs. These lowlands have shallow sandy soils, often mixed with muck in wetland areas. The region has a strong connection between surface water and groundwater systems, leading to frequent recharge of the limestone aquifer. As a result, the Gulf Coastal Lowlands primarily rely on subsurface drainage, making groundwater a dominant component in their hydrology (White, 1970; Ceryak et al., 1983).

Groundwater Resources

Groundwater resources in the WWSP region include the Surficial aquifer system (SAS), the Floridan aquifer system (FAS), and where present, the intermediate confining unit (ICU)/intermediate aquifer system (IAS). A brief description of these aquifer systems is listed below:

- The SAS is the uppermost aquifer system, generally unconfined, and comprised primarily of unconsolidated beds of sand, shelly sand, shell, and clay.
- The ICU/IAS separates the underlying FAS from the overlying SAS. In some areas, the FAS is unconfined due to the absence of the ICU, such as in the Lower Suwannee River Basin.
- The FAS within the planning area is comprised primarily of carbonate rocks. In much of its extent, the FAS is comprised of the Upper Floridan aquifer (UFA) and the Lower Floridan aquifer (LFA). The two aquifers are separated by a semi-confining unit referred to as the middle confining unit (MCU). The MCU varies in lithologic and hydraulic characteristics and the degree of confinement can vary significantly. In the WWSP region, the MCU is present throughout Madison County, in northern Jefferson and Taylor counties, and Levy County.

Detailed information on the representation of these aquifer systems can be found in the North Florida-Southeast Georgia regional groundwater flow model version 1.1 (NFSEG) Final Report (Durden et al., 2019).

Traditional Water Sources

The main water source in the WWSP region is fresh groundwater due to the high productivity of the UFA (Appendix A, Table A-2). Given the historical and current utilization of fresh groundwater, the District recognizes fresh groundwater as the only traditional water supply source in the WWSP region and designates all other water sources to be nontraditional, such as alternative water supplies (subsection 373.019(1), F.S.).

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

Purpose

The District develops water demand projections to determine existing legal uses, anticipated future needs, and existing and reasonably anticipated sources of water and water conservation efforts. The District's goal in projecting water demands is to develop reasonable estimates of projected need based on the best information available. Water demand projections were reviewed with the water users. Additionally, these projections are consistent with statewide planning guidance on water demand projections. The projected increase in water demand is used in water resource assessments to determine the potential for unacceptable impacts to water resources and related natural systems.

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

- Public Supply (PS)
- Domestic Self-supply (DSS) and Small Public Supply Systems (SPSS)
- Agricultural Irrigation Self-supply (AG)
- Landscape/Recreational Irrigation Self-supply (LR)
- Commercial/Industrial/Institutional and Mining Dewatering Self-supply (CII/MD)
- Power Generation Self-supply (PG)

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

Total water demand in the WWSP region is anticipated to increase from 109 million gallons per day (mgd) in 2015 to 127 mgd in 2045 (16%; Table 2; Figure 8). Agriculture represents the largest demand in the WWSP region (58.0 mgd; 53%), followed by CII/MD (41.5 mgd; 38%) and PS (4.4 mgd; 4%) in 2015 (Table 2, Figure 7). The District also calculated a 1-in-10 year drought water demand for 2045, which represents an event that would result in an increase in water demand of a magnitude that would have a 10% probability of occurring during any given year. The District estimates that total water demand in 2045 could increase by an additional 16% (147 mgd) if a 1-in-10 year drought event occurred.

Table 2. Summary of water use (mgd) by use type in the WWSP region

Water Use Category	2015	2045	Increase
PS	4.4	5.1	17%
DSS/SPSS	4.2	4.5	6%
AG	58.0	74.3	28%
CII/MD	41.5	41.8	6%
L/R	1.2	1.2	1%
PG	0.0	0.0	N/A
Total	109.3	126.8	16%

*Totals may be slightly different due to rounding of individual values.

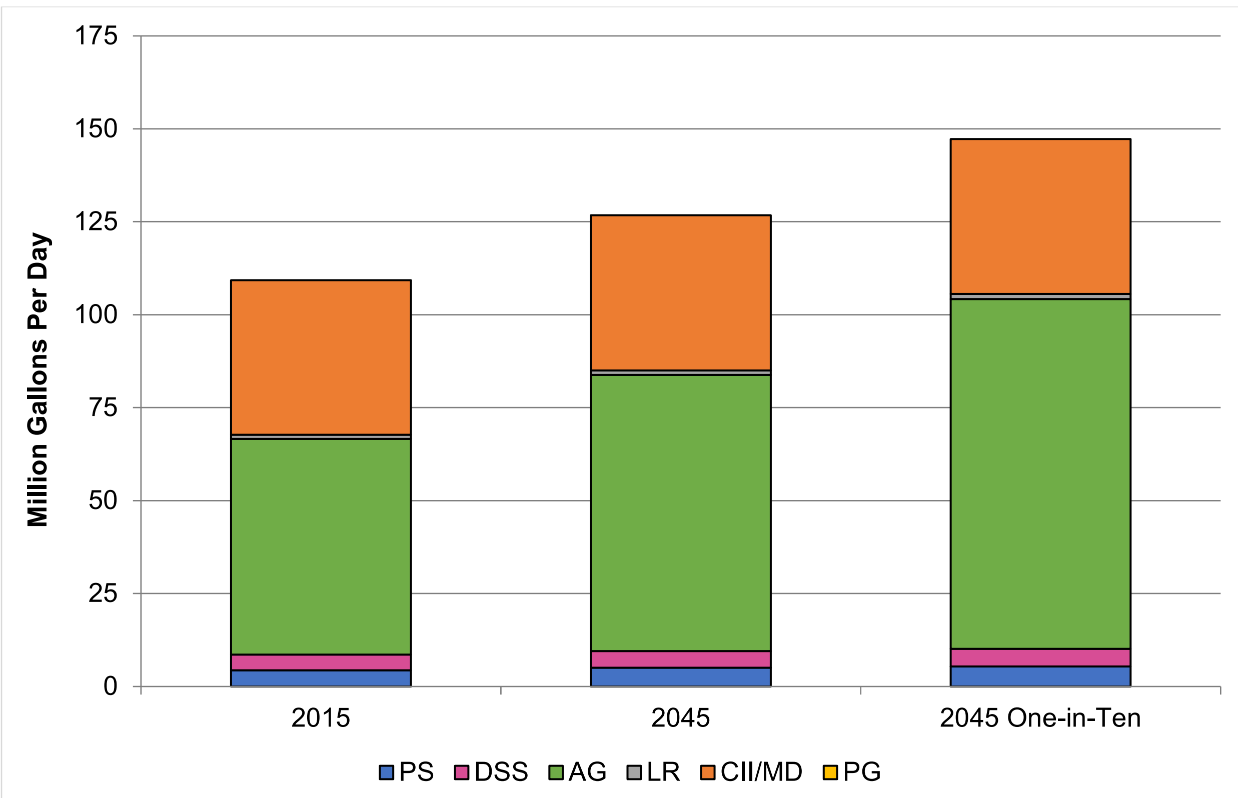

Figure 7. 2015 water use estimates and 2045 water demand projections in the WWSP region by category

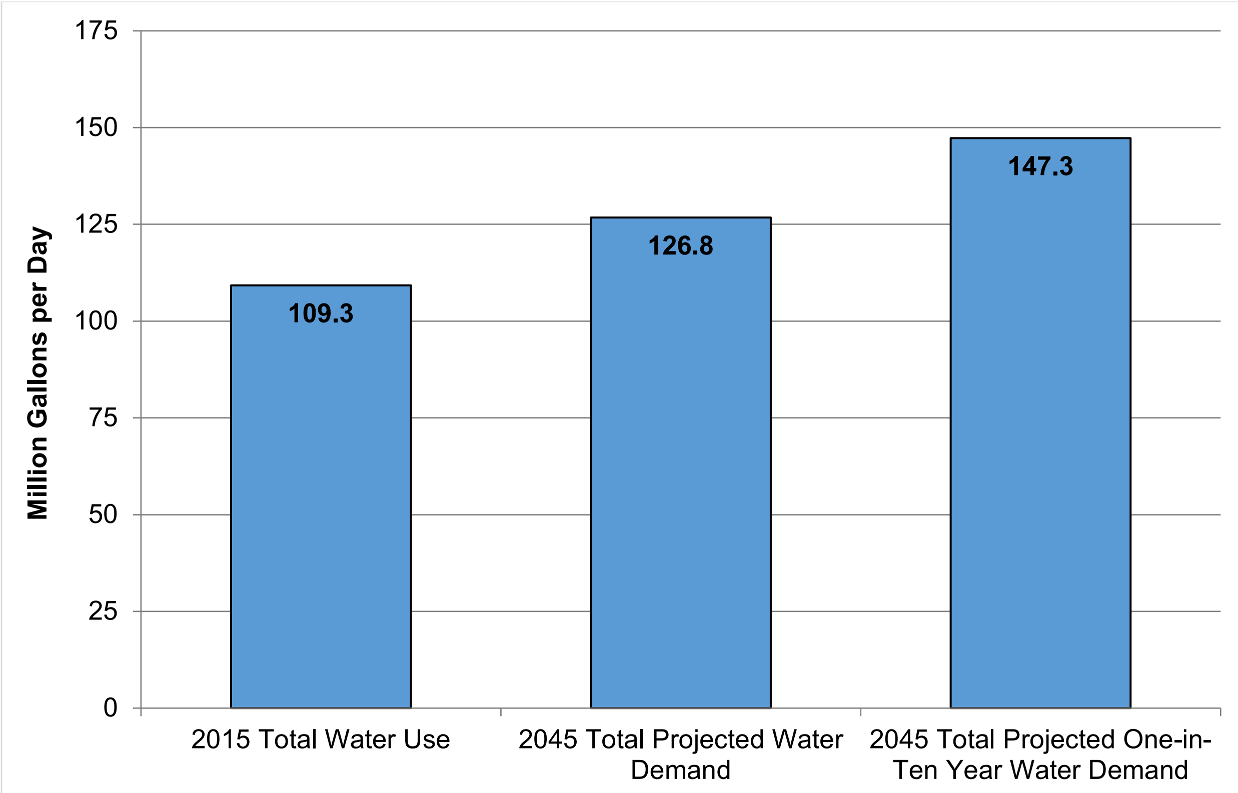

Figure 8. 2015 total water use estimates and 2045 water demand projections in the WWSP region

Future Water Demand Projections and Methodology

Assumptions

For the purposes of the WWSP, the District assumes that projected increases in supply will come from traditional sources unless users have made a commitment to the development and use of other sources of supply.

Guidance and minimum requirements for developing water demand and population projections are described in section 373.709, F.S. Detailed methodology for the development and spatial distribution of population and water demand projections can be found in Appendix A.

Population Projections

Population projections yield the estimated population growth and percent change from 2015 to 2045. The District estimated the population projections for water supply utilities in two categories: public supply, and domestic self-supply and small public supply systems. More details on the methods used for estimating population are described in Appendix A.

The District's total population for the WWSP region is expected to increase from 90,119 people in 2015 to 97,500 in 2045, which is an 8% increase (Figures 9 and 10). For the 2045 total population projections, about 60% of the projected population will use water from public supply, 32% will use water via DSS and SPSS, and the remaining 8% from CII/MD. The population served by public supply utilities in the WWSP region is expected to increase by 4,520 people (17% to approximately 31,121 people) through 2045. The population receiving water from domestic self-supply and small public supply systems in the WWSP region is expected to increase by 4,029 people (7% to approximately 58,602 people) through 2045.

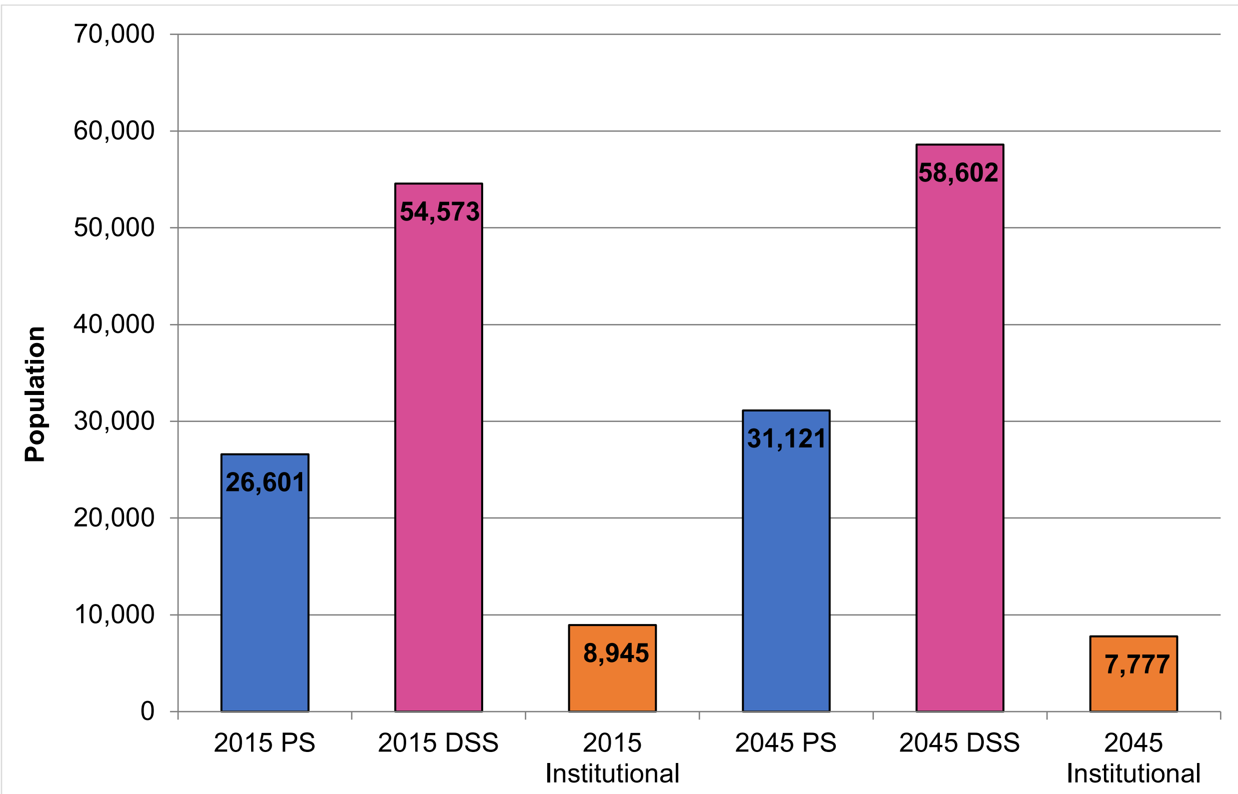

Figure 9. 2015 population estimates and 2045 population projections in the WWSP region by category

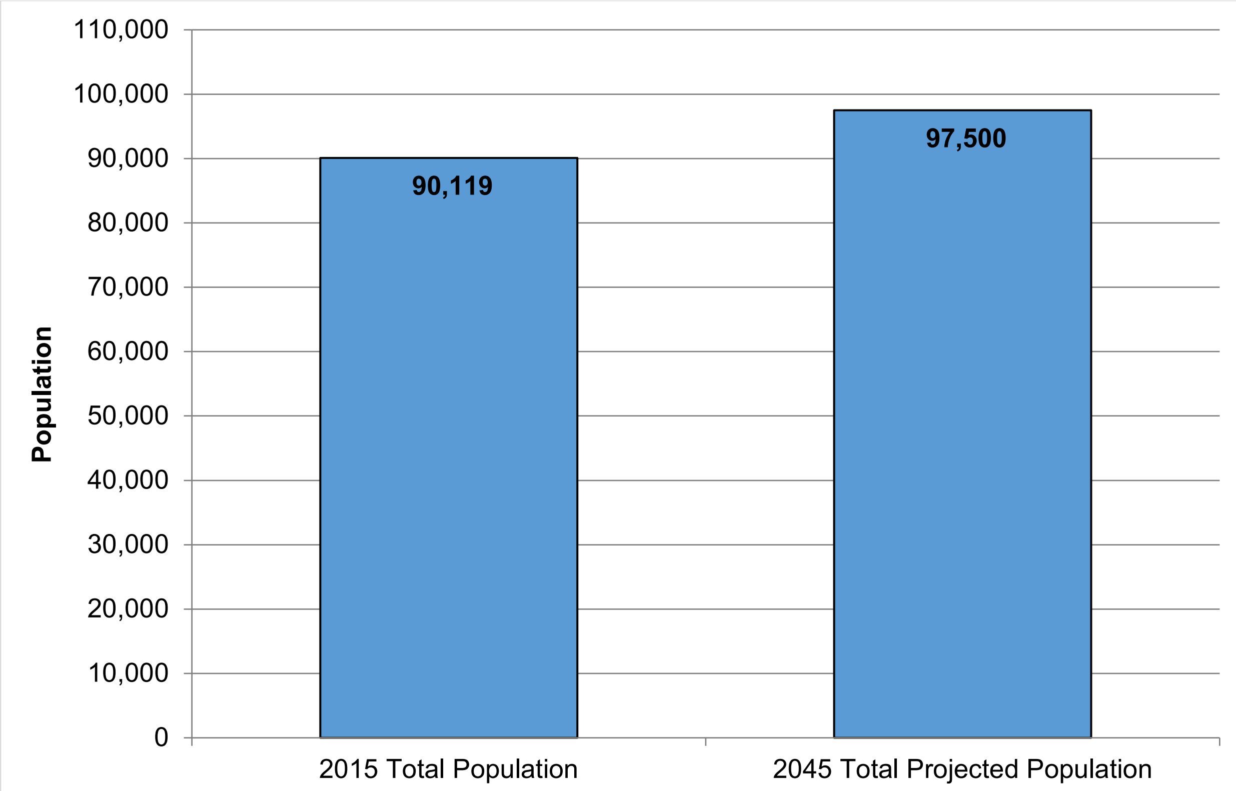

Figure 10. 2015 total population estimates and 2045 population projections in the WWSP region

Public Supply

The public supply category consists of indoor and outdoor residential and nonresidential uses supplied by a municipality, county, regional water supply authority, special district, public or privately owned water utility or multijurisdictional water supply authority for human consumption and other purposes. This category is split between large public supply systems, which include permits that withdraw an annual average of 0.1 mgd or more, and SPSS that withdraw less than 0.1 mgd. The methods for projecting water demand for SPSS are the same as for large public supply systems and are described immediately below. However, the water use estimates for small public supply are aggregated and incorporated with the domestic self-supply estimates which are described in the next section.

Demand

For the WWSP, the District based the water demand projections for large public supply and small public supply on the most recent five-year average gross per capita rate (2014-2018). The gross per capita water use rate is the factor applied to projected population to determine future water demand. This rate represents, on average, how much water one person uses in a day. For large public supply and small public supply, the gross per capita rate is defined as the total water use (including residential and non-residential uses) for each individual permittee divided by its respective residential population served expressed in average gallons per capita per day (gpcd). A five-year average is used to address annual variations in water use due to climate variations and implementation of water conservation programs. The District calculated five-year average gross per capita water use rates for each individual public supply and small public supply utility.

The use of 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 measures, reductions in landscape irrigation with potable water, and increases in multifamily housing occupancy can decrease the gross per capita rates. Conversely, factors such as expanded tourism and other commercial development, larger irrigated lots, and increases in single family housing can increase the gross per capita rates. Factors affecting gross per capita rates and public supply water demands will be captured during future water supply plan updates.

The District's large public supply water demand for the WWSP region is expected to increase by 0.7 mgd, from 4.4 to 5.1 mgd (17% increase) by 2045 (Figure 11). The District aggregated the projected water demand for the small public supply for each county and summed those values to the total respective county demand for the DSS category, shown in the next section. Large public supply represents 4% of the 2045 projected water demand in the WWSP region.

The District also calculated a 1-in-10 year drought water demand for 2045 (Figure 11). It is estimated that water demand in 2045 could increase by six percent if a 1-in-10 year drought event occurred.

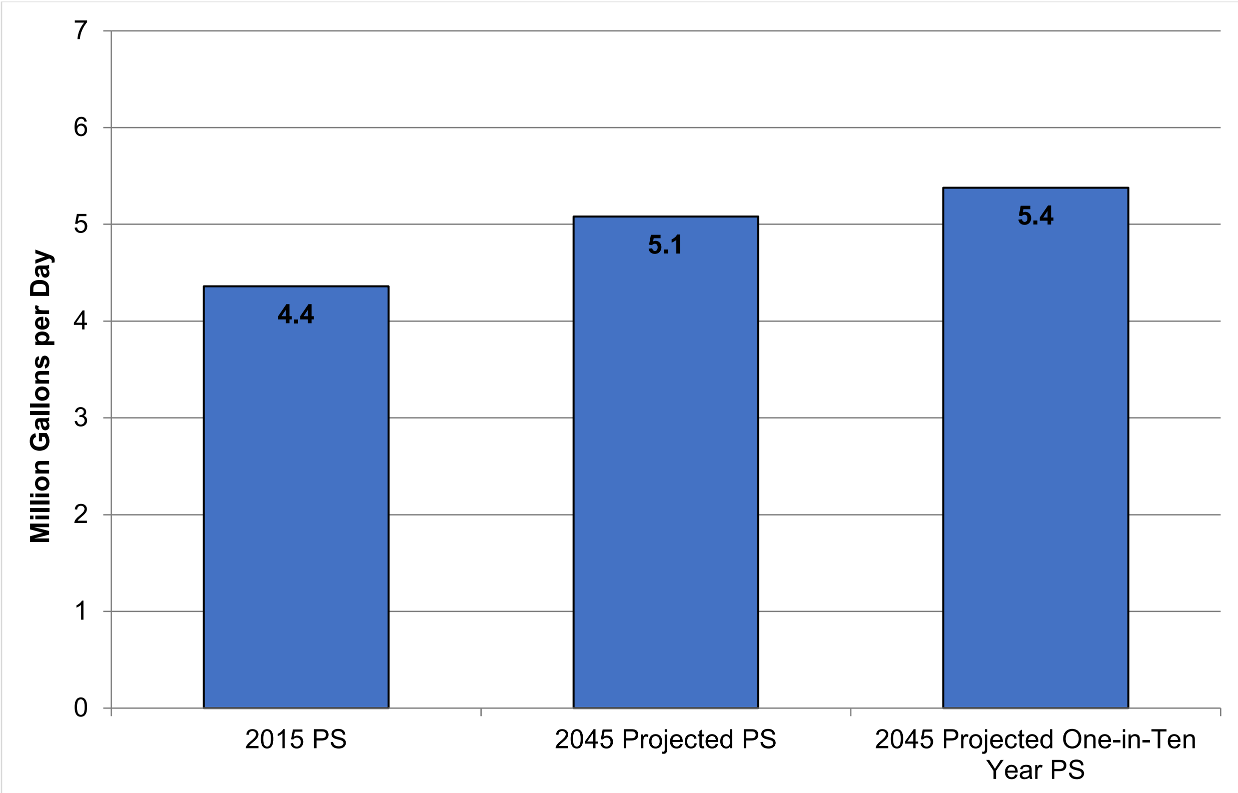

Figure 11. 2015 large public supply water use estimates and 2045 water demand projections in the WWSP region

Domestic Self-Supply

The DSS category consists of indoor and outdoor water use at residential dwellings not served by a central public supply and water usage from SPSS (systems less than 0.1 mgd). Historic water use and population and projected water demand and population for SPSS are calculated individually but are aggregated with the DSS category for reporting purposes at the county level.

Demand

For the WWSP, the District based the DSS water demand projections on the most recent five-year average residential per capita rate (2014-2018). For DSS, the residential per capita rate (also referred to as household use, both indoor and outdoor) is defined as the water used for solely residential purposes. Gross per capita is not used for this category as it includes more than just residential uses. Details on the small public supply water demand are described in the Public Supply section.

The District's total combined DSS and small public supply water demand for the WWSP region is expected to increase by 0.3 mgd, from 4.2 mgd to 4.5 mgd (6% increase) by 2045 (Figure 12). Of the 2045 combined DSS water demand, DSS wells represent 3.5% of the projected water demand.

The District also calculated a 1-in-10 year drought water demand for 2045 (Figure 12). It is estimated that water demand in 2045 could increase by six percent if a 1-in-10 year drought event occurred.

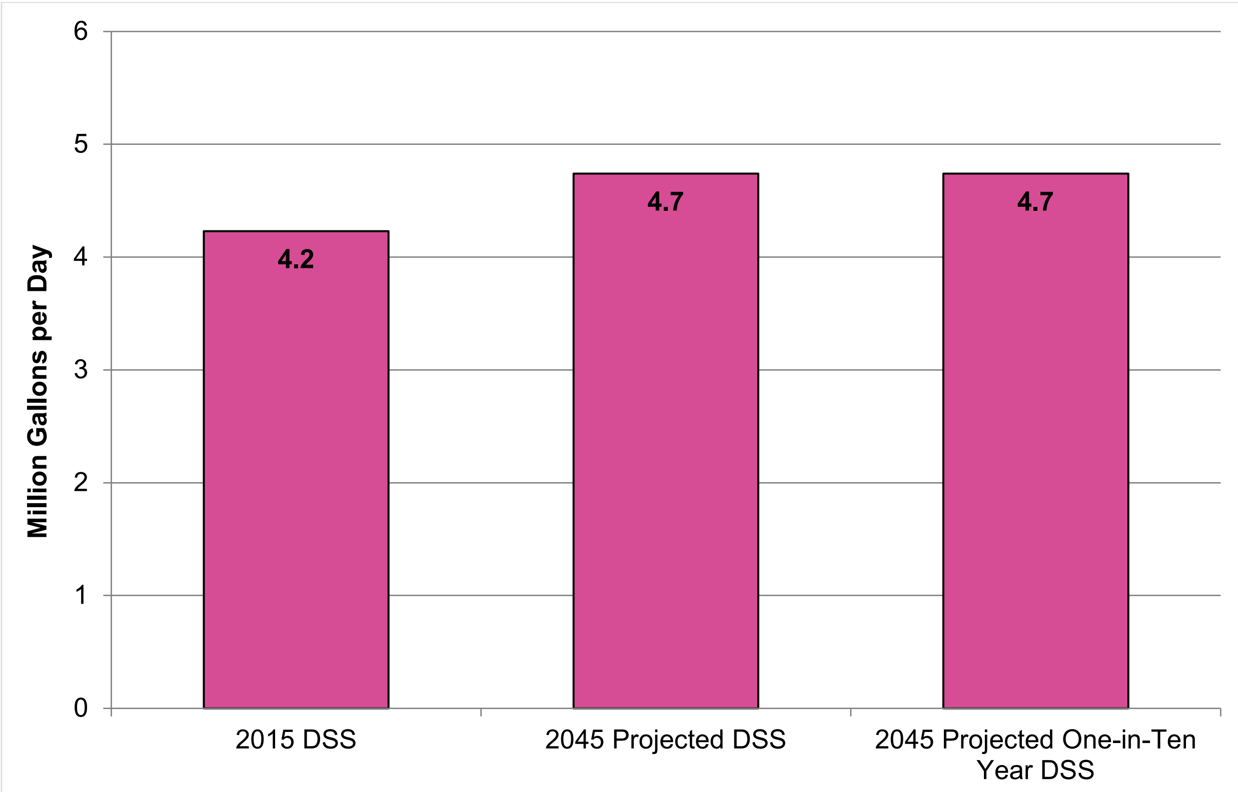

Figure 12. 2015 domestic self-supply water use estimates and 2045 water demand projections in the WWSP region

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, fruit, field crops, greenhouse/nursery, sod, etc. 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 other livestock.

In 2013, legislation was passed that required the districts to consider agricultural demand projections provided by FDACS (subparagraph 373.709(2)(a)1b., F.S.) when developing RWSPs. FDACS develops projections of future agricultural acreage, water demand, and a 1-in-10 drought demand for the State of Florida, which is updated annually. This product is known as the Florida Statewide Agricultural Irrigation Demand (FSAID), and the final report for the version identified as FSAID VII was delivered on June 30, 2020. This FSAID VII iteration has base year acreage and water use estimates for 2018 with projections for 2020-2045. The District used the final FSAID VII agricultural acreage and water demand projections for the WWSP. Detailed methodology can be found in the June 30, 2020, FSAID VII Final Report (FDACS, 2020).

Acreage and Demand

The District's total agricultural water demand for the WWSP region is expected to increase by 15 mgd, from 58 mgd to 74 mgd (28% increase) by 2045, and acreage is expected to increase by 23,595 acres, from 48,394 to 71,989 acres (49% increase) by 2045 (Figures 13 and 14).

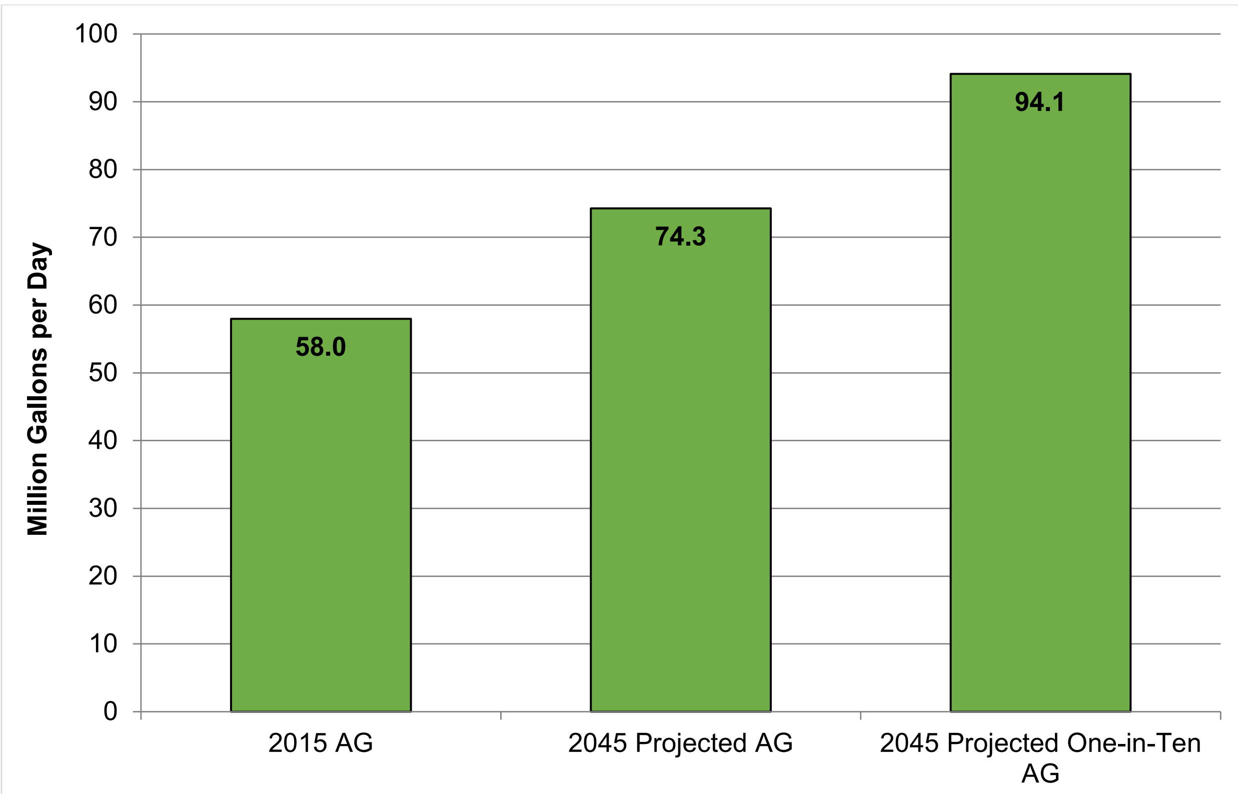

Figure 13. 2015 agriculture self-supply water use estimates and 2045 water demand projections in the WWSP region

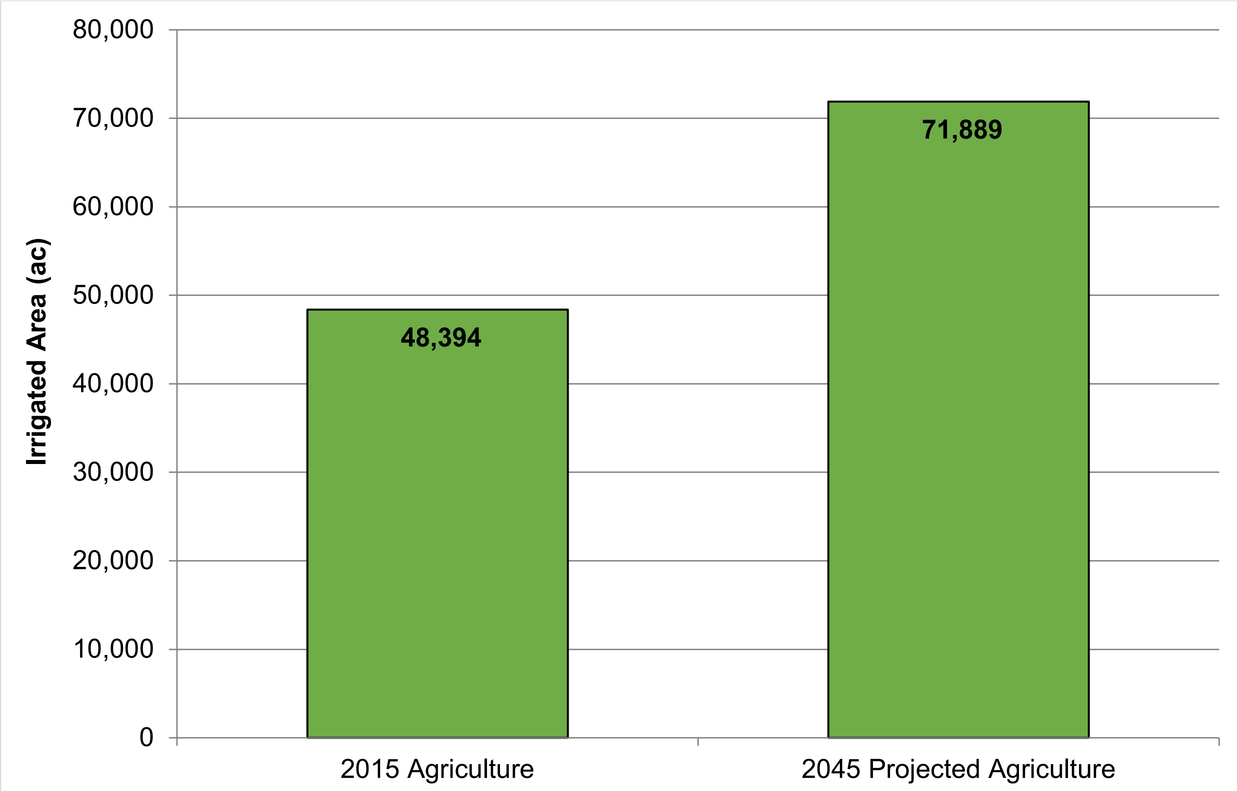

Figure 14. 2015 agriculture self-supply acreage estimates and 2045 acreage projections in the WWSP region

Commercial/Industrial/Institutional and Mining/Dewatering

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

Demand

Water demand for the CII/MD category was projected at the county level using a respective CII/MD historic average gpcd. Commercial/Industrial/Institutional and Mining/Dewatering historic water use, and projected water demand consists of only consumptive uses; recycled surface water and other non-consumptive uses were removed. The District defines consumptive use as any use of water that reduces the supply from which it is withdrawn or diverted. For the WWSP, the District used the loss of water in the mining operations due to evaporation and water removed in the product in calculating demand. The amount of water lost is represented by 5% of the total surface water withdrawals of the mine operation. The remaining surface water was assumed to be recirculated in the mining process and, therefore, is considered non-consumptive. The CII/MD average gpcd was applied to the additional population projected by BEBR (Rayer, 2020) for each five-year increment and the associated water demand was added to the base year, 2015 water use. Water demands for large commercial and industrial facilities (e.g., pulp and paper mills) that are not impacted by population growth were held constant.

The District's total combined CII/MD water demand for the WWSP region is expected to increase by 0.2 mgd, from 41.5 mgd to 41.7 mgd (1% increase) by 2045 (Figure 15). The District determined that drought events (1-in-10 year) do not have significant impacts on water use in the CII/MD category. Water use for these categories is related primarily to processing and production needs.

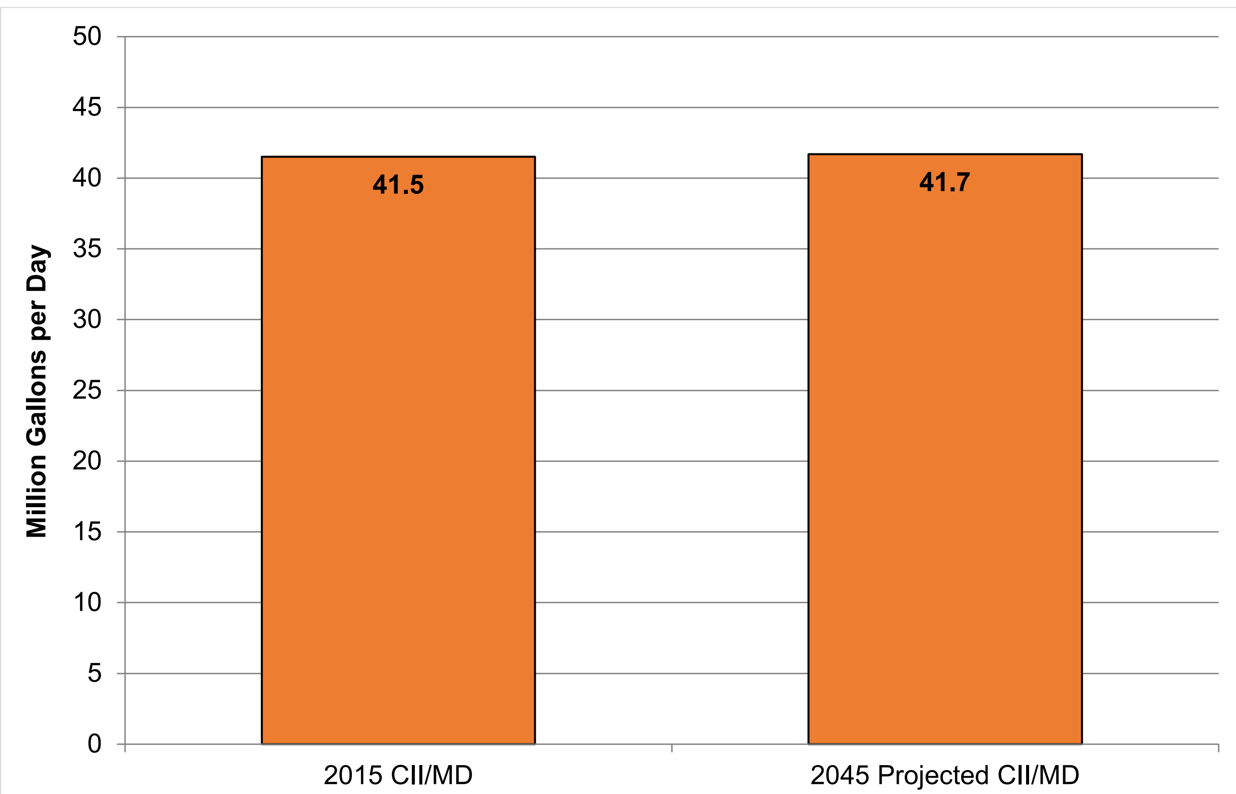

Figure 15. 2015 commercial/industrial/institutional and mining/dewatering self-supply water use estimates and 2045 water demand projections in the WWSP region

Landscape/Recreation

The LR category represents water use associated with the irrigation, maintenance, and operation of golf courses, cemeteries, parks, medians, attractions, and other large self-supplied irrigation areas. Landscape use includes the outside watering of plants, shrubs, lawns, ground cover, trees and other flora in such diverse locations as the common areas of residential developments and industrial buildings, parks, recreational areas, cemeteries, public rights-of-ways, and medians. Recreational use includes the irrigation of recreational areas such as golf courses, soccer, baseball and football fields, and playgrounds. Water-based recreation use is also included in this category, which includes public or private swimming and wading pools, and other water-oriented recreation such as water parks. Landscape irrigation using water from a public supply utility or a DSS well is included in the PS or DSS category based on best available information, as appropriate.

Demand

Water demand for the LR category was projected at the county level using a respective LR historic average gpcd. The average LR gpcd was applied to the additional population projected by BEBR (Rayer, 2020) for each five-year increment, and the associated water demand was added to the 2015 base-year water use.

The District's total LR water demand for the WWSP region is expected to increase by 0.07 mgd, from 1.15 to 1.22 mgd (6% increase) by 2045 (Figure 16).

The District determined that historic data and net irrigation ratios are acceptable when calculating the 1-in-10 year LR water demand projection. In addition, agricultural irrigation models have supplemental irrigation values for LR that can also be used. A 1-in-10 year drought factor was developed for each county, using the highest year water use from 2014-2018 and the percent increase from the average 2014-2018 LR water use. For example, if water use in 2015 was five percent higher than the 2014-2018 average, five percent was applied to the average 2045 water demand to project a 2045 1-in-10 year water demand.

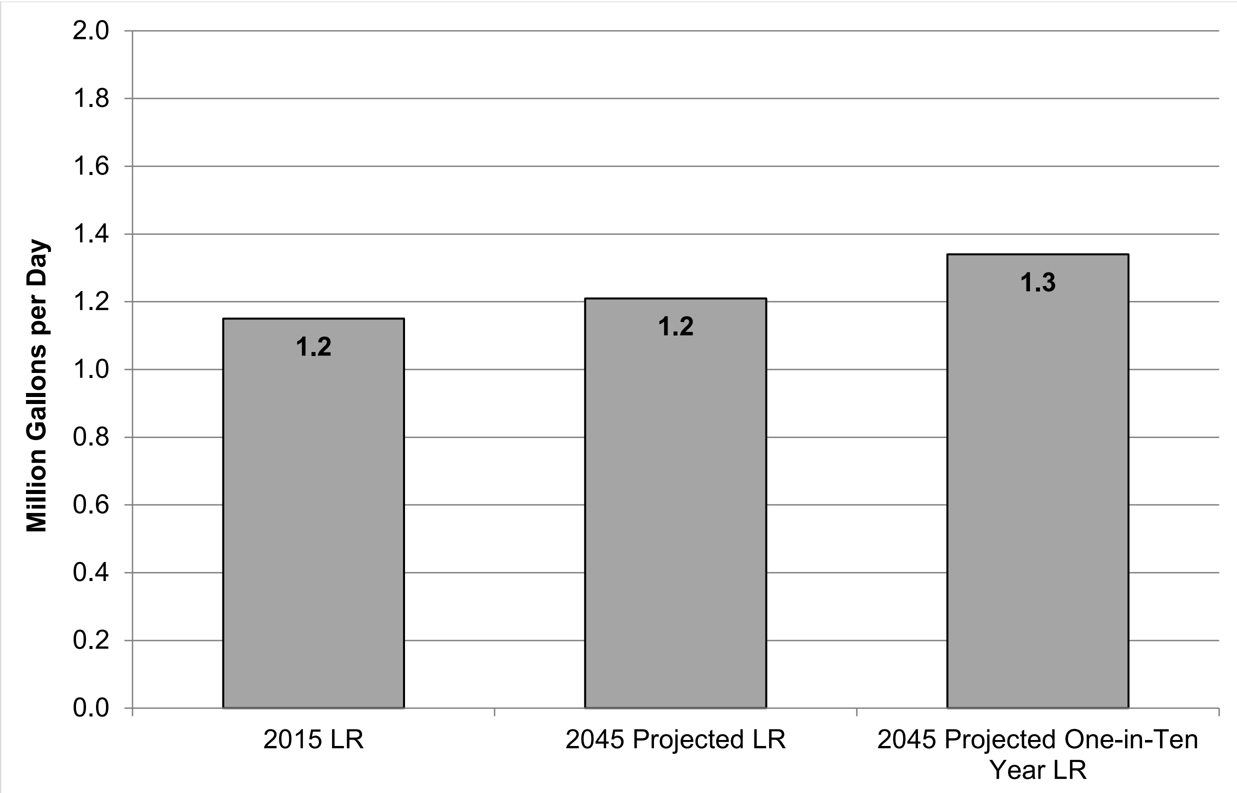

Figure 16. 2015 landscape/recreational self-supply water use estimates and 2045 water demand projections in the WWSP region

Power Generation

The 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

There are no power generation facilities with a consumptive use of water located in the WWSP region.

Reclaimed Water Projections

Projections were made for domestic wastewater treatment facilities (WWTF) with 2018 permitted wastewater treatment capacities equal to or greater than 0.1 mgd. Detailed methodology for reclaimed water projections can be found in Appendix A.

Existing Flows

The District considered existing 2018 reclaimed water flows for future use that were not considered to be used beneficially. The District considered 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 (RIBs) are not considered beneficial reuse, unless located in recharge areas. The majority of WWTF in the WWSP region are located in recharge areas.

The DEP has a statewide reuse utilization goal of 75% (DEP, 2003). The potential existing additional reclaimed water that could be used for reuse was calculated by taking the difference between the 2018 WWTF flow at 75% utilization and 2018 beneficial reuse. This method ensured existing flows would not exceed the 75% utilization goal. It is recognized that each WWTF is unique and items such as system upgrades and treatment, additional storage, system expansion, customer availability, etc., must be taken into consideration.

Figure 17 reflects the 2018 reclaimed water flows, with the size of the symbol representing the total flow, orange representing disposal, and purple representing beneficial use of reclaimed water. No disposal flows were recorded in 2018. The City of Perry and City of Cedar Key may use surface water as a method of disposal; however, neither had any disposal flow in 2018. Facility names and associated flows can be found in Appendix A.

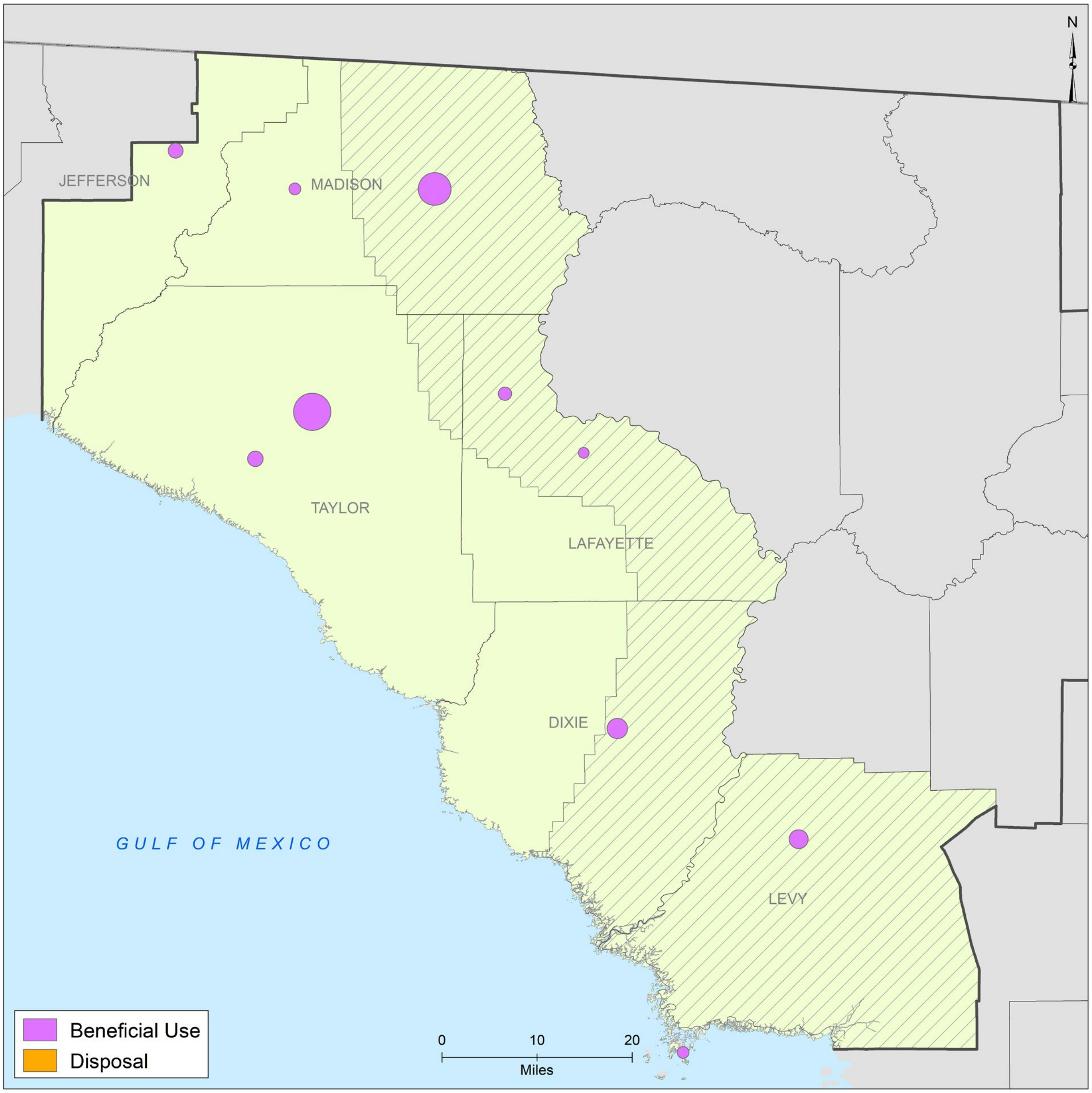

Figure 17. Summary of 2018 reclaimed water flows in the WWSP region

Future Flows

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

It was further assumed that the increased sewered population will generate approximately 73 gpcd of wastewater to the local WWTF (sources are identified in Appendix A). The estimated future flow was then multiplied by the DEP utilization goal of 75 % (DEP, 2003) to generate a 2045 quantity of potential new additional reclaimed water available for reuse.

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

For the purposes of this WWSP, the District also created a future reclaimed water scenario using the 2018 percent beneficial reuse utilization for existing and future flows, which would assume that no changes to current treatment processes are made (e.g., WWTF upgrade). In addition, the District recognizes potential future wastewater flow could be less if additional residential indoor water conservation is achieved. For example, the American Water Works Association has noted on their website (Drinktap.org) that if all residences installed more efficient water fixtures and regularly checked for leaks, daily indoor water use and associated wastewater flows could potentially be reduced to 45.2 gpcd (Vickers, 2001).

The District estimated that increased future reclaimed water flows between 0.06 mgd and 0.12 mgd, as described above, could be used for beneficial purposes, potentially offsetting withdrawals from traditional water sources and predicted impacts within the WWSP region.

Water Conservation and Irrigation Efficiency

Current water demand projections and the water conservation potential for the WWSP region were calculated in an effort to gauge the future impact of water conservation. It is important to note that reductions in water use resulting from current and historical water conservation efforts are reflected in the 2045 water demand projections that were calculated for this plan. Detailed methodology for water conservation can be found in Appendix A.

For this WWSP, the District 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 VII Final Report (FDACS, 2020). For the remaining water use categories, the District employed the methodology developed during the Central Florida Water Initiative (CFWI) RWSP process (CFWI, 2020).

For the first scenario (low conservation potential) for the public supply and DSS categories, as well as all other categories excluding agriculture, the District used the low-end estimates of percent savings of conservation from the 2020 CFWI RWSP. For this scenario, it is estimated that approximately 13.3 mgd of the projected demand for 2045 could be offset by water conservation.

For the second scenario (high conservation potential) for the public supply and DSS categories, the District analyzed the average 2014-2018 gross per capita rate for the entire WWSP region. If all public supply systems and DSS residents achieved the average 2014-2018 gross per capita rate for the WWSP region, water conservation could be increased by 1.4 mgd, from 13.3 to 14.7 mgd, potentially offsetting future demand (Table 3).

Table 3. 2045 water conservation and irrigation efficiency potential in mgd

Category	**2045 Low Conservation Potential**	**2045 High Conservation Potential**
PS	0.36	1.89
DSS/SPSS	0.16	0.16
AG	11.79	11.79
CII/MD	0.06	0.06
L/R	0.92	0.92
PG	0.00	0.00
Total	13.28	14.65

*Totals may be slightly different due to rounding of individual values.

Chapter 4: Assessment of Groundwater Conditions Associated with Future Water Demand Projections

Purpose

The North Florida-Southeast Georgia regional groundwater flow model (NFSEG) is a modeling tool developed as a requirement of the North Florida Regional Water Supply Partnership (Partnership), between the District and the St. Johns River Water Management District (SJRWMD) (Charter for SJRWMD-SRWMD Cooperative Groundwater Model Development Project). For consistency in water supply planning, establishment, and assessment of MFLs, and permitting decisions, the Partnership agreed to implement a joint regional groundwater flow model. The model covers the region depicted in Figure 18, which improves representation of the aquifer system on a regional basis. The current version of NFSEG is referred to as NFSEG v1.1 (Durden et al., 2019). More details about NFSEG v1.1 can be found in Appendix B. Model files are available for download and can be found at northfloridawater.com.

Hydrologic Assessment

As an implementation of MODFLOW NWT, NFSEG v1.1 represents groundwater flow in the FAS using a finite-difference approximation of the groundwater flow equation. Though necessarily simplified in deference to practical considerations, system features are nevertheless represented with a degree of rigor that is adequate for satisfaction of NFSEG v1.1 development objectives as outlined in the model documentation (Durden et al., 2019). The model is thus a practical tool for use in predicting responses of the FAS to various hypothetical and/or approximate stresses. The NFSEG v1.1 was used to simulate changes in the potentiometric surface of the UFA due to projected groundwater withdrawals. The focus of this effort was to assess the effect of groundwater withdrawals in the WWSP region.

A primary controlling factor on flow within the FAS is the degree to which it is confined by the ICU. In Dixie, Lafayette, Levy, and Taylor counties, along with the southern portion of Jefferson County and southeastern part of Madison County, the UFA is unconfined and transmissive. Therefore, as the geology transitions from confined areas to unconfined areas, changes due to groundwater pumping result in less drawdown and are expressed as reductions in spring flow.

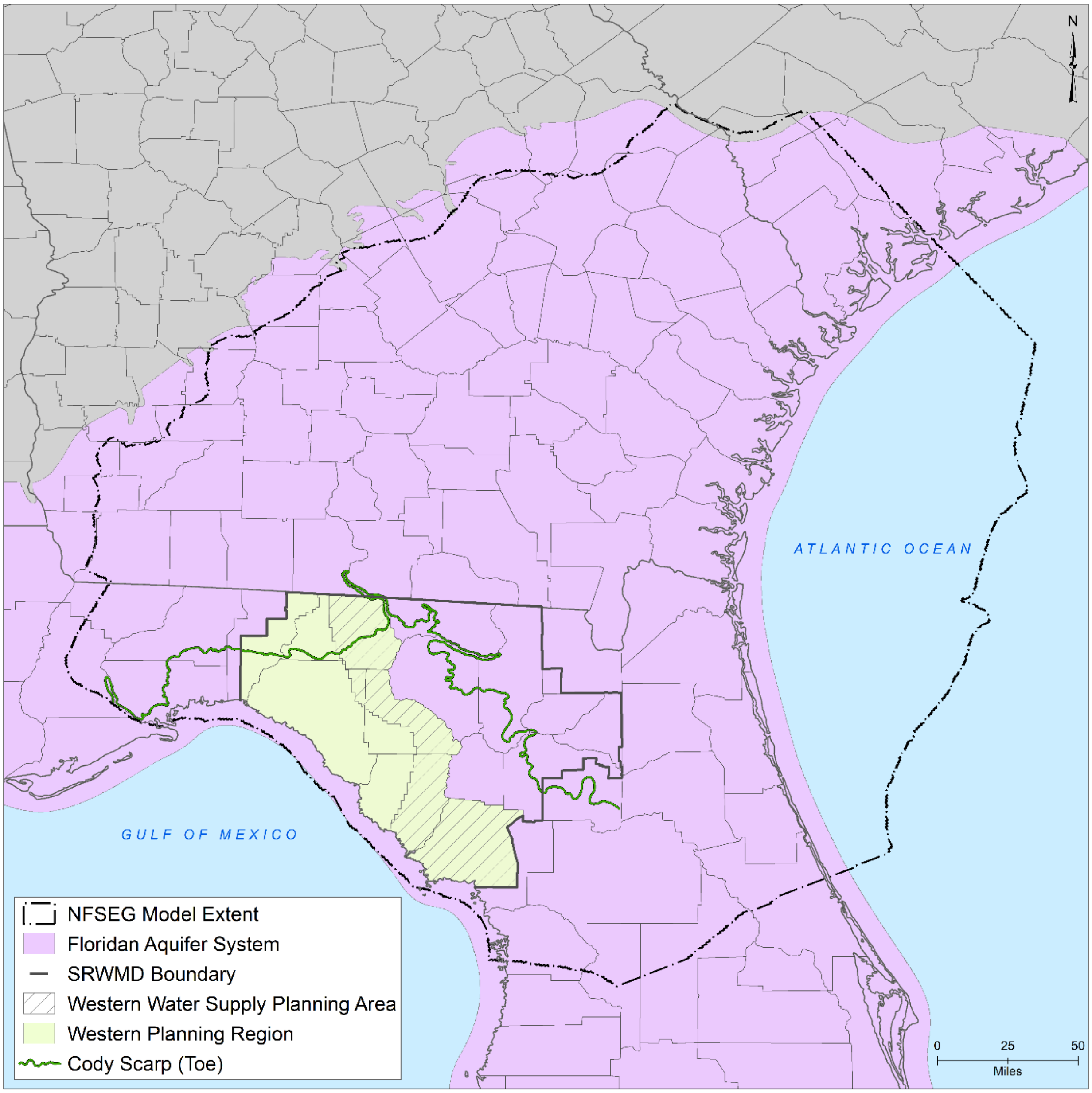

Figure 18. NFSEG model domain and the FAS

Methodology

The District completed a water resource assessment using the NFSEG v1.1 to estimate the potential impacts of groundwater withdrawals on natural systems through the planning horizon. The assessment addressed the potential impacts of groundwater withdrawals with respect to wetlands, adopted MFLs (including OFSs), and waterbodies without MFLs in the WWSP region.

The analysis involved the use of NFSEG v1.1 to simulate changes in groundwater levels and spring flows under three different pumping scenarios and comparisons of the results. Three scenarios were used for this assessment: “pumps off”, the 2014-2018 average groundwater withdrawals, which is referred to as current pumping (CP), and 2045 projected groundwater withdrawals. The “pumps off” scenario does not represent a historic or predevelopment condition; rather, it approximates a condition where no groundwater pumping is taking place. The scenarios were utilized to estimate potential impacts of existing and projected groundwater withdrawals to natural systems. In each of these evaluations, changes in groundwater levels and flows were determined as differences in the simulated groundwater levels or flows of the 2009 calibrated version of NFSEG v1.1 (the base simulation) and corresponding groundwater levels or flows of the scenario under consideration.

Results

Figure 19 shows the change in potentiometric surface of the UFA from CP to the 2045 projection, which mostly indicates a decrease in UFA potentiometric surface. The small areas of increase in the simulated potentiometric surface (aquifer rebound) were associated with reductions in pumping between CP and 2045 or due to the change in pumping distribution between CP and 2045. More information on the simulated change in groundwater levels can be found in Appendix B. The outputs from the modeled scenarios were used to assess potential impacts to water resources as described in Chapter 5.

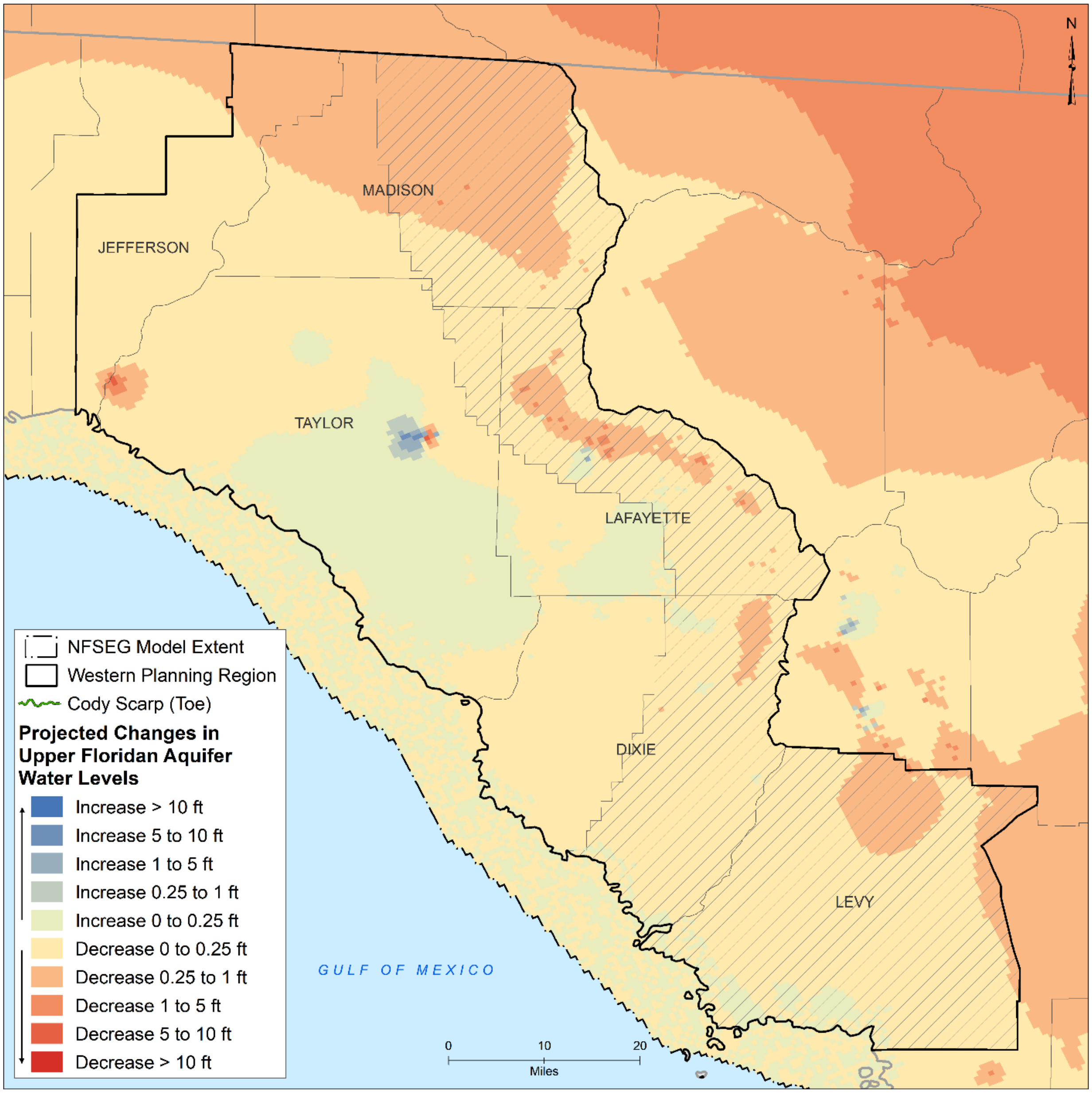

Figure 19. Changes in UFA water levels from current pumping to 2045 within the WWSP region

Chapter 5: Water Resource Assessment

Purpose

The purpose of the WWSP water resource assessment is to evaluate the extent to which water resources and related natural systems may be impacted if 2045 projected future demands are met with groundwater within the WWSP region. The components that are evaluated in the water resource assessment include groundwater quality, MFLs, waterbodies without adopted MFLs, wetlands, and resiliency. Details regarding the water resource assessments can be found in Appendices C through G. The results of the assessment identified potential impacts that could occur absent implementation of projects and measures identified in Chapter 7 for the WWSP region. The results were also used to support the continued delineation of water supply planning areas (WSPA) in the WWSP region (section 62-40.520(2), Florida Administrative Code (F.A.C.)).

Water Resource Assessment Methods and Results

Groundwater Quality

The FAS is the primary source of potable water in North Florida. Lowered water levels in the FAS create a potential for saltwater intrusion and subsequent reductions in groundwater quality. Saltwater intrusion can occur from saltwater moving inland from the ocean (i.e., lateral intrusion) or from relic seawater migrating vertically (i.e., upconing). Saltwater intrusion can affect the productivity of existing groundwater withdrawal infrastructure and the availability of potable groundwater.

The Environmental Protection Agency (EPA) has established National Primary and Secondary Drinking Water Regulations which contain water quality standards for several contaminants. Primary water quality standards are mandatory and enforceable, to protect public health, while secondary water quality standards are non-mandatory guidelines aimed at managing aesthetic attributes such as color, odor, and taste. Additionally, the Florida Safe Drinking Water Act (sections 403.850 - 403.864, F.S.) directs DEP to develop rules that reflect the national drinking water standards. Chapters 62-550, 62-555, and 62-560, F.A.C., were enacted to implement the requirements of the Florida Safe Drinking Water Act. More specifically, chapter 62-550, F.A.C., lists secondary drinking water standards for finished drinking water that include concentration limits for chloride. Increasing trends in chloride concentrations can be an indicator of saltwater intrusion because it is one of the principal chemical constituents in seawater and is unaffected by ion exchange. Saltwater intrusion can impact the efficiency of current infrastructure, leading to higher expenses associated with treatment and infrastructure maintenance. While saltwater intrusion presents a difficulty for all water users in affected areas, it poses a more pronounced challenge for small public supply systems and self-supply water users, who may have limited options for infrastructure improvements or modifications.

This water quality assessment analyzed the current status and trends for three water quality analytes: chloride, total dissolved solids (TDS), and specific conductivity, all of which are useful indicators to detect the presence of saltwater in fresh groundwater sources. Of the three analytes considered for this assessment, chloride and TDS are subject to secondary drinking water quality standards. The secondary maximum contaminant level (SMCL) for chloride is 250 milligrams per liter (mg/L) to ensure palatability, and the SMCL for TDS is 500 mg/L, to ensure desirable appearance and taste (EPA, 2023). While no EPA water quality standards are established for specific conductivity, 1,500 micromhos per centimeter (µmhos/cm) is the upper bound of typical potable water suggested by Shaw and Trost (1984).

To determine if saltwater intrusion into groundwater sources was occurring within the WWSP region due to groundwater withdrawals, the District assessed recent and historic water quality data. Water quality trends indicate whether a specific water quality analyte is increasing or decreasing over time. The status assessment statistically analyzed water quality data for chloride, TDS, and specific conductivity analytes for an assessment period of five years, from January 1, 2017, to December 31, 2021. The current trend analysis for each analyte was determined for an assessment period of 15 years, from January 1, 2007, to December 31, 2021. More details on the water quality status assessment and trend analysis can be found in Appendix C.

Chloride

Using the chloride SMCL of 250 mg/L as a benchmark, the chloride status assessment for the WWSP region determined that one well in southern Levy County exceeded the 250 mg/L standard with a chloride concentration of 641 mg/L. This monitoring well (S141429001) is a very deep well (greater than 400 feet deep) and is near the coast.

Of the wells that had sufficient long-term data to analyze a trend, the trend in chloride concentration was stable for seven wells, increasing for nine wells, and decreasing for two wells. Some wells with increasing trends are not near the coast but are in locations commonly associated with land applications of fertilizer. Figure 20 shows the status and trends for chloride concentrations in monitoring wells within the WWSP region. More detailed information on the chloride assessment can be found in Appendix C.

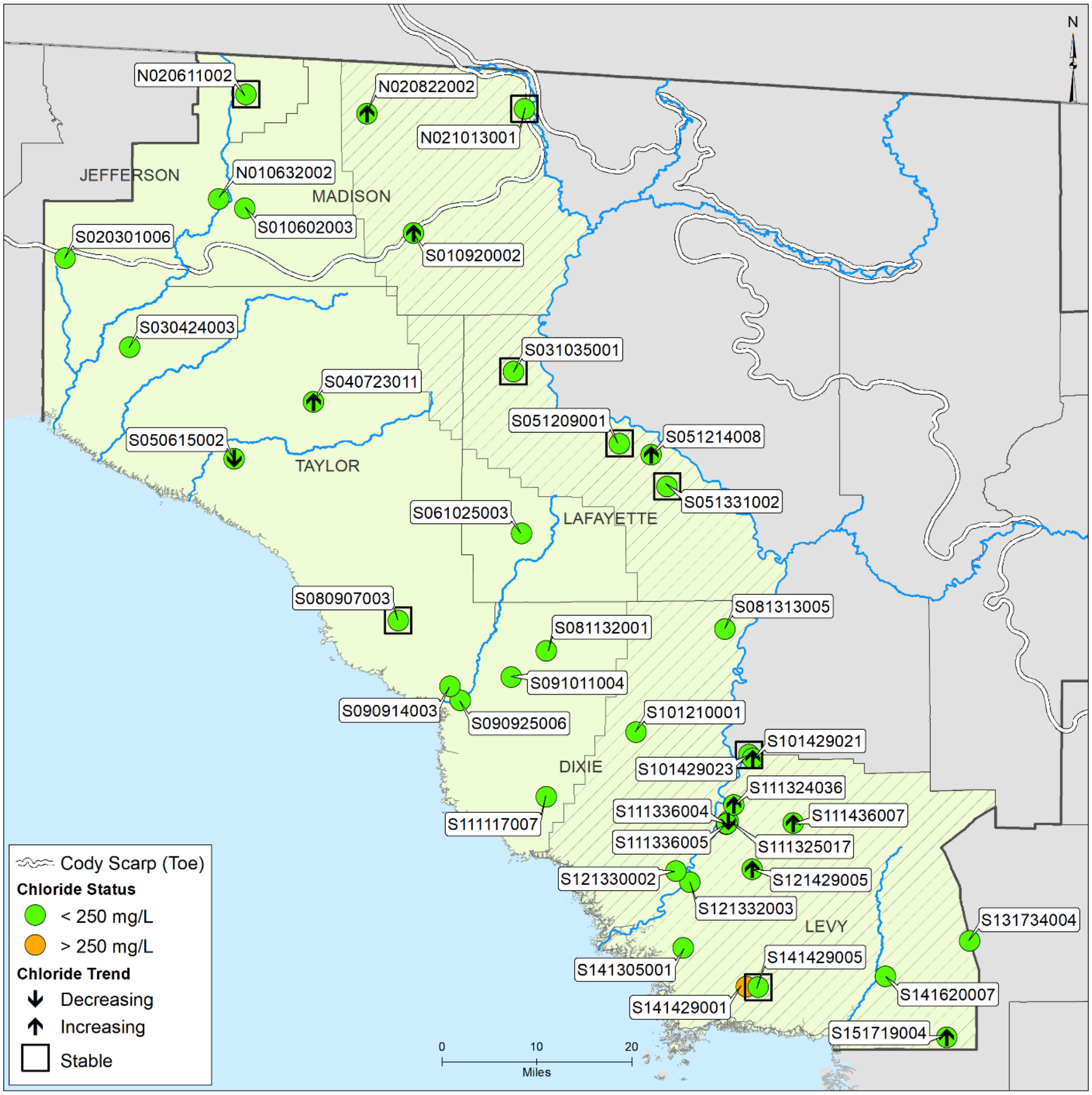

Figure 20. Chloride status and trend assessment by station ID

Total Dissolved Solids

The TDS status assessment determined there were 18 wells with a TDS concentration below 250 mg/L, 15 wells with a concentration between 250 and 500mg/L, and four wells with a TDS concentration above the SMCL of 500 mg/L. The four wells exceeding the SMCL are all located in Levy County and are near the coast or near a river system (S111324036, S121332003, S141429001, and S141620007). One of these, S141429001, is the deep well in southern Levy County with high chloride concentrations.

The trend analysis for TDS in monitoring wells within the WWSP region determined that eight wells had a stable trend, six wells had an increasing trend, and four wells had a decreasing trend. However, all six wells with increasing trends have TDS concentrations well below the 500 mg/L SMCL. Some of the wells exhibiting upward trends are not near the coast but are commonly found in areas that are associated with fertilizer application on land. Figure 21 shows the status and trends for the TDS analysis of monitoring wells within the WWSP region. More detailed information on the TDS assessment can be found in Appendix C.

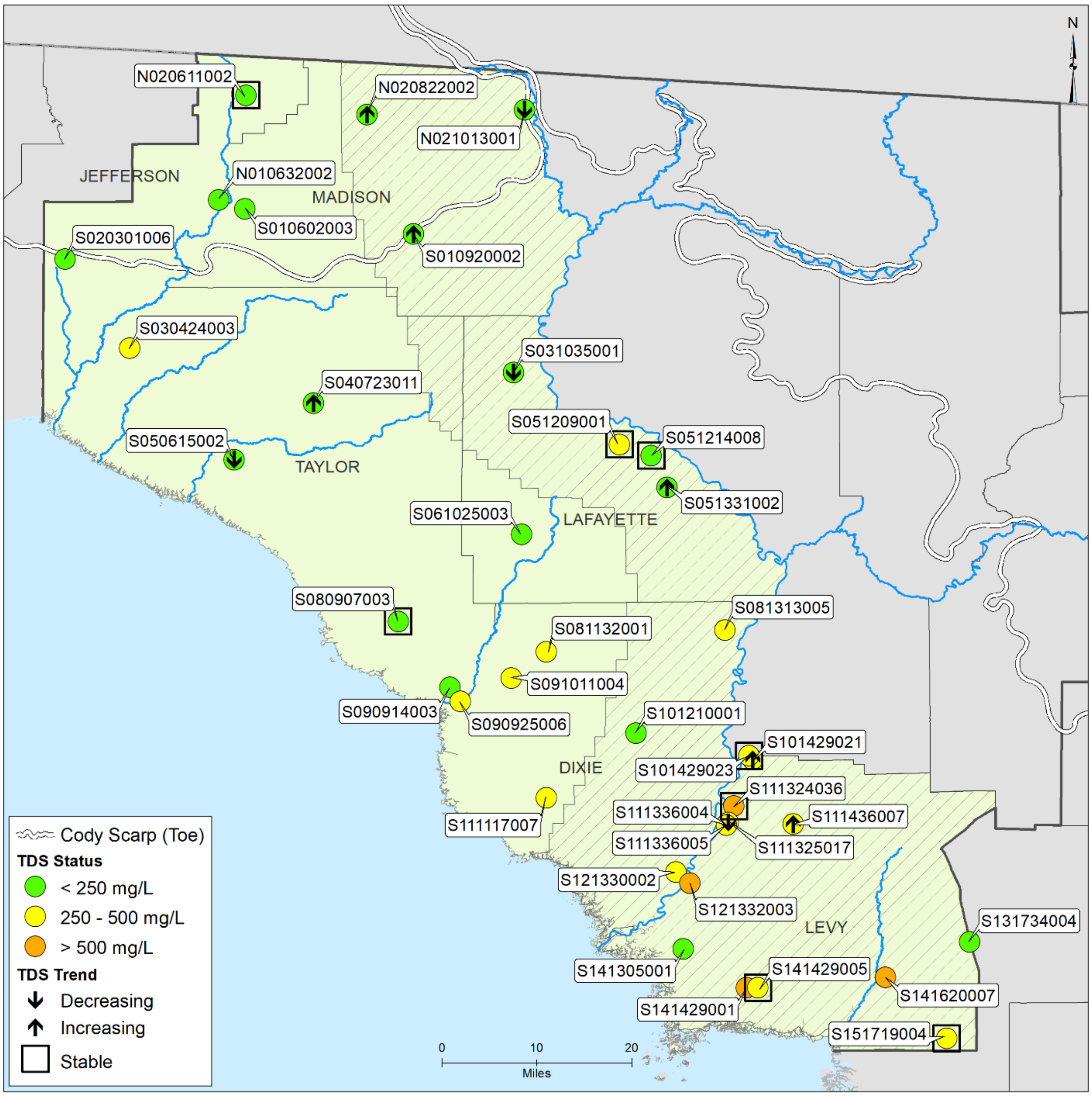

Figure 21. TDS status and trend assessment by station ID

Specific Conductivity

The specific conductivity status assessment determined there were 34 wells with concentrations less than 1,000 µmhos/cm, one well with a concentration between 1,000 and 1,500 µmhos/cm, and two wells with a concentration above 1,500 µmhos/cm. The two wells with concentrations above 1,500 µmhos/cm are in southern Levy County (S141429001 and S141620007).

The specific conductivity trend analysis identified 11 wells with a stable trend, four wells with an increasing trend, and three wells with a decreasing trend. There were 19 wells with insufficient long-term data to conduct a trend analysis. The wells with increasing trends are in Madison, Levy, and Taylor counties. Again, some of these wells with increasing trends are not near the coast but are in locations commonly associated with land applications of fertilizer. Figure 22 shows the status and trends for the specific conductivity analysis. More detailed information on the specific conductivity assessment can be found in Appendix C.

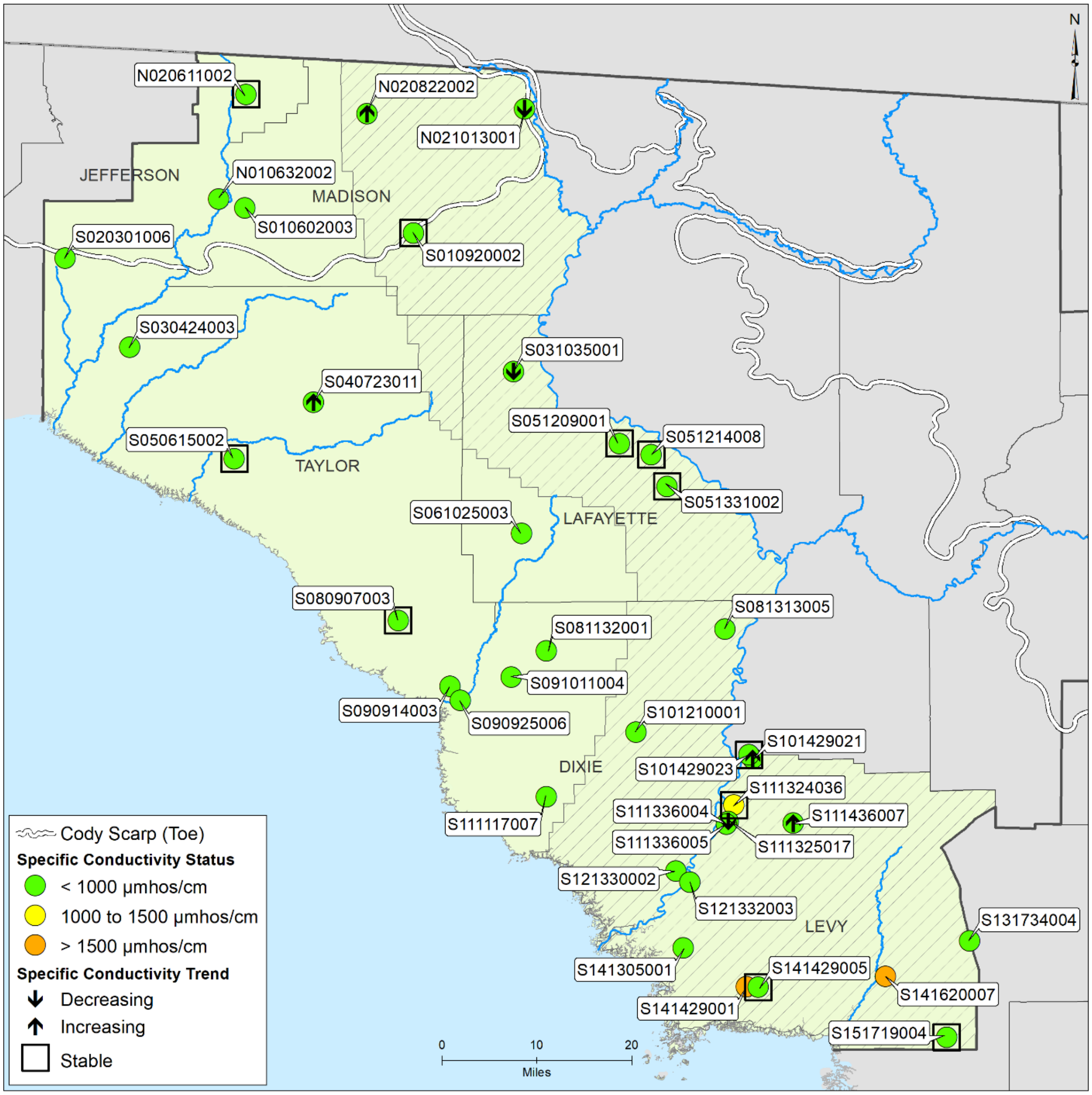

Figure 22. Specific conductivity status and trend assessment by station ID

The results of the water quality analysis revealed elevated levels of all three analytes within one monitoring well near the coast in southern Levy County (S141429001), indicating the presence of saltwater in this well. However, many of the monitoring wells in the WWSP region had less than 50 mg/L of chloride and a majority of wells showed stable or decreasing trends. Four monitoring wells had TDS concentrations greater than 500 mg/L, however all monitoring wells with an increasing TDS trend have concentrations well below the SMCL. Two wells exhibited specific conductivity values exceeding 1,500 µmhos/cm. Increasing trends in chloride, TDS, and specific conductivity identified in this analysis suggest that groundwater quality may constrain the availability of fresh groundwater that is suitable for drinking without supplemental treatment in some areas of the WWSP region, and the District will continue to monitor these conditions.

Minimum Flows and Levels

Section 373.042, F.S., directs DEP or the districts to establish minimum flows for surface watercourses and minimum levels for groundwater and surface waters. This encompasses rivers, springs, and lakes in the WWSP region. MFLs represent the flow(s) and/or level(s) at which further withdrawals would be significantly harmful to the water resources or ecology of the area. As such, MFLs provide quantitative metrics for water resource assessments and criteria for evaluating CUP/WUP applications.

Each district is required to submit to DEP an annual priority list and schedule for the establishment of MFLs (subsection 373.042(3), F.S.) (SRWMD, 2023a). The priority lists are 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. Information on all the adopted MFLs within the District can be found in chapter 40B-8, F.A.C*.,* emergency rule 40BER-17-01, F.A.C, and chapter 62-42.300. F.A.C.

MFLs were evaluated to determine whether adopted spring or river flows would be achieved if all projected future demands are met with groundwater. The evaluation assessed waterbodies at CP which is the average of 2014-2018 water use and projected groundwater withdrawals at the 2045 planning horizon. Spring flow and river flow were used as appropriate to evaluate the changes between the PO, CP, and the 2045 projected groundwater withdrawal scenarios. Within the WWSP region, the District assessed the status of 25 springs with 20 springs being an OFS or part of an OFS spring group, and six river reaches. More detailed information on the methodology and results can be found in Appendix D.

The WWSP does not change the status of an MFL waterbody. Where current or projected future demands exceed the MFL screening criteria, this plan identifies project options that can be implemented to meet demands while sustaining natural systems. More detailed information on the project options identified can be found in Chapter 7 and Appendix I.

Rivers and Springs with Minimum Flows

The water resource evaluation determined that there are four river reaches and eight springs that are meeting the screening criteria under CP and the 2045 projection. One river reach and two springs are meeting the screening criteria under CP but exceeding the screening criteria under the 2045 projection. Lastly, there is one river reach and 15 springs exceeding the screening criteria under both CP and the 2045 projection.

There are four Outstanding Florida Springs (OFS) on the Suwannee River that are currently under an emergency rule (rule 40BER 17-01, F.A.C.) which went into effect in 2017. The springs covered under this emergency rule are Falmouth Spring, Lafayette Blue Spring, Peacock Springs, and Troy Spring. The existing emergency rule shows that these four MFLs are being met. The analysis conducted for the 2023 North Florida Regional Water Supply Plan (NFRWSP), identified that Lafayette Blue Spring and Falmouth Spring as being in prevention. However, these four OFS are on the District's 2023 MFL Priority List, and technical work is underway to establish the updated MFLs (SRWMD, 2023a). Upon finalization of the updated MFLs, the status of these OFS on the Suwannee River will be re-assessed. Furthermore, Madison Blue Spring is on the District's 2023 MFL Priority List for reevaluation in 2024, along with the Waccasassa River at Gulf Hammock and Levy Blue Spring reevaluation in 2026 (SRWMD, 2023a).

Lakes with Minimum Levels

There were no lakes with adopted MFLs assessed in the WWSP region.

Table 4 shows a summary of the results of the MFLs assessment under the CP and 2045 withdrawal conditions. Figure 23 below shows a map of the locations and names of the waterbodies assessed as well as the assessment results for each waterbody.

Table 4. Status of assessed MFLs

Waterbody Type	Waterbody Name	Basin	Exceeds Screening Criteria at CP	Exceeds Screening Criteria at 2045
River	Aucilla River at Lamont	Aucilla River	No	Yes
Spring	Big Blue Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	Buzzard Log Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	Cassidy Spring[1]	Wacissa Springs Group	Yes	Yes
River	Econfina River Near Perry	Econfina River	No	No
Spring	Falmouth Spring[1]	Middle Suwannee River	No	Yes
Spring	Fanning Springs[1]	Lower Suwannee River	No	No
Spring	Garner Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	JEF63991[1]	Wacissa Springs Group	Yes	Yes
Spring	JEF63992[1]	Wacissa Springs Group	Yes	Yes
Spring	JEF63993[1]	Wacissa Springs Group	Yes	Yes
Spring	Jefferson Blue Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	Lafayette Blue Spring[1]	Middle Suwannee River	No	Yes
Spring	Levy Blue Spring	Waccasassa River	Yes	Yes
Spring	Little Blue Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	Little Fanning Spring	Lower Suwannee River	No	No
Spring	Log Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	Madison Blue Spring[1]	Withlacoochee River	Yes	Yes
Spring	Manatee Spring[1]	Lower Suwannee River	No	No
Spring	Minnow Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	Nutall Rise	Aucilla River	No	No
Spring	Peacock Springs[1]	Middle Suwannee River	No	No
River	Steinhatchee River near Cross City	Steinhatchee River	No	No
Spring	Steinhatchee River Rise	Steinhatchee River	No	No
River	Suwannee River Near Wilcox	Lower Suwannee River	No	No
Spring	TAY76992	Steinhatchee River	No	No
Spring	Thomas Spring[1]	Wacissa Springs Group	Yes	Yes
Spring	Troy Spring[1]	Middle Suwannee River	No	No
River	Waccasassa River at Gulf Hammock	Waccasassa River	No	No
Spring	Wacissa Headspring[1]	Wacissa Springs Group	Yes	Yes
River	Wacissa River Near Wacissa	Wacissa River	Yes	Yes

[1]Outstanding Florida Spring or Springs Group

Figure 23. MFL assessment results

In conclusion, MFLs play a critical role in preserving the water resources and ecology of the WWSP region. While some waterbodies are meeting the screening criteria, others are exceeding the screening criteria under CP and expected to exceed the screening criteria in 2045. Efforts are underway to address these impacts, update MFLs in the region, and coordinate with adjacent water management districts, as appropriate.

Waterbodies without Adopted Minimum Flows and Levels

The purpose of this assessment is to provide a screening evaluation of the potential for water resource impacts within the WWSP region where MFLs have not been adopted.

There are four river reaches, 22 springs, and one lake that were assessed. More details on this analysis can be found in Appendix E.

Baseline conditions for the rivers, springs, and lake were calculated using the PO scenario. Flows and water levels under the baseline condition were compared to modeled flows and water levels under the 2045 scenario. If projected demands are met with groundwater, waterbodies that showed more than a 10% decrease in flow from a no-pumping condition were identified. The lake was assessed based on lake specific criteria. The 10% reduction in flow does not necessarily correspond to an ecological threshold beyond which significant harm would occur, but it does highlight areas where resource constraints may occur. The MFL development process accounts for the unique hydrologic and ecological conditions of individual springs, and links changes in flow to a quantitative significant harm threshold. Subsequent versions of the WWSP will include any newly adopted or reevaluated MFLs.

Rivers and Springs without Adopted Minimum Flows

Of the four rivers without adopted MFLs that were assessed, the Withlacoochee River near Pinetta is meeting the 10% screening criteria. The river reaches that are exceeding the 10% screening criteria are the Middle Suwannee at Branford, the Middle Suwannee at Ellaville, and the Withlacoochee River at Lee. The technical work and peer review process has been completed for the Middle Suwannee River reaches which are listed on the District's 2023 MFL Priority List for adoption in 2024. The Withlacoochee River at Lee and near Pinetta are also on the Priority List. Both river reaches are scheduled for adoption in 2026 (SRWMD, 2023a).

Additionally, there are 14 springs that are meeting the 10% screening criteria, which are all located on the Middle Suwannee River. There are eight springs that are exceeding the 10% screening criteria and are located on both the Middle Suwannee and Withlacoochee Rivers. All of the springs on the Middle Suwannee River are included in the District's 2023 Priority List, which are scheduled for adoption in 2025 and the springs on the Withlacoochee are scheduled for adoption in 2026 (SRWMD, 2023a).

Lakes without Adopted Minimum Levels

Cherry Lake, which is in Madison County, is meeting the lake specific screening criteria under both CP and the projected 2045 condition. Cherry Lake is also under evaluation and is listed on the District's 2023 MFL Priority List for adoption in 2024.

Table 5 shows a summary of the results of the waterbodies without adopted MFLs assessment under the 2045 withdrawal conditions. Figure 24 shows a map of the names and locations of the waterbodies assessed and displays the results of the assessment.

Table 5. Waterbodies without adopted MFLs assessment summary

Waterbody Type	Waterbody Name	County/Basin	Exceeds Screening Criteria at 2045
Spring	Allen Mill Pond Springs	Middle Suwannee River	No
Spring	Anderson Spring	Middle Suwannee River	No
Spring	Bell Spring	Middle Suwannee River	No
Spring	Bonnet Spring	Middle Suwannee River	No
Spring	Branford Spring	Middle Suwannee River	Yes
Spring	Charles Spring	Middle Suwannee River	Yes
Lake	Cherry Lake	Madison	No
Spring	Guaranto Spring	Middle Suwannee River	Yes
Spring	Hardee (Rosseter) Spring	Withlacoochee River	Yes
Spring	Hart Springs	Middle Suwannee River	No
Spring	Lime Sink Rise	Middle Suwannee River	Yes
Spring	Lime Spring	Middle Suwannee River	Yes
Spring	Little River Spring	Middle Suwannee River	No
Spring	Otter Spring	Middle Suwannee River	No
Spring	Pot Spring	Withlacoochee River	Yes
Spring	Pothole Spring	Middle Suwannee River	No
Spring	Rock Bluff Springs	Middle Suwannee River	No
Spring	Rock Sink Spring	Middle Suwannee River	No
Spring	Royal Spring	Middle Suwannee River	No
Spring	Ruth Spring	Middle Suwannee River	No
Spring	Suwanacoochee Spring	Middle Suwannee River & Withlacoochee River	Yes
River	Suwannee River at Branford	Middle Suwannee River	Yes
River	Suwannee River at Ellaville	Middle Suwannee River	Yes
Spring	Telford Spring	Middle Suwannee River	No
Spring	Turtle Spring	Middle Suwannee River	No
River	Withlacoochee River near Lee	Withlacoochee River	Yes
River	Withlacoochee River near Pinetta	Withlacoochee River	No

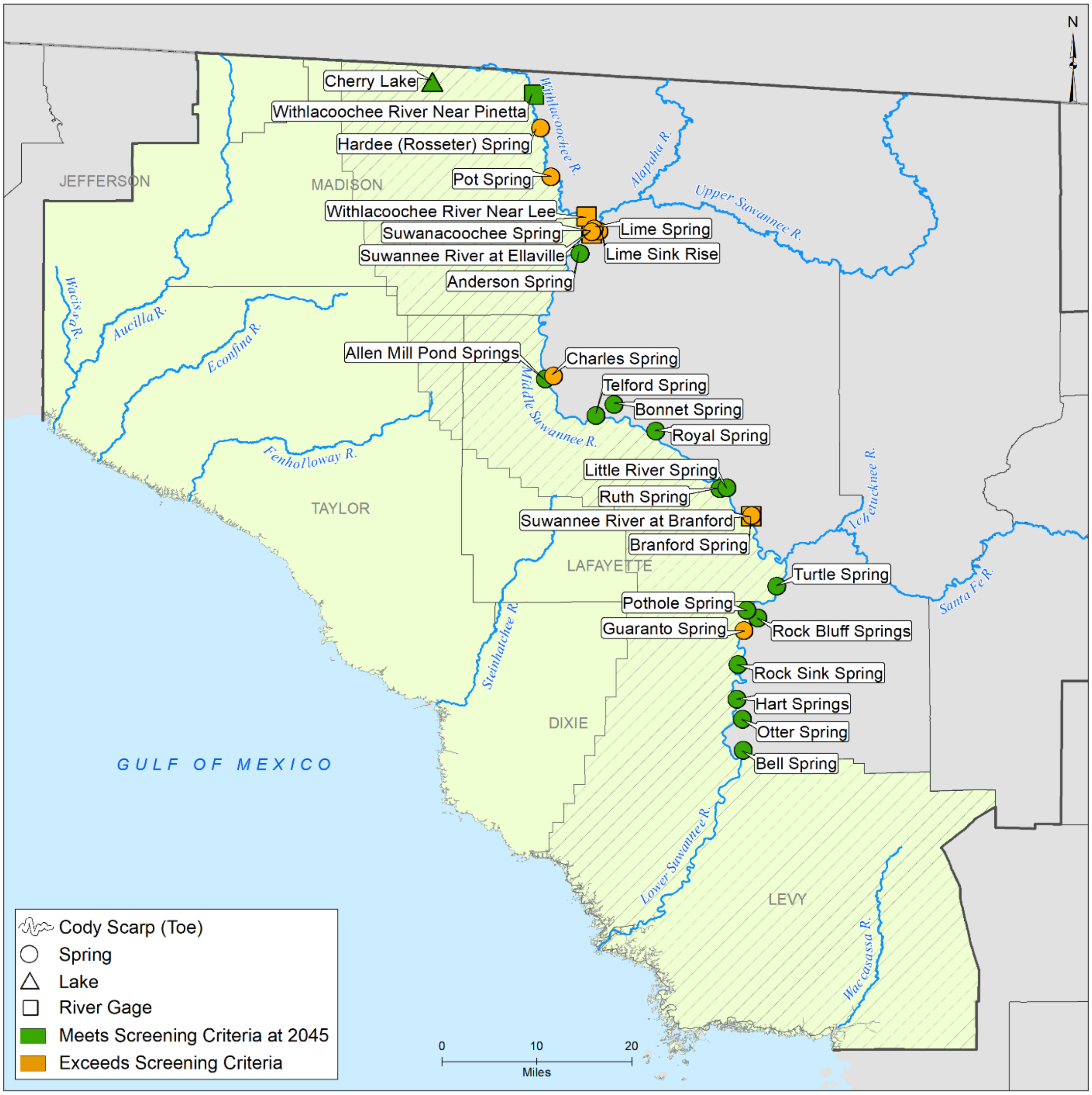

Figure 24. Waterbodies without adopted MFLs assessment results

In summary, this assessment evaluated the potential water resource impacts within the WWSP region where MFLs have not yet been established. The evaluation has determined that there are waterbodies where projected demands could lead to more than a 10% reduction in flow, however there are several waterbodies that are meeting the 10% screening criteria. Many of the waterbodies assessed are scheduled for MFL adoption in the coming years. Progress is being made and the MFL development process will provide a more comprehensive analysis to determine the significant harm thresholds specific to each waterbody.

Wetlands

Wetland vegetative communities can be affected by water level changes in the SAS due to unique combinations of soil type, vegetation species and hydrogeology. The wetlands assessment estimated the potential for adverse change to wetlands that may occur due to the projected increase in groundwater withdrawal between CP and 2045 projections. Factors other than groundwater withdrawals (e.g. modification of surface water hydrology) can result in significant alterations of wetlands relative to predevelopment conditions, but this wetland analysis is focused exclusively on assessing the potential for adverse changes to existing wetlands resulting from projected increases in groundwater withdrawals. More information on this assessment can be found in Appendix F.

The potential for adverse change to wetlands in the WWSP region were assessed using an updated version of the Kinser-Minno method (Kinser and Minno 1995; Kinser et. al. 2003; Lort et. al. 2022). The Kinser-Minno method is a Geographic Information Systems (GIS)-based model that forecasts the potential for adverse change to wetlands using soil permeability, sensitivities of plant communities to dewatering, depth to the UFA potentiometric surface (in unconfined areas), depth to the water table or surficial aquifer system (in confined areas), and a digital elevation model. This method categorizes the potential for adverse wetland change as low, moderate, or high, but only the moderate and high potentials for adverse change were considered in the analysis because the low potential for adverse wetland change classification indicates that plants are drought tolerant or that soils are not susceptible to dewatering (Kinser & Minno,1995).

Out of 753,900 acres assessed in the WWSP region, the wetland assessment identified 23,162 acres with a moderate or high potential for adverse change if projected demands are met with groundwater based on changes in groundwater levels between CP and 2045 projected withdrawals (Figure 25, Table 6). Changes to wetlands from groundwater pumping are primarily addressed via the District's regulatory program and through the development of WSD and WRD projects.

Table 6. Wetland acreage identified as having moderate or high potential for adverse change to wetland function between CP and 2045 projected pumping

County	Wetland Area (acres)
Dixie	1,722
Jefferson	494
Lafayette	3,919
Levy	11,283
Madison	5,127
Taylor	618
Total	**23,162**

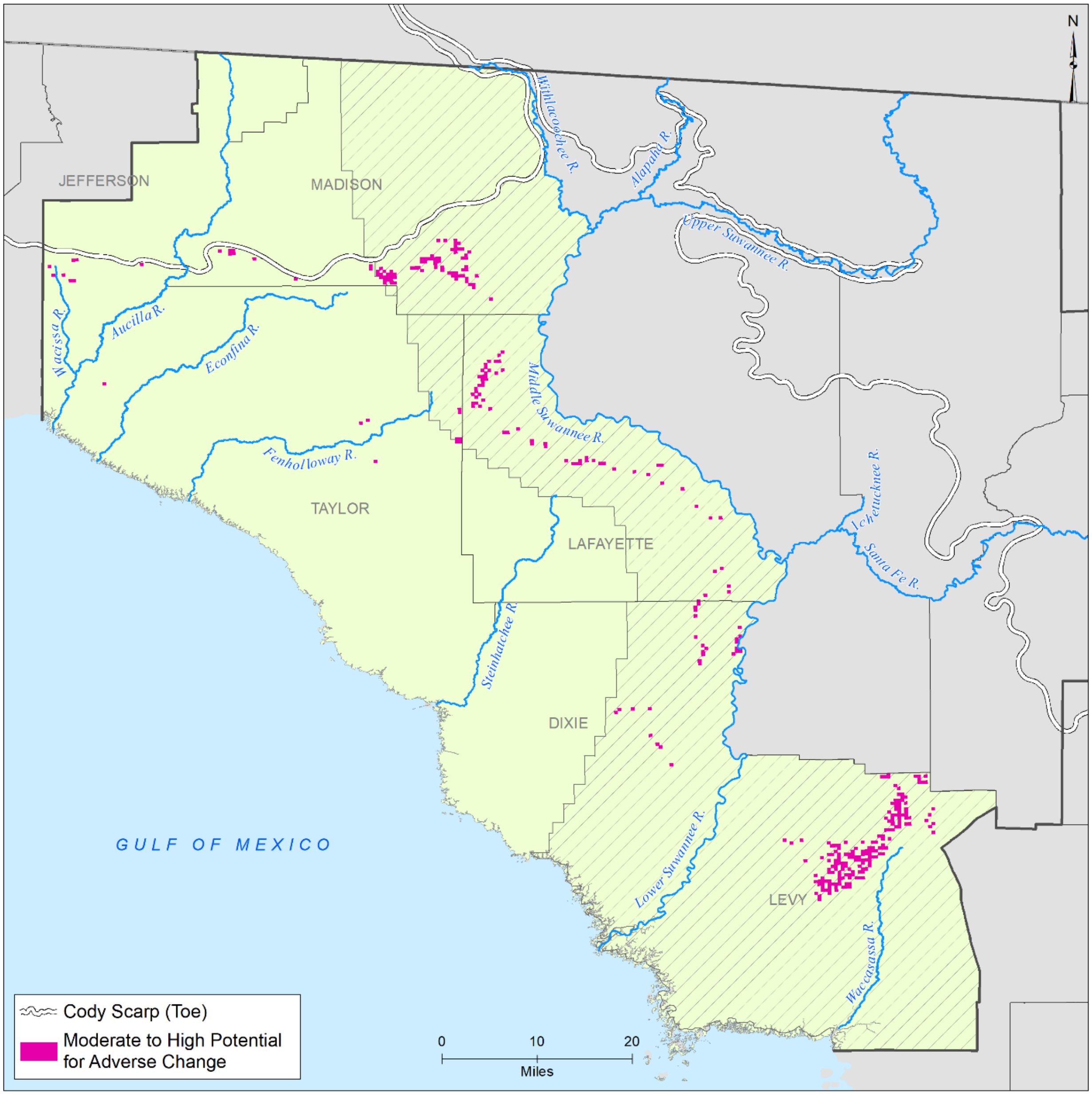

Figure 25. Locations with moderate to high potential for adverse change to wetlands

Resiliency

Rising sea levels and changing climate pose a threat to natural and manmade systems, including infrastructure that supports access to fresh water. Florida is vulnerable to the effects of climate change and SLR due to its unique climate, hydrology, geology, topography, natural resources, and dense coastal populations. To better plan for the potential effects of these future changes, the District conducted a planning level assessment to determine if fresh water supplies in the WWSP region are likely to become constrained due to flooding from SLR throughout the planning horizon (Appendix G).

Based on guidance established in 2021 by the Resilient Florida Grant Program (section 380.093, F.S.), the resiliency assessment evaluated the effects of both intermediate-low and intermediate-high SLR projections reported by the National Oceanic and Atmospheric Administration (NOAA) for the year 2050 (Sweet et al., 2017). The spatial extent of mean higher high water (MHHW) surface inundation resulting from the two SLR scenarios, as modeled by the University of Florida's GeoPlan Center, was intersected with the locations of current water treatment plants (WTP), wastewater treatment plants (WWTP), and permitted consumptive use wells to identify vulnerable infrastructure (University of Florida GeoPlan Center, 2020).

The Resilient Florida Grant Program itself includes a selection of grants that are available to counties, municipalities, water management districts, flood control districts, and regional resilience entities. These grants are instrumental in addressing the challenges posed by flooding and SLR in the state. Eligible applicants have the opportunity to secure financial support for vulnerability assessments (VA) and the implementation of adaptation and mitigation projects (DEP, 2023f). It is important to highlight that each county in the region is in the process of developing a more detailed VA of critical infrastructure that includes WTPs and WWTPs. The assessments are a mandatory requirement for securing funding from the Resilient Florida Grant Program. They will include a detailed analysis of each facility that considers compound flooding among other relevant factors. Several projects have already been awarded to various entities to support resilience initiatives in the WWSP region. Many counties and cities have already received funding for conducting VAs, including Dixie County, which lead the effort on behalf of Taylor and Jefferson counties, Levy County, Lafayette County, Madison County, the City of Cedar Key, and the Town of Greenville. Additionally, the Dixie County Board of County Commissioners, along with the Town of Greenville and the Town of Mayo, have secured grants for flood mitigation efforts.

The resiliency analysis assessed a total of 2,972 wells, 130 WTPs, and 60 WWTPs in the coastal counties with SLR projections. In summary, four CUP wells in the WWSP region may be affected by flooding due to SLR based on the intermediate-low and intermediate-high projections of SLR. Three of the wells are in Levy County and one well is in Taylor County (Table 7 and Figure 26).

Table 7. Summary of infrastructure potentially affected by intermediate-low and intermediate-high projections of SLR

County	Wells	WTPs	WWTPs
Dixie	0	0	0
Jefferson	0	0	0
Levy	3	0	0
Taylor	1	0	0

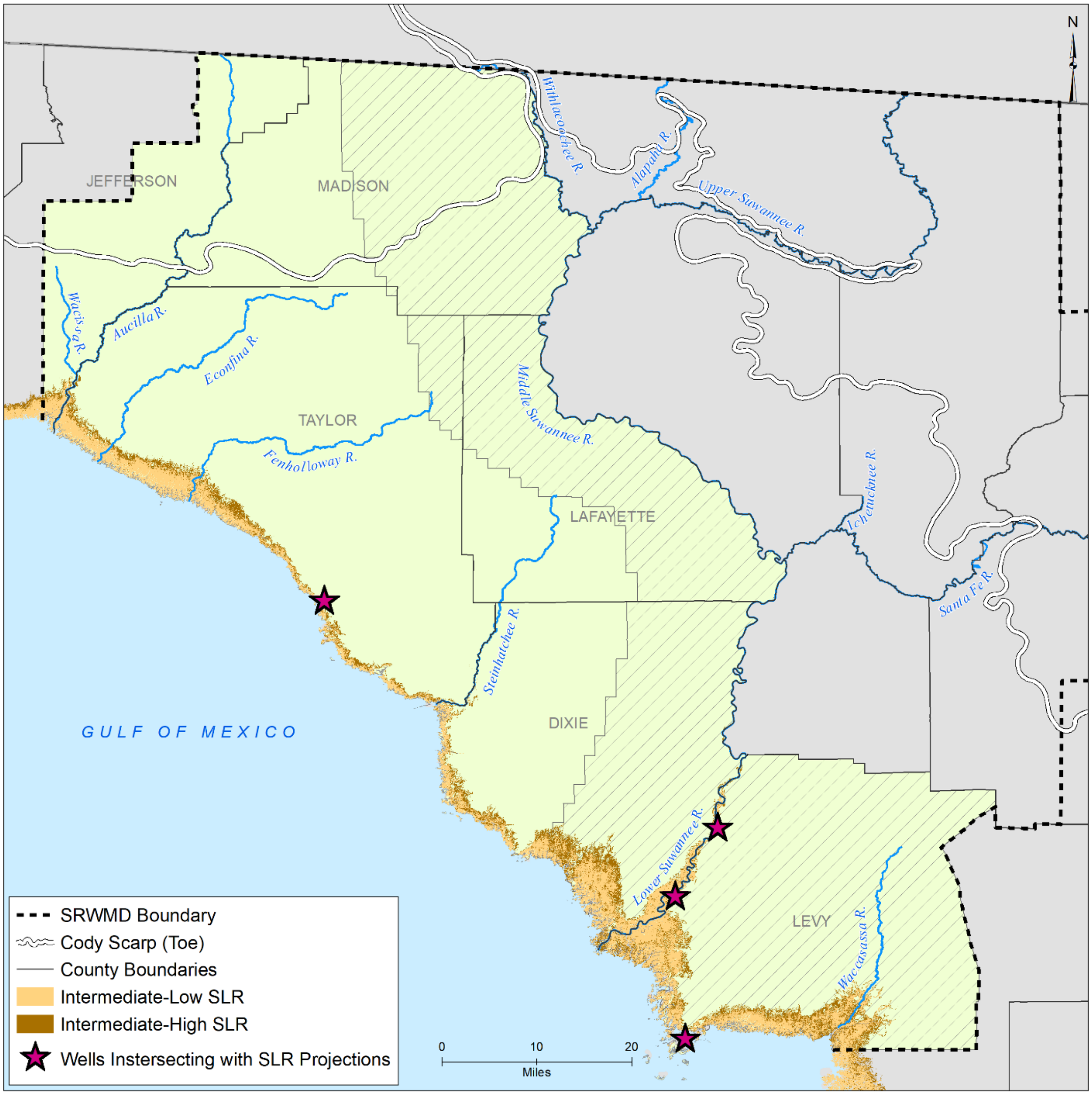

Figure 26. Water supply infrastructure in the WWSP region that intersects with intermediate-low and intermediate-high SLR inundation surface projections

Based on this analysis, the District concludes that projected SLR may pose a challenge for some existing or future water suppliers in coastal regions if adaptation actions are not taken. The timeframe and magnitude of enhanced management practices and/or infrastructure may need to be expedited to mitigate potential increases in SLR. Although solutions are available to some water suppliers experiencing the effects of SLR, such actions can increase the cost associated with providing potable water and wastewater treatment to existing and future users. Additionally, an increase in the intensity of rainfall events and the duration of drought are potential projected impacts of climate change that are of particular concern to water supply planning (IPCC, 2022).

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

- Decreased reliance on groundwater to meet future demands (e.g., increased utilization of reclaimed water, water conservation)
- Efficiency improvements (e.g., upgrade agricultural irrigation technology; replace aging public supply distribution systems to reduce losses)
- Improved infrastructure capacity and flexibility (e.g., interconnect water supply systems)
- Diversified water supply sources

Site-specific information can be used to determine the need for WSD or WRD projects to mitigate or prevent adverse impacts caused by projected SLR.

Collaboration will also be necessary to meet the challenges posed by climate change and provide reliable water supply for all water users. The State, through the DEP and The Florida Flood Hub, is providing money for adaptation planning and implementation to local governments and utilities, as well as providing Florida-specific data to better predict future challenges. The objectives of Florida Flood Hub, which is the State's scientific center for flood and resilience information and is located at the University of South Florida's College of Marine Sciences, are "to improve flood forecasting and inform science-based policy, planning, and management" (University of South Florida, 2023). The Flood Hub uses technical working groups and partnerships that consist of subject matter experts to research Florida-specific impacts of SLR and changes in rainfall patterns. Additionally, the Florida Water and Climate Alliance (FWCA) provides a venue for collaboration to address water supply challenges associated with climate change. The FWCA is a "stakeholder-scientist partnership committed to increase the relevance of climate science data and tools at relevant time and space scales to support decision-making in water resource management, planning and supply operations in Florida (floridawca.org)". FWCA collaborators include public water supply utilities, water management districts, academic institutions, and other stakeholders from throughout Florida. Collaborators share information, ideas, and current research that may help inform local and regional decisions regarding integration of climate science in water supply management. Although climate change poses significant challenges to water supply availability, local management actions and regional collaborations will help mitigate the associated impacts and enhance the continued reliability of water supply.

Chapter 6: Sufficiency Analysis

Purpose

Pursuant to subsection 373.709(2), F.S., a RWSP must include sufficient water supply development (WSD) and water resource development (WRD) project options to meet projected water demands while preventing the loss of natural resources and must support MFLs recovery or prevention strategies. This chapter summarizes the approach used to demonstrate sufficiency of the WWSP project options. In addition, this chapter identifies existing water supply planning areas (WSPAs) pertinent to the WWSP region (section 62-40.520(2), F.A.C.). The 2024 WWSP supports the continued designation of a portion of the WWSP region as a WSPA.

Sufficiency Analysis

The water resource assessment discussed in Chapter 5 addressed the potential impacts of groundwater withdrawals with respect to water quality, wetlands, adopted MFLs (including OFSs), and waterbodies without MFLs in the WWSP region. The assessment identified potential impacts to water resources in the WWSP region resulting from the 2015 base year groundwater use of 109 mgd and the 2045 projected groundwater demand scenario of 127 mgd (18 mgd increase). This projected increase is primarily due to growth in the agricultural sector. There are no increases in surface water demand projected, therefore the District determined that there are sufficient water sources to meet the current and future surface water demand.

Based on the results from the water resource assessment, the District determined that some, but not all the future demands can be met with traditional water sources while sustaining water resources and related natural systems during the planning horizon. The District determined that water supply planning, pursuant to section 373.709, F.S., was necessary, therefore WSD and WRD project options must be developed and implemented. The purpose of performing a sufficiency analysis is to determine whether the implementation of specific WSD and WRD project options will allow for projected water demands to be met while sustaining natural systems.

The District assessed current projects and solicited for new project options from stakeholders in the region. Based on the suite of WSD and WRD projects, which total approximately 4.13 mgd, the District determined that there are sufficient projects to address the potential water resource constraints. Additionally, as part of the development of water use demand projections in Chapter 3, the District estimated a water conservation potential ranging from 13.3 to 14.7 mgd and a beneficial use of reclaimed water ranging from 0.06 to 0.12 mgd by 2045. Detailed information on the suite of project options can be found in Chapter 7.

Water Quality

The results of the water quality assessment concluded that there are wells showing increasing trends in one or more of the water quality analytes that were assessed. There is also one well with high chlorides, TDS, and specific conductivity which indicates a presence of saltwater. The development of AWS such as reclaimed water and surface water, and wellfield management plans can reduce the use of potable groundwater and prevent harmful saline intrusion into groundwater sources.

The District, in coordination with DEP, will monitor regional groundwater quality trends for prioritizing AWS projects. The Florida Trend Network is managed by DEP and examines long-term changes in Florida's ambient water quality (DEP, 2023d). The District's Regulatory Program will continue to evaluate the local potential for harmful upconing and lateral intrusion during the WUP application review to ensure all permitting criteria are met prior to permit issuance. In addition, the District 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).

Minimum Flows and Levels

The MFLs evaluation determined that there are waterbodies that are exceeding the screening criteria under CP and expected to exceed the screening criteria during the planning horizon. The implementation of the projects summarized in Chapter 7 and detailed in Appendix I are sufficient to enable the achievement of the MFLs in the WWSP region through the planning horizon. Continued regional coordination is recommended to understand the potential influence of reginal water demands on MFL waterbodies in the District. As mentioned previously, there are efforts underway to address the impacts identified in Chapter 5 and to update MFLs in the region. Any prevention or recovery strategies associated with updated MFLs that are set will be appended to this 2024 WWSP.

Additionally, the four OFS on the Suwannee River are under emergency rule. While the results of the constraints analysis in the 2023 NFRWSP identified Lafayette Blue Spring and Falmouth Spring as being in prevention, technical work underway to establish the updated MFLs. Upon finalization, the status of these OFS on the Suwannee River will be re-assessed.

Waterbodies without Adopted Minimum Flows and Levels

The assessment of waterbodies without MFLs determined that there are waterbodies that exceed the screening criteria in 2045. These waterbodies are all listed on the 2023 District's MFL Priority List for future adoption. Projects are continuing to be developed that will provide options to address any constraints on these waterbodies, and any prevention or recovery strategies associated with future adopted MFLs that are set will be appended to this 2024 WWSP.

Wetlands

The assessment identified wetlands with a moderate or high potential for adverse change; however, it is important to note that this analysis is meant to be a screening tool for regional planning purposes. Since the potential for adverse change does not necessarily correspond to realized adverse change, water supply and water resource project development did not focus on reducing the acreage of wetlands with a moderate or high potential for adverse change identified in the WWSP region. Regardless, implementation of the projects specified in the WWSP region can reduce the acreage of potentially adversely changed wetlands, although these benefits were not quantified as part of the plan.

The Districts' 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 the continued use of enhanced wetland assessment protocols in conjunction with the spatial review of wetland acreage identified in the WWSP, the Districts 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 Supply Planning Areas

Water Resource Caution Areas (WRCA) are geographic areas identified by a district as having existing water resource problems or areas in which water resource problems are projected to develop during the next twenty years. WRCAs are established pursuant to section 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 WRCA, shall be subject to the reuse requirements of section 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.

In the District, a WSPA meets the definition of a WRCA. A portion of the District's Western Planning Region was recommended for designation as a WSPA based on the evaluation performed for the 2015-2035 WSA. The designation of the Western WSPA became effective on December 4, 2019 (Figure 27).

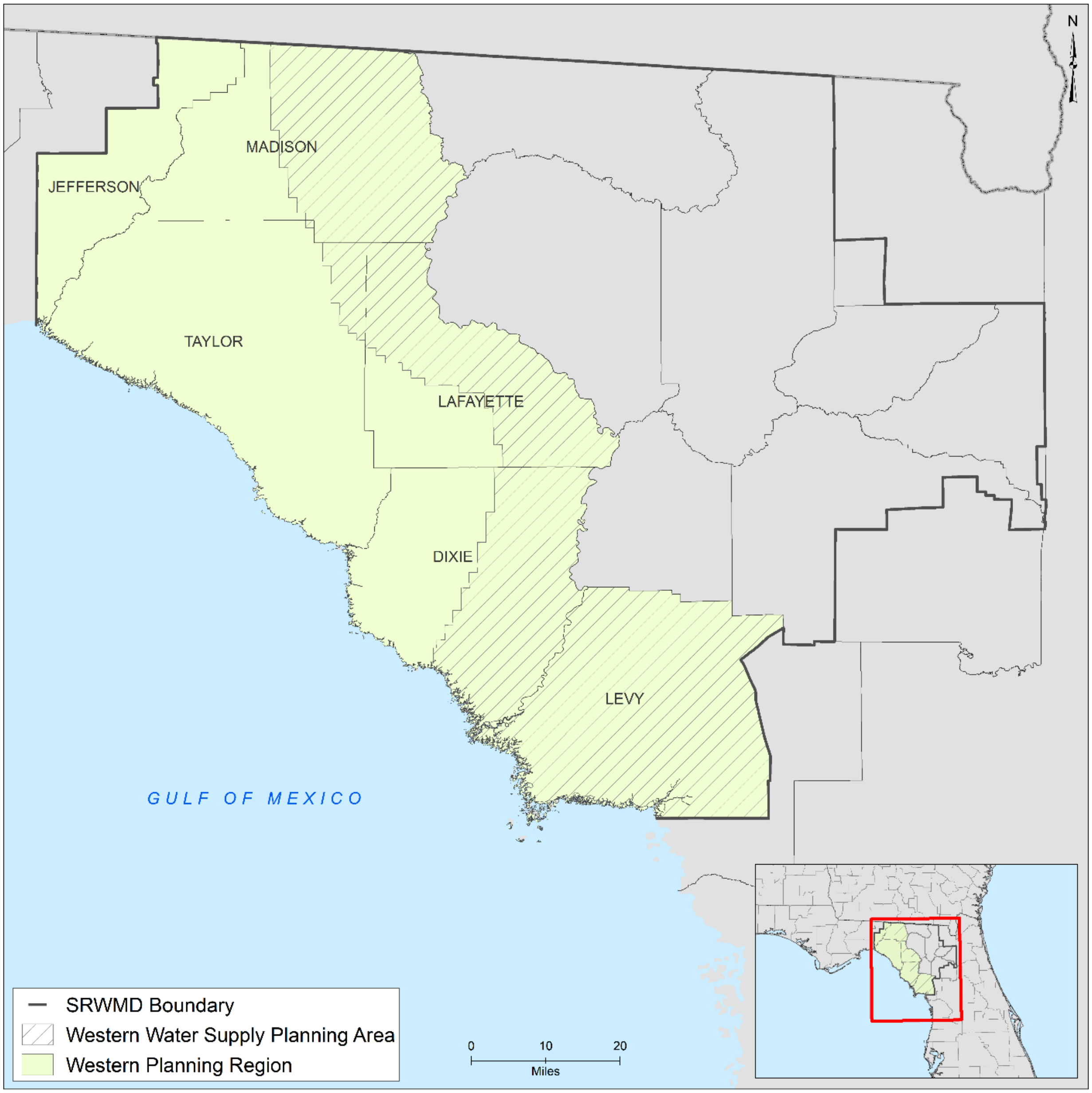

Figure 27. Existing WSPA in the WWSP region

Chapter 7: Project Options

Purpose

An important part of the water supply planning process is to identify WSD and WRD project options that are necessary to meet current and future water demands. This chapter provides an overview of the WSD, WRD, and water conservation projects and programs that are available to water users located within the WWSP region to avoid water resource impacts identified in Chapter 5. Where possible, planning-level estimates of the potential available yield for each source are provided. These estimates address a number of factors including consideration of any established MFLs, potential impacts to water and environmental resources, the results of previous water resource evaluations, permit feasibility, water source quality, consideration of existing legal uses, and known engineering limitations.

In the WWSP region, groundwater demand is projected to increase by 16%, from 109 mgd in 2015 to an estimated 127 mgd in 2045. To assist with meeting current and future water supply needs, focusing on water conservation and the development of AWS is necessary. Fresh groundwater sources are considered the traditional water supply source, with other sources such as brackish groundwater, surface water/stormwater, seawater, and reclaimed water being nontraditional. This 2024 WWSP focuses on water conservation and groundwater recharge projects to meet future demand, and the project options identified are sufficient to meet current and projected water supply demands.

Project Options

During the planning process, the District worked with stakeholders to identify project options. When compiling the list of project options, there was 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 WRD or WSD. The development of projects will serve the public interest by providing, in an affordable manner, water to meet basic public health, safety, and welfare needs, water for agricultural, commercial/industrial/institutional, recreational, and other typical public supply system needs, and protection of the natural systems within the WWSP region.

Pursuant to subsection 373.709(7), F.S., nothing contained in the WSD component of a RWSP should be construed as a requirement for local governments, public or privately owned utilities, special districts, self-suppliers, regional water supply authorities, multi-jurisdictional entities, or other water suppliers to select an identified project merely because it was identified in the plan. If the projects identified in the WWSP are not selected by a water supplier, the entity will need to identify another AWS project option sufficient to meet its future needs and advise the District of the alternate project(s). In addition, the associated local government will need to include such project information in its water supply facilities work plan (see Chapter 2).

Water supply plans are not self-implementing. Projects included in this 2024 WWSP are options from which local governments, utilities, and other water users may choose in accordance with subsection 373.709(7), F.S. Budgetary constraints and uncertainties for both users and agencies also create hurdles to ensuring specific solutions will be economically feasible and affordable. Funding for the development of AWS is primarily the responsibility of water suppliers and users with potential funding assistance from the State of Florida and the District. This 2024 WWSP identifies sufficient funding mechanisms and sources to address the economic feasibility of projects in Chapter 8 (paragraphs 373.709(2)(b), 373.709(2)(d) and 373.709(6)(a)).

Project Cost and Volume Estimation Methodology

Pursuant to subparagraph 373.709(2)(a)2., F.S., the District considered the technical, financial, and permit feasibility of project options at a planning level when developing the 2024 WWSP. The projects that meet the criteria for inclusion in the WWSP are summarized into three categories: WSD, WRD, and water conservation projects. The following information is provided for each project option identified:

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

Table 8 provides a summary of project options aimed at addressing WSD, WRD, and water conservation efforts. In some cases, projects included in the WWSP have benefits beyond the quantity of water made available, including benefits to enhance resiliency, mitigate flooding risks, or provide enhanced nutrient management. There is one WSD project with a total estimated benefit of 0.03 mgd and a total estimated cost of $60.0 million. For WRD projects, there are four projects with a total estimated benefit of 4.1 mgd and a total estimated cost of $17.84 million. Additionally, the 10 water conservation projects have a total estimated benefit of 8.94 mgd, incurring a total estimated cost of $42.79 million. The financial feasibility of an individual project option is inherently addressed during the development process. The estimated benefits and costs associated with project options are based on preliminary assessments and will be reviewed as projects are submitted for funding opportunities. The District is continuing to develop conceptual project options that offset future water demands or impacts.

Figure 28 displays the approximate locations of project options, which were assigned during the project solicitation process. The locations may not be exact but are in general areas where projects are likely to be located. Projects that are mapped outside of the WWSP region span multiple counties and are symbolized at District headquarters in Live Oak, FL. The projects that do not have locations assigned are not mapped.

Overall, these project options offer a comprehensive approach to water management and supply, providing 15 projects with an estimated total benefit of 13.07 mgd and an estimated total cost of $120.63 million. There are sufficient project options for the development of water supplies to meet future demand while sustaining the natural systems in the WWSP region through 2045. Appendix I provides more detailed information on the listed project options.

Table 8. Summary of project options

Type	Number of Projects	Estimated Benefit (mgd)	Estimated Total Cost ($M)
Water Supply Development	1	0.03	$60.0
Water Resource Development	4	4.10	$17.84
Water Conservation	10	8.94	$42.79
Total	**15**	**13.07**	**$120.63**

*Totals may be slightly different due to rounding of individual values.

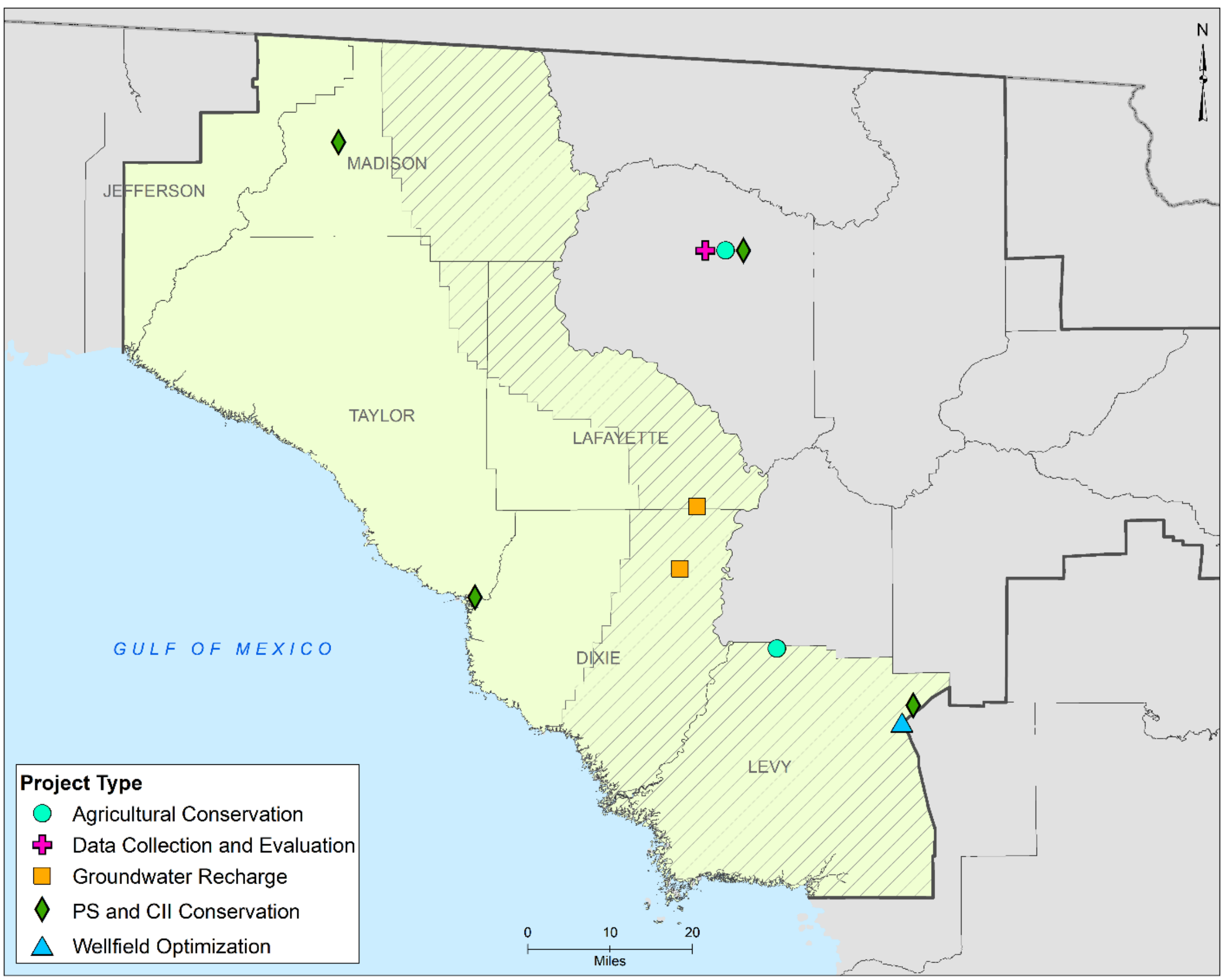

Figure 28. Project options in the WWSP region

Water Supply Development Project Options

Water supply development is defined in subsection 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. Water supply development projects are generally the responsibility of water users, such as utilities or agricultural entities, to meet their needs (paragraph 373.705(1)(b), F.S.; section 62-40.531(4), F.A.C.). An important part of the WWSP process is identifying WSD project options that are necessary to meet the anticipated water needs of the planning area through 2045 planning horizon. While water users are not limited to the projects listed in the WWSP, the list represents a set of projects that, if implemented, could supply a sufficient quantity of water to meet the projected water demands, if implemented.

There is one WSD project is identified in the WWSP region, which is the Waccasassa Water and Wastewater Cooperative (W3C) wellfield optimization project. This project is aimed at establishing a Regional Water and Wastewater Authority to address challenges associated with water supply, wastewater treatment, or collection, and distribution systems for the City of Cedar Key, Town of Otter Creek, Town of Bronson, and unincorporated areas of Levy County. It will also address poor source water quality for the area west of Bronson and reduce nutrient loading for coastal ecosystems. The project encompasses the design and construction of a WTP and WWTF with initial water supply benefits estimated at 0.03 mgd and an estimated capital cost of $60 million. Upon completion, there may be potential reclaimed water flow that may add to the estimated benefits.

Wellfield Optimization

Utilities employ different strategies to manage and optimize wellfield performance with the objective of maximizing water production while minimizing water losses or resource impacts. Examples of these strategies include well rotation, well deepening/back-plugging, and blending to maintain water quality.

Water Resource Development Project Options

The intent of WRD projects is to increase the amount of water available for water supply (subsection 373.019(24), F.S.). WRD projects include regional projects designed to create traditional or alternative sources from an identifiable and quantifiable supply of water for existing and/or future reasonable-beneficial uses. While WRD projects are typically, but not always, implemented directly by the District or by the District in conjunction with other agencies or local governments (paragraph 373.705(1)(a), F.S.), there are some WRD projects included in this WWSP that are proposed by other entities (see Appendix I). WRD projects also encompass data collection and analysis activities that support WSD by local governments, utilities, regional water supply authorities, and others. This includes programs that collect and analyze data for natural system monitoring, groundwater monitoring, water supply planning, feasibility studies for new technologies, and ongoing regional water conservation programs.

The WRD projects primarily focus on data collection and evaluation and groundwater recharge efforts in various counties within the WWSP region and are summarized in Table 9. These projects aim to conduct advanced wastewater treatment facility (AWTF) analysis and feasibility studies, enhance natural drainage systems by constructing treatment wetlands, and implement silvicultural management practices on forested lands to reduce evapotranspiration. This can lead to increased aquifer recharge, spring flows, and water yield to nearby streams and wetlands. The estimated benefits for these projects range from 1.1 to 2.0 mgd with total capital costs ranging from $1.90 to $5.94 million. These initiatives play a crucial role in maintaining and securing a sustainable and clean water supply for the regions they serve.

Table 9. Summary of WRD project options

Type	Number of Projects	Estimated Benefit (mgd)	Estimated Total Cost ($M low range)
Data Collection and Evaluation	1	0.0	$4.0
Groundwater Recharge	3	4.1	$13.84
Total	**4**	**4.1**	**$17.84**

*Totals may be slightly different due to rounding of individual values.

Data Collection and Evaluation

Data collection and evaluation projects include, but are not limited to, conducting AWS feasibility studies, which incorporates the analysis of various project options such as treatment wetlands, reclaimed water alternatives, and water/wastewater collection and distribution systems. Projects under this category are funded to evaluate alternatives to address water supply and wastewater treatment needs, investigate the viability of the project, and determine if the project may be cost-effective. Additionally, these feasibility studies take into consideration natural resource concerns. An example of such project would involve studying the feasibility of constructing a regional water or advanced WWTF to address the needs of communities in a specific study area. As projects are identified based on the results from the feasibility studies, improved costs and benefits can be calculated.

Groundwater Recharge

Groundwater recharge projects can be used to increase the amount of water in an aquifer to help offset declines caused by groundwater withdrawals. There are several methods that can be used for aquifer recharge including land application in a high recharge area, direct injection via recharge wells, or other recharge techniques such as rapid infiltration basins (RIBs), treatment wetlands, or changes in land management practices. 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.

District Water Resource Management Programs

The District maintains a variety of long-term programs and initiatives that provide for the protection, conservation, and development of water resources. Water resource management programs support activities such as MFL development. The District also maintains an annual Five-Year Water Resource Development Work Program (WRDWP) which details the various WRD programs the District operates. These activities are integral components to the District in achieving its mission. Some programs and/or initiatives that are important to ongoing WWSP region WRD efforts include:

- Conservation Program: The District has increased its focus on water conservation by implementing programs to provide outreach and education to permit holders and other stakeholders to maximize conservation potential. To further this effort, the Districts have collaborated with DEP, the University of Florida's (UF) Institute of Food and Agricultural Sciences (IFAS), and other state agencies on the quantification of conservation and the expansion of cost-share opportunities.

- Groundwater Modeling: Groundwater flow models are used to support the District's core missions of protecting water supply and related natural systems through regional water supply planning, MFLs, and for regulatory evaluation. NFSEG v1.1 was used to support development of the 2024 WWSP.

- Data Collection & Analysis: The data collection and analysis activities conducted by the District supports the health of natural systems and the development of water supplies. Data collection programs allow the District 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 with existing problems and/or 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.

Water Conservation Project Options

Water conservation is an important element of water supply planning because it contributes to the sustainability of water supply sources. Subparagraph 373.709(2)(a)2, F.S., requires that water conservation be accounted for when determining if the total capacity of the WSD project options included in RWSPs exceeds the increase in projected water demands for the planning horizon. The Florida Legislature recognizes the importance of water conservation and declared the goal of water conservation for the state to be the prevention and reduction of the "wasteful, uneconomical, impractical, or unreasonable use of water resources" (section 373.227, F.S.). Water conservation includes any action that reduces the demand for water, including those that prevent or reduce wasteful or unnecessary uses and those that improve efficiency of use. All CUPs/WUPs must include a detailed water conservation plan. Utility water conservation plans must also analyze system water loss and remediation if the loss exceeds 10%. A water conserving rate structure is another required component for utility water conservation plans. These plans provide the ongoing vision and structure for regional water use efficiency programming and are updated with each renewal of the permit. Achieving long-term improvements in water use efficiency will require a combination of advanced technologies, best management practices (BMPs) and behavioral changes. Education, outreach, and public engagement are essential for accomplishing a measurable increase in water conservation and maintaining a lasting commitment to efficient water use in North Florida.

Conservation strategies and projects are recognized as being the most economically feasible to help meet future growth and reduce existing demand. Implementing projects to meet the high conservation potential for all water use categories (an additional 14.7 mgd of savings) as described in Chapter 3 and Table 3, will likely be a more cost-effective option than implementing some of the WSD and WRD projects discussed above. As more AWS becomes available, efficient use of more expensive sources makes water conservation critical to the region. Transitioning to better implementation of programs and messaging will help user groups in upcoming years. The District anticipates that a conservation-only strategy will not completely offset the predicted shortfall in fresh groundwater supplies, however continued investment in water conservation is critical to help the WWSP region meet its future water needs.

In total, there are 10 water conservation projects, with six projects dedicated to agricultural conservation and four projects focused on PS/CII conservation (Table 10). The total estimated benefit for the agricultural conservation projects is 8.82 mgd with a total cost for implementation estimated at $29.1 million. Additionally, the PS/CII water conservation projects are estimated to have a total benefit of 0.13 mgd, incurring a total estimated cost of $13.7 million. The costs associated with PS/CII conservation also include investments in critical infrastructure. A detailed summary of water conservation projects submitted can be found in Appendix I.

Table 10. Summary of water conservation project options

Type	Number of Projects	Estimated Benefit (mgd)	Estimated Total Cost ($M low range)
Agricultural Conservation	6	8.82	$29.12
PS/CII Conservation	4	0.13	$13.67
Total	**10**	**8.94**	**$42.79**

*Totals may be slightly different due to rounding of individual values.

Public Supply & Commercial/Industrial/Institutional Water Conservation

In the public water supply category, a notable advancement in water conservation is the access to granular water use data through programs like advanced metering infrastructure (AMI) and the UF Water Savings, Analytics, and Verification (H_2OSAV) tool built by the Program for Resource Efficient Communities/Center for Land Use Efficiency (UF/IFAS Center for Land Use Efficiency, n.d.). These tools allow utilities to focus on high water users and to accurately measure the quantity of water saved over time resulting from conservation practices. Water use data analysis allows direct notification to customers of high-water use along with rebate opportunities for irrigation system retrofit. Utility funded irrigation evaluations by several utilities have offered significant opportunities to increase efficiency by educating customers on scheduling irrigation, installing smart controllers, and locating irrigation leaks. Advanced metering infrastructure and H2O SAV are essential tools to implement targeted conservation programming to both new and existing customers. Outdoor water use (irrigation) remains the prime target for demand reduction, as 50-70% of newer home water use is for irrigation (Taylor, 2023). Additionally, the District collaborates closely with the DEP-funded Florida Friendly Landscaping™ (FFL) program to assist in informing the public of the conservation message.

In the past, the District has partnered with Alachua County, with funding from the AWS program, on a Turf SWAP (Save Water Add Plants) project to reduce impacts from urban landscapes and focus on irrigation tune-ups or other methods to reduce water use on landscape irrigation. The goal of the Turf Swap Program is to encourage water savings through FFL and reducing or improving irrigation systems (The Master's Lawn Care, n.d.). This program could be implemented throughout the WWSP region to assist with water conservation efforts. Areas to target would include new developments with in-ground irrigation.

The following water conservation strategies have been, are, or can be implemented within the WWSP region by non-agricultural water providers:

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

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

- Landscape and irrigation design codes: Many jurisdictions in the WWSP region have land development codes with provisions that encourage efficient outdoor water use. As industry design and approaches evolve, District staff work to encourage updates to these design codes to maximize opportunities to reduce outdoor water use. Some examples include limiting in-ground irrigation to specific landscape areas, implementing efficient design with technologies like smart irrigation controllers and adherence to restrictions, managing an irrigation water budget through utility oversight and billing data, retrofitting existing systems with homeowner education and enforcement, and amending new landscape soils with compost to potentially reduce irrigation requirements (Bean & Radovanovic, 2021).

- Outreach and Education: Water conservation outreach for both indoor and outdoor water use occurs via websites, utility bill stuffers, events, and other approaches implemented by local governments, utilities, the District, DEP, and other partners. Outreach messages include general recommendations for efficient water use as well as advertising for existing programs such as FFL and the Florida Green Building Coalition. The District also continues to highlight water conservation in the month of April and throughout the year utilizing social media, videos, graphics, handouts, and other traditional media sources.

- Water use audits for residential and commercial customers: This strategy has been very effective in the NFRWSP area when employed by a public supply utility because it provides customized recommendations, includes direct contact with landowners, and can be targeted to water users with the greatest potential for savings. The UF H_2OSAV program has quantified that certain outdoor practices can yield meaningful water savings (Taylor, 2023). If such programs are implemented broadly, then the region could approach a per capita goal to reduce more expensive AWS options (Table 11). This could be an option for conserving water in the WWSP region.

Table 11. UF H_2OSAV quantified outdoor practices

Conservation Measure	Average Savings
Enforcing Irrigation Restrictions	36-44 gallons per day per property
Smart Irrigation Controllers	95-100 gallons per day per property
Irrigation Evaluations	50-155 gallons per day per property

- Meter reading technology: Automatic meter reading (AMR) and AMI can help 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. It has been used to identify individual homeowners or businesses that public supply utility staff can contact to provide technical assistance in identifying and resolving the cause(s) of high-water use and/or unusual increases. Referenced above, the UF H_2OSAV tool is another granular tool to assist in meaningful demand reduction.

- 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, smart irrigation controllers). Water savings is achieved one of two ways; either when the replacement fixtures and devices are more efficient than the older fixtures or when broken/malfunctioning fixtures and devices are replaced. Fixture replacement occurs in both residential households and commercial facilities. Although there are no active water conservation rebate programs in the WWSP region, they are a viable option for conserving water.

- 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.

Agricultural Water Conservation

In addition to the PS/CII water conservation programs and practices described above, the District is taking proactive steps to promote sustainable agricultural practices through its Agricultural Cost-Share Program. This program emphasizes the adoption of various water conservation measures to ensure responsible water use in the agricultural sector. Examples of supported conservation practices are center pivot retrofits, variable rate irrigation, soil moisture probes, end gun shutoffs, remote controlling equipment, weather stations, and variable frequency drives (VFD). These enable producers to optimize their water efficiency and reduce overall water use. Additionally, Precision Agriculture Cost-Share incentivizes the implementation of grid soil sampling, variable rate nutrient application, and use of side dressing equipment to minimize nutrients and reduce water use. Many BMPs implemented through the FDACS BMP programs also improve water quality and water quantity such as enhancing agricultural irrigation efficiency. Currently, there are 285 agricultural producers with approximately 191,994 acres that are enrolled in FDACS BMP programs in the Western Planning Region. For more information see fdacs.gov.

The Suwannee River Partnership (SRP) was established in 1999 and is comprised of a diverse range of stakeholders from government entities at various levels, as well as farmers, residents, and environmental associations. The SRP works together to advocate for water quality and conservation to preserve the water resources in the Suwannee River Basin and Coastal Rivers Basin. The mission centers on implementing research-based solutions that protect and conserve water resources, including voluntary and incentive-driven programs. More information on the SRP can be found at suwanneeriverpartnership.com.

Other Potential Project Options

In addition to the wellfield optimization, data collection and evaluation, groundwater recharge, and water conservation projects listed previously, there are many other potential project options that could be explored and implemented to assist with meeting future demands. The options outlined below have been successfully executed in the state of Florida and could evaluated to see if local conditions are suitable for implementation within the WWSP region.

Aquifer Storage and Recovery

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

Brackish Groundwater

Brackish groundwater, for AWS purposes, is generally defined as water with a TDS concentration of greater than 500 mg/L. Brackish groundwater exists in the FAS in portions of the WWSP region, specifically in coastal areas. Brackish groundwater is currently used to meet water demands in areas of North Florida and could be expanded to meet future demands. The use of brackish groundwater may require treatment by methods such as low-pressure reverse osmosis (RO), or electrodialysis reversal (EDR). Treatment of brackish groundwater 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 there may not be sufficient hydrologic confinement to protect overlying aquifer systems from possible drawdown and saline water intrusion. Currently, there are no brackish groundwater project options listed in the WWSP, however it could be a potential AWS source.

Indirect Potable Reuse

Indirect potable reuse (IPR) is the planned delivery or discharge of purified reclaimed water to ground or surface waters for the development of, or to supplement, potable water supply. This method has been implemented in Florida, nationally, and internationally. The potential for IPR via groundwater recharge is significant, and interest in IPR implementation could grow among utilities in the region.

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 DEP and the District's rules, for beneficial purposes. Reclaimed water utilization is a key component of water resource management and is used for non-potable purposes such as landscape irrigation, agricultural irrigation (where applicable), aesthetic uses, groundwater recharge, industrial uses, environmental enhancement, and fire protection purposes. Reclaimed water 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 such as IPR or recycled for potable water supply uses, also referred to as direct potable reuse (DPR). Although DPR is not currently being implemented, this method is being investigated in Florida and is being used in other states and countries to meet potable water demands.

Reservoirs

Surface water reservoirs provide storage of water, primarily during wet weather conditions, which can be used in the dry season. Water is typically captured, pumped from rivers, canals, reclaimed water sources or stormwater, 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.

Seawater

The use of desalinated seawater from the Gulf of Mexico is an additional water source option in the WWSP region. Seawater is essentially an unlimited source of water. However, desalination is required before seawater can be used for water supply purposes, and the concentrate resulting 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 WWSP region. 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. The costs associated with seawater projects can be higher than other alternative water supply options and, therefore, proposed seawater projects would benefit from partnerships with other water suppliers, Districts, and/or other state agencies.

Stormwater

Section 62-40.210(37), F.A.C., defines “stormwater recycling” as the capture of stormwater for irrigation or other beneficial use. The DEP and the districts define stormwater as the flow of water which results from, and which occurs immediately following, a rainfall event and is normally captured in ponds, swales, or similar areas for water quality treatment or flood control. (See section 62-40.210(34), F.A.C.). Development of the natural landscape can result in significant changes to the characteristics of stormwater flows. When captured stormwater runoff can provide considerable volumes of water that can result in water supply, aquifer recharge, water quality, and natural system benefits. The reliability of stormwater can vary considerably depending upon climatic conditions and storage capability. Therefore, the feasibility of effectively using stormwater as an AWS source often relies on the ability to use it in conjunction with another source (or sources), in order to decrease operational vulnerability to climatic variability (i.e., conjunctive use) or implementing seasonal storage. Stormwater represents a potentially viable AWS at the local level, particularly for irrigation water uses. A major potential project opportunity is the ability for local governments and utilities to partner with the Florida Department of Transportation (FDOT) on stormwater capture and harvesting projects.

Surface Water

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

Surficial Aquifer System/Intermediate Aquifer Water Sources

Historically, the UFA has been the traditional water source for public supply uses in the WWSP region. Water resource constraints could limit the availability of UFA withdrawals as water demand continues to increase as a result of population and agricultural growth. The challenge for public suppliers using the SAS or IAS as an AWS option is that there are no known locations where these aquifers could supply a sufficient quantity of water for this use. However, there could be some availability for DSS or LRA users to use the SAS or IAS as alternative sources to meet increased future demands.

Mining Operation Land Reclamation Variances

Upon completion of mining operations, mines may provide an opportunity for WSD or WRD projects through the process of land reclamation (paragraphs 373.709(2)(j), 378.212(1)(g), and subsection 378.404(9), F.S.). These projects facilitate the development of water storage or recharge sites and may have the potential to contribute to MFLs prevention or recovery strategies. Mining operations and reclamation opportunities can be discussed with mining operators for mines whose locations may be advantageous for WRD or WSD.

The District completed a preliminary screening analysis to identify current mining sites in the WWSP region (Appendix H). This analysis did not consider the technical or financial feasibility of using mining sites for WSD or WRD projects. In summary, there were 6,674 acres of mining lands identified in the WWSP region. Individual mining sites will be evaluated, as needed, in areas where WSD or WRD projects may provide an improvement in water availability in the basin and do not cause adverse impacts to water resources. For these sites, the District may review the mine's Conceptual

Reclamation Plan to understand the potential timeframe for ceasing mining operations and conceptual reclamation plans. Conceptual plans for reclaimed mining sites will be discussed with the DEP for WRD or WSD projects having the support of both the District and the mining operator or owner.

Chapter 8: Funding

Purpose

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

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

Water Supplier and User Funding Options

Funding for WSD and sponsor led WRD is the primary responsibility of water suppliers and users. Cost-share funding from water management districts, state, and federal funding programs can contribute to financing the cost of WSD. Typically, the cost of water supply for water suppliers and users is included in the operation and maintenance program for producing the specific commodity and is generally reflected and recovered in the price and sale of the commodity. For water and sewer service, there are a variety of ways that have been implemented to recover costs, which are summarized below.

Water Utility Revenue Funding Sources

In general, increased water demand results from new customers which in turn can help 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 WSD, WRD, or treatment capital costs; rather these fees recover the actual costs of tapping water mains and installing water service connection piping and water meters. Impact fees are restricted to the cost of designing and constructing new water resource components, treatment costs, and transmission facilities. Impact fees cannot be utilized for replacement and rehabilitation of existing 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 replacement and rehabilitation, source development (such as groundwater recharge or IPR), treatment costs, and transmission construction-cost debt service. Base charges are frequently established at amounts greater than the billing and meter replacement cost in order to ensure that the utility maintains a steady revenue stream that is not overly sensitive to seasonal demand variations. 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 water management districts. As set forth in subsection 373.713(1), F.S., counties, municipalities, and special districts have the legislative ability to create regional water supply authorities in a manner that is cost effective and reduces the environmental effects of concentrated groundwater withdrawals. Regional water supply authorities are granted multiple rights and privileges including the ability to levy taxes, issue bonds, and incur debt to develop water supplies. Authorities may also receive preferred funding assistance from the state and water management districts for the capital costs of new alternative water supplies and regional infrastructure.

Water Management District Funding Options

The districts provide financial assistance for water conservation, WSD, and WRD projects through cooperative (or cost-share) funding programs. Financial assistance is provided primarily to governmental entities, but private entities may be eligible to participate in these programs.

The District promotes water conservation and the implementation of measures that produce significant water savings beyond those required in a CUP/WUP. Additionally, the District provides cost-share funding for projects that foster its core missions. The Regional Initiative Valuing Environmental Resources (RIVER) cost-share program provides funding assistance to water supply and/or wastewater utilities, government entities, and local entities for projects that decrease water consumption, implement water savings programs, provide AWS, protect water supply, improve water quality, restore natural systems, and provide flood protection.

The District also partners with other agencies and associations as part of the SRP to provide cost-share funding to agriculture producers to help implement best management practices (BMPs) that protect and conserve water. Cost-share funding is available to producers to maximize irrigation system efficiency, for tools to manage irrigation scheduling, and for irrigation system remote monitoring and control. Along with

FDACS, the District provides funding to support mobile irrigation lab services that deliver technical assistance to producers for evaluating system efficiency and make recommendations for improvements (SRWMD, 2023b).

In addition, the Rural Economic Development Initiative (REDI) was established to better serve Florida’s economically distressed rural communities (section 288.0656, F.S.). Counties or communities facing economic challenges are entitled to seek a "Match Waiver or Reduction" in relation to job or wage criteria, eligible company criterion, incentive prerequisites, and grant funding. The eligibility for a match waiver in grant programs is determined by individual state agencies, taking into account their yearly budget allocations and adherence to federal and state regulations (Florida Department of Economic Opportunity, n.d.). All counties in the Western Planning Region are REDI counties, which qualify for match waivers.

Water Resource Development Work Program

The District prepares and updates a Five-Year WRDWP following the approval of the annual budget. This WRDWP describes the implementation strategy and funding plan for WRD, WSD, and AWS components.

State Funding Options

Agricultural Conservation

The FDACS’ Office of Agricultural Water Policy (OAWP) works with multiple partners, including the Natural Resources Conservation Services (NRCS), DEP, water management districts, and Soil and Water Conservation Districts (SWCD), 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

Since Fiscal Year (FY) 2014, the District received $135 million for 62 projects to help protect and restore natural systems districtwide. These projects address either water quality or water quantity, although many often provide dual benefits. Typical water quality projects include WWTF upgrades, conversion of septic systems to central sewer, and enhanced stormwater treatment. Typical water quantity projects include water conservation, reclaimed water system enhancements or expansions, and AWS development. The springs protection category also includes funding from DEP for row crop, dairy, and nursery irrigation system efficiency improvements, and enhanced water recycling components for dairies.

The future of springs funding looks particularly bright given the passage of the 2016 Legacy Florida legislation that earmarks $50 million per year from the Land Acquisition Trust Fund for springs restoration for the next 20 years. It is anticipated that the districts, local governments, and public supply utilities will continue to partner with the state of Florida through DEP to aggressively implement projects well into the future (DEP, 2023a).

State of Florida Alternative Water Supply and Development Program

Since FY 2020, the governor and Florida Legislature have allocated funding statewide for WRD and WSD projects to help protect the state's water resources and ensure the needs of existing and future users are met. The funding supported the implementation of water conservation programs, AWS projects, and WRD 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 the District were awarded almost $15 million, however future funding is not guaranteed (DEP, 2023b).

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, the population affected, and consolidation of very small public water systems that 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 low interest rates. Community assistance is available for small communities having populations less than 10,000. Fifteen percent of the annual funds are reserved exclusively for small communities. In addition, small communities may qualify for loans from the unreserved 85% of the funds (DEP, 2023e).

Florida Forever Program

The Florida Forever program is an initiative aimed at conserving and protecting natural areas and wildlife habitats throughout the state of Florida. The primary goal of Florida Forever is to acquire and manage critical lands including wetlands, forests, beaches, rivers, and other important ecological areas to ensure their long-term preservation. The program is administered by DEP and receives funding through the Florida Forever Trust Fund. The trust fund is primarily financed through a portion of the state's documentary stamp tax revenues, which are generated from real estate transactions. Subject to annual appropriation, the Florida Forever Program could be a source of project funding (DEP, 2023c).

Water and Land Conservation Amendment

In 2014, the Water and Land Conservation Amendment was approved by voters to be added to the Florida Constitution. This amendment requires one third of documentary stamp revenue to be placed into the Land Acquisition Trust Fund. These funds are allocated for the acquisition/restoration of conservation lands, management of existing conservation lands, and the restoration of water resources, such as wetlands, springs, and rivers. Since 2016, the Legacy Florida legislation has allocated funds for springs protection consistent with the Water and Land Conservation amendment (The Florida Senate, 2015).

Resiliency Funding

In May 2021, Governor DeSantis signed Senate Bill 1954 into law creating the Resilient Florida Program to address statewide flooding and SLR (section 380.093, F.S.). This comprehensive legislation ensures a coordinated approach to Florida’s coastal and inland resilience. The program enhances the State’s efforts to protect our inland waterways, coastlines, and shores, which serve as invaluable natural defenses against SLR and flooding. The legislation is the largest investment in Florida’s history, more than $100 million annually, to prepare communities for the impacts of climate change, including SLR, intensified storms, and flooding.

The Resilient Florida Program provides two separate grant opportunities, one for planning and the other for implementation of resilience projects that address flooding and SLR (DEP, 2023f). Resilient Florida Planning Grants provide 100% funding to local governments to complete comprehensive planning requirements related to flooding; VAs to identify or address risks of flooding and sea level rise; and develop projects, plans, and policies to prepare or adapt to effects of flooding and SLR. The Statewide Flooding and Sea Level Rise Resilience Plan, known as the Resilience Plan, consists of ranked projects that address the risk of flooding and SLR to coastal and inland communities for critical assets, as defined in statute. Critical assets must be previously identified in a local or state developed VA. The DEP is required to submit the list of projects to the Legislature by December 1 annually for consideration of funding in the next state fiscal year. Projects included in the Resilience Plan will receive 50% cost-share funding from the State.

Federal Funding

Environmental Quality Incentive Program

The United States Department of Agriculture’s NRCS provides technical and financial assistance to agricultural producers through the Environmental Quality Incentive Program (EQIP) for the installation or implementation of structural and management practices to improve environmental quality on agricultural lands. Water supply and nutrient management through detention/retention or tailwater recovery ponds can also be implemented through this program (USDA, 2023).

State and Tribal Assistance Grants

Another partnership with states involves funding assistance through cooperative agreements, referred to as State and Tribal Assistance Grants. These funds are available through the Environmental Protection Agency, which historically required 45 percent in matching funds from local government cooperators (EPA, 2023a).

Water Infrastructure Finance and Innovation Act

The Water Infrastructure Finance and Innovation Act (WIFIA) established a new financing mechanism to accelerate investment in our nation's water infrastructure. The WIFIA program provides loans for up to 49 percent of eligible project costs for projects that cost at least $20 million for large communities and $5 million for small communities (population of 25,000 or less) (EPA, 2023b).

Public-Private Partnerships, Cooperatives and Other Private Investment

Public-private partnerships are gaining popularity as a potential source of funding to reduce the financial burden for public entities. However, these partnerships can require technical expertise and financial risk beyond the expertise and risk tolerance of many utilities and water supply authorities. There are a range of public/private partnership options that may provide the required expertise and reduce the financial risks. These options range from all-public ownership to all-private ownership of facility design, construction, and operation. Additionally, competition among private firms desiring to fund, build, or operate WSD projects with assistance from government entities could reduce project costs, potentially resulting in lower customer charges.

Summary of Funding Mechanisms

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

Chapter 9: Conclusion

Summary

This 2024 WWSP was prepared by the District in coordination with stakeholders and is consistent with the water supply planning requirements of chapter 373, F.S. The WWSP concludes that fresh groundwater may be able to supply some, but not all of the projected increase in demand during the planning horizon, while also sustaining natural systems. Groundwater demands in all water use categories are projected to increase from 109 mgd in 2015 to approximately 127 mgd in 2045 (an 18 mgd increase). There are waterbodies that are exceeding the screening criteria under current and future conditions, portions of the region where groundwater quality may constrain the availability of fresh groundwater that is suitable for drinking without supplemental treatment, and wetlands with a moderate to high potential for adverse change.

To meet current and future water demands while protecting water resources, the 2024 WWSP identifies WSD and WRD project options, as well as water conservation efforts. With these project options, the District has identified 4.1 mgd of estimated benefit that is potentially available to offset the projected increase in groundwater demand. These benefits are in addition to approximately 13.3 to 14.6 mgd of water conservation potential. The District is also continuing to develop conceptual project options that offset future water demands or impacts.

Challenges in water resource development and natural resource protection require joint efforts to monitor, characterize, and analyze current and projected hydrologic conditions. Successful implementation of the WWSP requires close coordination with regional and local governments, utilities, stakeholders in the agriculture, commercial, and industrial fields, and other water users. Collaboration among stakeholders is essential for implementing the recommendations and guidance in the WWSP. Public and private partnerships can ensure that water resources in the WWSP region are carefully managed and available to meet future demands.

Opportunities may exist for additional traditional groundwater withdrawals to meet future water demands through 2045, however the few opportunities for increased traditional groundwater withdrawals generally include local areas where groundwater withdrawals have not been fully optimized. Options for obtaining new water supplies to meet existing and future water demands from both conventional and alternative sources must comply with applicable CUP/WUP rules and conditions. While the WWSP may not be used in the review of CUPs/WUPs, the District is allowed to use data or other information used to establish the plan in reviewing CUPs/WUPs.

The primary solutions identified in the WWSP to meet the future water demands include enhanced water conservation, wellfield optimization, data collection and evaluation, and groundwater recharge efforts. The projects provided in this water supply plan were developed as a planning level assessment to show that sufficient options are available to address potential water resource impacts in the WWSP region. With appropriate management, water conservation efforts, and implementation of the identified WSD and WRD projects, the 2024 WWSP concludes that the future demands can be met through the 2045 planning horizon while sustaining water resources and related natural systems.

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Appendix A

Population and Water Demand Projections

Introduction

This Appendix contains information on the methodology and data developed for use in the development of the water demand estimates and projections for the 2024 Western Water Supply Plan (WWSP) for six water use categories, as well as future reclaimed water supply and estimates of potential conservation. It also describes the methodologies used to determine the spatial distribution of projected groundwater withdrawals used in the groundwater flow model scenarios. The methods described below are identical to the methods used for the 2023 North Florida Regional Water Supply Plan (NFRWSP).

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

Background and Water Use Categories

The planning horizon for the 2024 WWSP is 2020 to 2045. Population and water demand estimates and projections are a cornerstone for assessing the water needs and availability in regional water supply planning. The Suwannee River Water Management District (District) develops water demand projections to evaluate "existing legal uses, anticipated future needs, and existing and reasonably anticipated sources of water and conservation efforts," as set forth in subparagraph 373.036(2)(b)4a, Florida Statutes (F.S.). The goals of the District are to project water demands that are reasonable and based on the best information available at the time the projections were developed.

The baseline year, 2015 for the WWSP, is the year that acts as the starting point for water demand projections and is based on the best available data of reported and estimated water use. Water use in the baseline year is not a projection, but rather actual or estimated use. The District has specific requirements for monitoring and reporting of permitted withdrawals. These requirements apply to wells with a primary casing inside diameter of eight inches or greater, as well as surface water pumps with a cumulative intake diameter of six inches or greater.

Five-Year Interval Intermediate Water Use Projections as required by subparagraph 62-40.531(1)(a), Florida Administrative Code (F.A.C.), must include water demand projections for five-year intervals during the planning period. The interval years should end on 5 or 0 (e.g., 2020, 2025, 2030, etc.) as directed by the state formats and guidelines for regional water supply planning (DEP 2019).

Water demands for this 2024 WWSP are estimated in 5-year increments (subsection 62-40.531(1)(a), F.A.C.) for the following six water use categories established by the Florida Department of Environmental Protection (DEP) and the state's five water management districts:

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

2. **Domestic Self-supply and Small Public Supply Systems (DSS)** - The DSS category consists of residential dwellings that are self-supplied water from a dedicated, on-site well and are not connected to a central utility. The DSS category also includes centralized Small Public Supply Systems (SPSS) that provide water for human consumption with average annual permitted quantities of less than 0.1 mgd.

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

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

5. **Commercial/Industrial/Institutional (CII) and Mining/Dewatering (MD)** - The CII category consists of self-supplied water use associated with the production of goods or provisions of services by CII establishments (e.g., general businesses, office complexes, commercial cooling and heating, bottled water, food and beverage processing, restaurants, gas stations, hotels, car washes, churches, hospitals, and prisons). The MD category consists of water use associated with mining (extraction and processing of subsurface materials and minerals) and long-term dewatering (removal of water to control surface or groundwater levels during construction or excavation activities).

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

Other than the PS category, all other water use categories obtain water from dedicated, on-site wells and pumps and are not connected to a central utility. In addition to the six water use categories listed above, projections are developed for future reclaimed water flows that could potentially be used to partially offset water demand. Reclaimed water is treated domestic wastewater that has received at least secondary treatment and basic disinfection and is reused for a beneficial purpose. Water demands, reclaimed water flows, and estimates of potential conservation are expressed in average mgd unless otherwise noted.

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

Methodology

Data and Information Sources

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

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

PS and DSS Population Estimates and Projections

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

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

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

PS Water Demand

Gross Per Capita Water Use

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

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

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

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

To calculate the 1-in-10 year water demand projections, the average year water demands were multiplied by 1.06 (corresponding to a six percent increase). The 1-in-10 year Drought Subcommittee of the Water Planning Coordination Group (WPCG) concluded that a 6% increase in water demand would occur in such an event for the PS water use category (WDPS 1998).

Spatial Groundwater Distribution

For groundwater modeling purposes, the projected groundwater demand and associated location of withdrawal needed to be determined. The projected groundwater demand, specific to each PS and SPSS, was distributed evenly to their respective active or proposed wells/stations contained in their CUP. For those PS systems with multiple wellfields and/or specific wellfield allocations, the associated water demand was divided proportionally amongst the respective wellfields and then further to the wellfields' respective wells/stations.

DSS Water Demand

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

Residential Per Capita Water Use

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

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

Spatial Groundwater Distribution

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

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

Agricultural Water Demand

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

Acreage

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

Demand

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

Spatial Groundwater Distribution

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

Landscape/Recreational Water Demand

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

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

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

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

Spatial Groundwater Distribution

The projected water demand for the LR category is only estimated at the county level. For groundwater modeling purposes, the groundwater demand and associated location of withdrawal needed to be determined. Several LR CUPs have surface water withdrawals; future groundwater demand for the respective future years at the county level was calculated using the 2015 percent split between groundwater and surface water (via reported CUP data and the SJRWMD's published report (SJRWMD 2016)). The county level groundwater demand for future year scenarios was then distributed to the CUP level using a percent share method of permitted allocation. For example, if an LR CUP's groundwater allocation represented 10% of the county's total groundwater allocation in 2015, then the LR CUP allocation also maintained 10% of the county groundwater allocation in 2045. The estimated projected groundwater demand specific to each LR CUP was then distributed evenly to their respective active or proposed stations. For counties located in more than one district (e.g., Jefferson County), the projected LR water demand specific to each district was only applied to the respective LR CUPs and stations identified within the respective districts' portion of the county. While future land use and potential new locations of LR polygons was not taken into consideration, the method applied is generally accepted as a valid method for regional planning purposes.

Commercial/Industrial/Institutional and Mining/Dewatering Water Demand

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

The CII/MD average gpcd was applied to the additional population projected by BEBR (Rayer, S. and Y. Wang. 2020) for each five-year increment and the associated water demand added to the 2015 baseline year water use. One county in the WWSP has a large CII user (e.g., paper and pulp mills) that is not impacted by population increases (Taylor County). The water use associated with this permit was removed from the average per capita calculations for future CII/MD water demands.

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

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

Spatial Groundwater Distribution

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

Power Generation Water Demand

There is no PG water use in the WWSP region, therefore water use was not estimated or projected for this category.

Review of Population and Water Demand Projections

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

Summary of Population and Water Demand Projections

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

2045 Reclaimed Water Projections

Projections of future reclaimed water flows were made for domestic wastewater treatment facilities (WWTF) with 2018 permitted wastewater treatment capacities equal to or greater than 0.1 mgd (DEP 2019a).

Existing Flows

The 2018 flows were separated by total WWTF flow and beneficial reuse (Figure A-1 and Table A-1). For this WWSP, beneficial reuse was considered to be only those uses in which reclaimed water takes the place of an existing or potential use of higher quality water for which reclaimed water is suitable, such as water used for landscape irrigation. Generally, delivery of reclaimed water to sprayfields, absorption fields, and rapid infiltration basins (RIBs) are not considered beneficial reuse, unless located in recharge areas. The majority of WWTF in the WWSP region are located in recharge areas.

The DEP regards several applications of reclaimed water as reuse that the District does not. Therefore, it is common for the District's beneficial reuse quantities to be lower than that of DEP. The District requires the application to achieve a water resource benefit in order to qualify as reuse. Reuse must take the place of an existing or potential use of higher-quality water or be used to grow useful crops, restore, or maintain adopted minimum flows and/or levels of a river, lake, or wetland, or effectively recharge a useable aquifer. An application that does not meet any of these criteria is considered by the District to be disposal. Reclaimed water applications considered to be reuse by DEP, but disposal by the District are underground injection, absorption fields and RIBs located in discharge areas, surface water augmentation where not required, sprayfields, and artificial wetlands. Reclaimed water applications for underground injection, absorption fields and RIBs will be considered beneficial if they are located in recharge areas, as identified via studies or through consumptive use permitting.

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

Table A-1. Facilities in the WWSP with reuse and disposal flows

Facility Name	Map ID	Total Treated Flow (mgd)	Beneficial Use Flow (mgd)	Disposal Flow (mgd)
Cedar Key WRF	1	0.092	0.092	0
Chiefland, City of WWTF	2	0.239	0.239	0
City Of Perry WWTF	3	0.937	0.937	0
Cross City, Town of WWTF	4	0.28	0.516	-0.236
Greenville WWTF	5	0.094	0.094	0
Jefferson Correctional Institution WWTF	6	0.15	0.155	-0.005
Madison, City of WWTF	7	0.721	0.721	0
Mayo Correctional Institution WWTF	8	0.119	0.119	0
Mayo, Town of WWTF	9	0.078	0.078	0
Taylor Correctional Institution WWTF	10	0.164	0.164	0

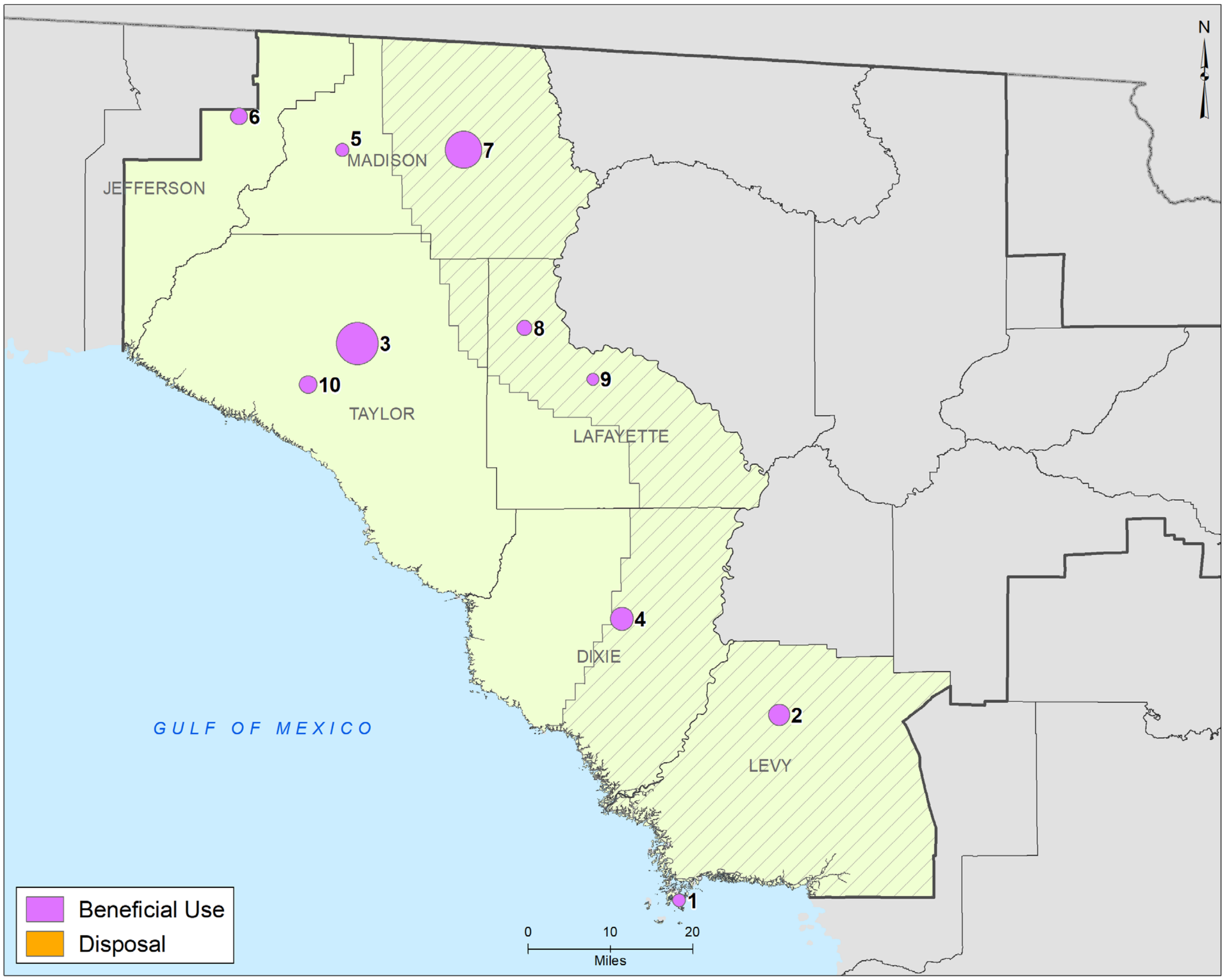

Figure A-1. Summary of 2018 WWTF reclaimed water and disposal flows in the WWSP region

Future Flows

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

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

System Size Determinations, Section (1)(B) Table I (effective date 6/25/2009) - System Design.

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

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

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

Spatial Distribution

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

2045 Estimated Water Conservation Potential

Current water conservation potential for the 2024 WWSP region was calculated in order to gauge the future benefit of effective water conservation. For the 2024 WWSP, all categories of water use, except agriculture, utilized the results in the 2020 Central Florida Water Initiative (CFWI) Regional Water Supply Plan (RWSP) as the basis for estimating water conservation potential (CFWI 2020). Table 1 is excerpted from page 50 of the 2020 CFWI RWSP which was developed in partnership with stakeholders and is based on an in-depth assessment of the conservation potential from implementing best management practices. More detailed information on how water conservation estimates were developed in the CFWI can be found can be found at https://cfwiwater.com/waterconservation.html and in the 2020 CFWI RWSP (CFWI 2020).

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

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

mgd = million gallons per day

For agriculture, water conservation savings were estimated from the FDACS – FSAID VII Final Report (FDACS 2020). Additionally, a second scenario of water conservation potential based on per capita rates was estimated for the public supply and domestic self-supply (DSS) water use categories.

For the first water conservation scenario, the District used the low-end estimates from the 2020 CFWI RWSP plus the FSAID VII estimates. For the 2024 WWSP, the resulting percentage savings derived from the 2020 CFWI RWSP in Table 1 will be applied to all of the water use categories (except agriculture). See Table 2 for the estimated percentage savings.

Table 2. Percentage Savings Calculated from the 2020 CFWI RWSP

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

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

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

NWFWMD and SWFMWD Water Use and Projections

The NWFWMD and SWFWMD provided their water use estimates and projections. These data were incorporated into the 2023 NFRWSP geodatabase. Details concerning the development of the NWFWMD and SWFWMD data and projections should be directed back to the respective water management districts.

Georgia and South Carolina Water Use

Districts obtained water use data and projections through 2050 from the Georgia Environmental Protection Division (GEPD). The data were spatially distributed by staff and provided to GEPD for review. In June 2021, GEPD staff provided comments concerning surface water distribution which were addressed, and the resulting distribution was incorporated into the 2022 NFRWSP geodatabase. Additional information on the Georgia data and projections can be obtained from the GEPD at: Georgia Water Planning. South Carolina data was obtained from the US. Geological Survey at: ScienceBase Catalog Home. Details on how the data were distributed can be found in the *Methodology for the Spatial Distribution of Historic Water Use and Projected Water Demand for Georgia and South Carolina* (SJRWMD 2020).

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Table A-2 (SRWMD - Western Planning Region). Population Estimates for 2015 and Population Projections for 2020-2045, by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	BEBR County Population	Institutional Population	District Population	Public Supply Population	Domestic and Small Public Supply Systems Population	BEBR County Population	Institutional Population	District Population	Public Supply Population	Domestic and Small Public Supply Systems Population
		2015					2020				
Dixie	SRWMD	16,468	1,536	16,468	2,491	12,441	16,700	1,658	16,700	2,952	12,090
Jefferson	SRWMD	14,519	1,119	4,676	553	3,004	14,800	1,096	4,717	606	3,015
Lafayette	SRWMD	8,664	1,647	8,664	1,188	5,829	8,700	1,191	8,700	1,208	6,301
Levy	SRWMD	40,448	0	18,287	5,674	12,613	41,600	0	18,581	5,931	12,650
Madison	SRWMD	19,200	1,585	19,200	5,504	12,111	19,200	1,610	19,422	5,763	12,049
Taylor	SRWMD	22,824	3,058	22,824	11,191	8,575	22,600	2,222	22,600	11,661	8,717
SRWMD Western Planning Region Total		**122,123**	**8,945**	**90,119**	**26,601**	**54,573**	**123,600**	**7,777**	**90,720**	**28,121**	**54,822**

County	District	BEBR County Population	Institutional Population	District Population	Public Supply Population	Domestic and Small Public Supply Systems Population	BEBR County Population	Institutional Population	District Population	Public Supply Population	Domestic and Small Public Supply Systems Population
		2025					2030				
Dixie	SRWMD	16,900	1,658	16,900	3,077	12,165	17,000	1,658	17,000	3,141	12,201
Jefferson	SRWMD	15,100	1,096	4,797	618	3,083	15,300	1,096	4,849	626	3,127
Lafayette	SRWMD	9,100	1,191	9,100	1,208	6,701	9,400	1,191	9,400	1,208	7,001
Levy	SRWMD	42,700	0	19,072	6,016	13,056	43,600	0	19,474	6,103	13,371
Madison	SRWMD	19,500	1,610	19,722	5,832	12,280	19,700	1,610	19,922	5,886	12,426
Taylor	SRWMD	23,200	2,222	23,200	12,269	8,709	23,600	2,222	23,600	12,696	8,682
SRWMD Western Planning Region Total		**126,500**	**7,777**	**92,791**	**29,020**	**55,994**	**128,600**	**7,777**	**94,245**	**29,660**	**56,808**

County	District	BEBR County Population	Institutional Population	District Population	Public Supply Population	Domestic and Small Public Supply Systems Population	BEBR County Population	Institutional Population	District Population	Public Supply Population	Domestic and Small Public Supply Systems Population	BEBR County Population	Institutional Population	District Population	Public Supply Population	Domestic and Small Public Supply Systems Population	District Population Percent Change 2015-2045
		2035					2040					2045					
Dixie	SRWMD	17,100	1,658	17,100	3,161	12,281	17,100	1,658	17,100	3,161	12,281	17,100	1,658	17,100	3,161	12,281	4%
Jefferson	SRWMD	15,400	1,096	4,876	629	3,151	15,600	1,096	4,929	639	3,194	15,700	1,096	4,955	644	3,215	6%
Lafayette	SRWMD	9,700	1,191	9,700	1,208	7,301	9,900	1,191	9,900	1,208	7,501	10,100	1,191	10,100	1,214	7,695	17%
Levy	SRWMD	44,300	0	19,787	6,146	13,641	44,900	0	20,055	6,200	13,855	45,500	0	20,323	6,265	14,058	11%
Madison	SRWMD	19,800	1,610	20,022	5,907	12,505	20,000	1,610	20,222	5,958	12,654	20,100	1,610	20,322	6,006	12,706	6%
Taylor	SRWMD	24,000	2,222	24,000	13,126	8,652	24,300	2,222	24,300	13,465	8,613	24,700	2,222	24,700	13,831	8,647	8%
SRWMD Western Planning Region Total		**130,300**	**7,777**	**95,485**	**30,177**	**57,531**	**131,800**	**7,777**	**96,506**	**30,631**	**58,098**	**133,200**	**7,777**	**97,500**	**31,121**	**58,602**	**8%**

Notes:

1.) Rounding errors account for nominal discrepancies.

2.) 2015 county population projections were obtained from BEBR Florida Estimates of Population 2015, Published April 2015.

3.) 2020 - 2045 county population projections were obtained from BEBR Population Projections: Volume 53, Bulletin 186, Published January 2020.

4.) Population projections shown here are permanent population projections only and do not include any factors such as seasonal residents, tourist population or net commuter population.

5.) Public water supply utility service areas often include residences that derive their water supply from privately owned (domestic self-supply) wells. Typically, these domestic self-supply water uses existed prior to their locations becoming part of public water supply service areas. For public water supply service areas, the District does not have sufficient information to separate the population served by public supply systems from those served by domestic self-supply wells. Therefore, public water supply population estimated by the District often include some domestic self-supply population. In certain counties the domestic self-supply population is projected to decrease.

Table A-3 (SRWMD - Western Planning Region). Water Use for 2015 and 5-in-10 Year Total Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045, by Category of Use, in the Western Planning Region of the Suwannee River Water

Category	District	Water Use			Demand Projections (5-in-10)																			Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045					2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total			Ground	Surface	Total
Public Supply	SRWMD	4.36	0.00	**4.36**	4.70	0.00	**4.70**	4.84	0.00	**4.84**	4.94	0.00	**4.94**	4.97	0.00	**4.97**	5.03	0.00	**5.03**	5.08	0.00	**5.08**		17%	5.38	0.00	**5.38**
Domestic Self-supply and Small Public Supply Systems	SRWMD	4.23	0.00	**4.23**	4.21	0.00	**4.21**	4.28	0.00	**4.28**	4.35	0.00	**4.35**	4.40	0.00	**4.40**	4.45	0.00	**4.45**	4.49	0.00	**4.49**		6%	4.74	0.00	**4.74**
Agricultural Irrigation Self-supply	SRWMD	57.97	0.02	**57.99**	55.98	0.02	**56.00**	59.87	0.02	**59.89**	63.40	0.02	**63.42**	66.88	0.02	**66.90**	70.75	0.02	**70.77**	74.25	0.02	**74.27**		28%	94.09	0.02	**94.11**
Landscape / Recreational Self-supply	SRWMD	1.15	0.00	**1.15**	1.15	0.00	**1.15**	1.18	0.00	**1.18**	1.19	0.00	**1.19**	1.20	0.00	**1.20**	1.20	0.00	**1.20**	1.21	0.00	**1.21**		5%	1.34	0.00	**1.34**
Commercial / Industrial / Institutional Self-supply	SRWMD	41.35	0.17	**41.52**	41.35	0.17	**41.52**	41.41	0.17	**41.58**	41.44	0.17	**41.61**	41.47	0.17	**41.64**	41.50	0.17	**41.67**	41.53	0.17	**41.70**		0%	41.53	0.17	**41.70**
Power Generation Self-supply	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**		N/A	0.00	0.00	**0.00**
SRWMD Western Planning Region Total		**109.06**	**0.19**	**109.25**	**107.39**	**0.19**	**107.58**	**111.58**	**0.19**	**111.77**	**115.32**	**0.19**	**115.51**	**118.92**	**0.19**	**119.11**	**122.93**	**0.19**	**123.12**	**126.56**	**0.19**	**126.75**		**16%**	**147.08**	**0.19**	**147.27**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-4 (SRWMD - Western Planning Region). Total Water Use for 2015 and 5-in-10 Year Water Demand Projections for 2020-2045, and 1-in-10 Year Water Demand Projections for 2045 by County in the Western Planning Region of the Suwannee River

County	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Dixie	SRWMD	8.99	0.00	**8.99**	7.86	0.00	**7.86**	8.35	0.00	**8.35**	8.83	0.00	**8.83**	9.24	0.00	**9.24**	9.74	0.00	**9.74**	10.11	0.00	**10.11**	12%	12.47	0.00	**12.47**
Jefferson	SRWMD	3.77	0.02	**3.79**	3.22	0.02	**3.24**	3.23	0.02	**3.25**	3.25	0.02	**3.27**	3.28	0.02	**3.30**	3.29	0.02	**3.31**	3.32	0.02	**3.34**	-12%	4.00	0.02	**4.02**
Lafayette	SRWMD	12.85	0.00	**12.85**	12.55	0.00	**12.55**	13.64	0.00	**13.64**	14.61	0.00	**14.61**	15.56	0.00	**15.56**	16.62	0.00	**16.62**	17.58	0.00	**17.58**	37%	21.89	0.00	**21.89**
Levy	SRWMD	16.77	0.00	**16.77**	16.14	0.00	**16.14**	17.66	0.00	**17.66**	19.08	0.00	**19.08**	20.32	0.00	**20.32**	21.74	0.00	**21.74**	22.98	0.00	**22.98**	37%	28.67	0.00	**28.67**
Madison	SRWMD	24.04	0.00	**24.04**	24.80	0.00	**24.80**	25.79	0.00	**25.79**	26.60	0.00	**26.60**	27.53	0.00	**27.53**	28.50	0.00	**28.50**	29.49	0.00	**29.49**	23%	36.60	0.00	**36.60**
Taylor	SRWMD	42.64	0.17	**42.81**	42.82	0.17	**42.99**	42.91	0.17	**43.08**	42.95	0.17	**43.12**	42.99	0.17	**43.16**	43.04	0.17	**43.21**	43.08	0.17	**43.25**	1%	43.42	0.17	**43.59**
SRWMD Western Planning Region Total		**109.06**	**0.19**	**109.25**	**107.39**	**0.19**	**107.58**	**111.58**	**0.19**	**111.77**	**115.32**	**0.19**	**115.51**	**118.92**	**0.19**	**119.11**	**122.93**	**0.19**	**123.12**	**126.56**	**0.19**	**126.75**	**16%**	**147.05**	**0.19**	**147.24**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-5 (SRWMD - Western Planning Region). Public Supply Population Served and Water Use for 2015, Public Supply Population and 5-in-10 Year Water Demand Projections for 2020-2045, and 1-in-10 Year Water Demand Projections for 2045 by County in the Western Planning Region of the Suwannee River Water Management District.

County	District	Population Served	Population Projections						Water Use			Demand Projections (5-in-10)																					Percent Change	Demand Projections (1-in-10)		
									2015			2020			2025			2030			2035			2040			2045							2045		
		2015	2020	2025	2030	2035	2040	2045	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total				2015-2045	Ground	Surface	Total
Dixie	SRWMD	2,491	2,952	3,077	3,141	3,161	3,161	3,161	0.65	0.00	**0.65**	0.80	0.00	**0.80**	0.84	0.00	**0.84**	0.87	0.00	**0.87**	0.87	0.00	**0.87**	0.87	0.00	**0.87**	0.87	0.00	**0.87**				34%	0.92	0.00	**0.92**
Jefferson	SRWMD	553	606	618	626	629	639	644	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**				N/A	0.00	0.00	**0.00**
Lafayette	SRWMD	1,188	1,208	1,208	1,208	1,208	1,208	1,214	0.15	0.00	**0.15**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**				7%	0.17	0.00	**0.17**
Levy	SRWMD	5,674	5,931	6,016	6,103	6,146	6,200	6,265	0.68	0.00	**0.68**	0.61	0.00	**0.61**	0.62	0.00	**0.62**	0.64	0.00	**0.64**	0.64	0.00	**0.64**	0.65	0.00	**0.65**	0.66	0.00	**0.66**				-3%	0.70	0.00	**0.70**
Madison	SRWMD	5,504	5,763	5,832	5,886	5,907	5,958	6,006	1.14	0.00	**1.14**	1.27	0.00	**1.27**	1.29	0.00	**1.29**	1.31	0.00	**1.31**	1.31	0.00	**1.31**	1.32	0.00	**1.32**	1.33	0.00	**1.33**				17%	1.41	0.00	**1.41**
Taylor	SRWMD	11,191	11,661	12,269	12,696	13,126	13,465	13,831	1.74	0.00	**1.74**	1.86	0.00	**1.86**	1.93	0.00	**1.93**	1.96	0.00	**1.96**	1.99	0.00	**1.99**	2.03	0.00	**2.03**	2.06	0.00	**2.06**				18%	2.18	0.00	**2.18**
SRWMD Western Planning Region Total		**26,601**	**28,121**	**29,020**	**29,660**	**30,177**	**30,631**	**31,121**	**4.36**	**0.00**	**4.36**	**4.70**	**0.00**	**4.70**	**4.84**	**0.00**	**4.84**	**4.94**	**0.00**	**4.94**	**4.97**	**0.00**	**4.97**	**5.03**	**0.00**	**5.03**	**5.08**	**0.00**	**5.08**				**17%**	**5.38**	**0.00**	**5.38**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 1-in-10 rainfall year demand for 2045 calculated as an additional 6 percent of 2045 average demand.

Table A-6 (SRWMD - Western Planning Region). Public Supply Population Served and Water Use for 2015 and Public Supply Population Projections for 2020-2045, 5-in-10 Year Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045 by County and Utility, in the Western Planning Region of the Suwannee River Water Management District.

County	Utility	CUP Number	Population Served 2015	Population Projections 2020	2025	2030	2035	2040	2045	Buildout	Percent Change 2015-2045	Water Use 2015 GW	SW	Total
Dixie - SRWMD	Town of Cross City	216823	1,637	2,063	2,188	2,252	2,267	2,267	2,267	5,173	38%	0.53	0.00	0.53
	Town of Suwannee	216831	286	300	300	300	302	302	302	476	6%	0.07	0.00	0.07
	Town of Horseshoe Beach	217129	164	167	167	167	167	167	167	332	2%	0.05	0.00	0.05
	NCRWA Old Town (Also in Gilchrist and Levy)	220310	404	422	422	422	425	425	425	1,744	5%	0.00	0.00	0.00
	SRWMD Dixie Total		**2,491**	**2,952**	**3,077**	**3,141**	**3,161**	**3,161**	**3,161**	**7,725**	**27%**	**0.65**	**0.00**	**0.65**
Jefferson - SRWMD	Jefferson Communities Water System Inc.	218662	553	606	618	626	629	639	644	18,403	16%	0.00	0.00	0.00
	SRWMD Jefferson Total		**553**	**606**	**618**	**626**	**629**	**639**	**644**	**18,403**	**16%**	**0.00**	**0.00**	**0.00**
Lafayette - SRWMD	Town of Mayo	216851	1,188	1,208	1,208	1,208	1,208	1,208	1,214	1,780	2%	0.15	0.00	0.15
	SRWMD Lafayette Total		**1,188**	**1,208**	**1,208**	**1,208**	**1,208**	**1,208**	**1,214**	**1,780**	**2%**	**0.15**	**0.00**	**0.15**
Levy - SRWMD	Cedar Key SP Water & Sewer District	216821	2,180	2,304	2,304	2,304	2,304	2,304	2,304	4,616	6%	0.12	0.00	0.12
	City of Chiefland	216826	2,211	2,317	2,402	2,489	2,532	2,586	2,651	9,063	20%	0.31	0.00	0.31
	Town of Bronson	216830	1,106	1,133	1,133	1,133	1,133	1,133	1,133	5,075	2%	0.15	0.00	0.15
	City of Fanning Springs (Also in Dixie and Gilchrist)	220310	177	177	177	177	177	177	177	581	0%	0.10	0.00	0.10
	SRWMD Levy Total		**5,674**	**5,931**	**6,016**	**6,103**	**6,146**	**6,200**	**6,265**	**19,335**	**10%**	**0.68**	**0.00**	**0.68**
Madison - SRWMD	City of Madison	216506	3,783	3,969	4,034	4,088	4,109	4,152	4,200	16,736	11%	0.93	0.00	0.93
	Town of Greenville	217127	770	796	796	796	796	796	796	2,040	3%	0.10	0.00	0.10
	Town of Lee	218663	331	338	338	338	338	346	346	1,929	5%	0.06	0.00	0.06
	Cherry Lake Utilities Corporation Inc.	219588	620	660	664	664	664	664	664	1,903	7%	0.05	0.00	0.05
	SRWMD Madison Total		**5,504**	**5,763**	**5,832**	**5,886**	**5,907**	**5,958**	**6,006**	**22,608**	**26%**	**1.14**	**0.00**	**1.14**
Taylor - SRWMD	City of Perry	216835	6,736	6,919	6,919	6,919	6,919	6,919	6,919	12,145	3%	1.43	0.00	1.43
	Big Bend Water Authority	220484	3,222	3,412	3,952	4,307	4,662	4,923	5,289	6,192	64%	0.26	0.00	0.26
	Taylor Coastal	221166	1,233	1,330	1,398	1,470	1,545	1,623	1,623	8,749	32%	0.05	0.00	0.05
	SRWMD Taylor Total		**11,191**	**11,661**	**12,269**	**12,696**	**13,126**	**13,465**	**13,831**	**27,086**	**24%**	**1.74**	**0.00**	**1.74**
SRWMD Western Planning Region Total			**26,601**	**28,121**	**29,020**	**29,660**	**30,177**	**30,631**	**31,121**	**96,937**	**17%**	**4.36**	**0.00**	**4.36**

County	Utility	Demand Projections (5-in-10) 2020 GW	2020 SW	2020 Total	2025 GW	2025 SW	2025 Total	2030 GW	2030 SW	2030 Total	2035 GW	2035 SW	2035 Total	2040 GW	2040 SW	2040 Total	2045 GW	2045 SW	2045 Total	Percent Change 2015-2045	2014-2018 Avg Gross GPCD	Demand Projections (1-in-10) 2045 GW	SW	Total
Dixie - SRWMD	Town of Cross City	0.68	0.00	0.68	0.72	0.00	0.72	0.75	0.00	0.75	0.75	0.00	0.75	0.75	0.00	0.75	0.75	0.00	0.75	42%	331	0.80	0.00	0.80
	Town of Suwannee	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0%	239	0.07	0.00	0.07
	Town of Horseshoe Beach	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0%	276	0.05	0.00	0.05
	NCRWA Old Town (Also in Gilchrist and Levy)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	0	0.00	0.00	0.00
	SRWMD Dixie Total	**0.80**	**0.00**	**0.80**	**0.84**	**0.00**	**0.84**	**0.87**	**0.00**	**0.87**	**0.87**	**0.00**	**0.87**	**0.87**	**0.00**	**0.87**	**0.87**	**0.00**	**0.87**	**34%**	**N/A**	**0.92**	**0.00**	**0.92**
Jefferson - SRWMD	Jefferson Communities Water System Inc.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%	N/A	0.00	0.00	0.00
	SRWMD Jefferson Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0%**	**N/A**	**0.00**	**0.00**	**0.00**
Lafayette - SRWMD	Town of Mayo	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	7%	133	0.17	0.00	0.17
	SRWMD Lafayette Total	**0.16**	**0.00**	**0.16**	**0.16**	**0.00**	**0.16**	**0.16**	**0.00**	**0.16**	**0.16**	**0.00**	**0.16**	**0.16**	**0.00**	**0.16**	**0.16**	**0.00**	**0.16**	**7%**	**N/A**	**0.17**	**0.00**	**0.17**
Levy - SRWMD	Cedar Key SP Water & Sewer District	0.13	0.00	0.13	0.13	0.00	0.13	0.13	0.00	0.13	0.13	0.00	0.13	0.13	0.00	0.13	0.13	0.00	0.13	8%	58	0.14	0.00	0.14
	City of Chiefland	0.31	0.00	0.31	0.32	0.00	0.32	0.34	0.00	0.34	0.34	0.00	0.34	0.35	0.00	0.35	0.36	0.00	0.36	16%	135	0.38	0.00	0.38
	Town of Bronson	0.15	0.00	0.15	0.15	0.00	0.15	0.15	0.00	0.15	0.15	0.00	0.15	0.15	0.00	0.15	0.15	0.00	0.15	0%	132	0.16	0.00	0.16
	City of Fanning Springs (Also in Dixie and Gilchrist)	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	-80%	94	0.02	0.00	0.02
	SRWMD Levy Total	**0.61**	**0.00**	**0.61**	**0.62**	**0.00**	**0.62**	**0.64**	**0.00**	**0.64**	**0.64**	**0.00**	**0.64**	**0.65**	**0.00**	**0.65**	**0.66**	**0.00**	**0.66**	**-3%**	**N/A**	**0.70**	**0.00**	**0.70**
Madison - SRWMD	City of Madison	1.04	0.00	1.04	1.06	0.00	1.06	1.08	0.00	1.08	1.08	0.00	1.08	1.09	0.00	1.09	1.10	0.00	1.10	18%	263	1.17	0.00	1.17
	Town of Greenville	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	10%	142	0.12	0.00	0.12
	Town of Lee	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	17%	208	0.07	0.00	0.07
	Cherry Lake Utilities Corporation Inc.	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0%	81	0.05	0.00	0.05
	SRWMD Madison Total	**1.27**	**0.00**	**1.27**	**1.29**	**0.00**	**1.29**	**1.31**	**0.00**	**1.31**	**1.31**	**0.00**	**1.31**	**1.32**	**0.00**	**1.32**	**1.33**	**0.00**	**1.33**	**17%**	**N/A**	**1.41**	**0.00**	**1.41**
Taylor - SRWMD	City of Perry	1.49	0.00	1.49	1.49	0.00	1.49	1.49	0.00	1.49	1.49	0.00	1.49	1.49	0.00	1.49	1.49	0.00	1.49	4%	215	1.58	0.00	1.58
	Big Bend Water Authority	0.32	0.00	0.32	0.38	0.00	0.38	0.41	0.00	0.41	0.44	0.00	0.44	0.47	0.00	0.47	0.50	0.00	0.50	92%	95	0.53	0.00	0.53
	Taylor Coastal	0.05	0.00	0.05	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.07	0.00	0.07	0.07	0.00	0.07	40%	41	0.07	0.00	0.07
	SRWMD Taylor Total	**1.86**	**0.00**	**1.86**	**1.93**	**0.00**	**1.93**	**1.96**	**0.00**	**1.96**	**1.99**	**0.00**	**1.99**	**2.03**	**0.00**	**2.03**	**2.06**	**0.00**	**2.06**	**18%**	**N/A**	**2.18**	**0.00**	**2.18**
SRWMD Western Planning Region Total		**4.70**	**0.00**	**4.70**	**4.84**	**0.00**	**4.84**	**4.94**	**0.00**	**4.94**	**4.97**	**0.00**	**4.97**	**5.03**	**0.00**	**5.03**	**5.08**	**0.00**	**5.08**	**17%**	**N/A**	**5.38**	**0.00**	**5.38**

Notes:
1.) All water use and demand projections are shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) Projected population for years 2020 - 2045 are based on BEBR Population Projections: Volume 53, Bulletin 186, Published January 2020.
4.) Population projections shown here are permanent population projections only and do not include any factors such as seasonal residents, tourist population or net commuter population.
5.) Per capita used to calculate demand projections is an average from 2014 - 2018 and is calculated as (Total Water Use / Total Estimated Population). This per capita is commonly referred to as a gross per capita, as it includes all uses within a utility.
6.) 1-in-10 rainfall year demand for 2045 calculated as an additional 6 percent of 2045 average demand.
7.) SW quantities (allocations) for 2020 - 2045 were obtained from consumptive use permits.
8.) Public water supply utility service areas often include residences that derive their water supply from privately owned (domestic self-supply) wells. Typically, these domestic self-supply water uses existed prior to their locations becoming part of public water supply service areas. For public water supply service areas, the District does not have sufficient information to separate the population served by public supply systems from those served by domestic self-supply wells. Therefore, public water supply population estimated b

Table A-6a (SRWMD - Western Planning Region). 2014-2018 Water Use, Population Served, and Five-Year Gross Per Capita Averages for Public Supply Permitted Equal to or Greater than 0.10 mgd, in the Western Planning Region of the Suwannee River Water Management District.

Cup Number	Owner	Utility	Alternate Name / Comments	County	Water Use					Population					2014-2018 Average Gross GPCD	Notes
					2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
216823	Town of Cross City	Town of Cross City	PWS 2630202	Dixie	0.519	0.525	0.546	0.552	0.578	1,645	1,637	1,617	1,611	1,696	331	
216831	Town of Suwannee	Town of Suwannee	PWS 2151140	Dixie	0.061	0.065	0.073	0.072	0.073	286	286	285	285	300	239	
217129	Town of Horseshoe Beach	Town of Horseshoe Beach	PWS 2150512	Dixie	0.041	0.045	0.047	0.049	0.042	164	164	160	158	167	276	
220310	NCRWA Old Town	NCRWA Old Town		Dixie	0.000	0.000	0.000	0.000	0.000	405	404	401	398	421	0	Wells are outside of Dixie County.
SRWMD Dixie Total					**0.621**	**0.635**	**0.666**	**0.673**	**0.693**	**2,500**	**2,491**	**2,463**	**2,452**	**2,584**	**263**	
ed by NWFWMD	Jefferson Communities Water System	Jefferson Communities Water System Inc. - Ll	PWS 1330748	Jefferson	0.000	0.000	0.000	0.000	0.000	548	553	529	577	603	N/A	Wells are in NWFWMD
SRWMD Jefferson Total					**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**548**	**553**	**529**	**577**	**603**	**N/A**	
216851	Town of Mayo	Town of Mayo	PWS 2341181	Lafayette	0.168	0.147	0.161	0.147	0.172	1,195	1,188	1,182	1,183	1,208	133	
SRWMD Lafayette Total					**0.168**	**0.147**	**0.161**	**0.147**	**0.172**	**1,195**	**1,188**	**1,182**	**1,183**	**1,208**	**133**	
216821	Cedar Key Sp Water & Sewer District	Cedar Key Sp Water & Sewer District	PWS 2380178	Levy	0.132	0.116	0.125	0.129	0.141	2,191	2,180	2,207	2,283	2,304	58	
216826	City of Chiefland	City of Chiefland	PWS 2380189	Levy	0.312	0.314	0.284	0.291	0.293	2,220	2,211	2,215	2,208	2,229	135	
216830	Town of Bronson	Town of Bronson	PWS 2381178	Levy	0.114	0.154	0.151	0.153	0.164	1,111	1,106	1,110	1,130	1,133	132	
220310	City of Fanning Springs	City of Fanning Springs	PWS 2381411	Levy	0.094	0.097	0.117	0.130	0.137	178	177	176	175	176	170	The per capita was re-calculated to include the whole population estimate for the utility, resulting in a GPCD of 170.
SRWMD Levy Total					**0.652**	**0.681**	**0.677**	**0.703**	**0.735**	**5,700**	**5,674**	**5,708**	**5,796**	**5,842**	**120**	
216506	City of Madison	City of Madison	PWS 2400205	Madison	1.013	0.925	0.974	1.058	1.043	3,806	3,783	3,762	3,741	3,969	263	
217127	Town of Greenville	Town of Greenville	PWS 2400440	Madison	0.098	0.100	0.116	0.130	0.104	773	770	772	756	796	142	
218663	Town of Lee	Town of Lee	PWS 2401296	Madison	0.069	0.062	0.079	0.059	0.072	331	331	319	319	338	208	
219588	Cherry Lake Utilities Corporation Inc.	Cherry Lake Utilities Corporation Inc.	PWS 2400185	Madison	0.051	0.052	0.055	0.045	0.050	622	620	620	621	659	81	
SRWMD Madison Total					**1.231**	**1.139**	**1.224**	**1.292**	**1.269**	**5,532**	**5,504**	**5,473**	**5,437**	**5,762**	**222**	
216835	City of Perry	City of Perry	PWS 2620208	Taylor	1.414	1.431	1.497	1.415	1.498	6,745	6,736	6,663	6,638	6,919	215	
220484	Big Bend Water Authority	Big Bend Water Authority	PWS 2621102	Taylor	0.294	0.262	0.371	0.272	0.322	3,222	3,222	3,174	3,168	3,300	95	
221166	Taylor Coastal	Taylor Coastal	PWS 2624165	Taylor	0.049	0.050	0.050	0.052	0.052	1,233	1,233	1,200	1,214	1,265	41	
SRWMD Taylor Total					**1.757**	**1.743**	**1.918**	**1.739**	**1.872**	**11,200**	**11,191**	**11,037**	**11,020**	**11,484**	**161**	
SRWMD Western Planning Region Total					**4.429**	**4.345**	**4.646**	**4.554**	**4.741**	**26,675**	**26,601**	**26,392**	**26,465**	**27,483**	**174**	Jefferson Communities Population is not included in the GPCD calculation

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 2014 - 2018 water use data source is NFSEG master geodatabase with metered and estimated public supply water use.
4.) 2014 - 2018 population obtained from BEBR estimates of population, DEP MOR and Basic Facility Report Data, parcel data, and public supply data requests.

Table A-7 (SRWMD - Western Planning Region). Domestic Self-supply and Small Public Supply Systems Population and Water Use for 2015 and 5-in-10 Year Water Demand Projections for 2020-2045, and 1-in-10 Year Water Demand Projections for 2045 by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Population	Population Projections						Percent Change 2015-2045	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
										2015			2020			2025			2030			2035			2040			2045				2045		
		2015	2020	2025	2030	2035	2040	2045		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Dixie	SRWMD	12,441	12,090	12,165	12,201	12,281	12,281	12,281	-1%	1.21	0.00	**1.21**	1.18	0.00	**1.18**	1.18	0.00	**1.18**	1.19	0.00	**1.19**	1.19	0.00	**1.19**	1.19	0.00	**1.19**	1.19	0.00	**1.19**	-2%	1.26	0.00	**1.26**
Jefferson	SRWMD	3,004	3,015	3,083	3,127	3,151	3,194	3,215	7%	0.25	0.00	**0.25**	0.25	0.00	**0.25**	0.25	0.00	**0.25**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	4%	0.28	0.00	**0.28**
Lafayette	SRWMD	5,829	6,301	6,701	7,001	7,301	7,501	7,695	32%	0.55	0.00	**0.55**	0.60	0.00	**0.60**	0.64	0.00	**0.64**	0.67	0.00	**0.67**	0.70	0.00	**0.70**	0.72	0.00	**0.72**	0.74	0.00	**0.74**	35%	0.78	0.00	**0.78**
Levy	SRWMD	12,613	12,650	13,056	13,371	13,641	13,855	14,058	11%	0.92	0.00	**0.92**	0.88	0.00	**0.88**	0.90	0.00	**0.90**	0.92	0.00	**0.92**	0.94	0.00	**0.94**	0.96	0.00	**0.96**	0.98	0.00	**0.98**	7%	1.03	0.00	**1.03**
Madison	SRWMD	12,111	12,049	12,280	12,426	12,505	12,654	12,706	5%	0.71	0.00	**0.71**	0.70	0.00	**0.70**	0.71	0.00	**0.71**	0.72	0.00	**0.72**	0.72	0.00	**0.72**	0.73	0.00	**0.73**	0.73	0.00	**0.73**	3%	0.77	0.00	**0.77**
Taylor	SRWMD	8,575	8,717	8,709	8,682	8,652	8,613	8,647	1%	0.59	0.00	**0.59**	0.60	0.00	**0.60**	0.60	0.00	**0.60**	0.59	0.00	**0.59**	0.59	0.00	**0.59**	0.59	0.00	**0.59**	0.59	0.00	**0.59**	0%	0.62	0.00	**0.62**
SRWMD Western Planning Region Total		**54,573**	**54,822**	**55,994**	**56,808**	**57,531**	**58,098**	**58,602**	**7%**	**4.23**	**0.00**	**4.23**	**4.21**	**0.00**	**4.21**	**4.28**	**0.00**	**4.28**	**4.35**	**0.00**	**4.35**	**4.40**	**0.00**	**4.40**	**4.45**	**0.00**	**4.45**	**4.49**	**0.00**	**4.49**	**6%**	**4.74**	**0.00**	**4.74**

Notes:

1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) Public water supply utility service areas often include residences that derive their water supply from privately owned (domestic self-supply) wells. Typically, these domestic self-supply water uses existed prior to their locations becoming part of public water supply service areas. For public water supply service areas, the District does nc
4.) 1-in-10 rainfall year demand for 2045 calculated as an additional 6 percent of 2045 average demand.

Table A-7a (SRWMD - Western Planning Region). Domestic Self-Supply Population and Water Use for 2015 and Population Projections for 2020-2045, 5-in-10 Year Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045 by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Population	Population Projections						Percent Change 2015-2045	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	2014-2018 Avg GPCD	Demand Projections (1-in-10)		
										2015			2020			2025			2030			2035			2040			2045					2045		
		2015	2020	2025	2030	2035	2040	2045		GW	SW	Total	GW	SW	Total	GW	SW	Total	GW	SW	Total	GW	SW	Total	GW	SW	Total	GW	SW	Total			GW	SW	Total
Dixie	SRWMD	12,308	11,957	12,032	12,068	12,148	12,148	12,148	-1%	1.17	0.00	**1.17**	1.14	0.00	**1.14**	1.14	0.00	**1.14**	1.15	0.00	**1.15**	1.15	0.00	**1.15**	1.15	0.00	**1.15**	1.15	0.00	**1.15**	-2%	95	1.22	0.00	**1.22**
Jefferson	SRWMD	2,825	2,836	2,901	2,943	2,964	3,005	3,026	7%	0.25	0.00	**0.25**	0.25	0.00	**0.25**	0.25	0.00	**0.25**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	4%	87	0.28	0.00	**0.28**
Lafayette	SRWMD	5,829	6,301	6,701	7,001	7,301	7,501	7,695	32%	0.55	0.00	**0.55**	0.60	0.00	**0.60**	0.64	0.00	**0.64**	0.67	0.00	**0.67**	0.70	0.00	**0.70**	0.72	0.00	**0.72**	0.74	0.00	**0.74**	35%	96	0.78	0.00	**0.78**
Levy	SRWMD	10,914	10,938	11,316	11,613	11,782	11,991	12,183	12%	0.67	0.00	**0.67**	0.68	0.00	**0.68**	0.70	0.00	**0.70**	0.72	0.00	**0.72**	0.73	0.00	**0.73**	0.74	0.00	**0.74**	0.76	0.00	**0.76**	13%	62	0.81	0.00	**0.81**
Madison	SRWMD	12,063	12,001	12,232	12,378	12,457	12,606	12,658	5%	0.70	0.00	**0.70**	0.70	0.00	**0.70**	0.71	0.00	**0.71**	0.72	0.00	**0.72**	0.72	0.00	**0.72**	0.73	0.00	**0.73**	0.73	0.00	**0.73**	4%	58	0.77	0.00	**0.77**
Taylor	SRWMD	8,486	8,621	8,613	8,586	8,556	8,517	8,551	1%	0.58	0.00	**0.58**	0.59	0.00	**0.59**	0.59	0.00	**0.59**	0.58	0.00	**0.58**	0.58	0.00	**0.58**	0.58	0.00	**0.58**	0.58	0.00	**0.58**	0%	68	0.61	0.00	**0.61**
SRWMD Western Planning Region Total		**52,425**	**52,654**	**53,795**	**54,589**	**55,208**	**55,768**	**56,261**	**7%**	**3.92**	**0.00**	**3.92**	**3.96**	**0.00**	**3.96**	**4.03**	**0.00**	**4.03**	**4.10**	**0.00**	**4.10**	**4.14**	**0.00**	**4.14**	**4.18**	**0.00**	**4.18**	**4.22**	**0.00**	**4.22**	**8%**	**N/A**	**4.47**	**0.00**	**4.47**

Notes:

1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) Projected population for years 2020 - 2045 are based on BEBR Population Projections: Volume 53, Bulletin 186, Published January 2020.
4.) Population projections shown here are permanent population projections only and do not include any factors such as seasonal residents, tourist population or net commuter population.
5.) Per capita used to calculate demand projections is an average from 2014 - 2018 and is calculated as (Total County-wide Residential Water Use / Total Estimated Population). This per capita is commonly referred to as a residential per capita, as it only includes the indoor and outdoor residential uses.
6.) 1-in-10 rainfall year demand for 2045 calculated as an additional 6 percent of 2045 average demand.
7.) All demands are expected to come from groundwater, thus surface water projections are zero.
8.) 2015 water use data source is NFSEG master geodatabase with estimated domestic self-supply water use.
9.) 2014 - 2018 residential county per capita rates obtained from SRWMD published water use reports.

Table A-7b (SRWMD - Western Planning Region). Small Public Supply Population Served and Water Use for 2015, Small Public Supply Population Projections 2020-2045, 5-in-10 Year Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045 by County and Utility, in the Western Planning Region of the Suwannee River Water Management District.

County	Utility	CUP Number	Population Served 2015	Population Projections 2020	2025	2030	2035	2040	2045	Buildout	Percent Change 2015-2045	Water Use 2015 GW	2015 SW	2015 Total	Demand Projections (5-in-10) 2020 GW	2020 SW	2020 Total	2025 GW	2025 SW	2025 Total
Dixie - SRWMD	Charles Carr	218620	42	42	42	42	42	42	42	42	0%	0.01	0.00	0.01	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	Larry T. Cannon	218836	5	5	5	5	5	5	5	5	0%	0.01	0.00	0.01	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	Jim & Sophie Deal	218866	56	56	56	56	56	56	56	56	0%	0.01	0.00	0.01	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	Velma Lovelace	218929	30	30	30	30	30	30	30	50	0%	0.01	0.00	0.01	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	SRWMD Dixie Total		**133**	**133**	**133**	**133**	**133**	**133**	**133**	**153**	**0%**	**0.04**	**0.00**	**0.04**	**0.04**	**0.00**	**0.04**	**0.04**	**0.00**	**0.04**
Jefferson - SRWMD	Jefferson Communities Water System Inc. - Lamont System	218662	179	179	182	184	187	189	189	N/A	6%	0.02	0.00	**0.02**	0.03	0.00	**0.03**	0.03	0.00	**0.03**
	SRWMD Jefferson Total		**179**	**179**	**182**	**184**	**187**	**189**	**189**	**0**	**6%**	**0.02**	**0.00**	**0.02**	**0.03**	**0.00**	**0.03**	**0.03**	**0.00**	**0.03**
Levy - SRWMD	Blevins Propeties, Inc.	215920	42	42	42	42	42	42	42	42	0%	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	Fowlers Bluff Water Association	216642	361	374	398	410	509	510	516	601	43%	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	University Oaks MHP	220497	289	293	293	293	293	293	293	293	1%	0.13	0.00	**0.13**	0.08	0.00	**0.08**	0.08	0.00	**0.08**
	Manatee Utilities	217177	156	158	162	168	170	174	179	230	15%	0.02	0.00	**0.02**	0.02	0.00	**0.02**	0.02	0.00	**0.02**
	Town of Otter Creek	216656	179	173	173	173	173	173	173	1,156	-3%	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	Fimc Hideaway Inc.	219482	372	372	372	372	372	372	372	372	0%	0.02	0.00	**0.02**	0.02	0.00	**0.02**	0.02	0.00	**0.02**
	Springside / Propery Planning	220881	300	300	300	300	300	300	300	300	0%	0.05	0.00	**0.05**	0.05	0.00	**0.05**	0.05	0.00	**0.05**
	SRWMD Levy Total		**1,699**	**1,712**	**1,740**	**1,758**	**1,859**	**1,864**	**1,875**	**2,994**	**10%**	**0.25**	**0.00**	**0.25**	**0.20**	**0.00**	**0.20**	**0.20**	**0.00**	**0.20**
Madison - SRWMD	Jimmie Ragans	215614	30	30	30	30	30	30	30	30	**0%**	0.01	0.00	**0.01**	0.00	0.00	**0.00**	0.00	0.00	**0.00**
	M. V. Evans Mobile Home Park	217482	18	18	18	18	18	18	18	18	**0%**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**
	SRWMD Madison Total		**48**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**0%**	**0.01**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Taylor - SRWMD	ALS Pheonix Water System	221616	41	48	48	48	48	48	48	49	**17%**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**
	Everett's Mobile Home Park	215763	48	48	48	48	48	48	48	48	**0%**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**
	SRWMD Taylor Total		**89**	**96**	**96**	**96**	**96**	**96**	**96**	**97**	**8%**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**
SRWMD Western Planning Region Total			**2,148**	**2,168**	**2,199**	**2,219**	**2,323**	**2,330**	**2,341**	**3,292**	**9%**	**0.33**	**0.00**	**0.33**	**0.28**	**0.00**	**0.28**	**0.28**	**0.00**	**0.28**

Utility	Demand Projections (5-in-10) 2030 GW	2030 SW	2030 Total	2035 GW	2035 SW	2035 Total	2040 GW	2040 SW	2040 Total	2045 GW	2045 SW	2045 Total	Percent Change 2015-2045	2014-2018 Avg GPCD	Demand Projections (1-in-10) 2045 GW	2045 SW	2045 Total
Charles Carr	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0%	190	0.01	0.00	**0.01**
Larry T. Cannon	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0%	2000	0.01	0.00	**0.01**
Jim & Sophie Deal	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0%	143	0.01	0.00	**0.01**
Velma Lovelace	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0%	233	0.01	0.00	**0.01**
SRWMD Dixie Total	**0.04**	**0.00**	**0.04**	**0.04**	**0.00**	**0.04**	**0.04**	**0.00**	**0.04**	**0.04**	**0.00**	**0.04**	**0%**	**N/A**	**0.04**	**0.00**	**0.04**
Jefferson Communities Water System Inc. - Lamont System	0.03	0.00	**0.03**	0.03	0.00	**0.03**	0.03	0.00	**0.03**	0.03	0.00	**0.03**	50%	150	0.03	0.00	**0.03**
SRWMD Jefferson Total	**0.03**	**0.00**	**0.03**	**0.03**	**0.00**	**0.03**	**0.03**	**0.00**	**0.03**	**0.03**	**0.00**	**0.03**	**50%**	**N/A**	**0.03**	**0.00**	**0.03**
Blevins Propeties, Inc.	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0%	143	0.01	0.00	**0.01**
Fowlers Bluff Water Association	0.01	0.00	**0.01**	0.02	**0.00**	**0.02**	0.02	0.00	**0.02**	0.02	0.00	**0.02**	100%	32	0.02	0.00	**0.02**
University Oaks MHP	0.08	0.00	**0.08**	0.08	**0.00**	**0.08**	0.08	0.00	**0.08**	0.08	0.00	**0.08**	-38%	277	0.08	0.00	**0.08**
Manatee Utilities	0.02	0.00	**0.02**	0.02	**0.00**	**0.02**	0.03	0.00	**0.03**	0.03	0.00	**0.03**	50%	147	0.03	0.00	**0.03**
Town of Otter Creek	0.01	0.00	**0.01**	0.01	**0.00**	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0%	56	0.01	0.00	**0.01**
Fimc Hideaway Inc.	0.02	0.00	**0.02**	0.02	**0.00**	**0.02**	0.02	0.00	**0.02**	0.02	0.00	**0.02**	0%	62	0.02	0.00	**0.02**
Springside / Propery Planning	0.05	0.00	**0.05**	0.05	**0.00**	**0.05**	0.05	0.00	**0.05**	0.05	0.00	**0.05**	0%	150	0.05	0.00	**0.05**
SRWMD Levy Total	**0.20**	**0.00**	**0.20**	**0.21**	**0.00**	**0.21**	**0.22**	**0.00**	**0.22**	**0.22**	**0.00**	**0.22**	**-12%**	**N/A**	**0.22**	**0.00**	**0.22**
Jimmie Ragans	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	-100%	117	0.00	0.00	**0.00**
M. V. Evans Mobile Home Park	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	200	0.00	0.00	**0.00**
SRWMD Madison Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**-100%**	**N/A**	**0.00**	**0.00**	**0.00**
ALS Pheonix Water System	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	67	0.00	0.00	**0.00**
Everett's Mobile Home Park	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0.01	0.00	**0.01**	0%	146	0.01	0.00	**0.01**
SRWMD Taylor Total	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**	**0%**	**213**	**0.01**	**0.00**	**0.01**
SRWMD Western Planning Region Total	**0.28**	**0.00**	**0.28**	**0.29**	**0.00**	**0.29**	**0.30**	**0.00**	**0.30**	**0.30**	**0.00**	**0.30**	**-9%**	**N/A**	**0.30**	**0.00**	**0.30**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) Projected population for years 2020 - 2045 are based on BEBR Population Projections: Volume 53, Bulletin 186, Published January 2020.
4.) Population projections shown here are permanent population projections only and do not include any factors such as seasonal residents, tourist population or net commuter population.
5.) Per capita used to calculate demand projections is an average from 2014 - 2018 and is calculated as (Total Water Use / Total Estimated Population). This per capita is commonly referred to as a gross per capita, as it includes all uses within a utility.
6.) 1-in-10 rainfall year demand for 2045 calculated as an additional 6 percent of 2045 average demand.

Table A-7c (SRWMD - Western Planning Region). 2014-2018 Water Use, Population Served, and Five-Year Gross Per Capita Averages for Public Supply Permitted Smaller than 0.10 mgd in the Western Planning Region of the Suwannee River Water Management District.

Cup Number	Owner	Utility	Alternate Name / Comments	County	Water Use 2014	Water Use 2015	Water Use 2016	Water Use 2017	Water Use 2018	Population 2014	Population 2015	Population 2016	Population 2017	Population 2018	2014-2018 Avg GPCD	Notes
218620	Charles Carr	Charles Carr		Dixie	0.008	0.008	0.008	0.008	0.008	42	42	42	42	42	190	
218836	Larry T. Cannon	Larry T. Cannon		Dixie	0.010	0.010	0.010	0.010	0.010	5	5	5	5	5	2,000	
218866	Jim & Sophie Deal	Jim & Sophie Deal		Dixie	0.008	0.008	0.008	0.008	0.008	56	56	56	56	56	143	
218929	Velma Lovelace	Velma Lovelace		Dixie	0.007	0.007	0.007	0.007	0.007	30	30	30	30	30	233	
SRWMD Dixie Total					**0.033**	**0.033**	**0.033**	**0.033**	**0.033**	**133**	**133**	**133**	**133**	**133**	**248**	
218662	Jefferson Communities Water System Inc. - Lamont System	Jefferson Communities Water System Inc. - Lamont System	PWS 1330754	Jefferson	0.022	0.020	0.026	0.031	0.035	179	179	179	179	179	150	
SRWMD Jefferson Total					**0.022**	**0.020**	**0.026**	**0.031**	**0.035**	**179**	**179**	**179**	**179**	**179**	**150**	
215920	Blevins Properties, Inc.	Blevins Properties, Inc.		Levy	0.006	0.006	0.006	0.006	0.006	42	42	42	42	42	143	
216642	Fowlers Bluff Water Association	Fowlers Bluff Water Association	PWS 2380387	Levy	0.010	0.012	0.012	0.013	0.011	363	361	361	363	366	32	
220497	University Oaks MHP	University Oaks MHP		Levy	0.063	0.130	0.061	0.084	0.064	291	289	288	291	293	277	
217177	Manatee Utilities	Manatee Utilities		Levy	0.022	0.023	0.023	0.023	0.023	157	156	155	155	155	147	
216656	Town of Otter Creek	Town of Otter Creek	PWS 2380854	Levy	0.008	0.010	0.011	0.010	0.010	179	179	174	171	173	56	
219482	Fimc Hideaway Inc.	Fimc Hideaway Inc.		Levy	0.020	0.023	0.026	0.023	0.024	372	372	372	372	372	62	
220881	Springside/Property Planning	Springside/Property Planning		Levy	0.045	0.045	0.045	0.045	0.045	300	300	300	300	300	150	
SRWMD Levy Total					**0.174**	**0.249**	**0.184**	**0.204**	**0.183**	**1,704**	**1,699**	**1,692**	**1,694**	**1,701**	**117**	
215614	Jimmie Ragans	Jimmie Ragans		Madison	0.006	0.006	0.006	0.006	0.006	30	30	30	30	30	200	
217482	M. V. Evans Mobile Home Park	M. V. Evans Mobile Home Park		Madison	0.003	0.003	0.003	0.003	0.003	18	18	18	18	18	167	
SRWMD Madison Total					**0.009**	**0.009**	**0.009**	**0.009**	**0.009**	**48**	**48**	**48**	**48**	**48**	**188**	
221616	ALS Pheonix Water System	ALS Pheonix Water System		Taylor	0.005	0.002	0.002	0.003	0.003	50	41	41	45	48	67	
215763	Everett's Mobile Home Park	Everett's Mobile Home Park		Taylor	0.007	0.007	0.007	0.007	0.007	48	48	48	48	48	146	
SRWMD Taylor Total					**0.012**	**0.009**	**0.009**	**0.010**	**0.010**	**98**	**89**	**89**	**93**	**96**	**108**	
SRWMD Western Planning Region Total					**0.250**	**0.320**	**0.261**	**0.287**	**0.270**	**2,162**	**2,148**	**2,141**	**2,147**	**2,157**	**129**	

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 2014 - 2018 water use data source is NFSEG master geodatabase with metered and estimated small public supply water use.
4.) 2014 - 2018 population obtained from BEBR estimates of population, DEP MOR and Basic Facility Report Data, parcel data, and public supply data requests.

Table A-8 (SRWMD - Western Planning Region). Agricultural Irrigation Self-supply Water Use, Miscellaneous Agricultural Water Use, and Acreage for 2015, 5-in-10 Year Water Demand Projections for 2020-2045, Acreage Projections for 2020-2045, and 1-in-10 Year Water Demand Projections for 2045 by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Water Use			Demand Projections (5-in-10)																		Percent Change	Acreage	Acreage Projections						Percent Change	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045												2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	2015-2045	2015	2020	2025	2030	2035	2040	2045	2015-2045	Ground	Surface	Total
Dixie	SRWMD	6.81	0.00	**6.81**	5.56	0.00	**5.56**	6.01	0.00	**6.01**	6.45	0.00	**6.45**	6.86	0.00	**6.86**	7.36	0.00	**7.36**	7.73	0.00	**7.73**	14%	6,195	7,000	7,356	7,708	8,046	8,370	8,705	41%	9.97	0.00	**9.97**
Jefferson	SRWMD	3.27	0.02	**3.29**	2.72	0.02	**2.74**	2.73	0.02	**2.75**	2.74	0.02	**2.76**	2.77	0.02	**2.79**	2.78	0.02	**2.80**	2.81	0.02	**2.83**	-14%	2,333	2,401	2,401	2,401	2,401	2,401	2,401	3%	3.44	0.02	**3.46**
Lafayette	SRWMD	11.76	0.00	**11.76**	11.40	0.00	**11.40**	12.43	0.00	**12.43**	13.36	0.00	**13.36**	14.27	0.00	**14.27**	15.30	0.00	**15.30**	16.23	0.00	**16.23**	38%	9,324	11,532	12,250	12,963	13,663	14,361	15,060	62%	20.50	0.00	**20.50**
Levy	SRWMD	14.80	0.00	**14.80**	14.28	0.00	**14.28**	15.76	0.00	**15.76**	17.14	0.00	**17.14**	18.36	0.00	**18.36**	19.75	0.00	**19.75**	20.96	0.00	**20.96**	42%	11,154	13,417	14,479	15,576	16,303	17,347	18,067	62%	26.53	0.00	**26.53**
Madison	SRWMD	20.87	0.00	**20.87**	21.50	0.00	**21.50**	22.43	0.00	**22.43**	23.20	0.00	**23.20**	24.12	0.00	**24.12**	25.06	0.00	**25.06**	26.03	0.00	**26.03**	25%	18,912	24,384	24,958	25,535	26,103	26,672	27,241	44%	33.01	0.00	**33.01**
Taylor	SRWMD	0.46	0.00	**0.46**	0.52	0.00	**0.52**	0.51	0.00	**0.51**	0.51	0.00	**0.51**	0.50	0.00	**0.50**	0.50	0.00	**0.50**	0.49	0.00	**0.49**	7%	476	515	515	515	515	515	515	8%	0.64	0.00	**0.64**
SRWMD Western Planning Region Total		**57.97**	**0.02**	**57.99**	**55.98**	**0.02**	**56.00**	**59.87**	**0.02**	**59.89**	**63.40**	**0.02**	**63.42**	**66.88**	**0.02**	**66.90**	**70.75**	**0.02**	**70.77**	**74.25**	**0.02**	**74.27**	**28%**	**48,394**	**59,249**	**61,959**	**64,698**	**67,031**	**69,666**	**71,989**	**49%**	**94.09**	**0.02**	**94.11**

Notes:

1.) All water use is shown in million gallons per day.

2.) Rounding errors account for nominal discrepancies.

3.) 2015 water use data source is NFSEG master geodatabase with metered and estimated agricultural water use.

4.) 2015 acreage source is FSAID IV published June 30, 2017 by The Balmoral Group for the Florida Department of Agriculture and Consumer Services.

5.) 2020 - 2045 acreage projections and 2020 - 2045 average and 1-in-10 water demand projections derived from FSAID VII, published June 30, 2020 from The Balmoral Group for the Florida Department of Agriculture and Consumer Services.

6.) 2020 - 2045 groundwater / surface water split estimated using 2015 ratios.

Table A-8a (SRWMD - Western Planning Region). Agricultural Irrigation Self-supply Water Use (Including Miscellaneous Water Use) and Acreage for 2015, 5-in-10 Year Water Demand Projections and Acreage Projections for 2020-2045, and 1-in-10 Year Water Demand Projections for 2045, by Crop Category by County, in the Western Planning Region of the Suwannee River Water Management District.

County	Crop Category	2015 Estimated Agriculture		2020 Projected Agriculture		2025 Projected Agriculture		2030 Projected Agriculture		2035 Projected Agriculture		2040 Projected Agriculture		2045 Projected Agriculture		Percent Change 2015-2045		2045 (1-in-10) Demand
		Acres	MGD	Acres	MGD	Acres	MGD	Acres	MGD	Acres	MGD	Acres	MGD	Acres	MGD	Acreage	MGD	
	Citrus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Fruit (Non-citrus)	0	0.00	0	0.00	0	0.00	28	0.05	64	0.11	64	0.11	117	0.21	N/A	N/A	0.29
	Potatoes	0	0.00	0	0.00	22	0.02	22	0.02	22	0.02	22	0.02	47	0.05	N/A	N/A	0.08
	Vegetables (Fresh Market)	212	0.38	257	0.31	524	0.65	750	0.93	883	1.10	933	1.17	1,032	1.30	387%	242%	1.70
	Field Crops	5,625	5.84	6,338	4.77	6,338	4.80	6,417	4.90	6,586	5.08	6,728	5.25	6,829	5.37	21%	-8%	6.82
Dixie - SRWMD	Greenhouse/Nursery	9	0.04	9	0.03	17	0.05	17	0.05	17	0.05	131	0.30	174	0.29	1833%	625%	0.44
	Hay	158	0.23	205	0.19	264	0.23	283	0.24	283	0.24	301	0.25	315	0.25	99%	9%	0.35
	Sod	191	0.20	191	0.16	191	0.16	191	0.16	191	0.16	191	0.16	191	0.16	0%	-20%	0.19
	Sugarcane	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Miscellaneous	0	0.12	0	0.10	0	0.10	0	0.10	0	0.10	0	0.10	0	0.10	N/A	-17%	0.10
	Total	**6,195**	**6.81**	**7,000**	**5.56**	**7,356**	**6.01**	**7,708**	**6.45**	**8,046**	**6.86**	**8,370**	**7.36**	**8,705**	**7.73**	**41%**	**14%**	**9.97**
	Citrus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Fruit (Non-citrus)	124	0.26	124	0.22	124	0.22	124	0.22	124	0.22	124	0.22	124	0.22	0%	-15%	0.32
	Potatoes	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Vegetables (Fresh Market)	35	0.01	9	0.01	9	0.01	9	0.01	9	0.01	9	0.01	9	0.01	-74%	0%	0.02
	Field Crops	1,124	1.56	1,816	1.30	1,816	1.31	1,816	1.32	1,816	1.34	1,816	1.35	1,816	1.37	62%	-12%	1.74
Jefferson - SRWMD	Greenhouse/Nursery	407	1.13	388	0.94	388	0.94	388	0.94	388	0.95	388	0.95	388	0.96	-5%	-15%	1.09
	Hay	20	0.07	64	0.06	64	0.06	64	0.06	64	0.06	64	0.06	64	0.06	220%	-14%	0.08
	Sod	623	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	-100%	N/A	0.00
	Sugarcane	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Miscellaneous	0	0.25	0	0.21	0	0.21	0	0.21	0	0.21	0	0.21	0	0.21	N/A	-16%	0.21
	Total	**2,333**	**3.29**	**2,401**	**2.74**	**2,401**	**2.75**	**2,401**	**2.76**	**2,401**	**2.79**	**2,401**	**2.80**	**2,401**	**2.83**	**3%**	**-14%**	**3.46**
	Citrus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Fruit (Non-citrus)	0	0.18	88	0.17	242	0.45	378	0.69	385	0.70	512	0.93	564	1.02	N/A	467%	1.44
	Potatoes	0	0.00	0	0.00	35	0.04	35	0.04	68	0.08	78	0.09	89	0.10	N/A	N/A	0.15
	Vegetables (Fresh Market)	498	0.98	757	0.95	1,045	1.33	1,388	1.77	1,727	2.21	1,911	2.46	2,137	2.75	329%	181%	3.61
	Field Crops	6,862	6.46	8,545	6.26	8,679	6.42	8,852	6.60	9,107	6.90	9,399	7.22	9,631	7.49	40%	16%	9.51
Lafayette - SRWMD	Greenhouse/Nursery	68	0.27	115	0.26	182	0.40	202	0.45	241	0.53	326	0.72	454	1.00	568%	270%	1.13
	Hay	1,896	2.16	2,027	2.09	2,067	2.12	2,108	2.14	2,135	2.18	2,135	2.21	2,185	2.20	15%	2%	2.99
	Sod	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Sugarcane	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Miscellaneous	0	1.72	0	1.67	0	1.67	0	1.67	0	1.67	0	1.67	0	1.67	N/A	-3%	1.67
	Total	**9,324**	**11.76**	**11,532**	**11.40**	**12,250**	**12.43**	**12,963**	**13.36**	**13,663**	**14.27**	**14,361**	**15.30**	**15,060**	**16.23**	**62%**	**38%**	**20.50**
	Citrus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Fruit (Non-citrus)	0	0.18	101	0.17	333	0.59	580	1.03	812	1.44	855	1.52	1,017	1.81	N/A	906%	2.55
	Potatoes	0	0.00	0	0.00	0	0.00	116	0.13	129	0.15	209	0.24	224	0.26	N/A	N/A	0.37
	Vegetables (Fresh Market)	1,452	3.63	2,472	3.50	2,938	4.11	3,257	4.54	3,363	4.70	3,621	5.06	3,884	5.42	167%	49%	7.09
	Field Crops	7,610	7.13	9,017	6.88	9,196	7.06	9,367	7.24	9,562	7.47	9,825	7.74	9,910	7.88	30%	11%	10.00
Levy - SRWMD	Greenhouse/Nursery	844	2.31	880	2.23	954	2.40	973	2.45	1,144	2.83	1,318	3.23	1,495	3.63	77%	57%	4.10
	Hay	1,248	0.84	947	0.81	1,058	0.91	1,283	1.06	1,293	1.08	1,519	1.27	1,537	1.27	23%	51%	1.73
	Sod	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Sugarcane	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Miscellaneous	0	0.72	0	0.69	0	0.69	0	0.69	0	0.69	0	0.69	0	0.69	N/A	-4%	0.69
	Total	**11,154**	**14.80**	**13,417**	**14.28**	**14,479**	**15.76**	**15,576**	**17.14**	**16,303**	**18.36**	**17,347**	**19.75**	**18,067**	**20.96**	**62%**	**42%**	**26.53**
	Citrus	0	0.02	27	0.02	27	0.03	27	0.03	27	0.03	27	0.03	27	0.03	N/A	50%	0.04
	Fruit (Non-citrus)	7	0.11	60	0.11	221	0.40	331	0.60	421	0.76	543	0.97	681	1.22	9629%	1009%	1.72
	Potatoes	0	0.00	0	0.00	0	0.00	75	0.09	75	0.09	75	0.09	75	0.09	N/A	N/A	0.12
	Vegetables (Fresh Market)	1,617	3.53	3,019	3.64	3,239	3.96	3,381	4.18	3,452	4.31	3,684	4.64	3,794	4.81	135%	36%	6.30
	Field Crops	16,679	13.96	19,361	14.38	19,462	14.55	19,658	14.80	19,859	15.14	20,006	15.41	20,205	15.71	21%	13%	19.95
Madison - SRWMD	Greenhouse/Nursery	342	0.76	370	0.78	431	0.92	431	0.92	515	1.11	583	1.26	705	1.53	106%	101%	1.73
	Hay	267	1.31	1,547	1.35	1,578	1.35	1,632	1.36	1,754	1.46	1,754	1.44	1,754	1.42	557%	8%	1.93
	Sod	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Sugarcane	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Miscellaneous	0	1.18	0	1.22	0	1.22	0	1.22	0	1.22	0	1.22	0	1.22	N/A	3%	1.22
	Total	**18,912**	**20.87**	**24,384**	**21.50**	**24,958**	**22.43**	**25,535**	**23.20**	**26,103**	**24.12**	**26,672**	**25.06**	**27,241**	**26.03**	**44%**	**25%**	**33.01**

Table A-8a, Continued (SRWMD - Western Planning Region). Agricultural Irrigation Self-supply Water Use (Including Miscellaneous Water Use) and Acreage for 2015, 5-in-10 Year Water Demand Projections and Acreage Projections for 2020-2045, and 1-in-10 Year Water Demand Projections for 2045, by Crop Category by County, in the Western Planning Region of the Suwannee River Water Management District.

Taylor - SRWMD	Citrus	0	0.04	39	0.04	39	0.04	39	0.04	39	0.04	39	0.04	39	0.04	N/A	0%	0.06
	Fruit (Non-citrus)	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Potatoes	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Vegetables (Fresh Market)	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Field Crops	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Greenhouse/Nursery	7	0.01	7	0.01	7	0.01	7	0.01	7	0.01	7	0.01	7	0.01	0%	0%	0.01
	Hay	469	0.34	469	0.38	469	0.37	469	0.37	469	0.36	469	0.36	469	0.35	0%	3%	0.48
	Sod	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Sugarcane	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Miscellaneous	0	0.08	0	0.09	0	0.09	0	0.09	0	0.09	0	0.09	0	0.09	N/A	13%	0.09
	Total	**476**	**0.46**	**515**	**0.52**	**515**	**0.51**	**515**	**0.51**	**515**	**0.50**	**515**	**0.50**	**515**	**0.49**	**8%**	**7%**	**0.64**
SRWMD Western Planning Region Total	Citrus	0	0.06	66	0.06	66	0.07	66	0.07	66	0.07	66	0.07	66	0.07	N/A	17%	0.10
	Fruit (Non-citrus)	131	0.73	373	0.67	920	1.66	1,441	2.59	1,806	3.23	2,098	3.75	2,503	4.48	1811%	514%	6.32
	Potatoes	0	0.00	0	0.00	57	0.06	248	0.28	294	0.34	384	0.44	435	0.50	N/A	N/A	0.72
	Vegetables (Fresh Market)	3,814	8.53	6,514	8.41	7,755	10.06	8,785	11.43	9,434	12.33	10,158	13.34	10,856	14.29	185%	68%	18.72
	Field Crops	37,900	34.95	45,077	33.59	45,491	34.14	46,110	34.86	46,930	35.93	47,774	36.97	48,391	37.82	28%	8%	48.02
	Greenhouse/Nursery	1,677	4.52	1,769	4.25	1,979	4.72	2,018	4.82	2,312	5.48	2,753	6.47	3,223	7.42	92%	64%	8.50
	Hay	4,058	4.95	5,259	4.88	5,500	5.04	5,839	5.23	5,998	5.38	6,242	5.59	6,324	5.55	56%	12%	7.56
	Sod	814	0.20	191	0.16	191	0.16	191	0.16	191	0.16	191	0.16	191	0.16	-77%	-20%	0.19
	Sugarcane	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	N/A	N/A	0.00
	Miscellaneous	0	4.07	0	3.98	0	3.98	0	3.98	0	3.98	0	3.98	0	3.98	N/A	-2%	3.98
	Total	**48,394**	**57.99**	**59,249**	**56.00**	**61,959**	**59.89**	**64,698**	**63.42**	**67,031**	**66.90**	**69,666**	**70.77**	**71,989**	**74.27**	**49%**	**28%**	**94.11**

Notes:

1.) All water use is shown in million gallons per day.

2.) Rounding errors account for nominal discrepancies.

3.) 2015 total water use data source is NFSEG master geodatabase with metered and estimated agricultural water use. The 2015 water use by crop was estimated using 2020 FSAID VII ratios.

4.) 2015 acreage source is FSAID IV published June 30, 2017 by The Balmoral Group for the Florida Department of Agriculture and Consumer Services.

5.) 2020 - 2045 acreage projections and 2020 - 2045 average and 1-in-10 water demand projections derived from FSAID VII published June 30, 2020 by The Balmoral Group for the Florida Department of Agriculture and Consumer Services.

Table A-8b (SRWMD - Western Planning Region). Miscellaneous Agricultural Self-supply Water Use for 2015, 5-in-10 Year Demand Projections for 2020-2045, and 1-in-10 Year Demand Projections for 2045 by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	2015 Water Use				2020-2045 Demand Projections				Percent Change 2015-2045
		Dairy	Livestock	Aquaculture	Total	Dairy	Livestock	Aquaculture	Total	
Dixie	SRWMD	0.00	0.06	0.05	**0.12**	0.00	0.05	0.04	**0.10**	-17%
Jefferson	SRWMD	0.00	0.18	0.06	**0.25**	0.00	0.15	0.05	**0.21**	-16%
Lafayette	SRWMD	1.30	0.42	0.01	**1.72**	1.26	0.41	0.01	**1.67**	-3%
Levy	SRWMD	0.00	0.71	0.00	**0.72**	0.00	0.69	0.00	**0.69**	-4%
Madison	SRWMD	0.69	0.47	0.02	**1.18**	0.71	0.49	0.02	**1.22**	3%
Taylor	SRWMD	0.00	0.07	0.01	**0.08**	0.00	0.08	0.01	**0.09**	13%
SRWMD Western Planning Region Total		**1.99**	**1.91**	**0.15**	**4.07**	**1.97**	**1.87**	**0.13**	**3.98**	**-2%**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 2015 total water use data source is NFSEG master geodatabase with metered and estimated agricultural water use. The 2015 water use by category was estimated using 2020 FSAID VII ratios.
4.) 2020 - 2045 projected water demand derived from FSAID VII AG layer, published June 30, 2020 by the Balmoral Group for the Florida Department of Agriculture and Consumer Services.
5.) FSAID VII AG layer, published June 30, 2020 by the Balmoral Group for the Florida Department of Agriculture and Consumer Services assumes no increase for 1-in-10 year drought conditions.

Table A-9 (SRWMD - Western Planning Region). Landscape / Recreational Self-supply Water Use for 2015 and 5-in-10 Year Demand Projections for 2020-2045, and 1-in-10 Year Demand Projections for 2045 by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Water Use			Demand Projections (5-in-10)																					Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Dixie	SRWMD	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0%	0.12	0.00	**0.12**
Jefferson	SRWMD	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0%	0.12	0.00	**0.12**
Lafayette	SRWMD	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0%	0.06	0.00	**0.06**
Levy	SRWMD	0.21	0.00	**0.21**	0.21	0.00	**0.21**	0.22	0.00	**0.22**	0.22	0.00	**0.22**	0.22	0.00	**0.22**	0.22	0.00	**0.22**	0.22	0.00	**0.22**	5%	0.25	0.00	**0.25**
Madison	SRWMD	0.32	0.00	**0.32**	0.32	0.00	**0.32**	0.33	0.00	**0.33**	0.33	0.00	**0.33**	0.33	0.00	**0.33**	0.33	0.00	**0.33**	0.33	0.00	**0.33**	3%	0.35	0.00	**0.35**
Taylor	SRWMD	0.35	0.00	**0.35**	0.35	0.00	**0.35**	0.36	0.00	**0.36**	0.37	0.00	**0.37**	0.38	0.00	**0.38**	0.38	0.00	**0.38**	0.39	0.00	**0.39**	11%	0.44	0.00	**0.44**
SRWMD Western Planning Region Total		**1.15**	**0.00**	**1.15**	**1.15**	**0.00**	**1.15**	**1.18**	**0.00**	**1.18**	**1.19**	**0.00**	**1.19**	**1.20**	**0.00**	**1.20**	**1.20**	**0.00**	**1.20**	**1.21**	**0.00**	**1.21**	**5%**	**1.34**	**0.00**	**1.34**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 2015 water use data source is NFSEG master geodatabase with metered and estimated landscape/recreational water use.
4.) 2020 - 2045 projected surface water demand was interpolated based on 2015 percentages.
5.) 2045 1-in-10 rainfall year demands estimated using percentage above average from highest water year from 2014 - 2018.

Table A-9a (SRWMD - Western Planning Region). 2014-2018 Water Use, Total County Population, and Five-Year Gross Per Capita Averages for Landscape / Recreational Self-supply and Landscape/Recreational/Aesthetic Self-supply Water Demand Increases, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Total County Water Use					2014-2018 Average	High Year	% Above Average
		2014	2015	2016	2017	2018			
Dixie	SRWMD	0.12	0.12	0.11	0.12	0.12	0.12	0.12	0%
Jefferson	SRWMD	0.13	0.09	0.09	0.09	0.09	0.10	0.13	30%
Lafayette	SRWMD	0.06	0.06	0.06	0.06	0.04	0.06	0.06	0%
Levy	SRWMD	0.23	0.21	0.20	0.19	0.17	0.20	0.23	15%
Madison	SRWMD	0.34	0.32	0.31	0.31	0.31	0.32	0.34	6%
Taylor	SRWMD	0.28	0.35	0.31	0.30	0.30	0.31	0.35	13%
SRWMD Western Planning Region Total		**1.16**	**1.15**	**1.08**	**1.07**	**1.03**	**1.10**	**1.16**	**5%**

County	County Population Within District					2014-2018 Average GPCD	County Population Projections Within District						
	2014	2015	2016	2017	2018		2015	2020	2025	2030	2035	2040	2045
Dixie	15,066	16,468	15,091	15,076	14,818	8	16,468	16,700	16,900	17,000	17,100	17,100	17,100
Jefferson	3,574	4,676	3,554	3,552	3,600	26	4,676	4,717	4,797	4,849	4,876	4,929	4,955
Lafayette	6,972	8,664	7,000	7,085	7,094	8	8,664	8,700	9,100	9,400	9,700	9,900	10,100
Levy	18,661	18,287	18,697	19,015	18,709	11	18,287	18,581	19,072	19,474	19,787	20,055	20,323
Madison	17,663	19,200	17,713	17,704	17,812	18	19,200	19,422	19,722	19,922	20,022	20,222	20,322
Taylor	19,760	22,824	19,698	19,866	20,068	15	22,824	22,600	23,200	23,600	24,000	24,300	24,700
SRWMD Western Planning Region Total	**81,696**	**90,119**	**81,753**	**82,298**	**82,101**	**N/A**	**90,119**	**90,720**	**92,791**	**94,245**	**95,485**	**96,506**	**97,500**

County	Increase in County Population Within District						Change in Landscape / Recreational Self-supply Water Demand					
	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2020	2025	2030	2035	2040	2045
Dixie	232	200	100	100	0	0	0.00	0.00	0.00	0.00	0.00	0.00
Jefferson	41	80	52	27	53	26	0.00	0.00	0.00	0.00	0.00	0.00
Lafayette	36	400	300	300	200	200	0.00	0.00	0.00	0.00	0.00	0.00
Levy	294	491	402	313	268	268	0.00	0.01	0.00	0.00	0.00	0.00
Madison	222	300	200	100	200	100	0.00	0.01	0.00	0.00	0.00	0.00
Taylor	-224	600	400	400	300	400	0.00	0.01	0.01	0.01	0.00	0.01
SRWMD Western Planning Region Total	**601**	**2,071**	**1,454**	**1,240**	**1,021**	**994**	**0**	**0.03**	**0.01**	**0.01**	**0.00**	**0.01**

Notes:

1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 2014 - 2018 water use data source is NFSEG master geodatabase with metered and estimated landscape / recreational water use.
4.) 2014 - 2018 population obtained from BEBR estimates of population, DEP MOR and Basic Facility Report Data, parcel data, and public supply data requests.
5.) Projected population for years 2020 - 2045 are based on BEBR Population Projections: Volume 53, Bulletin 186, Published January 2020.

Table A-10 (SRWMD - Western Planning Region). Commercial / Industrial / Institutional and Mining / Dewatering Self-supply Water Use for 2015 and 5-in-10 Year Demand Projections for 2020-2045, by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045
		2015			2020			2025			2030			2035			2040			2045			
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	
Dixie	SRWMD	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0%
Jefferson	SRWMD	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0%
Lafayette	SRWMD	0.33	0.00	**0.33**	0.33	0.00	**0.33**	0.35	0.00	**0.35**	0.36	0.00	**0.36**	0.37	0.00	**0.37**	0.38	0.00	**0.38**	0.39	0.00	**0.39**	18%
Levy	SRWMD	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0%
Madison	SRWMD	1.00	0.00	**1.00**	1.01	0.00	**1.01**	1.03	0.00	**1.03**	1.04	0.00	**1.04**	1.05	0.00	**1.05**	1.06	0.00	**1.06**	1.07	0.00	**1.07**	7%
Taylor	SRWMD	39.50	0.17	**39.67**	39.49	0.17	**39.66**	39.51	0.17	**39.68**	39.52	0.17	**39.69**	39.53	0.17	**39.70**	39.54	0.17	**39.71**	39.55	0.17	**39.72**	0%
SRWMD Western Planning Region Total		**41.35**	**0.17**	**41.52**	**41.35**	**0.17**	**41.52**	**41.41**	**0.17**	**41.58**	**41.44**	**0.17**	**41.61**	**41.47**	**0.17**	**41.64**	**41.50**	**0.17**	**41.67**	**41.53**	**0.17**	**41.70**	**0%**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 2015 water use data source is NFSEG master geodatabase with metered and estimated commercial/industrial/institutional and mining/dewatering water use.
4.) 2020 - 2045 projected surface water demand was interpolated based on 2015 percentages.
5.) The commercial/industrial/institutional and mining/dewatering water use category is not impacted by drought conditions, therefore the 5-in-10 2045 water demand also serves as the 1-in-10 water demand.

Table A-10a (SRWMD - Western Planning Region). 2014-2018 Water Use, Total County Population, and Five-Year Gross Per Capita Averages for Commercial / Industrial / Institutional and Mining / Dewatering Self-supply Water Demand Increases, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Total County Water Use					County Population Within District					2014-2018 Average GPCD	County Population Projections Within District							Increase in County Population Within District						Change in Commercial / Industrial / Institutional and Mining / Dewatering Self-supply Water Demand					
		2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		2015	2020	2025	2030	2035	2040	2045	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2020	2025	2030	2035	2040	2045
Dixie	SRWMD	0.20	0.20	0.21	0.12	0.12	15,066	16,468	15,091	15,076	14,818	11	16,468	16,700	16,900	17,000	17,100	17,100	17,100	232	200	100	100	0	0	0.00	0.00	0.00	0.00	0.00	0.00
Jefferson	SRWMD	0.22	0.16	0.18	0.19	0.17	3,574	4,676	3,554	3,552	3,600	49	4,676	4,717	4,797	4,849	4,876	4,929	4,955	41	80	52	27	53	26	0.00	0.00	0.00	0.00	0.00	0.00
Lafayette	SRWMD	0.32	0.33	0.32	0.33	0.28	6,972	8,664	7,000	7,085	7,094	43	8,664	8,700	9,100	9,400	9,700	9,900	10,100	36	400	300	300	200	200	0.00	0.02	0.01	0.01	0.01	0.01
Levy	SRWMD	0.15	0.16	0.14	0.13	0.13	18,661	18,287	18,697	19,015	18,709	8	18,287	18,581	19,072	19,474	19,787	20,055	20,323	294	491	402	313	268	268	0.00	0.00	0.00	0.00	0.00	0.00
Madison	SRWMD	0.83	1.00	0.87	1.00	0.90	17,663	19,200	17,713	17,704	17,812	51	19,200	19,422	19,722	19,922	20,022	20,222	20,322	222	300	200	100	200	100	0.01	0.02	0.01	0.01	0.01	0.01
Taylor	SRWMD	1.89	0.21	0.21	0.21	0.20	19,760	22,824	19,698	19,866	20,068	27	22,824	22,600	23,200	23,600	24,000	24,300	24,700	-224	600	400	400	300	400	-0.01	0.02	0.01	0.01	0.01	0.01
SRWMD Western Planning Region Total		**3.61**	**2.06**	**1.93**	**1.98**	**1.80**	**81,696**	**90,119**	**81,753**	**82,298**	**82,101**	**27**	**90,119**	**90,720**	**92,791**	**94,245**	**95,485**	**96,506**	**97,500**	**601**	**2,071**	**1,454**	**1,240**	**1,021**	**994**	**0.00**	**0.06**	**0.03**	**0.03**	**0.03**	**0.03**

1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) 2014 - 2018 water use data source is NFSEG master geodatabase with metered and estimated commercial / industrial / institutional and mining / dewatering water use.
4.) 2014 - 2018 population obtained from Technical Staff Reports, BEBR estimates of population, DEP MOR and Basic Facility Report Data, parcel data, published annual reports, and permittee surveys.
5.) Projected population for years 2020 - 2045 are based on BEBR Population Projections: Volume 53, Bulletin 186, Published January 2020, using a parcel population projection model.
6.) Taylor County projections were adjusted to hold pulp, paper mill, and large industrial quantities constant; total water use shown for calculations does not include pulp, paper mill, and large industrial quantities.

Table A-11 (SRWMD - Western Planning Region). Power Generation Self-supply Water use for 2015 and 5-in-10 Year Demand Projections for 2020-2045, by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Non-consumptive Saline and Fresh Surface Water Use Cooling						
		2015			2020			2025			2030			2035			2040			2045										
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		2015	2020	2025	2030	2035	2040	2045
Dixie	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jefferson	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lafayette	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levy	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Madison	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taylor	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SRWMD Western Planning Region Total		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) The power generation water use category is not impacted by drought conditions, therefore the 5-in-10 2045 water demand also serves as the 1-in-10 water demand.
4.) Consumptive surface water is assumed to be 2 percent of total surface water to account for losses.

Table A-12 (SRWMD - Western Planning Region). Public Supply and Domestic Self-supply and Small Public Supply 2015 Water Use, 5-in-10 Year Water Demand Projections for 2020-2045, and 1-in-10 Year Water Demand Projections for 2045, by County, in the Western Planning Region of the Suwannee River Water Management District.

County	District	2015 Water Use			2020 Demand Projections (5-in-10)			2025 Demand Projections (5-in-10)			2030 Demand Projections (5-in-10)			2035 Demand Projections (5-in-10)			2040 Demand Projections (5-in-10)			2045 Demand Projections (5-in-10)			Percent Change 2015-2045			2045 Demand Projections (1-in-10)		
		Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total	Public Supply	Domestic Self-Supply and Small Public Supply	Total
Dixie	SRWMD	0.65	1.21	**1.86**	0.80	1.18	**1.98**	0.84	1.18	**2.02**	0.87	1.19	**2.06**	0.87	1.19	**2.06**	0.87	1.19	**2.06**	0.87	1.19	**2.06**	34%	-2%	**11%**	0.92	1.26	**2.18**
Jefferson	SRWMD	0.00	0.25	**0.25**	0.00	0.25	**0.25**	0.00	0.25	**0.25**	0.00	0.26	**0.26**	0.00	0.26	**0.26**	0.00	0.26	**0.26**	0.00	0.26	**0.26**	N/A	4%	**4%**	0.00	0.28	**0.28**
Lafayette	SRWMD	0.15	0.55	**0.70**	0.16	0.60	**0.76**	0.16	0.64	**0.80**	0.16	0.67	**0.83**	0.16	0.70	**0.86**	0.16	0.72	**0.88**	0.16	0.74	**0.90**	7%	35%	**29%**	0.17	0.78	**0.95**
Levy	SRWMD	0.68	0.92	**1.60**	0.61	0.88	**1.49**	0.62	0.90	**1.52**	0.64	0.92	**1.56**	0.64	0.94	**1.58**	0.65	0.96	**1.61**	0.66	0.98	**1.64**	-3%	7%	**2%**	0.70	1.03	**1.73**
Madison	SRWMD	1.14	0.71	**1.85**	1.27	0.70	**1.97**	1.29	0.71	**2.00**	1.31	0.72	**2.03**	1.31	0.72	**2.03**	1.32	0.73	**2.05**	1.33	0.73	**2.06**	17%	3%	**11%**	1.41	0.77	**2.18**
Taylor	SRWMD	1.74	0.59	**2.33**	1.86	0.60	**2.46**	1.93	0.60	**2.53**	1.96	0.59	**2.55**	1.99	0.59	**2.58**	2.03	0.59	**2.62**	2.06	0.59	**2.65**	18%	0%	**14%**	2.18	0.62	**2.80**
SRWMD Western Planning Region Total		**4.36**	**4.23**	**8.59**	**4.70**	**4.21**	**8.91**	**4.84**	**4.28**	**9.12**	**4.94**	**4.35**	**9.29**	**4.97**	**4.40**	**9.37**	**5.03**	**4.45**	**9.48**	**5.08**	**4.49**	**9.57**	**17%**	**6%**	**11%**	**5.38**	**4.74**	**10.12**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.
3.) Water use for the Public Supply category includes groundwater, surface water, and water from the Other category.

Table A-13 (15 - Dixie County). Water Use for 2015 and 5-in-10 Year Total Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045, by Category of Use in Dixie County in the Suwannee River Water Management District for the Western Planning Region.

Category	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Public Supply	SRWMD	0.65	0.00	**0.65**	0.80	0.00	**0.80**	0.84	0.00	**0.84**	0.87	0.00	**0.87**	0.87	0.00	**0.87**	0.87	0.00	**0.87**	0.87	0.00	**0.87**	34%	0.92	0.00	**0.92**
Domestic Self-supply and Small Public Supply Systems	SRWMD	1.21	0.00	**1.21**	1.18	0.00	**1.18**	1.18	0.00	**1.18**	1.19	0.00	**1.19**	1.19	0.00	**1.19**	1.19	0.00	**1.19**	1.19	0.00	**1.19**	-2%	1.26	0.00	**1.26**
Agricultural Irrigation Self-supply	SRWMD	6.81	0.00	**6.81**	5.56	0.00	**5.56**	6.01	0.00	**6.01**	6.45	0.00	**6.45**	6.86	0.00	**6.86**	7.36	0.00	**7.36**	7.73	0.00	**7.73**	14%	9.97	0.00	**9.97**
Landscape / Recreational Self-supply	SRWMD	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0.12	0.00	**0.12**	0%	0.12	0.00	**0.12**
Commercial / Industrial / Institutional Self-supply	SRWMD	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0.20	0.00	**0.20**	0%	0.20	0.00	**0.20**
Power Generation Self-supply	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	**0.00**
Dixie County Total		**8.99**	**0.00**	**8.99**	**7.86**	**0.00**	**7.86**	**8.35**	**0.00**	**8.35**	**8.83**	**0.00**	**8.83**	**9.24**	**0.00**	**9.24**	**9.74**	**0.00**	**9.74**	**10.11**	**0.00**	**10.11**	**12%**	**12.47**	**0.00**	**12.47**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-13 (16 - Jefferson County). Water Use for 2015 and 5-in-10 Year Total Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045, by Category of Use in Jefferson County in the Suwannee River Water Management District for the Western Planning Region.

Category	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Public Supply	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	**0.00**
Domestic Self-supply and Small Public Supply Systems	SRWMD	0.25	0.00	**0.25**	0.25	0.00	**0.25**	0.25	0.00	**0.25**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	0.26	0.00	**0.26**	4%	0.28	0.00	**0.28**
Agricultural Irrigation Self-supply	SRWMD	3.27	0.02	**3.29**	2.72	0.02	**2.74**	2.73	0.02	**2.75**	2.74	0.02	**2.76**	2.77	0.02	**2.79**	2.78	0.02	**2.80**	2.81	0.02	**2.83**	-14%	3.44	0.02	**3.46**
Landscape / Recreational Self-supply	SRWMD	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0.09	0.00	**0.09**	0%	0.12	0.00	**0.12**
Commercial / Industrial / Institutional Self-supply	SRWMD	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0%	0.16	0.00	**0.16**
Power Generation Self-supply	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	**0.00**
Jefferson County Total		**3.77**	**0.02**	**3.79**	**3.22**	**0.02**	**3.24**	**3.23**	**0.02**	**3.25**	**3.25**	**0.02**	**3.27**	**3.28**	**0.02**	**3.30**	**3.29**	**0.02**	**3.31**	**3.32**	**0.02**	**3.34**	**-12%**	**4.00**	**0.02**	**4.02**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-13 (17 - Lafayette County). Water Use for 2015 and 5-in-10 Year Total Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045, by Category of Use in Lafayette County in the Suwannee River Water Management District for the Western Planning Region.

Category	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Public Supply	SRWMD	0.15	0.00	**0.15**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	0.16	0.00	**0.16**	7%	0.17	0.00	**0.17**
Domestic Self-supply and Small Public Supply Systems	SRWMD	0.55	0.00	**0.55**	0.60	0.00	**0.60**	0.64	0.00	**0.64**	0.67	0.00	**0.67**	0.70	0.00	**0.70**	0.72	0.00	**0.72**	0.74	0.00	**0.74**	35%	0.78	0.00	**0.78**
Agricultural Irrigation Self-supply	SRWMD	11.76	0.00	**11.76**	11.40	0.00	**11.40**	12.43	0.00	**12.43**	13.36	0.00	**13.36**	14.27	0.00	**14.27**	15.30	0.00	**15.30**	16.23	0.00	**16.23**	38%	20.50	0.00	**20.50**
Landscape / Recreational Self-supply	SRWMD	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0.06	0.00	**0.06**	0%	0.06	0.00	**0.06**
Commercial / Industrial / Institutional Self-supply	SRWMD	0.33	0.00	**0.33**	0.33	0.00	**0.33**	0.35	0.00	**0.35**	0.36	0.00	**0.36**	0.37	0.00	**0.37**	0.38	0.00	**0.38**	0.39	0.00	**0.39**	18%	0.39	0.00	**0.39**
Power Generation Self-supply	SRWMD	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	N/A	0.00	0.00	**0.00**
Lafayette County Total		**12.85**	**0.00**	**12.85**	**12.55**	**0.00**	**12.55**	**13.64**	**0.00**	**13.64**	**14.61**	**0.00**	**14.61**	**15.56**	**0.00**	**15.56**	**16.62**	**0.00**	**16.62**	**17.58**	**0.00**	**17.58**	**37%**	**21.90**	**0.00**	**21.90**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-13 (18 - Levy County). Water Use for 2015 and 5-in-10 Year Total Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045, by Category of Use in Levy County in the Suwannee River Water Management District for the Western Planning Region.

Category	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Public Supply	SRWMD	0.68	0.00	0.68	0.61	0.00	0.61	0.62	0.00	0.62	0.64	0.00	0.64	0.64	0.00	0.64	0.65	0.00	0.65	0.66	0.00	0.66	-3%	0.70	0.00	0.70
Domestic Self-supply and Small Public Supply Systems	SRWMD	0.92	0.00	0.92	0.88	0.00	0.88	0.90	0.00	0.90	0.92	0.00	0.92	0.94	0.00	0.94	0.96	0.00	0.96	0.98	0.00	0.98	7%	1.03	0.00	1.03
Agricultural Irrigation Self-supply	SRWMD	14.80	0.00	14.80	14.28	0.00	14.28	15.76	0.00	15.76	17.14	0.00	17.14	18.36	0.00	18.36	19.75	0.00	19.75	20.96	0.00	20.96	42%	26.53	0.00	26.53
Landscape / Recreational Self-supply	SRWMD	0.21	0.00	0.21	0.21	0.00	0.21	0.22	0.00	0.22	0.22	0.00	0.22	0.22	0.00	0.22	0.22	0.00	0.22	0.22	0.00	0.22	5%	0.25	0.00	0.25
Commercial / Industrial / Institutional Self-supply	SRWMD	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0%	0.16	0.00	0.16
Power Generation Self-supply	SRWMD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	0.00	0.00	0.00
Levy County Total		**16.77**	**0.00**	**16.77**	**16.14**	**0.00**	**16.14**	**17.66**	**0.00**	**17.66**	**19.08**	**0.00**	**19.08**	**20.32**	**0.00**	**20.32**	**21.74**	**0.00**	**21.74**	**22.98**	**0.00**	**22.98**	**37%**	**28.67**	**0.00**	**28.67**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-13 (19 - Madison County). Water Use for 2015 and 5-in-10 Year Total Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045, by Category of Use in Madison County in the Suwannee River Water Management District for the Western Planning Region.

Category	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Public Supply	SRWMD	1.14	0.00	1.14	1.27	0.00	1.27	1.29	0.00	1.29	1.31	0.00	1.31	1.31	0.00	1.31	1.32	0.00	1.32	1.33	0.00	1.33	17%	1.41	0.00	1.41
Domestic Self-supply and Small Public Supply Systems	SRWMD	0.71	0.00	0.71	0.70	0.00	0.70	0.71	0.00	0.71	0.72	0.00	0.72	0.72	0.00	0.72	0.73	0.00	0.73	0.73	0.00	0.73	3%	0.77	0.00	0.77
Agricultural Irrigation Self-supply	SRWMD	20.87	0.00	20.87	21.50	0.00	21.50	22.43	0.00	22.43	23.20	0.00	23.20	24.12	0.00	24.12	25.06	0.00	25.06	26.03	0.00	26.03	25%	33.01	0.00	33.01
Landscape / Recreational Self-supply	SRWMD	0.32	0.00	0.32	0.32	0.00	0.32	0.33	0.00	0.33	0.33	0.00	0.33	0.33	0.00	0.33	0.33	0.00	0.33	0.33	0.00	0.33	3%	0.35	0.00	0.35
Commercial / Industrial / Institutional Self-supply	SRWMD	1.00	0.00	1.00	1.01	0.00	1.01	1.03	0.00	1.03	1.04	0.00	1.04	1.05	0.00	1.05	1.06	0.00	1.06	1.07	0.00	1.07	7%	1.07	0.00	1.07
Power Generation Self-supply	SRWMD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	0.00	0.00	0.00
Madison County Total		**24.04**	**0.00**	**24.04**	**24.80**	**0.00**	**24.80**	**25.79**	**0.00**	**25.79**	**26.60**	**0.00**	**26.60**	**27.53**	**0.00**	**27.53**	**28.50**	**0.00**	**28.50**	**29.49**	**0.00**	**29.49**	**23%**	**36.61**	**0.00**	**36.61**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-13 (20 - Taylor County). Water Use for 2015 and 5-in-10 Year Total Water Demand Projections for 2020-2045 and 1-in-10 Year Water Demand Projections for 2045, by Category of Use in Taylor County in the Suwannee River Water Management District for the Western Planning Region.

Category	District	Water Use			Demand Projections (5-in-10)																		Percent Change 2015-2045	Demand Projections (1-in-10)		
		2015			2020			2025			2030			2035			2040			2045				2045		
		Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total	Ground	Surface	Total		Ground	Surface	Total
Public Supply	SRWMD	1.74	0.00	1.74	1.86	0.00	1.86	1.93	0.00	1.93	1.96	0.00	1.96	1.99	0.00	1.99	2.03	0.00	2.03	2.06	0.00	2.06	18%	2.18	0.00	2.18
Domestic Self-supply and Small Public Supply Systems	SRWMD	0.59	0.00	0.59	0.60	0.00	0.60	0.60	0.00	0.60	0.59	0.00	0.59	0.59	0.00	0.59	0.59	0.00	0.59	0.59	0.00	0.59	0%	0.62	0.00	0.62
Agricultural Irrigation Self-supply	SRWMD	0.46	0.00	0.46	0.52	0.00	0.52	0.51	0.00	0.51	0.51	0.00	0.51	0.50	0.00	0.50	0.50	0.00	0.50	0.49	0.00	0.49	7%	0.64	0.00	0.64
Landscape / Recreational Self-supply	SRWMD	0.35	0.00	0.35	0.35	0.00	0.35	0.36	0.00	0.36	0.37	0.00	0.37	0.38	0.00	0.38	0.38	0.00	0.38	0.39	0.00	0.39	11%	0.44	0.00	0.44
Commercial / Industrial / Institutional Self-supply	SRWMD	39.50	0.17	39.67	39.49	0.17	39.66	39.51	0.17	39.68	39.52	0.17	39.69	39.53	0.17	39.70	39.54	0.17	39.71	39.55	0.17	39.72	0%	39.55	0.17	39.72
Power Generation Self-supply	SRWMD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	0.00	0.00	0.00
Taylor County Total		**42.64**	**0.17**	**42.81**	**42.82**	**0.17**	**42.99**	**42.91**	**0.17**	**43.08**	**42.95**	**0.17**	**43.12**	**42.99**	**0.17**	**43.16**	**43.04**	**0.17**	**43.21**	**43.08**	**0.17**	**43.25**	**1%**	**43.43**	**0.17**	**43.60**

Notes:
1.) All water use is shown in million gallons per day.
2.) Rounding errors account for nominal discrepancies.

Table A-14. 2045 Reclaimed Water Projections Using 2018 Percent Beneficial Utilization for the WWSP.

County	District	Waste Water Treatment Facility Name	Reuse System Name	WAFR ID	PAA	2018	Associated CUP	2018 Total Facility Treatment Flow	2018 Total Beneficial Reuse	Potential Existing Additional Reclaimed Water for Reuse	2018 Population	2045 Population	2045 Additional Population Hooked up to Sewer System	2045 New Waste Water Flow	2045 Potential New Additional Reclaimed Water for Reuse	2045 Total Potential Additional Reclaimed Water for Reuse	2045 Total Facility Treatment Flow	2018 Percent Utilization
Dixie	SRWMD	Cross City WWTF	Cross City WWTF	FL0027791	Yes	High	216823	0.28	0.52	-0.43	1,696	2,267	542	0.04	0.07	-0.36	0.32	184%
Dixie County - SRWMD Total								**0.28**	**0.52**	**-0.43**	**1,696**	**2,267**	**542**	**0.04**	**0.07**	**-0.36**	**0.32**	**184%**
Jefferson	SRWMD	Jefferson Correctional Institution	Jefferson Correctional Institution	FLA011642	Yes	High	N/A	0.15	0.16	-0.01	0	0	N/A	0.00	0.00	-0.01	0.15	103%
Jefferson County - SRWMD Total								**0.15**	**0.16**	**-0.01**	**0**	**0**	**N/A**	**0.00**	**0.00**	**-0.01**	**0.15**	**103%**
Lafayette	SRWMD	Mayo WWTF	Mayo, Town of	FLA011643	No	Basic	216851	0.08	0.08	0.00	1,208	1,214	6	0.00	0.00	0.00	0.08	100%
Lafayette	SRWMD	Mayo Correctional Institution	Mayo Correctional Institution	FLA011646	No	Basic	N/A	0.12	0.12	0.00	0	0	N/A	0.00	0.00	0.00	0.12	100%
Lafayette County - SRWMD Total								**0.20**	**0.20**	**0.00**	**1,208**	**1,214**	**6**	**0.00**	**0.00**	**0.00**	**0.20**	**100%**
Levy	SRWMD	Cedar Key WRF	Cedar Key	FL0031216	Yes	High	216821	0.09	0.09	0.00	2,304	2,304	0	0.00	0.00	0.00	0.09	100%
Levy	SRWMD	Chiefland WWTF	Chiefland	FLA011648	No	Basic	216826	0.24	0.24	0.00	2,229	2,651	401	0.03	0.03	0.03	0.27	100%
Levy County - SRWMD Total								**0.33**	**0.33**	**0.00**	**4,533**	**4,955**	**401**	**0.03**	**0.03**	**0.03**	**0.36**	**100%**
Madison	SRWMD	Greenville, Town of	Greenville, Town of	FLA011658	No	Basic	217127	0.09	0.09	0.00	796	796	0	0.00	0.00	0.00	0.09	100%
Madison	SRWMD	Madison, City of	Madison, City of	FLA116572	No	Basic	216506	0.72	0.72	0.00	3,969	4,200	219	0.02	0.02	0.02	0.74	100%
Madison County - SRWMD Total								**0.82**	**0.82**	**0.00**	**4,765**	**4,996**	**219**	**0.02**	**0.02**	**0.02**	**0.83**	**100%**
Taylor	SRWMD	Perry, City of	Perry, City of	FL0026387	Yes	High	216835	0.94	0.94	0.00	6,919	6,919	0	0.00	0.00	0.00	0.94	100%
Taylor	SRWMD	Taylor Correctional Institution	Taylor Correctional Institution	FLA011831	No	Basic	N/A	0.16	0.16	0.00	0	0	N/A	0.00	0.00	0.00	0.16	100%
Taylor County - SRWMD Total								**1.10**	**1.10**	**0.00**	**6,919**	**6,919**	**0**	**0.00**	**0.00**	**0.00**	**1.10**	**100%**
Total								**2.87**	**3.12**	**-0.44**	**19,121**	**20,351**	**1,169**	**0.09**	**0.12**	**-0.32**	**2.96**	**108%**

Notes:

1.) All estimates of reclaimed water and reuse flow are shown in million gallons per day.
2.) Rounding anomalies account for nominal discrepancies.
3.) 2018 Total facility treatment flow obtained from DEP 2018 Annual Reuse Inventory.
4.) Beneficial reuse consists of 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 and as such does not match DEP's broader definition of reuse.
5.) Potential existing additional reclaimed water for reuse calculated using the 2018 percent beneficial utilization of the 2018 total facility treatment flow minus the 2018 total beneficial reuse.
6.) Additional population hooked up to the sewer system calculated as 95 percent of the additional population growth within a service area from 2018 to 2045.
7.) New waste water flow calculated as additional population hooked up to the sewer system times 73 gpcd (58.6 gpcd for residential flow, AWWA indoor standard and 15 gpcd for commercial flow, National Engineering Handbook per employee).
8.) Potential new additional reclaimed water for reuse calculated using the 2018 percent beneficial utilization of the new waste water flow.
9.) Total potential additional reclaimed water for reuse calculated as potential existing additional reclaimed water for reuse plus potential new additional reclaimed water for reuse.
10.) 2045 Total facility treatment flow calculated as 2018 total facility treatment flow plus 2045 new waste water flow.
11.) Projections are grouped by population expected to growth within a public supply service area. Therefore, the projections by wastewater facility (WWTF) may not be specific to the WWTF, but as the region as a whole.
12.) Projections are not included for those service areas that do not currently have waste water treatment facilities.

Table A-15. 2045 Reclaimed Water Projections Using 75 Percent Beneficial Utilization for the WWSP.

County	District	Waste Water Treatment Facility Name	Reuse System Name	WAFR ID	PAA	2018	Associated CUP	2018 Total Facility Treatment Flow	2018 Total Beneficial Reuse	Potential Existing Additional Reclaimed Water for Reuse	2018 Population	2045 Population	2045 Additional Population Hooked up to Sewer System	2045 New Waste Water Flow	2045 Potential New Additional Reclaimed Water for Reuse	2045 Total Potential Additional Reclaimed Water for Reuse	2045 Total Facility Treatment Flow	At least 75% Utilization
Dixie	SRWMD	Cross City WWTF	Cross City WWTF	FL0027791	Yes	High	216823	0.28	0.52	-0.18	1,696	2,267	542	0.04	0.03	**-0.15**	0.32	75%
Dixie County - SRWMD Total								**0.28**	**0.52**	**-0.18**	**1,696**	**2,267**	**542**	**0.04**	**0.03**	**-0.15**	**0.32**	**75%**
Jefferson	SRWMD	Jefferson Correctional Institution	Jefferson Correctional Institution	FLA011642	Yes	High	N/A	0.15	0.16	0.00	0	0	N/A	0.00	0.00	**0.00**	0.15	75%
Jefferson County - SRWMD Total								**0.15**	**0.16**	**0.00**	**0**	**0**	**N/A**	**0.00**	**0.00**	**0.00**	**0.15**	**75%**
Lafayette	SRWMD	Mayo WWTF	Mayo, Town of	FLA011643	No	Basic	216851	0.08	0.08	0.00	1,208	1,214	6	0.00	0.00	**0.00**	0.08	75%
Lafayette	SRWMD	Mayo Correctional Institution	Mayo Correctional Institution	FLA011646	No	Basic	N/A	0.12	0.12	0.00	0	0	N/A	0.00	0.00	**0.00**	0.12	75%
Lafayette County - SRWMD Total								**0.20**	**0.20**	**0.00**	**1,208**	**1,214**	**6**	**0.00**	**0.00**	**0.00**	**0.20**	**75%**
Levy	SRWMD	Cedar Key WRF	Cedar Key	FL0031216	Yes	High	216821	0.09	0.09	0.00	2,304	2,304	0	0.00	0.00	**0.00**	0.09	75%
Levy	SRWMD	Chiefland WWTF	Chiefland	FLA011648	No	Basic	216826	0.24	0.24	0.00	2,229	2,651	401	0.03	0.02	**0.02**	0.27	75%
Levy County - SRWMD Total								**0.33**	**0.33**	**0.00**	**4,533**	**4,955**	**401**	**0.03**	**0.02**	**0.02**	**0.36**	**75%**
Madison	SRWMD	Greenville, Town of	Greenville, Town of	FLA011658	No	Basic	217127	0.09	0.09	0.00	796	796	0	0.00	0.00	**0.00**	0.09	75%
Madison	SRWMD	Madison, City of	Madison, City of	FLA116572	No	Basic	216506	0.72	0.72	0.00	3,969	4,200	219	0.02	0.01	**0.01**	0.74	75%
Madison County - SRWMD Total								**0.82**	**0.82**	**0.00**	**4,765**	**4,996**	**219**	**0.02**	**0.01**	**0.01**	**0.83**	**75%**
Taylor	SRWMD	Perry, City of	Perry, City of	FL0026387	Yes	High	216835	0.94	0.94	0.00	6,919	6,919	0	0.00	0.00	**0.00**	0.94	75%
Taylor	SRWMD	Taylor Correctional Institution	Taylor Correctional Institution	FLA011831	No	Basic	N/A	0.16	0.16	0.00	0	0	N/A	0.00	0.00	**0.00**	0.16	75%
Taylor County - SRWMD Total								**1.10**	**1.10**	**0.00**	**6,919**	**6,919**	**0**	**0.00**	**0.00**	**0.00**	**1.10**	**75%**
Total								**2.87**	**3.12**	**-0.18**	**19,121**	**20,351**	**1,169**	**0.09**	**0.06**	**-0.12**	**2.96**	**75%**

Notes:
1.) All estimates of reclaimed water and reuse flow are shown in million gallons per day.
2.) Rounding anomalies account for nominal discrepancies.
3.) 2018 Total facility treatment flow obtained from DEP 2018 Annual Reuse Inventory.
4.) Beneficial reuse for SRWMD consists of 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 and as such does not match DEP's broader definition of reuse.
5.) Potential existing additional reclaimed water for reuse calculated using 75 percent beneficial utilization of the 2018 total facility treatment flow minus the 2018 total beneficial reuse.
6.) Additional population hooked up to the sewer system calculated as 95 percent of the additional population growth within a service area from 2018 to 2045.
7.) New waste water flow calculated as additional population hooked up to the sewer system times 73 gpcd (58.6 gpcd for residential flow, AWWA indoor standard and 15 gpcd for commercial flow, National Engineering Handbook per employee).
8.) Potential new additional reclaimed water for reuse calculated using 75 percent beneficial utilization of the new waste water flow.
9.) Total potential additional reclaimed water for reuse calculated as potential existing additional reclaimed water for reuse plus potential new additional reclaimed water for reuse.
10.) 2045 Total facility treatment flow calculated as 2018 total facility treatment flow plus 2045 new waste water flow.
11.) Projections are grouped by population expected to growth within a public supply service area. Therefore, the projections by wastewater facility (WWTF) may not be specific to the WWTF, but as the region as a whole.
12.) Projections are not included for those service areas that do not currently have waste water treatment facilities.

Table A-16. 2045 Reclaimed Water Projections for the Western Planning Region area of the Suwannee River Water Management District.

County	District	Estimates Using WWTF 2018 Percent Beneficial Utilization Rate							Estimates Using DEP Beneficial Utilization Rate of 75 Percent						
		2018 Total Facility Treatment Flow	2018 Total Beneficial Reuse	Potential Existing Additional Reclaimed Water for Reuse	2045 New Waste Water Flow	2045 Potential New Additional Reclaimed Water for Reuse	2045 Total Potential Additional Reclaimed Water for Reuse	2045 Total Facility Treatment Flow	2018 Total Facility Treatment Flow	2018 Total Beneficial Reuse	Potential Existing Additional Reclaimed Water for Reuse	2045 New Waste Water Flow	2045 Potential New Additional Reclaimed Water for Reuse	2045 Total Potential Additional Reclaimed Water for Reuse	2045 Total Facility Treatment Flow
Dixie	SRWMD	0.28	0.52	-0.43	0.04	0.07	-0.36	0.32	0.28	0.52	-0.18	0.04	0.03	-0.15	0.32
Jefferson	SRWMD	0.15	0.16	-0.01	0.00	0.00	-0.01	0.15	0.15	0.16	0.00	0.00	0.00	0.00	0.15
Lafayette	SRWMD	0.20	0.20	0.00	0.00	0.00	0.00	0.20	0.20	0.20	0.00	0.00	0.00	0.00	0.20
Levy	SRWMD	0.33	0.33	0.00	0.03	0.03	0.03	0.36	0.33	0.33	0.00	0.03	0.02	0.02	0.36
Madison	SRWMD	0.82	0.82	0.00	0.02	0.02	0.02	0.83	0.82	0.82	0.00	0.02	0.01	0.01	0.83
Taylor	SRWMD	1.10	1.10	0.00	0.00	0.00	0.00	1.10	1.10	1.10	0.00	0.00	0.00	0.00	1.10
Western Planning Region Total		**2.87**	**3.12**	**-0.44**	**0.09**	**0.12**	**-0.32**	**2.96**	**2.87**	**3.12**	**-0.18**	**0.09**	**0.06**	**-0.12**	**2.96**

Notes:

1.) All estimates of reclaimed water and reuse flow are shown in million gallons per day.
2.) Rounding anomalies account for nominal discrepancies.
3.) 2018 Total facility treatment flow obtained from DEP 2018 Annual Reuse Inventory.
4.) Beneficial reuse for SJRWMD and SRWMD consists of 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 and as such does not match DEP's broader definition of reuse.
5.) Total potential additional reclaimed water for reuse calculated as potential existing additional reclaimed water for reuse plus potential new additional reclaimed water for reuse.
6.) 2045 Total facility treatment flow calculated as 2018 total facility treatment flow plus 2045 new waste water flow.
7.) Projections are not included for those service areas that do not currently have waste water treatment facilities.

Table A-17. First Scenario of Potential Water Conservation for the Western Planning Region of the Suwannee River Water Management District.

Category	District	Projected 2045 Water Demand	First Conservation Scenario	
			Percent Conservation	Projected 2045 Water Conservation
Public Supply	SRWMD	5.08	7.0%	0.36
Domestic Self-supply and Small Public Supply Systems	SRWMD	4.49	3.5%	0.16
Agricultural Irrigation Self-supply	SRWMD	74.27	N/A	11.79 *
Landscape / Recreational Self-supply	SRWMD	1.22	4.7%	0.06
Commercial / Industrial / Institutional Self-supply	SRWMD	41.75	2.2%	0.92
Power Generation Self-supply	SRWMD	0.00	13.8%	0.00
SRWMD Western Planning Region Total		**126.81**	**31.2%**	**13.28**

Notes:

1.) First Conservation Scenario - Percent of potential conservation for public supply, domestic self-supply, landscape/recreational self-supply, commercial/industrial/institutional self-supply, and power generation self-supply were based on the 2020 CFWI estimated percent savings.

2.) First Conservation Scenario - Agriculture is based on the Florida Department of Agriculture and Consumer Services Florida Statewide Agricultural Irrigation Demand VII Balmoral deliverable.

3.) Projected 2045 water demand and 2045 conservation potential are shown in million gallons per day.

*Interactive FSAID Power BI Conservation Slide 5
https://app.powerbi.com/view?r=eyJrIjoiNzBkZmI0YjYtYThjYi00OWY0LTllZjgtNTk1NTNjNjRmYTMxIiwidCI6ImNkZjIwZmQ4LTUzYzgtNDA5ZC1hZDViLTM4NDVmNjJiYWY2ZCIsImMiOjJ9

Table A-18. Average Gross Per Capita Scenario for Potential Public Supply Conservation in in the Western Planning Region of the Suwannee River Water Management District.

County	Utility	Permit Number	2045 Population Projection	2045 Water Demand Projection	Utility-Level 2014-2018 Average Gross Per Capita	2014-2018 Average Gross Per Capita for Part II	New 2045 Water Demand if Utility-Level Average Gross Per Capita is limited to the Average Gross for Part II	Potential Reduction in 2045 Water Demand	Potential Reduction in 2045 Water Demand (Percent)
Dixie - SRWMD	Town of Cross City	216823	2,267	0.75	331	174	0.39	-0.36	-47.4%
	Town of Suwannee	216831	302	0.07	239	174	0.05	-0.02	-24.9%
	Town of Horseshoe Beach	217129	167	0.05	276	174	0.03	-0.02	-41.9%
	NCRWA Old Town (Also in Gilchrist and Levy)	220310	425	0.00	0	174	0.00	N/A	N/A
	SRWMD Dixie Total		**3,161**	**0.87**	**N/A**	**174**	**0.48**	**-0.39**	**-45.3%**
Jefferson - SRWMD	Jefferson Communities Water System Inc.	218662	644	0.00	N/A	174	0.00	**N/A**	**N/A**
	SRWMD Jefferson Total		**644**	**0.00**	**N/A**	**174**	**0.00**	**N/A**	**N/A**
Lafayette - SRWMD	Town of Mayo	216851	1,214	0.16	133	174	0.16	0.00	0.0%
	SRWMD Lafayette Total		**1,214**	**0.16**	**N/A**	**174**	**0.16**	**0.00**	**0.0%**
Levy - SRWMD	Cedar Key SP Water & Sewer District	216821	2,304	0.13	58	174	0.13	0.00	0.0%
	City of Chiefland	216826	2,651	0.36	135	174	0.36	0.00	0.0%
	Town of Bronson	216830	1,133	0.15	132	174	0.15	0.00	0.0%
	City of Fanning Springs (Also in Dixie and Gilchrist)	220310	177	0.02	94	174	0.02	0.00	0.0%
	SRWMD Levy Total		**6,265**	**0.66**	**N/A**	**174**	**0.66**	**0.00**	**0.0%**
Madison - SRWMD	City of Madison	216506	4,200	1.10	263	174	0.73	-0.37	-33.6%
	Town of Greenville	217127	796	0.11	142	174	0.11	0.00	0.0%
	Town of Lee	218663	346	0.07	208	174	0.06	-0.01	-14.0%
	Cherry Lake Utilities Corporation Inc.	219588	664	0.05	81	174	0.05	0.00	0.0%
	SRWMD Madison Total		**6,006**	**1.33**	**N/A**	**174**	**0.95**	**-0.38**	**-28.5%**
Taylor - SRWMD	City of Perry	216835	6,919	1.49	215	174	1.20	-0.29	-19.2%
	Big Bend Water Authority	220484	5,289	0.50	95	174	0.50	0.00	0.0%
	Taylor Coastal	221166	1,623	0.07	41	174	0.07	0.00	0.0%
	SRWMD Taylor Total		**13,831**	**2.06**	**N/A**	**174**	**1.77**	**-0.29**	**-13.9%**
Region II Total			**31,121**	**5.08**	**N/A**	**N/A**	**4.02**	**-1.06**	**-20.8%**
		Part II 2014-2018 Average Gross Per Capita			**174**				

Notes:
1.) Projected 2045 water demand and potential reduction is shown in million gallons per day.

Table A-19. Range of Potential Water Conservation for the Western Planning Region of the Suwannee River Water Management District.

County	Category	Projected 2045 Water Demand	Second Conservation Scenario	
			Percent Conservation	Projected 2045 Water Conservation
Dixie - SRWMD	Public Supply	0.87	45.28%	0.39
	Domestic Self-supply and Small Public Supply Systems	1.19	45.28%	0.54
	Total	**2.06**	**45.28%**	**0.93**
Jefferson - SRWMD	Public Supply	0.00	N/A	N/A
	Domestic Self-supply and Small Public Supply Systems	0.26	N/A	N/A
	Total	**0.26**	**0.00%**	**0.00**
Lafayette - SRWMD	Public Supply	0.16	0.00%	0.00
	Domestic Self-supply and Small Public Supply Systems	0.74	0.00%	0.00
	Total	**0.90**	**0.00%**	**0.00**
Levy - SRWMD	Public Supply	0.66	0.00%	0.00
	Domestic Self-supply and Small Public Supply Systems	0.98	0.00%	0.00
	Total	**1.64**	**0.00%**	**0.00**
Madison - SRWMD	Public Supply	1.33	28.50%	0.38
	Domestic Self-supply and Small Public Supply Systems	0.73	28.50%	0.21
	Total	**2.06**	**28.50%**	**0.59**
Taylor - SRWMD	Public Supply	2.06	13.89%	0.29
	Domestic Self-supply and Small Public Supply Systems	0.59	13.89%	0.08
	Total	**2.65**	**13.89%**	**0.37**
Western Planning Region Total	**Public Supply**	**5.08**	**20.85%**	**1.06**
	Domestic Self-supply and Small Public Supply Systems	**4.49**	**18.46%**	**0.83**
	Total	**9.57**	**19.73%**	**1.89**

Notes:
1.) Second Conservation Scenario - Public supply is based on savings achieved if each Part 2014-2018 average gross per capita rate was met by respective utilities. The same percent savings are applied to the domestic self-supply category.
2.) Projected 2045 water demand and 2045 water conservation potential is shown in million gallons per day.

Population Estimation and Projection Technical Memorandum (2014-2018)

Overview

The Suwannee River Water Management District (SRWMD) estimated population for 2014-2018 and developed population projections from 2020-2045 which will be used for upcoming water supply planning efforts. Estimating an accurate population for the SRWMD is important for planning purposes because it forms the foundation of estimating and projecting water use for different categories within each county. This technical memorandum provides information on the data sources used, methodology and results of the population estimation process.

Data

This section explains the data that were used to estimate population, where the data came from, and how or why data were used.

Bureau of Economic and Business Research (BEBR)

BEBR publishes estimates of population and persons per household in Florida on a county-wide basis. These data are updated and published annually. They also publish population projections by county on a 25-year planning horizon. The SRWMD uses the annual and projected populations (medium series) to estimate population. Additional data sources described below are used to estimate residential populations within the county as well as prepare estimates of residential population on public supply versus self-supply.

Public Supply Utility Data

The SRWMD sent out a public supply (PS) data request in October 2019 to utilities inquiring about estimated population served by the utility, annual water use by category (residential, commercial, institutional, other), water connections by category, per capita rates (if known), and any additional information related to public supply service area boundaries (PSAB) and/or water lines. These data were used to estimate the 2018 residential population being served by the utility's water system and to calculate gross and residential per capita rates.

Public Supply Service Area Boundary (PSAB)

The SRWMD used the existing PSAB data collected for the 2017 North Florida Regional Water Supply Partnership (NFRWSP) Plan and made updates to the boundaries based on information provided by utilities. These data are in a shapefile format and show the extent of public supply service areas. The boundaries are used to estimate the potential served population. The potential served population is estimated to evaluate the maximum number of people that could be served by the utility using parcel data and published estimates of persons per household. This estimate is used to project population growth within the county.

Parcel Layer

The parcel layer data originates from each individual county property appraiser and is sent to the Florida Department of Revenue (FDOR) once a year. The SRWMD's contractors, Quantum Spatial and Panda Consultants, gather the data from the FDOR, compile it, and deliver it back to the SRWMD. Later in the year, they make updates from data received from each property appraiser. All water management districts (districts) individually contract with Quantum Spatial who uses Panda Consultants to process the data. All districts use the same specifications to ensure a consistent and complete dataset. The SRWMD used these data to estimate population served where utility data was not available, to estimate population distribution within counties served by two districts, and to calculate the potential served population inside of a PSAB.

Methodology

This section describes the methods used for estimating split counties, or counties that are shared with adjacent water management districts, as well as estimating served, non-served, institutional, and projected population.

Total County-wide Population

The BEBR county-wide population estimates, without institutional population, for 2014-2018 were used for the estimation of the total residential population (BEBR 2014, 2015, 2016, 2017, 2018). For split counties in the Western Region, a percent share was used to calculate the total population residing in the SRWMD's portion of the county.

Split Counties

The SRWMD shares five counties with adjacent districts. These counties are Alachua, Baker, Bradford, Jefferson, and Levy counties. For counties in the NFRWSP area, population estimates and projections for Alachua, Baker, and Bradford counties were developed in coordination with the St. Johns River Water Management District (SJRWMD). The total county-wide population estimates came from BEBR. The population model created by the SJRWMD was applied to estimate the population in the SJRWMD portion of NFRWSP counties for 2014-2018. The remainder of the population was assumed to be residing in the SRWMD's portion of shared counties.

For counties that are not located in the NFRWSP area, the SRWMD used the parcel layer to calculate the percent of dwelling units located in the SRWMD's portion of the counties. These counties include Jefferson and Levy counties. The percent share was calculated by taking the number of dwelling units in the SRWMD's portion of the county, dividing it by the total number of dwelling units in the county, and multiplying it by 100. For SRWMD planning efforts, this percent share was calculated annually for 2014-2018 to consider any shifts in dwelling units.

Public Supply and Small Public Supply (Served Population)

The served population is defined as the number of people receiving their water use from a public supply utility. The served population for 2018 was provided by many utilities from the public supply utility data request. For utilities that did not have an estimate of their served population, the SRWMD estimated the population by using the number of residential connections reported by the utility in the 2018 data request and multiplied them by BEBR's estimated persons per household for the corresponding county in which the public supply utility was located.

The potential served population was calculated to estimate the number of people served by a public supply utility from 2014-2017. The potential served population was estimated to evaluate the maximum number of people that could be served by the utility using parcel data and published estimates of persons per household. To calculate the potential served population, the number of residential dwelling units in a PSAB was multiplied by BEBR's estimated persons per household for the corresponding county and year. The percent change of potential served from one year to the next was used to estimate the served population from 2014-2017. To calculate the served population, the potential served population estimates for a given year were divided by the 2018 potential served population and multiplied by the 2018 utility reported population. Below shows an example of the formula used to calculate the served population for 2017.

$$2017\ served\ population = \frac{2017\ potential\ served}{2018\ potential\ served}\ X\ 2018\ utility\ reported\ population$$

There are two utilities for which additional data was used to estimate the served population. First, the City of Lake City provided additional data on residential connections that was used to calculate the served population for 2015-2018. The number of residential connections was multiplied by an estimate of 2.5 persons per household.

The second utility that provided additional information was Jefferson Communities Water System (JCWS). JCWS has two different systems located in the SRWMD; the Lloyd system which is split between the SRWMD and the Northwest Florida Water Management District (NWFWMD), and the Lamont system which is wholly encompassed in the SRWMD. To estimate the served population for Lloyd portion of JCWS, the SRWMD calculated the percent of parcels in the PSAB that fell within the SRWMD boundary. The 2018 served population was then multiplied by this percent to estimate the 2018 population served in the SRWMD's portion of the Lloyd system. The formula above was then used to estimate the served population for 2014-2017. JCWS provided estimates of population served for the Lamont system.

Population estimates for the SRWMD's portion of Gainesville Regional Utilities (GRU), Clay County Utility Authority, and Melrose Water Association were provided by the SJRWMD. These estimates were incorporated into the served population estimates for Alachua and Bradford counties and used to more accurately estimate the non-served population.

For small public supply permits that did not have a PSAB (i.e., mobile home parks), the served population was estimated based on the information provided in the permit. This estimate of population was held constant for current and projected years (2014-2018, 2020-2045).

Domestic Self Supply (Non-served Population)

The non-served population is defined as the number of people getting their water use from their own domestic self-supply well. This population was estimated by taking the total BEBR county-wide population estimate, less institutional population, and subtracting the served population.

Institutional Population

Correctional facilities and prisons located in the SRWMD are either connected to a public supply utility or are self-supplied and have an institutional water use permit that is required to report use. This institutional use is therefore already being accounted for in the water use estimates for either the public supply (PS) or commercial/industrial/institutional category (CII). Accounting for the institutional population separately enables the SRWMD to more accurately estimate the non-served population and the water use associated with the DSS category. The SRWMD used the 2014-2018 BEBR published inmate population estimates to determine the institutional population by county. To be consistent with BEBR Volume 53, Bulletin 186, which was used for projections, the 2019 institutional population was used as the projected population and held constant through the 2020-2045 planning period (Rayer, S. and Y. Wang. 2020).

Projections

County population projection estimates published by BEBR in January 2020 were used for estimating population from 2020-2045 (Rayer, S. and Y. Wang. 2020). The percent split calculated for 2018 was used to estimate the future populations of shared counties in the Western Region. In the NFRWSP, the county population estimated for the SRWMD is the difference between the BEBR estimate and the SJRWMD projected estimate for each projected year (2020, 2025, 2030, 2035, 2040, and 2045). Because BEBR's projection estimates include both residential and institutional population, the institutional population was subtracted out to be able to get an accurate estimate of the non-served residential population in the future. The institutional population was held constant through the projection period.

In some counties, the 2020 projected population was less than the estimated 2018 population, therefore there was a negative projection estimate due to the variability in the estimation of the institutional population. For counties with a negative projected population for 2020, the estimated total population was set equal to the 2018 total population and grown by the number of people BEBR projected for each time increment. Counties adjusted included Hamilton, Madison, and Union counties. Counties that had a positive 2020 projected residential population estimate were grown by the BEBR reported population projections, less the estimate of institutional population.

The SRWMD applied the population model created by the SJRWMD to distribute projected future population within the county (SJRWMD. 2021). This model also estimated the projected future served populations within PSABs. The projected future served population estimates were subtracted from the county-wide residential projections to get an estimate of the non-served projected population.

Stakeholder Outreach

The SRWMD summarized each utility's population and water use estimates and projections. We reached out to individual utilities to discuss the data and further refine our estimates. We made updates to the served population estimates for 2014-2018 for utilities that provided comments. If documentation was provided to substantiate higher growth estimates than the model predicted, then estimates were updated. For example, the City of Newberry provided the SRWMD with a citywide Equivalent Residential Unit (ERU) water use study with estimates and projections for their utility to substantiate a different growth rate.

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Appendix B

Simulated Change in Groundwater Levels within the North Florida-Southeast Georgia Regional Groundwater Flow Model (NFSEG)

Introduction

The North Florida-Southeast Georgia regional groundwater flow model (NFSEG) is a tool developed as a requirement of the North Florida Regional Water Supply Partnership (Partnership). In order to develop consistency in planning, establishment / assessment of minimum flows and levels (MFLs) and permitting decisions, the Partnership agreed to implement a joint regional groundwater flow model. Spanning larger areas within a single model enables improved representation of the aquifer system on a regional basis.

Technical experts from the SJRWMD and SRWMD and other key stakeholders worked collaboratively to develop the next generation regional-scale groundwater flow model for North Florida. The technical team's mandate was to ensure appropriate science is applied to the modeling and data analysis to support decision-making, and that the work completed is defensible, understood by the team, and collaboratively developed, as described in the Partnership's charter, available at northfloridawater.com. The current version of NFSEG is referred to as NFSEG v1.1 (Durden et al., 2019).

The NFSEG v1.1 was used to simulate changes in the potentiometric surface of the Floridan aquifer system (FAS) due to projected groundwater withdrawals. The focus of this effort is to assess the effect of groundwater withdrawals in the Western Water Supply Planning (WWSP) region (Figure B1).

NFSEG Overview

The NFSEG is a porous-equivalent, three-dimensional, steady-state, groundwater flow model covering approximately 60,000 square miles (Figure B1). The model is vertically discretized into seven layers representing, from top to bottom: (1) the surficial aquifer system (SAS), (2) the intermediate confining unit/aquifer system (ICU), where present; (3) the Upper Floridan aquifer (UFA); (4) the middle semi-confining unit (MCU), where present; (5) the Lower Floridan aquifer (LFA) where present; (6) the lower semi-confining unit; and (7) the Fernandina permeable zone of the LFA, where present. The model is horizontally discretized into uniform grid cells measuring 2,500 feet by 2,500 feet. Calibration of the NFSEG v1.1 was based on hydrologic conditions occurring during calendar years 2001 and 2009 (Durden et al., 2019).

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

The following, which comes from USGS Scientific Investigations Report 2016-5116 (Kuniansky, 2016), is a general statement regarding modeling of the 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 water management districts in Florida use a SCPE model approach for groundwater management and resource evaluation. Most of these SCPE models are applied to water-supply studies and are regional or subregional in scale and water budgets are desired; this is an appropriate application of such models."

NFSEG version 1.1 meets requirements for use in water supply planning, regulatory evaluation, and MFL-related evaluation within the NFSEG domain and is currently being utilized in support of these types of evaluations.

Methodology

The NFSEG v1.1 was used to simulate changes in groundwater levels based on differences between 2009 pumps off (PO) or the 2014 to 2018 average groundwater withdrawals, which is referred to as current pumping (CP), and 2045 projected withdrawals. Water use estimates used as inputs to the NFSEG were updated and vetted through a thorough public review process. Simulations included groundwater level changes in the SAS, the UFA, and the LFA.

Results

Decreases in simulated groundwater levels (aquifer drawdown) were predicted across most of the planning region for the SAS, UFA, and LFA (Figures B1 to B4). Areas of drawdown in the aquifer were apparent in northeastern Dixie County, central Lafayette County, northern Levy County, throughout Madison County, and in western Taylor County. Small areas of increase in the simulated potentiometric surface (aquifer rebound) were associated with reductions in pumping between CP and 2045 or due to the change in pumping distribution between CP and 2045. The main area of increase is seen in southern Lafayette County and throughout Taylor County. Lower magnitudes of drawdown were observed where the Floridan aquifer tends to be semi-confined or unconfined. However, the heightened transmissivity of the aquifer in these areas increases the potential for spring flow changes induced by groundwater withdrawals.

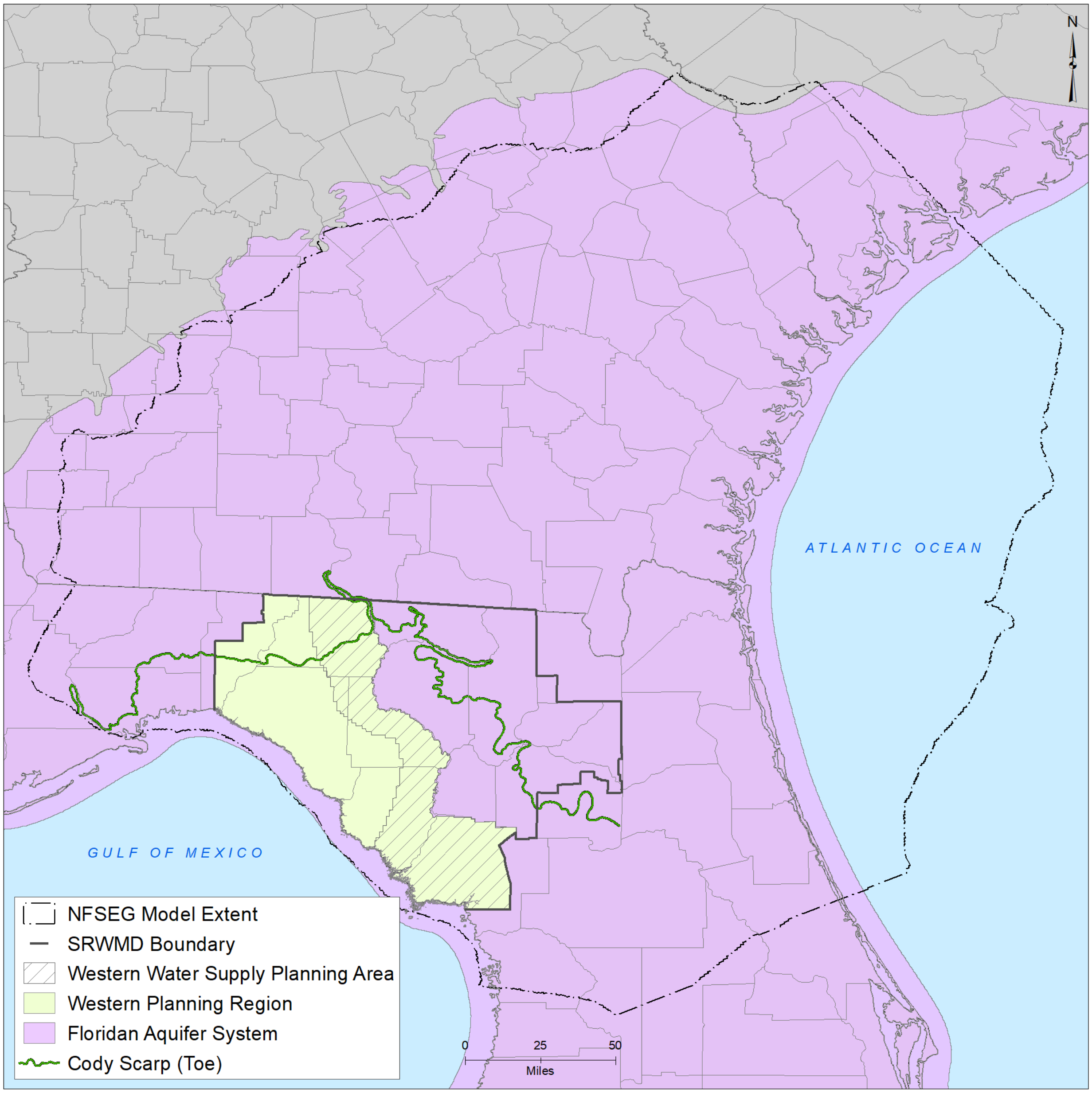

Figure B1. NFSEG model extent with coverage of the Floridan Aquifer system

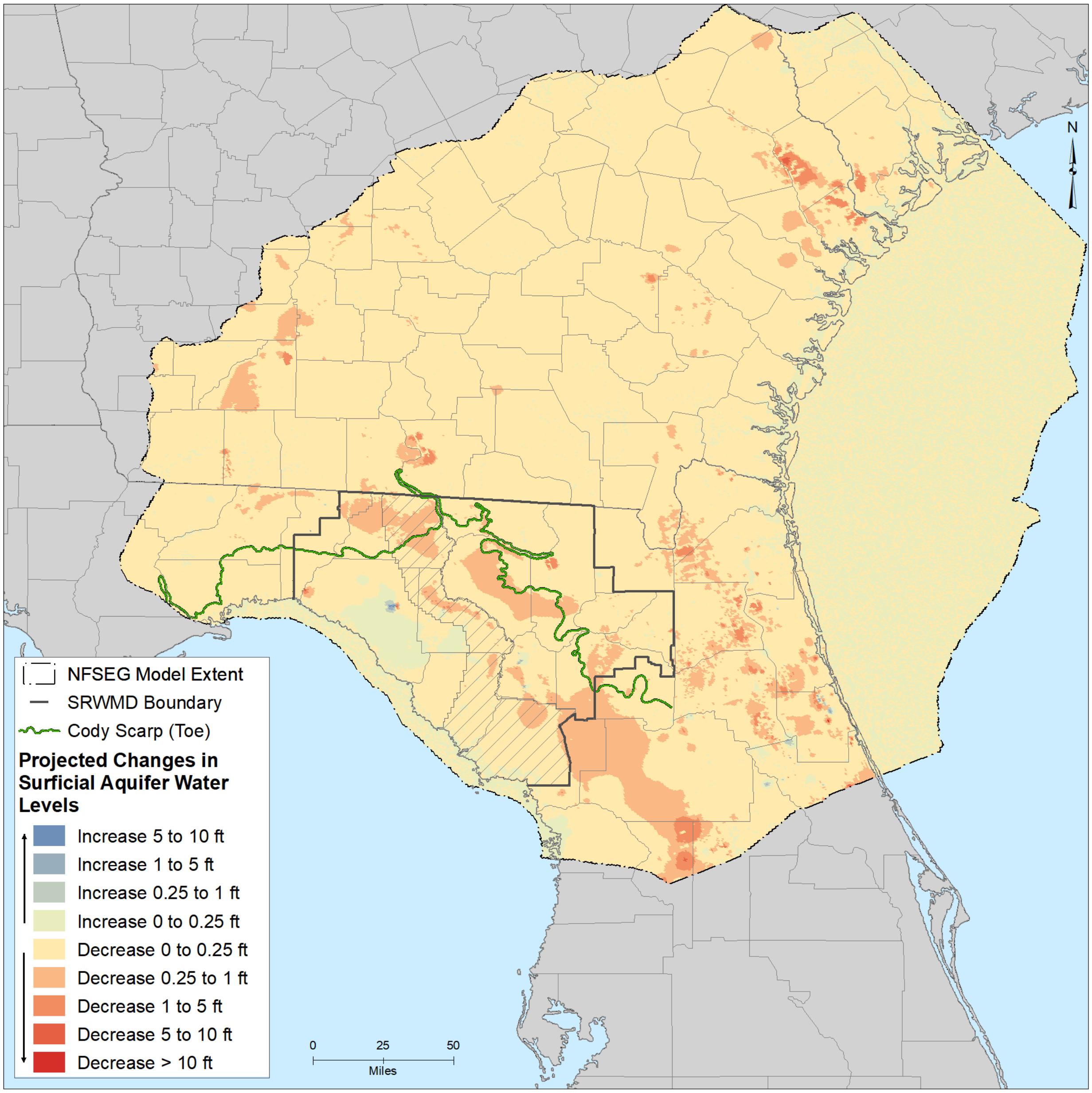

Figure B2. Changes in surficial aquifer water levels from CP to 2045 within the NFSEG domain

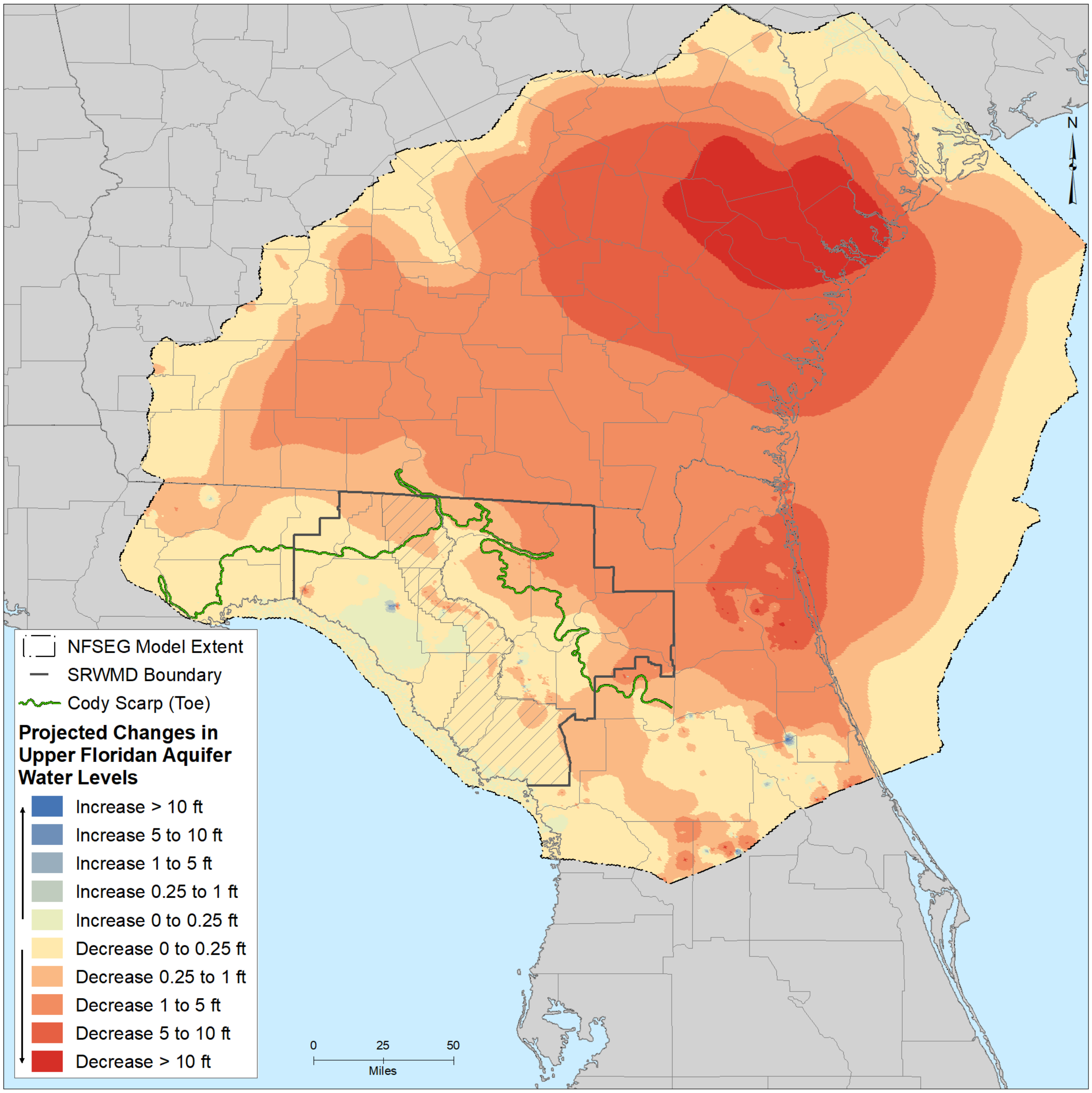

Figure B3. Changes in Upper Floridan aquifer water levels from CP to 2045 within the NFSEG domain

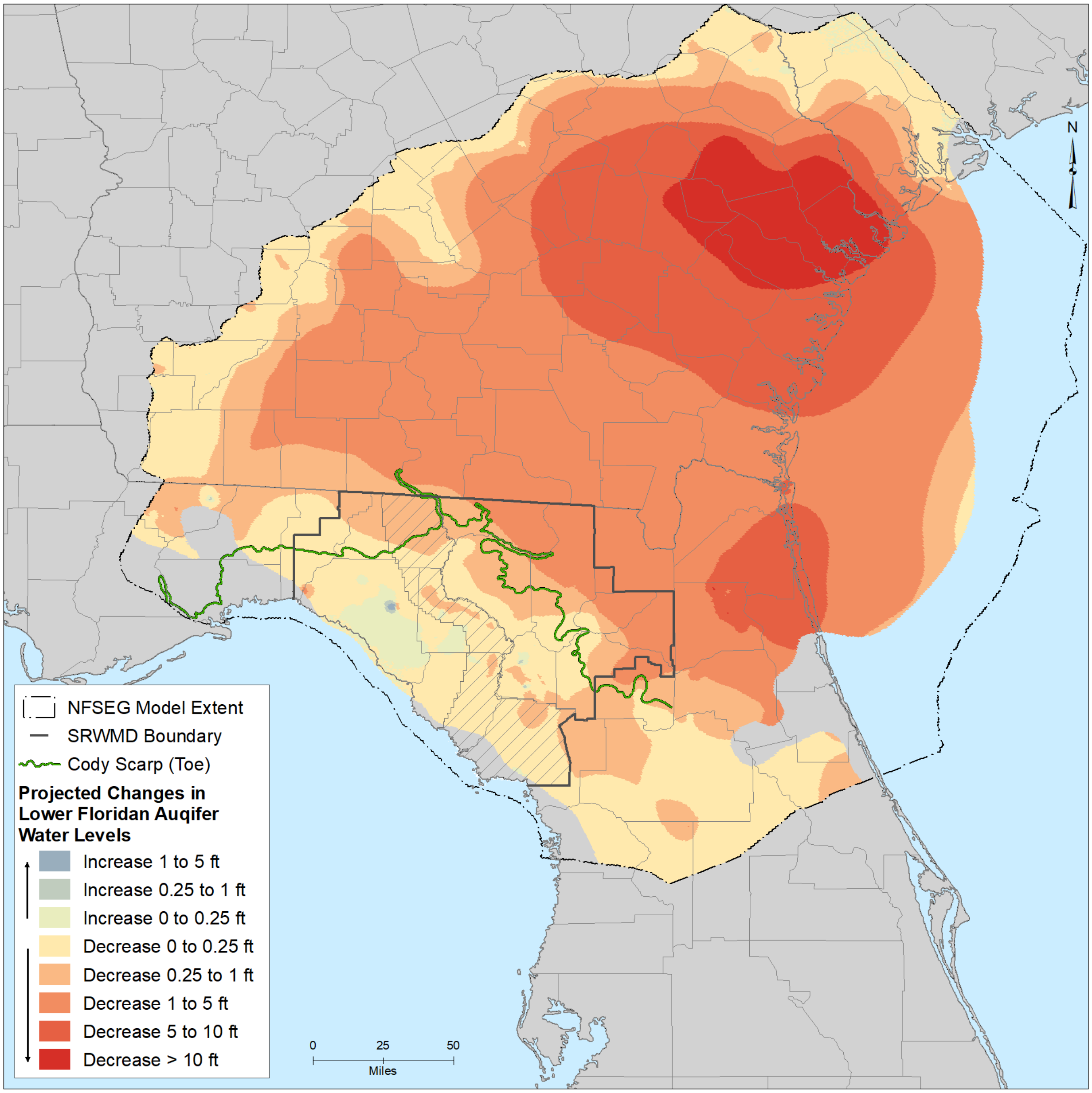

Figure B4. Changes in Lower Floridan aquifer water levels from CP to 2045 within the NFSEG domain

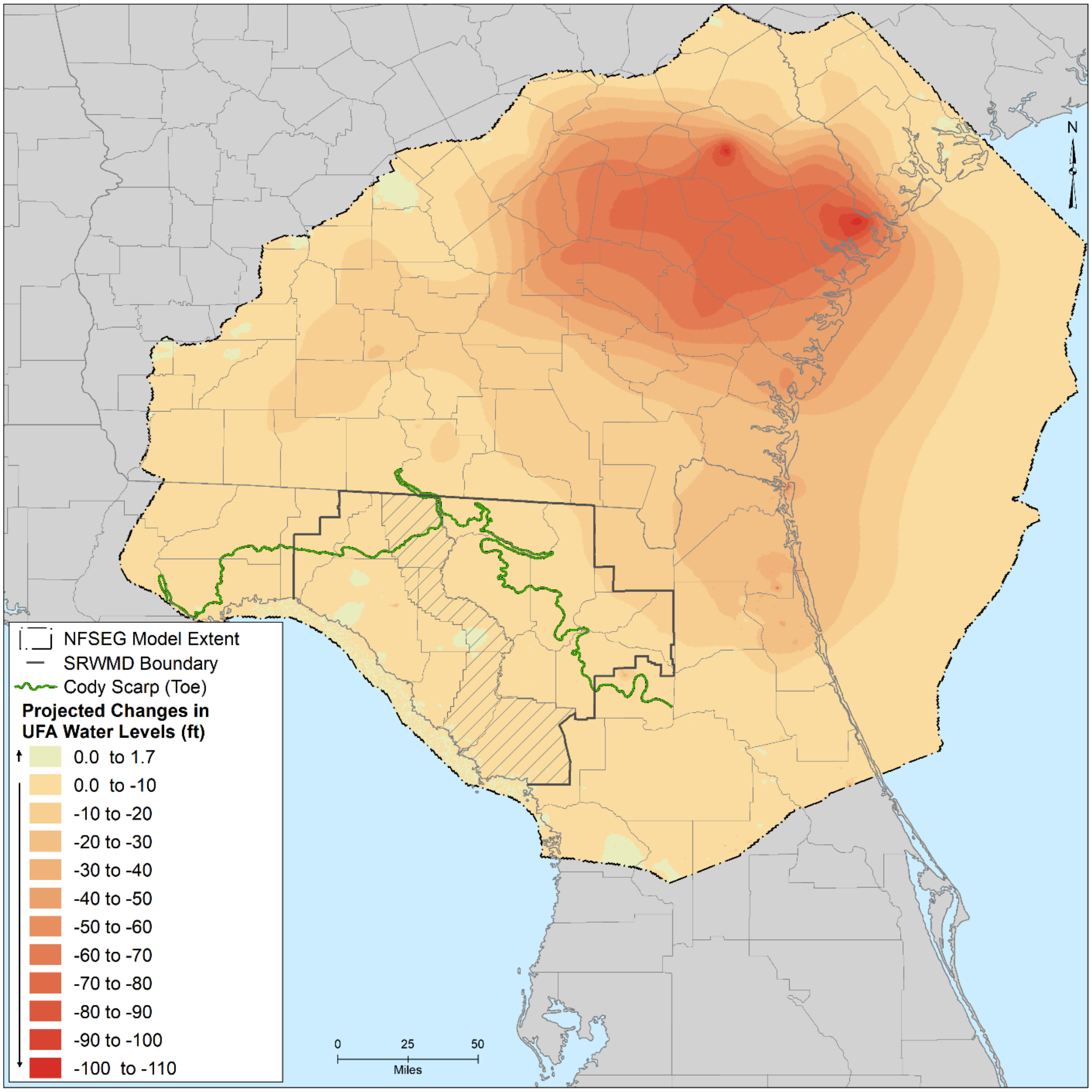

Figure B5. Changes in Upper Floridan aquifer water levels from PO to 2045 within the NFSEG domain

References

Durden, D., F. Gordu, D. Hearn, T. Cera, T. Desmarais, L. Meridth, A. Angel, C. Leahy, J. Oseguera and T. Grubbs. 2019. *North Florida-Southeast Georgia Groundwater Model (NFSEG v1.1)*. St. Johns River Water Management District Technical Publication SJ2019-01. Palatka, Fla.: St. Johns River Water Management District. 513 pp.

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Appendix C

Water Quality Assessment

Introduction

The Floridan aquifer system (FAS) is the primary source of potable water in North Florida. Lowered water levels in the FAS create a potential for saltwater intrusion and subsequent reductions in groundwater quality. Saltwater intrusion can occur from saltwater moving inland from the ocean (i.e., lateral intrusion) or from relic seawater migrating vertically (i.e., upconing). Saltwater intrusion can affect the productivity of existing groundwater withdrawal infrastructure and the availability of potable groundwater.

To monitor changes in groundwater quality, the Suwannee River Water Management District (District) has maintained a district-wide water quality monitoring network, including groundwater monitoring wells, since the 1970’s. Monitoring intervals vary for each well over time, ranging from monthly to annually, or less. Water samples collected from the monitoring wells are analyzed to measure several analytes, including nutrients, metals, common ions, and chemical properties such as color, turbidity and alkalinity. Three of the analytes measured; total chloride, total dissolved solids (TDS), and specific conductivity, are useful indicators of the presence of saltwater in freshwater sources. These three analytes were analyzed as part of this assessment.

The Environmental Protection Agency (EPA) has established National Primary and Secondary Drinking Water Regulations which contain water quality standards for several contaminants. Primary water quality standards are mandatory and enforceable, to protect public health, while secondary water quality standards are non-mandatory guidelines aimed at managing aesthetic attributes such as color, odor, and taste. Of the three analytes considered for this assessment, chloride and TDS are subject to secondary drinking water quality standards. The secondary maximum contaminant level (SMCL) for chloride is 250 milligrams per liter (mg/L) to ensure palatability, and the SMCL for TDS is 500 mg/L, to ensure desirable appearance and taste (United States Environmental Protection Agency, 2023). While no EPA water quality standards are established for specific conductivity, 1,500 μmhos/cm is the upper bound of typical potable water suggested by Shaw and Trost (1984).

Methods

The District groundwater monitoring network currently consists of 78 stations, with 39 stations in the WWSP region (Figure D1). Sixteen stations (wells) are currently sampled twice per year, 21 are sampled quarterly, and two are sampled monthly. Water quality samples are collected from each well following the most current Florida Department of Environmental Protection (DEP) Standard Operating Procedures for groundwater sample collection (Chapter 62-160, *F.A.C.)*.

Total chloride, TDS, and specific conductivity sample data were statistically analyzed by SJRWMD data analysts using SAS and R software, omitting suspect data points, sample duplicates, and blanks. The current status of each analyte for individual wells was determined for an assessment period of five years, from January 1, 2017, to

December 31, 2021. At least three years of data during the five-year status assessment period were required to complete the assessment, with the last year being 2021. The status is calculated as the median of annual median values for the five-year period. Some well locations lack sufficient data to determine the status for one or more analytes and are listed as “insufficient data” (Table C1).

The current trend of each analyte for each well was determined for an assessment period of 15 years, from January 1, 2007, to December 31, 2021. At least 10 years of data were required from the 15-year period of record to calculate a trend, with the last year being 2021. Trends were evaluated using a non-seasonal version of the nonparametric Mann-Kendall test (Meals et al., 2011). Some stations lacked sufficient data to determine trends for one or more analytes.

Results

Chloride

The chloride status assessment determined that only one monitoring well had a chloride concentration that exceeded the SMCL of 250 mg/L (Table C1; Figure C2). This monitoring well is located in southern Levy County (S141429001) and had a concentration of 641 mg/L. This well is approximately 440 feet deep and in close proximity to the coast, therefore the high chloride concentration combined with high TDS levels and specific conductivity, indicates the presence of saltwater.

The chloride trend analysis determined there were 18 monitoring wells with sufficient data to analyze a trend. Of these, there were seven wells with a stable trend, nine wells with an increasing trend, and two wells with a decreasing trend. Some of the wells with increasing trends are not in close proximity to the coast, however they are in locations that are commonly associated with land application of fertilizers or other land use activities. Monitoring well S141429001, which had a high chloride concentration status, does not have enough data to determine a trend.

TDS

The TDS status assessment determined there were 18 wells with a TDS concentration below 250 mg/L and 15 wells with a concentration between 250 mg/L and 500mg/L. There were four monitoring wells in Levy County that had a TDS concentration above the SMCL of 500 mg/L (Table C1; Figure C3). The four wells with high TDS were S121332003 (706 mg/L), S111324036 (860 mg/L), S141620007 (2,082 mg/L), and S141429001 (4,746 mg/L).

The TDS trend analysis determined that there were eight wells with a stable trend, six wells with an increasing trend, and four wells with a decreasing trend. The six wells that were found to have an increasing TDS trend are located in Madison, Taylor, Lafayette, and Levy counties. However, all six wells with increasing trends have TDS concentrations well below the SMCL of 500 mg/L. Of the four wells with high TDS concentrations, three of them had insufficient data for the trend analysis, and the one well that had enough data for a trend analysis (S111324036) showed to be stable.

Specific Conductivity

The specific conductivity status analysis determined that there are 34 wells with concentrations less than 1,000 µmhos/cm and one well with a concentration between 1,000 and 1,500 µmhos/cm. Two wells had a concentration above 1,500 µmhos/cm. The two wells with high specific conductivity were S141620007 (2,198 µmhos/cm) and S141429001 (4,961 µmhos/cm). Both wells are located in southern Levy County (Table C1; Figure C4). As stated above, well S141429001 shows high concentrations of chlorides, TDS, and specific conductivity, which indicates presence of saltwater.

The specific conductivity trend analysis determined eleven wells with a stable trend, four wells with an increasing trend, and three wells with a decreasing trend. There were 19 wells with insufficient data to conduct a trend analysis. Furthermore, the four monitoring wells that were found to have an increasing specific conductivity trend are located in Madison, Taylor, and Levy counties. The three wells with a decreasing trend are in Madison, Lafayette, and Levy counties.

Table C1. Chloride, TDS, and specific conductivity status and trends for monitoring wells in the WWSP

Station	Chloride (mg/L)	Chloride Trend	TDS (mg/L)	TDS Trend	Specific Conductivity (µmhos/cm)	Specific Conductivity Trend
N010632002	5.5	Insufficient Data	192.1	Insufficient Data	332.9	Insufficient Data
N020611002	4.8	Stable	195.6	Stable	326.5	Stable
N020822002	4.6	Increasing	179.7	Increasing	302.5	Increasing
N021013001	3.1	Stable	224.5	Decreasing	318.0	Decreasing
S010602003	4.8	Insufficient Data	152.3	Insufficient Data	254.4	Insufficient Data
S010920002	5.9	Increasing	213.9	Increasing	352.5	Stable
S020301006	6.6	Insufficient Data	189.7	Insufficient Data	354.1	Insufficient Data
S030424003	6.0	Insufficient Data	261.9	Insufficient Data	476.4	Insufficient Data
S031035001	6.2	Stable	219.0	Decreasing	401.1	Decreasing
S040723011	7.1	Increasing	212.8	Increasing	392.0	Increasing
S050615002	4.3	Decreasing	207.0	Decreasing	361.0	Stable
S051209001	10.6	Stable	308.1	Stable	477.0	Stable
S051214008	5.1	Increasing	190.0	Stable	355.3	Stable
S051331002	3.2	Stable	155.0	Increasing	268.0	Stable
S061025003	11.4	Insufficient Data	211.3	Insufficient Data	382.1	Insufficient Data
S080907003	6.2	Stable	117.5	Stable	209.0	Stable
S081132001	11.1	Insufficient Data	374.8	Insufficient Data	583.8	Insufficient Data
S081313005	6.5	Insufficient Data	263.1	Insufficient Data	447.8	Insufficient Data
S090914003	4.4	Insufficient Data	158.3	Insufficient Data	283.0	Insufficient Data
S090925006	23.5	Insufficient Data	348.5	Insufficient Data	580.0	Insufficient Data
S091011004	7.6	Insufficient Data	365.8	Insufficient Data	548.0	Insufficient Data
S101210001	4.5	Insufficient Data	185.3	Insufficient Data	330.8	Insufficient Data
S101429021	14.9	Increasing	355.5	Increasing	575.0	Increasing
S101429023	12.1	Stable	318.9	Stable	551.5	Stable
S111117007	14.5	Insufficient Data	276.5	Insufficient Data	472.5	Insufficient Data
S111324036	31.3	Increasing	859.7	Stable	1,162.8	Stable
S111325017	10.7	Decreasing	346.6	Decreasing	579.3	Decreasing

Station	Chloride (mg/L)	Chloride Trend	TDS (mg/L)	TDS Trend	Specific Conductivity (µmhos/cm)	Specific Conductivity Trend
S111336004	13.8	Insufficient Data	384.5	Insufficient Data	607.5	Insufficient Data
S111336005	9.4	Insufficient Data	NA	NA	NA	NA
S111436007	8.0	Increasing	269.0	Increasing	469.0	Increasing
S121330002	11.0	Insufficient Data	373.6	Insufficient Data	572.0	Insufficient Data
S121332003	42.1	Insufficient Data	706.1	Insufficient Data	970.3	Insufficient Data
S121429005	7.2	Increasing	NA	NA	NA	NA
S131734004	7.1	Insufficient Data	156.5	Insufficient Data	268.3	Insufficient Data
S141305001	2.4	Insufficient Data	201.5	Insufficient Data	330.0	Insufficient Data
S141429001	640.9	Insufficient Data	4,745.5	Insufficient Data	4,960.8	Insufficient Data
S141429005	11.5	Stable	288.3	Stable	471.0	Stable
S141620007	44.8	Insufficient Data	2,081.8	Insufficient Data	2,198.0	Insufficient Data
S151719004	7.8	Increasing	310.9	Stable	528.0	Stable

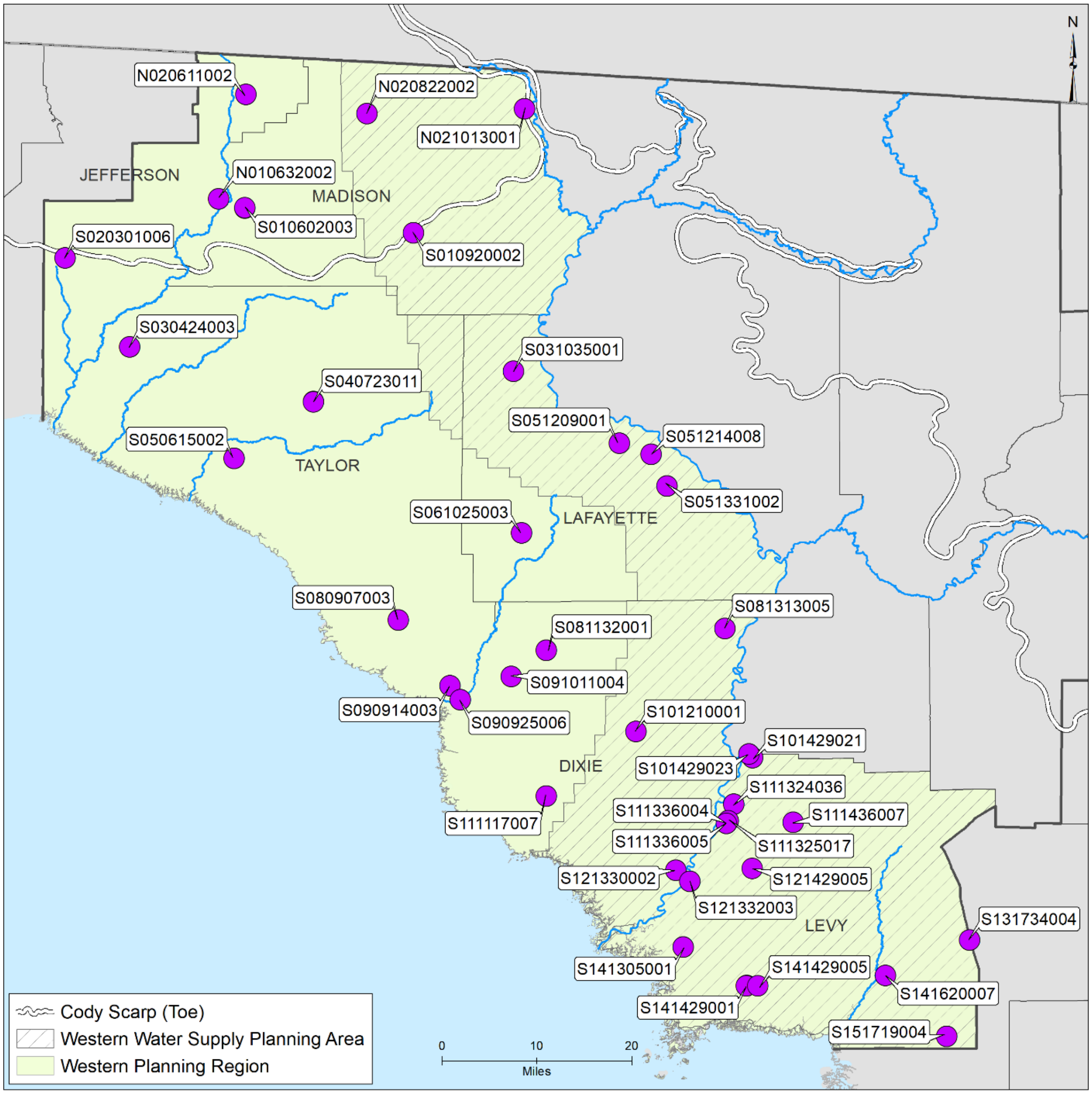

Figure C1. Water quality monitoring stations in the WWSP region

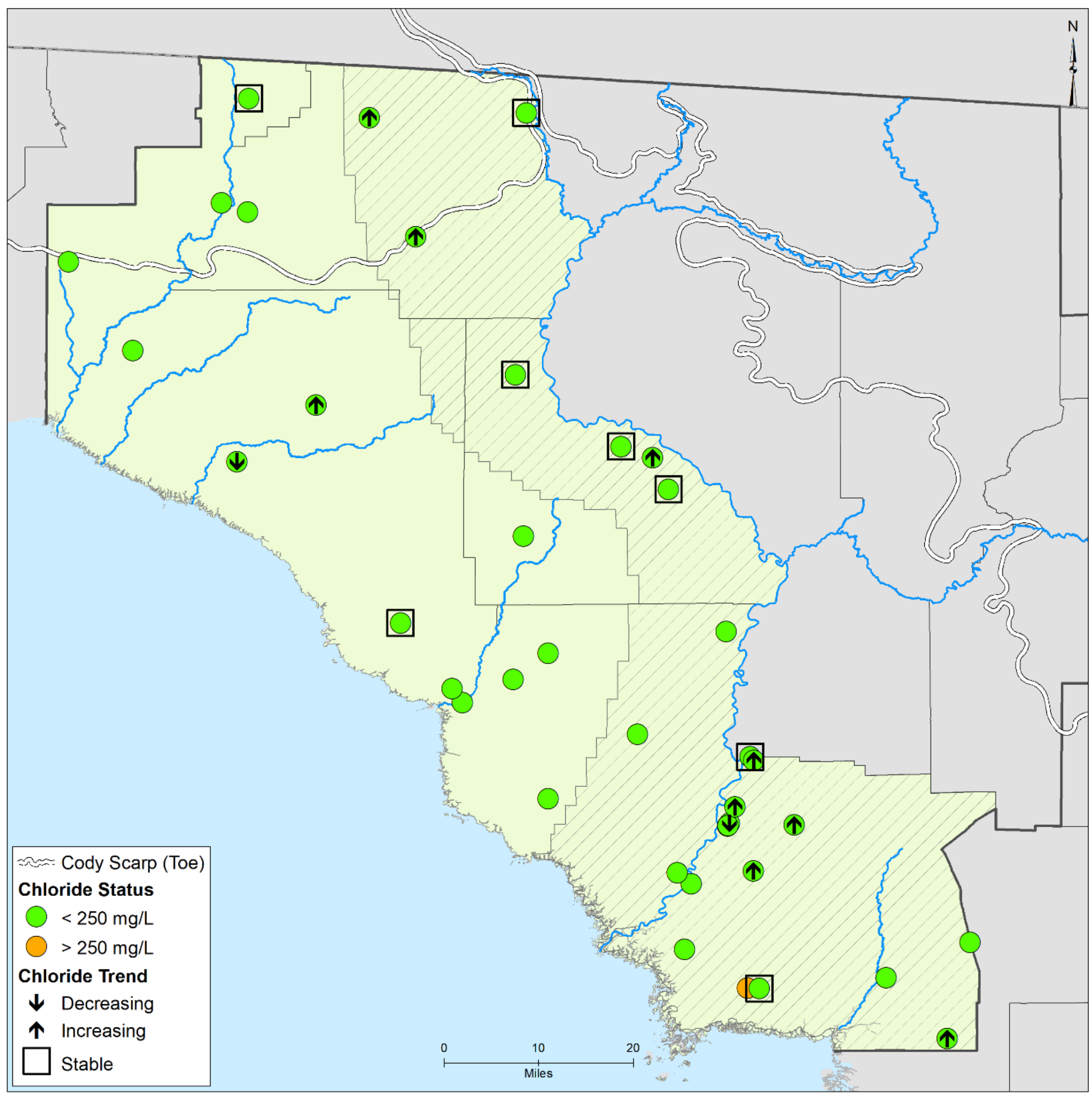

Figure C2. Chloride status and trends in the WWSP region

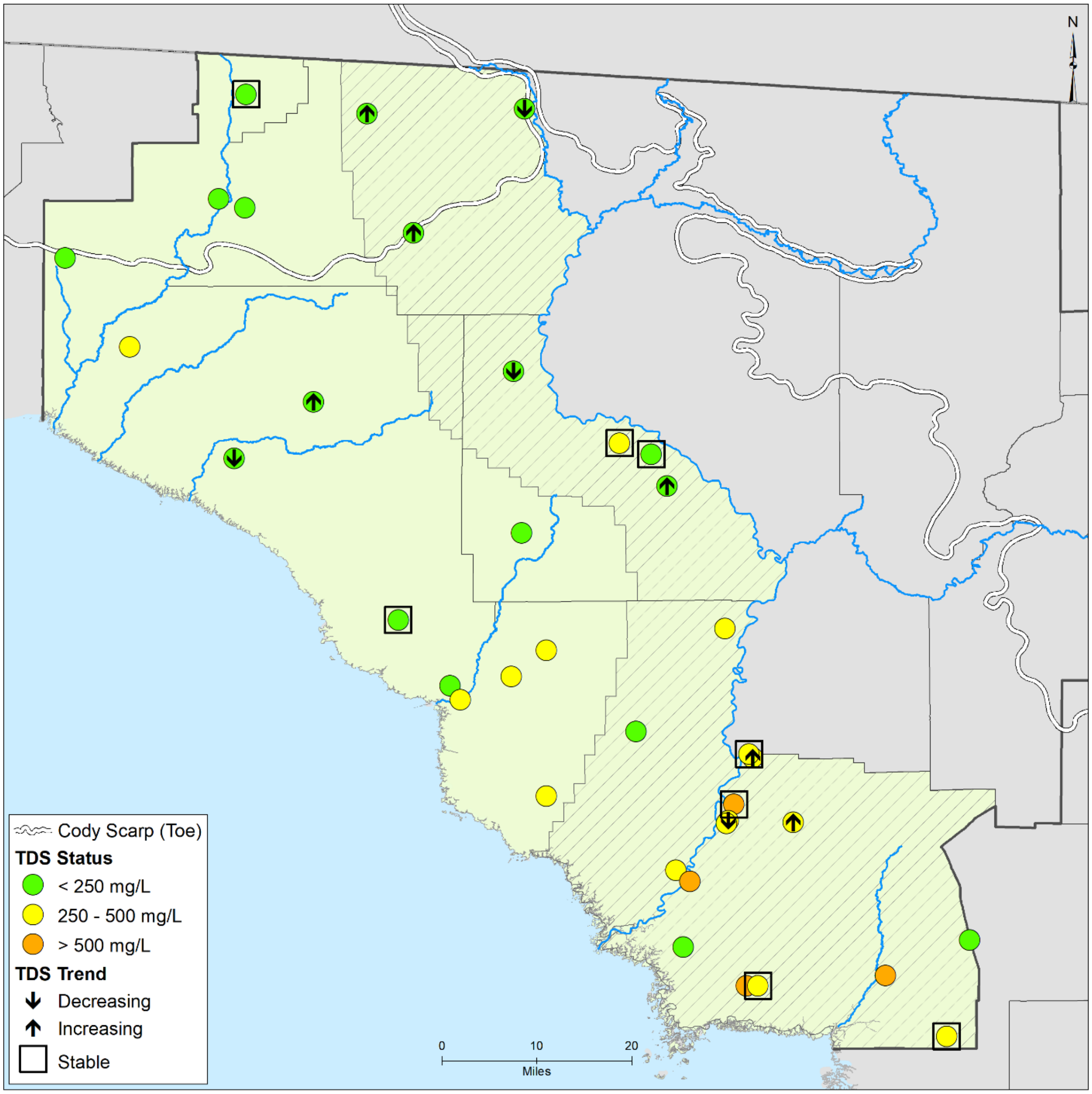

Figure C3. Total dissolved solids (TDS) status and trends in the WWSP region

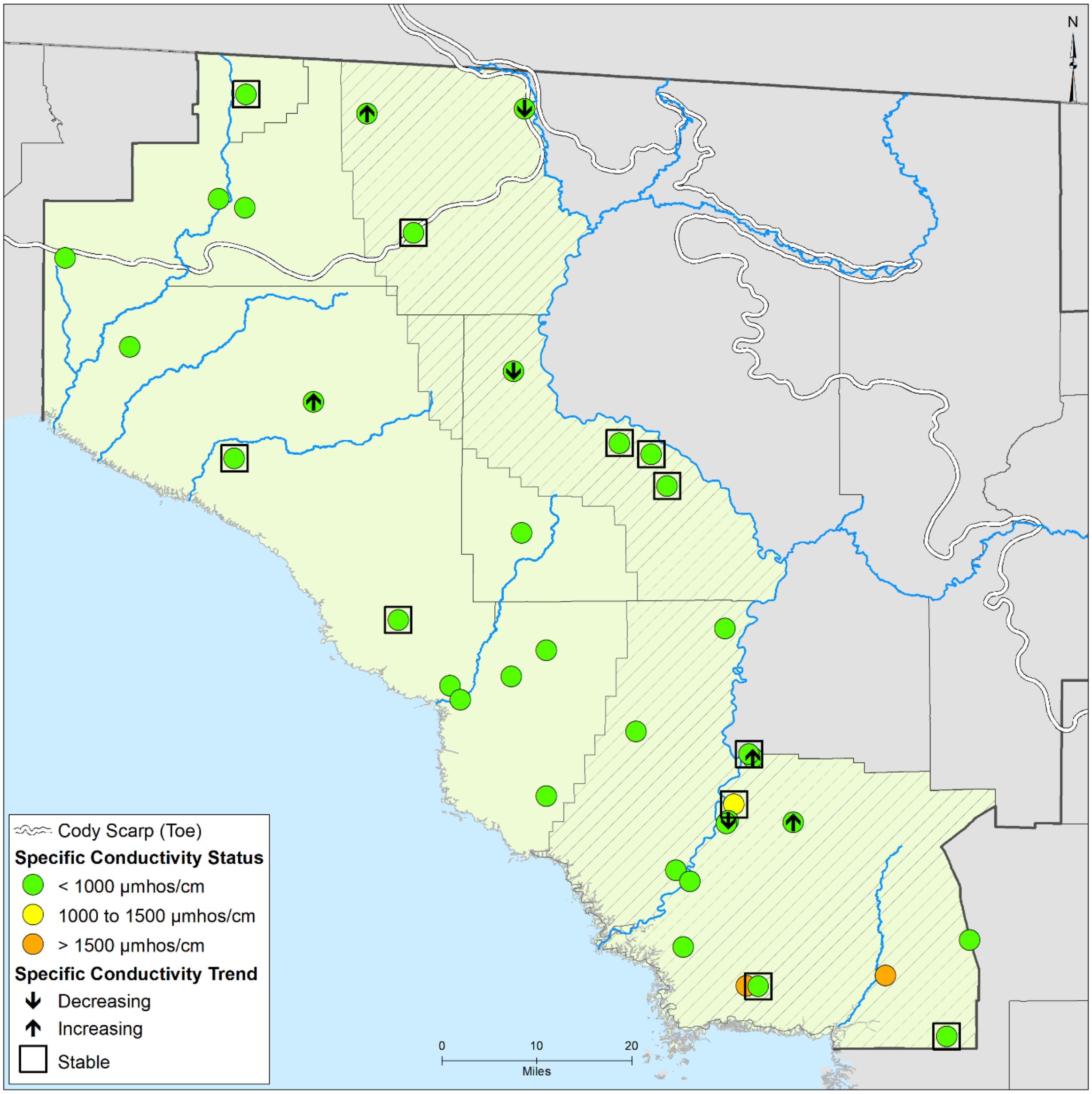

Figure C4. Specific conductivity status and trends in the WWSP region

References

Meals, D.W., Spooner, J., Dressing, S.A., and Harcum, J.B. 2011. *Statistical Analysis for Monotonic Trends*. Tech Notes 6, November 2011. Developed for U.S. Environmental Protection Agency by Tetra Tech, Inc., Fairfax, VA, 23 p. Available online at https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/nonpoint-source-monitoring-technical-notes. Accessed February 22, 2023.

Shaw, J.E., and Trost, S.M. 1984. *Hydrogeology of the Kissimmee Planning area: West Palm Beach*. South Florida Water Management District Technical Publication 84-1, 235 p.

United States Environmental Protection Agency. 2023. *Secondary Drinking Water Standards: Guidance for Nuisance Chemicals.* https://www.epa.gov/sdwa/secondary-drinking-water-standards-guidance-nuisance-chemicals. Accessed February 22, 2023.

Appendix D

Minimum Flows and Levels (MFLs) Assessment

Introduction

Minimum Flows and Levels (MFLs) are the minimum water flows and/or minimum water levels adopted by water management district Governing Boards or the Florida Department of Environmental Protection (DEP). MFLs are set to prevent significant harm to the water resources or the ecological structure and function of an area resulting from groundwater or surface water withdrawals. MFLs characterize water resource values (WRVs) for individual waterbodies and define the critical flows and levels necessary to protect these WRVs from significant harm. MFLs inform decisions regarding water use permitting, water shortages, assessments of water supply sources, and development of water resource and water supply projects.

Establishing MFLs is required pursuant to section (s.) 373.042(3), Florida Statutes (F.S.). Adoption is typically a four- to six-month process that involves public workshops, review by DEP and publication in the *Florida Administrative Register*. MFLs are to be reviewed periodically and revised as necessary under s. 373.0421(5), F.S. As of June 2023, the Suwannee River Water Management District (District), and DEP have established 31 MFLs in the Western Water Supply Planning (WWSP) region, including six rivers (six river gages) and 25 springs (Table D1 and Figure D1). There are no lakes in the WWSP region with an adopted MFL. The full list of adopted MFLs within the District can be found in chapters 40C-8 and 40B-8, respectively, and rule 62-42.300, Florida Administrative Code (F.A.C.).

Minimum Flows and Levels (MFLs) were evaluated during the WWSP process to determine whether adopted river or spring flows would be achieved if all projected withdrawals were met with fresh groundwater during the planning horizon (2045). This document includes a review of the basic methodology and results used to assess the influence of current and projected future pumping on MFL waterbodies.

Methodology

The North Florida-Southeast Georgia groundwater flow model (NFSEG) was used to simulate changes in aquifer potentiometric surfaces based on differences between pumps off (PO), 2014 to 2018 average groundwater withdrawals, which is referred to as current pumping (CP), and 2045 projected withdrawal scenarios. River flow, spring flow, and UFA levels were extracted and analyzed.

The impact of demand projections within the WWSP region through the planning horizon were evaluated by comparing the PO condition to CP, and PO to the 2045 projection. These percentages were then compared to the MFL screening criteria, specific to the waterbody of interest, to determine if a waterbody was meeting or exceeding the screening criteria. Nutall Rise was assessed based on river gage 2326550, which is between Nutall Rise and the mouth of the Aucilla river. River gage 2326526 on the Wacissa River was used as the compliance point for springs in the Wacissa Springs Group. As outlined in rule 40B-8.091, F.A.C., the springs that are part of this group include Big Blue Spring, Buzzard Log Spring, Cassidy Spring, Garner

Spring, JEF63991, JEF63992, JEF63993, Jefferson Blue Spring, Little Blue Spring, Log Spring, Minnow Spring, Thomas Spring, and Wacissa Headspring. Falmouth Spring is not represented in the NFSEG model. Falmouth Spring has documented connections to Lime Spring, Lime Sink Rise, and Suwanacoochee Spring and was assessed based on the average of flow changes at those springs.

This water supply plan does not change the status of an MFL waterbody. Where current or projected future demands exceed the MFL screening criteria, this plan will identify project options that can be implemented to meet demands while sustaining natural systems.

Results

There were five springs, 20 Outstanding Florida Springs (OFS), and six river reaches assessed (Figure D1). The water resource evaluation determined that 12 waterbodies are meeting the screening criteria under CP and the 2045 projection, three waterbodies are meeting the screening criteria under CP but exceeding the screening criteria under the 2045 projection, and 16 waterbodies are exceeding the screening criteria under both CP and the 2045 projection (Table D1; Figure D2).

The waterbodies that are meeting the MFL screening criteria under CP and 2045 are the Econfina River near Perry, Fanning Springs, Little Fanning Spring, Manatee Spring, Nutall Rise, Peacock Springs, Steinhatchee River near Cross City, Steinhatchee River Rise, the Lower Suwannee River near Wilcox, Tay76992, Troy Spring, and the Waccasassa River at Gulf Hammock.

Waterbodies that are meeting the MFL screening criteria under CP but are exceeding the criteria in 2045 are the Aucilla River at Lamont, Lafayette Blue Spring, and Falmouth Spring.

Waterbodies that are exceeding the MFL screening criteria under CP and the 2045 projection are Big Blue Spring, Buzzard Log Spring, Cassidy Spring, Garner Spring, JEF63991, JEF63992, JEF63993, Jefferson Blue Spring, Levy Blue Spring, Little Blue Spring, Log Spring, Madison Blue Spring, Minnow Spring, Thomas Spring, Wacissa Headspring, and the Wacissa River Near Wacissa.

There are four OFS on the Suwannee River that are currently under emergency rule (40BER 17-01). Of these, Lafayette Blue Spring and Falmouth Spring were identified in this analysis as exceeding the screening criteria. These OFS are on the District's 2023 MFL Priority List, and technical work is underway to establish the updated MFLs (SRWMD, 2023). Upon finalization of the updated MFLs, the status of the four OFS on the Suwannee River will be re-assessed.

Table D1: WWSP MFLs Assessment Summary

Waterbody Type	Waterbody Name	County/Basin	Exceeds Screening Criteria at CP	Exceeds Screening Criteria at 2045
River	Aucilla River at Lamont	Aucilla River	No	Yes
Spring	Big Blue Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Buzzard Log Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Cassidy Spring (OFS)	Wacissa Springs Group	Yes	Yes
River	Econfina River Near Perry	Econfina River	No	No
Spring	Falmouth Spring (OFS)[1]	Middle Suwannee River	No	Yes
Spring	Fanning Springs (OFS)	Lower Suwannee River	No	No
Spring	Garner Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	JEF63991 (OFS)	Wacissa Springs Group	Yes	Yes
Spring	JEF63992 (OFS)	Wacissa Springs Group	Yes	Yes
Spring	JEF63993 (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Jefferson Blue Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Lafayette Blue Spring (OFS)[1]	Middle Suwannee River	No	Yes
Spring	Levy Blue Spring[1]	Waccasassa River	Yes	Yes
Spring	Little Blue Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Little Fanning Spring	Lower Suwannee River	No	No
Spring	Log Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Madison Blue Spring (OFS)[1]	Withlacoochee River	Yes	Yes
Spring	Manatee Spring (OFS)	Lower Suwannee River	No	No
Spring	Minnow Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Nutall Rise	Aucilla River	No	No
Spring	Peacock Springs (OFS)[1]	Middle Suwannee River	No	No
River	Steinhatchee River near Cross City	Steinhatchee River	No	No
Spring	Steinhatchee River Rise	Steinhatchee River	No	No
River	Suwannee River Near Wilcox	Lower Suwannee River	No	No
Spring	TAY76992	Steinhatchee River	No	No
Spring	Thomas Spring (OFS)	Wacissa Springs Group	Yes	Yes
Spring	Troy Spring (OFS)[1]	Middle Suwannee River	No	No
River	Waccasassa River at Gulf Hammock[1]	Waccasassa River	No	No
Spring	Wacissa Headspring (OFS)	Wacissa Springs Group	Yes	Yes
River	Wacissa River Near Wacissa	Wacissa River	Yes	Yes

[1]Waterbodies on the District's 2022 MFL priority list scheduled for re-evaluation

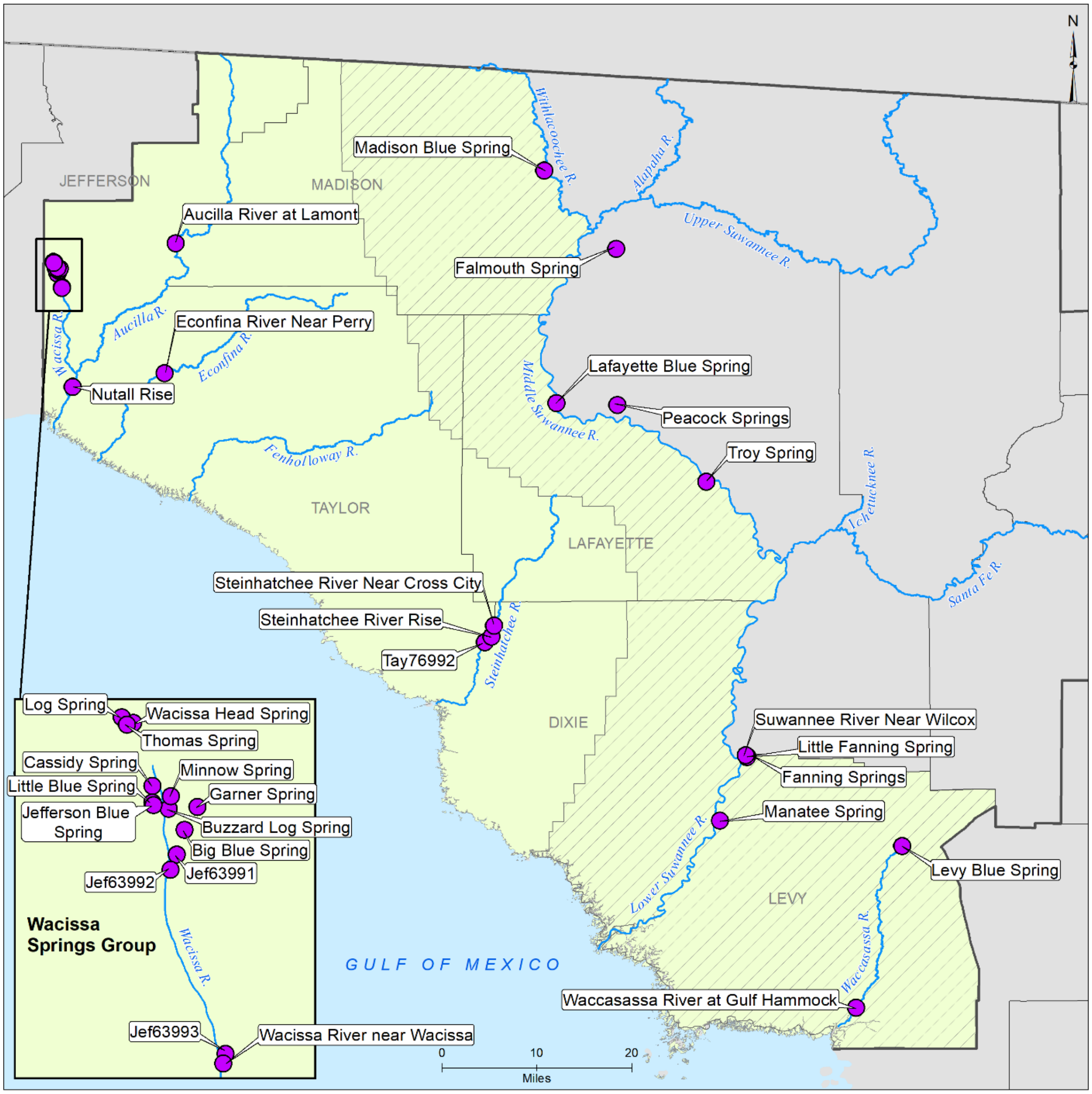

Figure D1. Names and locations of rivers and springs with adopted MFLs in the WWSP region

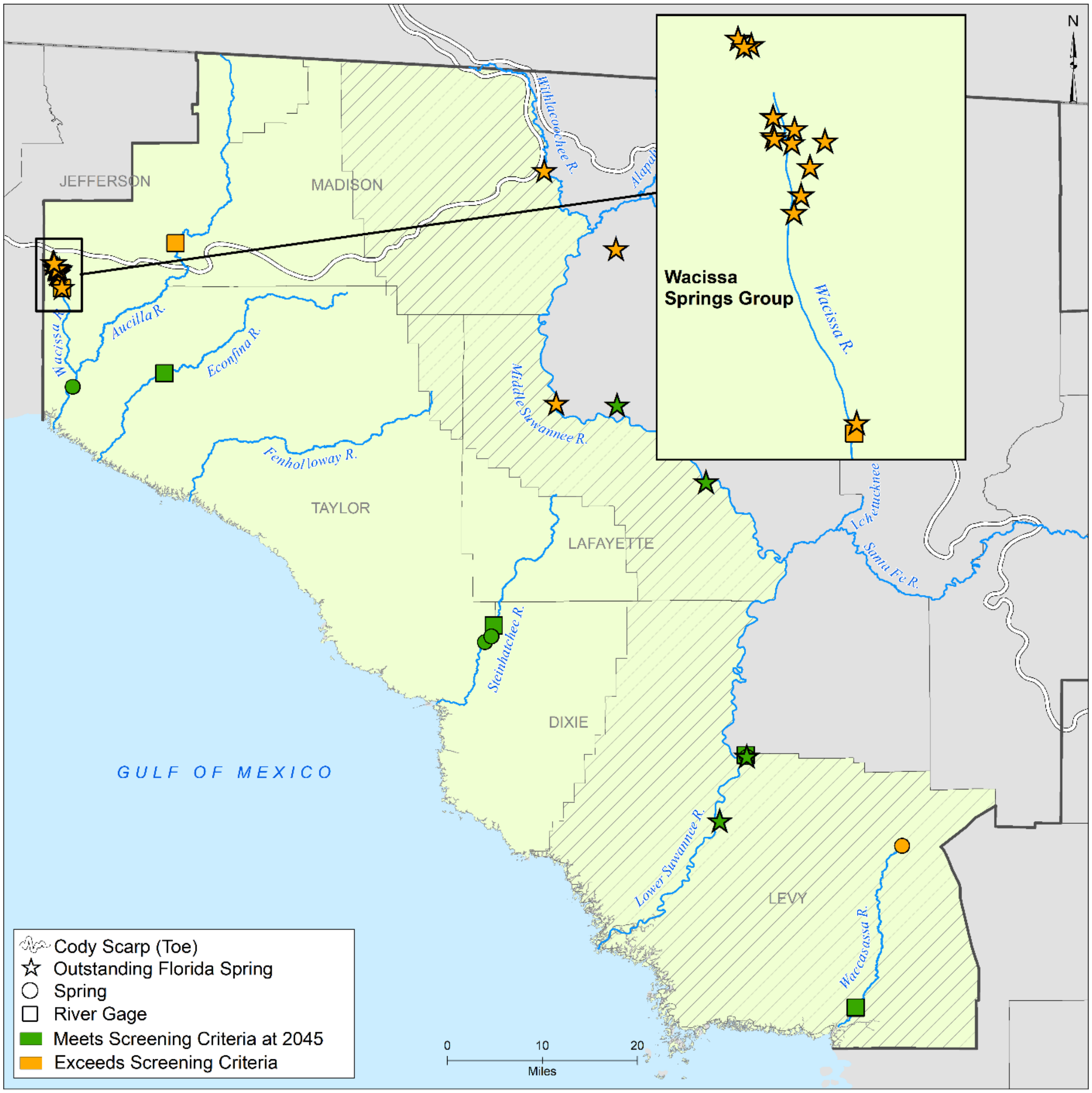

Figure D2. Results of the MFL assessment

References

SRWMD. 2023. Suwannee River Water Management District 2023 MFL Priority List and Schedule. SRWMD, Live Oak, FL. https://www.mysuwanneeriver.com/DocumentCenter/View/18942/2023-MFL-Priority-List-Table-Attachment-10252023?bidId=

Appendix E

Waterbodies without Adopted Minimum Flows and Levels (MFLs) Assessment

Introduction

Rivers, springs, and lakes without adopted Minimum Flows and Levels (MFLs) were evaluated during the Western Water Supply Plan (WWSP) process. This assessment provided a screening evaluation of the potential for water resource impacts in portions of the planning region where MFLs have not been adopted. This document reviews the basic methodology used to evaluate these waterbodies without adopted MFLs within the WWSP region followed by a summary of the results.

Methodology

Reference conditions for the waterbodies without adopted MFLs were calculated using the NFSEG model pumps off (PO) scenario. Predicted river flows and spring flows under this reference condition were compared to the simulated withdrawal conditions at the 2045 planning horizon. Rivers and springs with a simulated groundwater flow reduction greater than or equal to 10% from PO to 2045 were identified. The change in aquifer level from the PO to 2045 projection was used to evaluate lakes and was based on lake specific criteria.

A 10% reduction in flow does not necessarily correspond to an ecological threshold beyond which harm would occur. Conversely, waterbodies experiencing less than a 10% reduction in flow may still experience significant harm. The 10% threshold does, however, provide a high level of ecological protection for environmental flows and highlights areas where resource constraints may occur (Richter et al. 2012).

Accounting for the unique hydrologic and ecological conditions of individual springs and linking changes in flow to a quantitative significant harm threshold occurs during MFL development. Subsequent versions of the WWSP will incorporate any newly adopted or reevaluated MFLs.

Results

Within the WWSP region, there were four river gages, 22 springs, and one lake assessed (Figure E1). Of these, there are 17 waterbodies that are meeting the 10% screening criteria at 2045 and 10 waterbodies that are exceeding the screening criteria at 2045 (Table E1; Figure E2). MFL development is still ongoing for the springs and river gages listed below.

The springs that are meeting the screening criteria in 2045 are Allen Mill Pond Springs, Anderson Spring, Bell Spring, Bonnet Spring, Hart Springs, Little River Spring, Otter Spring, Pothole Spring, Rock Bluff Springs, Rock Sink Spring, Royal Spring, Ruth Spring, Telford Spring, and Turtle Spring on the Middle Suwannee River. The river gage that is currently meeting the screening criteria is the Withlacoochee River near Pinetta. Additionally, Cherry Lake in Madison County is meeting the lake-specific screening criteria.

The springs that are exceeding the screening criteria in 2045 are Branford Spring, Charles Spring, Guaranto Spring, Hardee (Rosseter) Spring, Lime Sink Rise, Lime Spring, Pot Spring, and Suwanacoochee Spring on the Withlacoochee and Middle Suwannee Rivers. Additionally, the Suwannee River at Branford, the Suwannee River at Ellaville, and the Withlacoochee River near Lee also exceed the screening criteria at 2045.

Table E1: WWSP Waterbodies without Adopted MFLs Assessment Results

Waterbody Type	**Waterbody Name**	**County/Basin**	**Exceeds Screening Criteria at 2045**
Spring	Allen Mill Pond Springs	Middle Suwannee River	No
Spring	Anderson Spring	Middle Suwannee River	No
Spring	Bell Spring	Middle Suwannee River	No
Spring	Bonnet Spring	Middle Suwannee River	No
Spring	Branford Spring	Middle Suwannee River	Yes
Spring	Charles Spring	Middle Suwannee River	Yes
Lake	Cherry Lake	Madison	No
Spring	Guaranto Spring	Middle Suwannee River	Yes
Spring	Hardee (Rosseter) Spring	Withlacoochee River	Yes
Spring	Hart Springs	Middle Suwannee River	No
Spring	Lime Sink Rise	Middle Suwannee River	Yes
Spring	Lime Spring	Middle Suwannee River	Yes
Spring	Little River Spring	Middle Suwannee River	No
Spring	Otter Spring	Middle Suwannee River	No
Spring	Pot Spring	Withlacoochee River	Yes
Spring	Pothole Spring	Middle Suwannee River	No
Spring	Rock Bluff Springs	Middle Suwannee River	No
Spring	Rock Sink Spring	Middle Suwannee River	No
Spring	Royal Spring	Middle Suwannee River	No
Spring	Ruth Spring	Middle Suwannee River	No
Spring	Suwanacoochee Spring	Middle Suwannee River & Withlacoochee River	Yes
River	Suwannee River at Branford	Middle Suwannee River	Yes
River	Suwannee River at Ellaville	Middle Suwannee River	Yes
Spring	Telford Spring	Middle Suwannee River	No
Spring	Turtle Spring	Middle Suwannee River	No
River	Withlacoochee River near Lee	Withlacoochee River	Yes
River	Withlacoochee River near Pinetta	Withlacoochee River	No

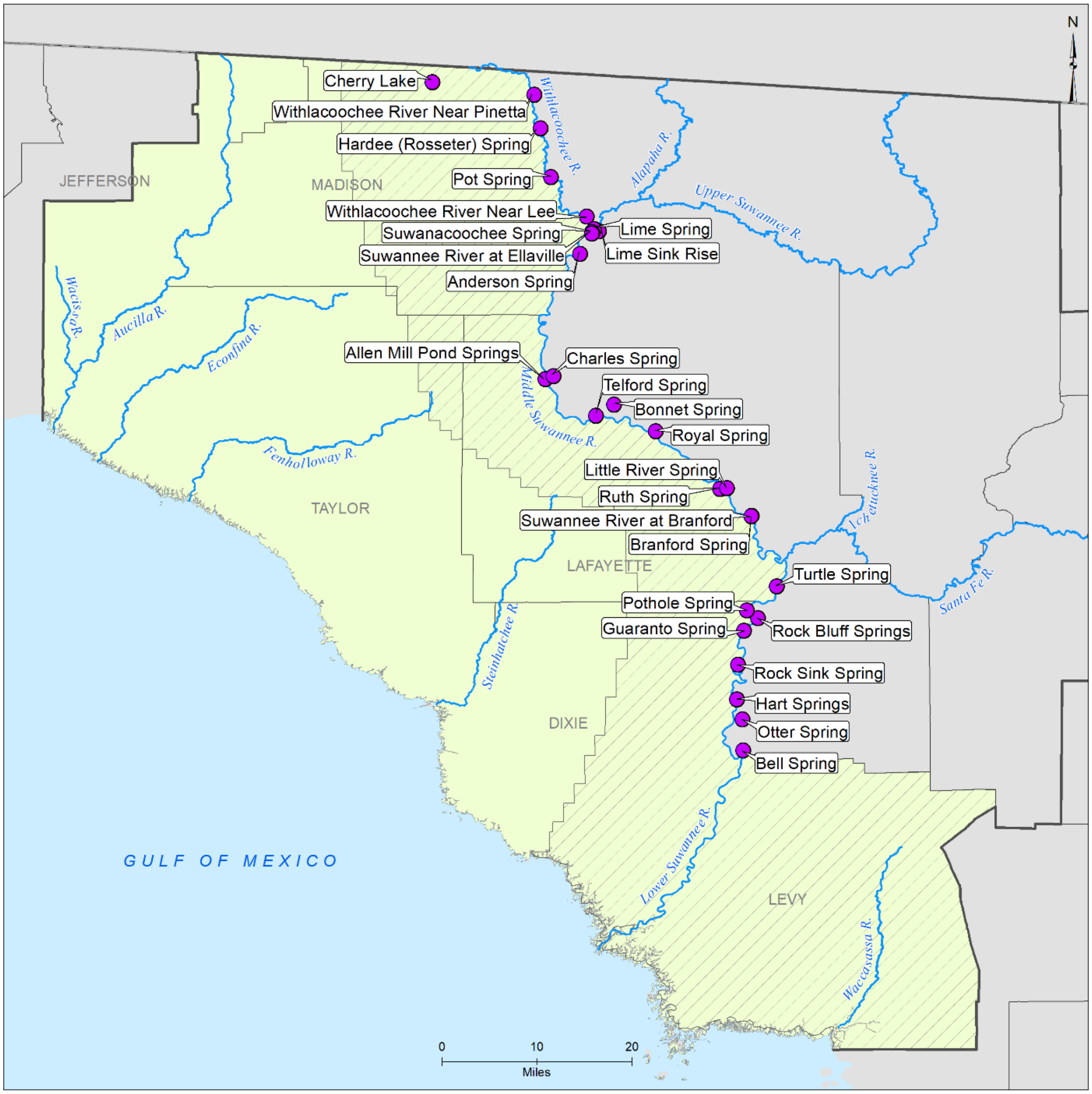

Figure E1: Names and locations of waterbodies without adopted MFLs in the WWSP region

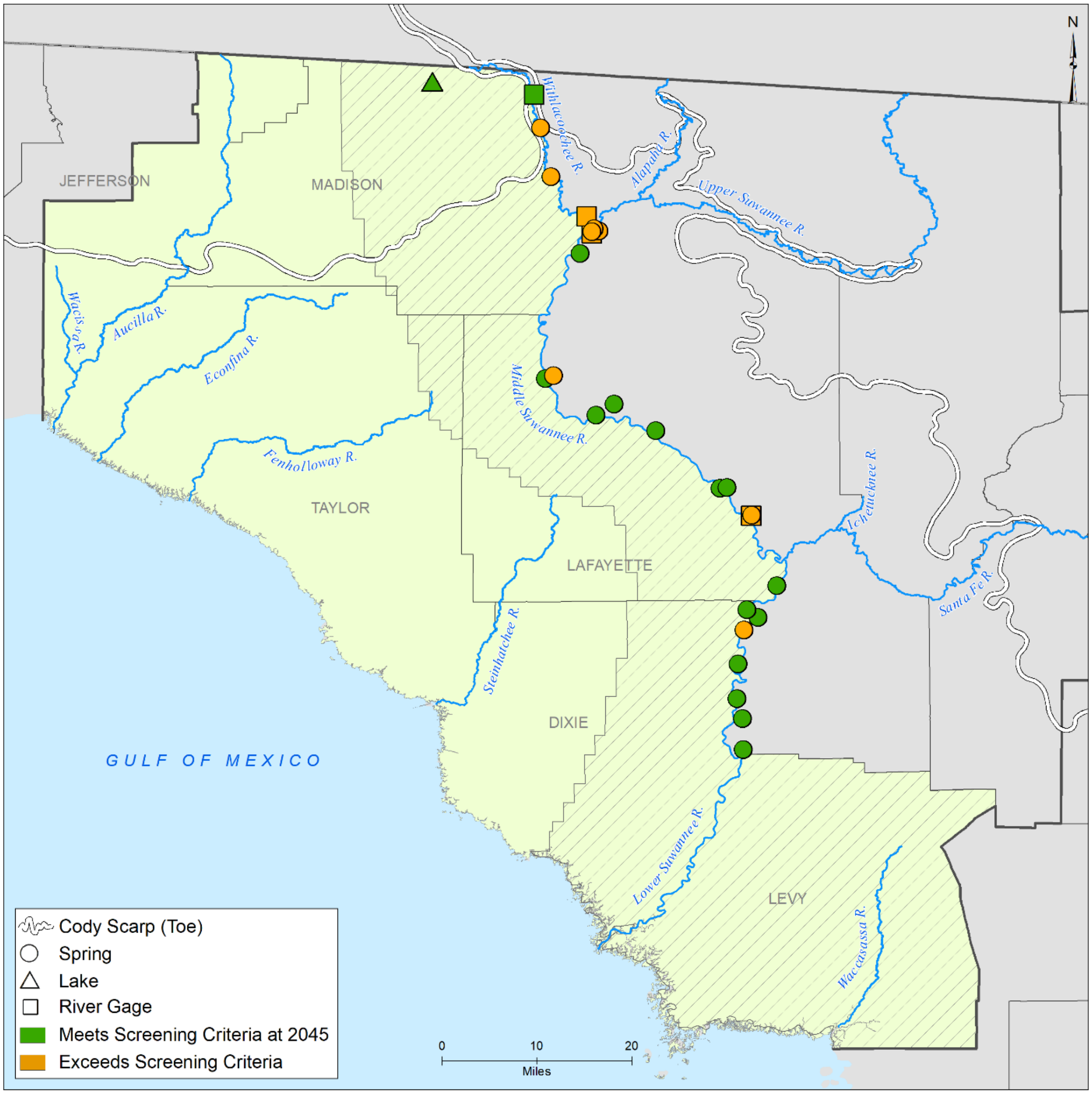

Figure E2: Waterbodies without adopted MFLs meeting or exceeding screening criteria

References

Richter, B.D., Davis, M.M., Apse, C. and Konrad, C. (2012), A PRESUMPTIVE STANDARD FOR ENVIRONMENTAL FLOW PROTECTION. River Res. Applic., 28: 1312-1321. https://doi.org/10.1002/rra.1511

Appendix F

Potential Adverse Change to Wetland Function Assessment

Introduction

As part of the Western Water Supply Plan (WWSP) development, the Suwannee River Water Management District (District) assessed the extent to which water resources and related natural systems may be impacted by projected increases in water use through 2045. Adverse change to wetland function is one component of the water resource assessment, along with saltwater intrusion/upwelling, minimum flows and levels (MFLs), priority waterbodies without MFLs, and water reservations. This information helps guide the delineation of water supply planning regions and the formulation of project options.

This document details the methods used to assess wetlands in the WWSP region associated with projected water demand at the planning horizon (2045) and the assessment results. Although significantly altered wetlands have occurred in the past due mainly to farmland conversion and urbanization, wetlands can be altered by factors other than groundwater withdrawals (e.g., modification of surface water hydrology). Therefore, this analysis focused exclusively on assessing the adverse change to existing wetlands due to projected increases in groundwater demand. The outcome of this assessment was used with other factors in determining whether traditional water supply (i.e., fresh groundwater) sources are sufficient to meet future water demands.

Background

In previous Water Supply Plans and Assessments, the probability of adverse change in wetland functions was determined using variations of the Kinser-Minno method incorporated into a GIS model (Kinser and Minno, 1995; Kinser et. al., 2003). The Kinser-Minno method provides an estimation of the magnitude (acres), degree (low to high), and spatial distribution of the potential future adverse change to wetlands throughout the District. The GIS model conducts a matrix analysis utilizing conditional statements dependent on soil permeability, sensitivities of plant communities to dewatering, and projected declines in the surficial aquifer (SA) to estimate the potential adverse change to individual plant communities that may occur if future water demands were met with traditional sources. The model was updated in 2003 and 2008, which included the depth to the Upper Floridan Aquifer (UFA) potentiometric surface as an additional screening parameter for the areas of unconfined UFA The additional steps of incorporating the depth to the UFA potentiometric surfaces with respect to the unconfined UFA provide further analysis depending on whether or not the area is hydraulically connected to the UFA and therefore, would or would not be influenced by changes in UFA levels. Since then, the model has received many minor updates such as the inclusion of a Digital Elevation Model (DEM).

The Kinser-Minno GIS Model was reviewed and updated in 2022. The soils data, vegetation layer, and the DEM data were updated. Another screening parameter, depth to water table or SAS, was introduced for the areas where the UFA is confined. An additional tool was added to the workflow to make the thresholds for depth to water table and depth to potentiometric surfaces adjustable. The updates to the model are described in detail in Attachment A.

Methodology

The 2022 Kinser-Minno tool (Attachment A) was used to simulate potential adverse change in wetlands based on increased groundwater withdrawals (drawdown) between current pumping (CP) and 2045 projected withdrawals. Due to the way in which the Kinser-Minno applies screening criteria, the tool was run using the pumps-off (PO) baseline conditions. Therefore, the tool used both PO to 2045 drawdown, and PO to CP drawdown. The difference in spatial and numerical results were subsequently used to estimate the effects of CP to 2045 drawdown. The area of potentially affected wetlands was summarized by county for the WWSP region. Furthermore, the Kinser-Minno tool predicts low, moderate, and high potential adverse change, but only moderate and high potential adverse changes were considered in the analysis.

Results

The analysis identified a total of 23,162 acres of wetlands with a moderate to high potential for adverse change based on increased groundwater withdrawals between CP and the 2045 projection (Table F1 & Figure F1). Levy County had the highest potential for adverse wetland change with 11,283 acres identified. The lowest potential for adverse wetland change was in Jefferson County, with 494 acres identified.

Table F1. Land area (acres) by county with a moderate to high potential for adverse change to wetlands in the WWSP region

County	Wetland Area (acres)
Dixie	1,722
Jefferson	494
Lafayette	3,919
Levy	11,283
Madison	5,127
Taylor	618
Total	**23,162**

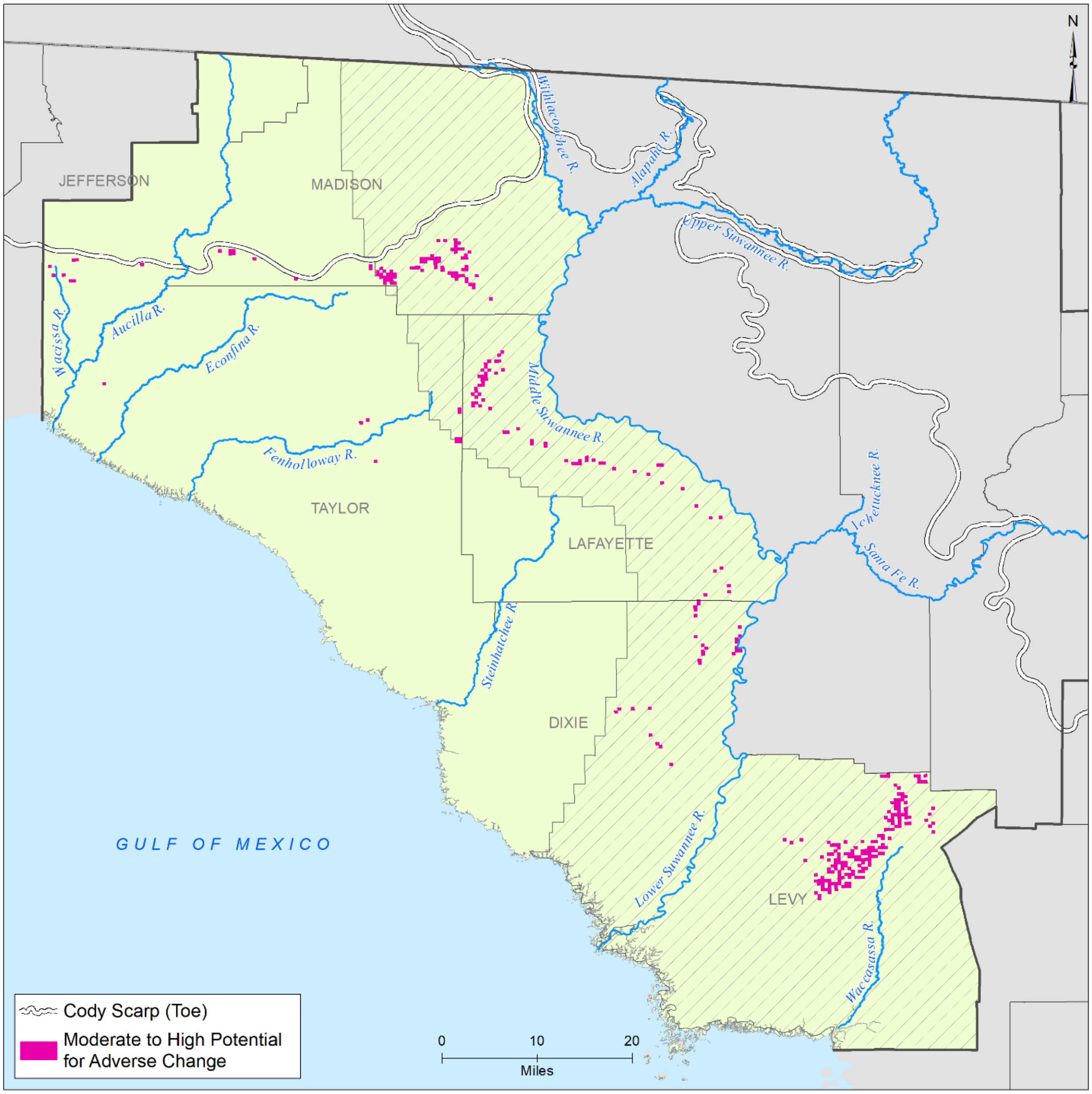

Figure F1. Locations with moderate to high potential for adverse change to wetlands

References

Kinser, P. and M. Minno. (1995). Estimating the Likelihood of Harm to Native Vegetation from Groundwater Withdrawals. SJRWMD Technical Publication SJ95-8.

Kinser, P., M. Minno, P. Burger, and S. Brown. (2003). Modification of Modeling Criteria for Application in the 2025 Assessment of Likelihood of Harm to Native Vegetation. SJRWMD Professional Paper SJ2003-PP3.

See Attachment A

Attachment A
2022 Kinser-Minno Wetland Assessment Tool

12/9/22 Update

by

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Fatih Gordu, PhD, P.E

Ed Carter

Andrew Sutherland, Ph.D.

St. Johns River Water Management District
Palatka, Florida

2022

Add

The St. Johns River Water Management District was created in 1972 by passage of the Florida Water Resources Act, which created five regional water management districts. The St. Johns District includes all or part of 18 counties in northeast and east-central Florida. Its mission is to preserve and manage the region's water resources, focusing on core missions of water supply, flood protection, water quality and natural systems protection and improvement. In its daily operations, the district conducts research, collects data, manages land, restores and protects water above and below the ground, and preserves natural areas.

This document is published to disseminate information collected by the district in pursuit of its mission. Electronic copies are available at *www.sjrwmd.com/documents/technical-reports* or by calling the district at the number below.

Scientific Reference Center
St. Johns River Water Management District
4049 Reid Street
Palatka, FL 32177
386-329-4500

Introduction

One of the responsibilities of the St. Johns River Water Management District (District) is to conduct "resource assessments, including identification of regionally significant water resource issues and problems within the "District" (Section 62-40.520, *Florida Administrative Code).* As part of this responsibility, the District developed a geoprocessing workflow as a ModelBuilder tool, an application to create and manage geoprocessing models within ArcGIS (ESRI, 2022), in 1995 to predict the likelihood of potential adverse change to wetlands, lakes and related vegetation from projected groundwater withdrawals within the district (Kinser and Minno 1995; Kinser et al. 2003). This geoprocessing tool, also known as Kinser-Minno Geographic Information System (GIS) tool, helps guide the delineation of water resource caution areas and the formulation of project options.

The Kinser-Minno GIS tool provides an estimation of the magnitude (acres), degree (high vs. low), and spatial distribution of the potential future adverse change to wetlands throughout the District. In previous District water supply assessments, the probability of adverse change in wetland functions was determined using variations of the Kinser-Minno method. The tool was updated in 2003 and 2008, which included the depth to the Upper Floridan aquifer (UFA) potentiometric surface as an additional screening parameter for the areas of unconfined UFA. Since then, the tool received many minor updates such as the inclusion of a Digital Elevation Model (DEM). The most recent version prior to this update is the 2018 Kinser-Minno model builder found in the *Vegharm2018* GIS toolbox.

The Kinser-Minno GIS tool conducts a matrix analysis utilizing conditional statements dependent on soil permeability, sensitivities of plant communities to dewatering, and projected declines in the surficial aquifer system (SAS) to estimate the potential adverse change to individual plant communities that may occur if future water demands were met with traditional sources. The additional step of incorporating the depth to the UFA potentiometric surfaces with respect to the unconfined UFA provides further analysis depending on whether or not the area is hydraulically connected to the UFA and therefore, would or would not be influenced by changes in UFA levels.

This report describes the recent improvements including addition of another screening parameter, the depth to water table or SAS, for the areas of confined UFA, updating soil, vegetation and topographic layers and making the thresholds adjustable within the tool. These updates are referred to as the 2022 Kinser-Minno tool.

Existing Data Review

The most recent documentation and in-depth information regarding the development of the 2018 Kinser-Minno tool was found in Appendix H of the 2022 Central Springs/East Coast (CSEC) Regional Water Supply Plan (SJRWMD 2022). District staff reviewed the tool, input data, and other documentation to determine if updates to the tool were required. The reviewed tool was referred to as *vegharm2018* in the CSEC plan and is shown in Figure 1.

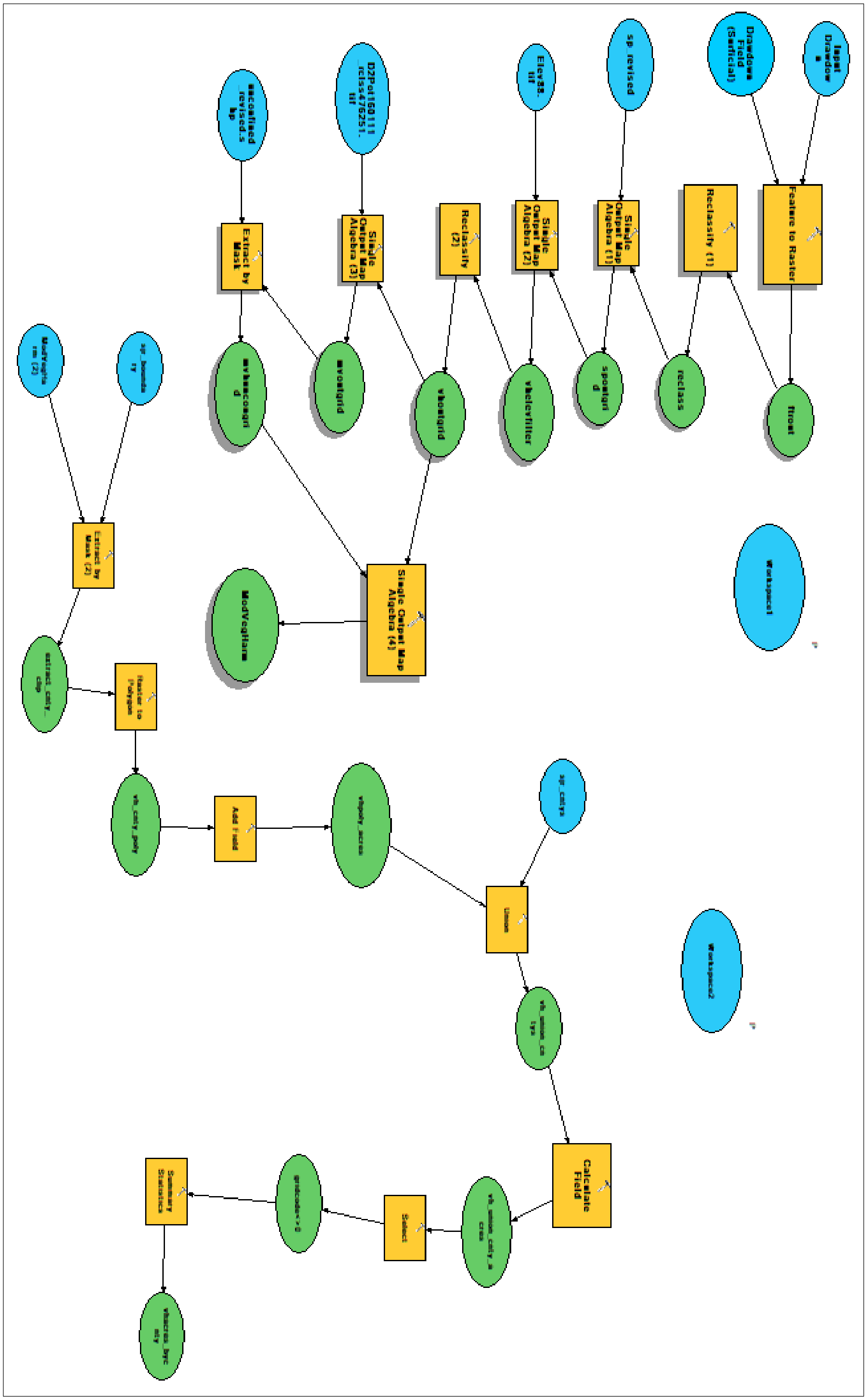


Figure 1. The 2018 Kinser-Minno model builder

The following GIS data, used in the tool listed in the CSEC Appendix H, was reviewed.

1. 2012 Soil Survey Geographic Database for Florida (SSURGO)
2. 2009 Land Cover/Land Use GIS Data Layer, SJRWMD
3. Unconfined Floridan Aquifer System Boundary, United States Geologic Survey (Miller 1986)
4. 2008 Digital Elevation Model for the State of Florida, Florida Department of Environmental Protection (FDEP)
5. May 2014 UFA Potentiometric Surface GIS Data Layer, SJRWMD

Soil Permeability Classification

The 2012 Soil Survey Geographic Database for Florida (SSURGO) was reported to be used to derive the soil permeability classification layer. Soil permeability refers to the capacity of a soil to allow water to pass through. This is a key component for assessing wetlands because it dictates how quickly an area of sensitive vegetation is dewatered when the water table declines.

The soil permeability was used to create the integrated soil and vegetation layer as an input in the workflow. The National Resources Conservation Service (NRCS) provides estimates of the inches of water per hour that can move downward through a saturated soil based on laboratory measurements. The soil permeability layer was made into a raster and then grouped into high, moderate, and low categories based on infiltration rate, as shown in Table 1.

Table 1. Soil Permeability Classification

Soil Permeability Class	Soil Permeability Rate (inches/hour)	CSEC RWSP Class
Very Slow	Less than 0.06	Low sensitivity to drawdown (1)
Slow	0.06 – 0.2	Low sensitivity to drawdown (1)
Moderately Slow	0.2 – 0.6	Low sensitivity to drawdown (1)
Moderate	0.6 – 2.0	Moderate sensitivity to drawdown (2)
Moderately Rapid	2.0 – 6.0	Moderate sensitivity to drawdown (2)
Rapid	6.0 – 20	High sensitivity to drawdown (3)
Very Rapid	Greater than 20	High sensitivity to drawdown (3)

Vegetation Classification

The SJRWMD 2009 Land Cover/Land Use GIS Data Layer was used to create the integrated soil and vegetation layer as an input in the workflow. This layer was used to identify current wetland areas to be screened for sensitivity to SAS drawdown. Areas that are not wetlands are excluded from the screening process. The layer was first made into a raster. Then, the vegetation types were classified into high, moderate, or low sensitivity as seen in Table 2.

Table 2. Classification of Sensitive Vegetation Types

Land Use Code	CSEC RWSP Class 1 = Low Sensitivity 2 = Moderate Sensitivity 3 = High Sensitivity
4100: Upland Coniferous Forests	1
4110: Pine Flatwoods	1
4120: Longleaf Pine - Xeric Oak	1
4130: Sand Pine	1
4140: Pine - Mesic Oak	1
4190: Hunting Plantation Woodlands	1
4200: Upland Hardwood Forests	2
4210: Xeric Oak	1
4270: Live Oak	1
4271: Oak - Cabbage Palm Forests	1
4280: Cabbage Palm	2
4340: Upland Mixed - Coniferous / Hardwood	2
4400: Tree Plantations	1
4410: Coniferous Plantations	2
4420: Hardwood Plantations	1
4430: Forest Regeneration Areas	2
6100: Wetland Hardwoods Forests	3
6110: Bay Swamps	3
6111: Bayhead	3
6120: Mangrove Swamps	1
6130: Gum Swamps	3
6140: Titi Swamps	3
6150: Stream and Lake Swamps (bottomland)	3
6170: Mixed Wetland Hardwoods	3
6172: Mixed Shrubs	3
6180: Cabbage Palms	3
6181: Cabbage Palm Hammock	3
6182: Cabbage Palm Savannah	3
6200: Wetland Coniferous Forests	3
6210: Cypress	3
6215: Cypress- Domes/Heads	3
6216: Cypress - Mixed Hardwoods	3

Land Use Code	**CSEC RWSP Class** 1 = Low Sensitivity 2 = Moderate Sensitivity 3 = High Sensitivity
6220: Pond Pine	3
6240: Cypress - Pine - Cabbage Palm	3
6250: Hydric Pine Flatwoods	3
6260: Pine Savannah	3
6300: Wetland Forested Mixed	3
6400: Vegetated Non-Forested Wetlands	3
6410: Freshwater Marshes	3
6411: Freshwater Marshes – Sawgrass	3
6420: Saltwater Marshes	1
6430: Wet Prairies	3
6440: Emergent Aquatic Vegetation	3
6460: Mixed Scrub-shrub Wetland	3
6500: Non-Vegetated Wetlands	3
6510: Tidal Flats	1
6520: Shoreline	1
6530: Intermittent Ponds	3
6600: Salt Flats	1

Integrated Soil and Vegetation

The classified soil and classified vegetation layers were integrated to create a single raster file to be used as an input into the workflow. This method is shown in Table 3.

This layer assigns sensitivity ranks to vegetation communities that have high sensitivity to water table drawdown, which is the wetlands (Table 3).

Table 3. Potential for Wetland Change Classification (Integrated Soil Permeability and Vegetation Type Sensitivity)

	High Vegetation Sensitivity	Moderate Vegetation Sensitivity	Low Vegetation Sensitivity
High Soil Permeability	High	Low	Low
Moderate Soil Permeability	Moderate	Low	Low
Low Soil Permeability	Low	Low	Low

Drawdown and Potential for Wetland Change Classification in Unconfined Areas

Regional groundwater models are used to predict change in the SAS elevation (drawdown). The drawdown shapefile is rasterized and then reclassified as follows; greater than 1.2 ft as a 3 (high), 0.35 to 1.2 ft as a 2 (moderate), and less than 0.35 ft as a 1 (low). The integrated soil and vegetation classification layer and the projected drawdown in the SAS were combined into a layer for potential future wetland change classification (Table 4).

Table 4. Potential Future Wetland Change Classification (Confined) (Integrated Potential for Wetland Change and Projected SAS Drawdown

	High Potential for Wetland Change	Moderate Potential for Wetland Change	Low Potential for Wetland Change
Projected SAS Drawdown > 1.2 ft	High	High	Low
Projected SAS Drawdown from 0.35 – 1.2 ft	High	Moderate	Low
Projected SAS Drawdown < 0.35 ft	Low	Low	Low

Depth to Unconfined Aquifer

Within the areas where the UFA is unconfined or exposed at the surface, the depth from land surface to the 2014 potentiometric surface was calculated. The depth from land surface to the potentiometric surface layer is combined with the potential for wetland change layer (Table 5) to determine changes to wetlands in areas where the UFA is unconfined.

Table 5. Potential Future Wetland Change Classification above the Unconfined UFA (Integrated Potential for Future Change for Confined Areas and Depth to the Unconfined UFA) (Kinser and Minno 2003)

	High Potential for Future Change	Moderate Potential for Future Change
0 – 15 ft to Unconfined UFA	High	Moderate
15 – 30 ft to Unconfined UFA	Moderate	Low
>30 ft to Unconfined UFA	Low	Low

Output

The final output of these combined layers was a raster file titled *modvegharm*. This file shows the areas for potential adverse change to wetland function with respect to drawdown. Areas that are classified as three have the highest potential for adverse change while areas classified as one have the lowest potential for adverse change. This raster output is put into the second portion of the model builder.

The second portion of the tool uses the SJRWMD boundary and the county boundaries to determine the acreage in each county for each classification. The output from the second portion of the tool is presented in a geodatabase table.

Tool Updates

After completing a thorough review of the tool that was presented in the 2022 CSEC Appendix H, SJRWMD determined updates were needed, including an additional screening parameter to further refine the results to better determine which wetlands had the highest potential for adverse impacts due to future groundwater drawdown. The section below outlines the updates that were made to the 2018 tool version.

Data Updates

As shown in Table 6, the soils data, vegetation layer, and DEM were updated. The soils and vegetation classifications were unchanged and are still grouped based on infiltration rate (high, moderate, low). The new soils and the vegetation layer were integrated to create the new input (Figure 2).

Table 6. GIS Data Updates Made to the Kinser-Minno Tool

	2018 Model	**2022 Model**
SSURGO Soils	2012 SSURGO soils	2017 SSURGO soils layer
Vegetation Layer	2009 Statewide Cooperative Land Cover	Compilation of of datasets 2019-2020 SRWMD and 2013-2016 SJRWMD
DEM	2008 Florida DEM	15m Florida DEM

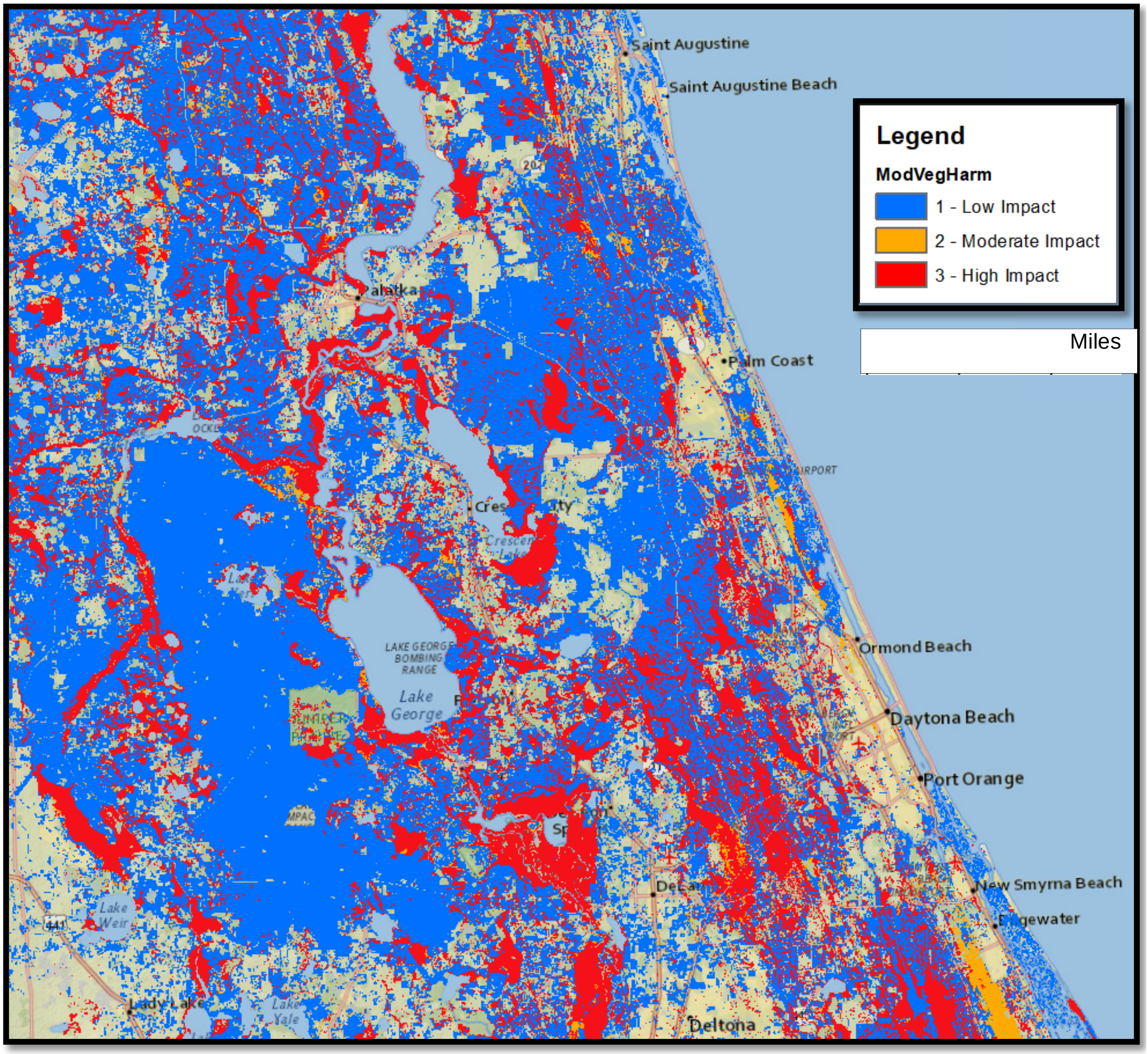


Figure 2. A portion of the District showing the updated integrated soils and vegetation layer. Three indicates high potential impact to wetlands, two for moderate impact, and one for low impact.

Depth to Water Table Update

The 2022 Kinser-Minno tool incorporated an additional screening parameter for the areas where the UFA is confined. Wetland vulnerability was further classified based on depth to water table or SAS (Table 7). This additional step of incorporating the depth to water table in the areas of confined UFA provides further screening to ensure the area is hydraulically connected to the SAS and therefore, would or would not be influenced by changes in SAS levels. The depth to water table used in this analysis was calculated using the simulated SAS levels from the 2009 simulation of North Florida Southeast regional groundwater model (NFSEG v1.1).

Vulnerability classes of High, Moderate and Low were set based on a review of extinction depths for different soil and land cover types estimated by Shah et al. (2007). Vulnerability thresholds of "Moderate" and "High" are set for sites where the water table is below 20 and 10 ft, respectively.

Vulnerability classes are also different for wetlands with high versus moderate potential for future change based on other criteria (i.e., soil permeability and vegetation type; Table 7). A feature was added to the workflow to allow users to adjust the depth to water table threshold.

Table 7. Potential Future Wetland Change Classification above the Confined UFA (Integrated Potential for Future Change for Confined Areas and Depth to water table)

	High Potential for Future Change	Moderate Potential for Future Change
0 – 10 ft to Water Table	High	Moderate
10 – 20 ft to Confined UFA	Moderate	Low
>20 ft to Confined UFA	Low	Low

2022 Kinser-Minno Workflow

Figure 3 shows the 2022 updated Kinser-Minno tool, which includes the updated soils data, vegetation layer, DEM, and depth to water table. This tool used the drawdown shapefile to create a raster. The raster is reclassified, which means having the values grouped, into three classes. These three classes are the basis for the computations in the model. The rasterized drawdown layer is then combined with the integrated soils and vegetation raster which is also reclassified into three classes. The two are combined based on a conditional statement to create a new output raster. This new output is then combined with the digital elevation data (DEM) to remove areas of 10ft or less.

This process step is where the tool branches off into two sections. One section is for the unconfined aquifer. This portion reclassifies the depth to the UFA potentiometric surfaces. The other section is for the confined aquifer. This portion of the workflow reclassifies the depth to water table (surficial aquifer). After each of these layers are reclassified within their respective areas, they are merged based on a conditional statement to create a raster layer that depicts the areas with potential adverse impact to wetlands. The output raster goes into the next portion of the model builder, which takes the potential adverse impact to wetlands raster, and creates a table that calculates the acreage of the adverse impact intensity (high, moderate, low) within each county in the area of interest.

Results

The North Florida Regional Water Supply Plan was the first project for which the updated tool was utilized. The tool utilized the output from the NFSEG v1.1 model simulation. The Kinser-Minno tool results include the updated soils, vegetation, DEM inputs and depth to water table. Table 8 shows the results for utilizing the Pumps Off (PO) to 2045 pumping scenario results as input to the 2022 Kinser-Minno tool. Figure 4 displays the results of the scenario.

Table 8. Comparison of the results for acres of potential adverse wetland impacts for each county in the of the NFRWSP region. The results are for the PO to 2045 NFSEG shapefile.

County	**Grid 1**	**Grid 2**	**Grid 3**	**Grid 2&3**
ALACHUA	103618	540	247	787
BAKER	2273			0
BRADFORD	1937			0
CLAY	38545	1544	371	1915
COLUMBIA	42656	62	62	124
DUVAL	27964			0
FLAGLER	133114	7413	432	7846
GILCHRIST	76807	1050	1473	2523
HAMILTON	26101	424	758	1182
NASSAU	35662	62		62
PUTNAM	114352	2222	185	2408
ST. JOHNS	98782	1114	494	1608
SUWANNEE	108109	317	1034	1351
UNION	3478			0
Total	813397	14950	5251	20201

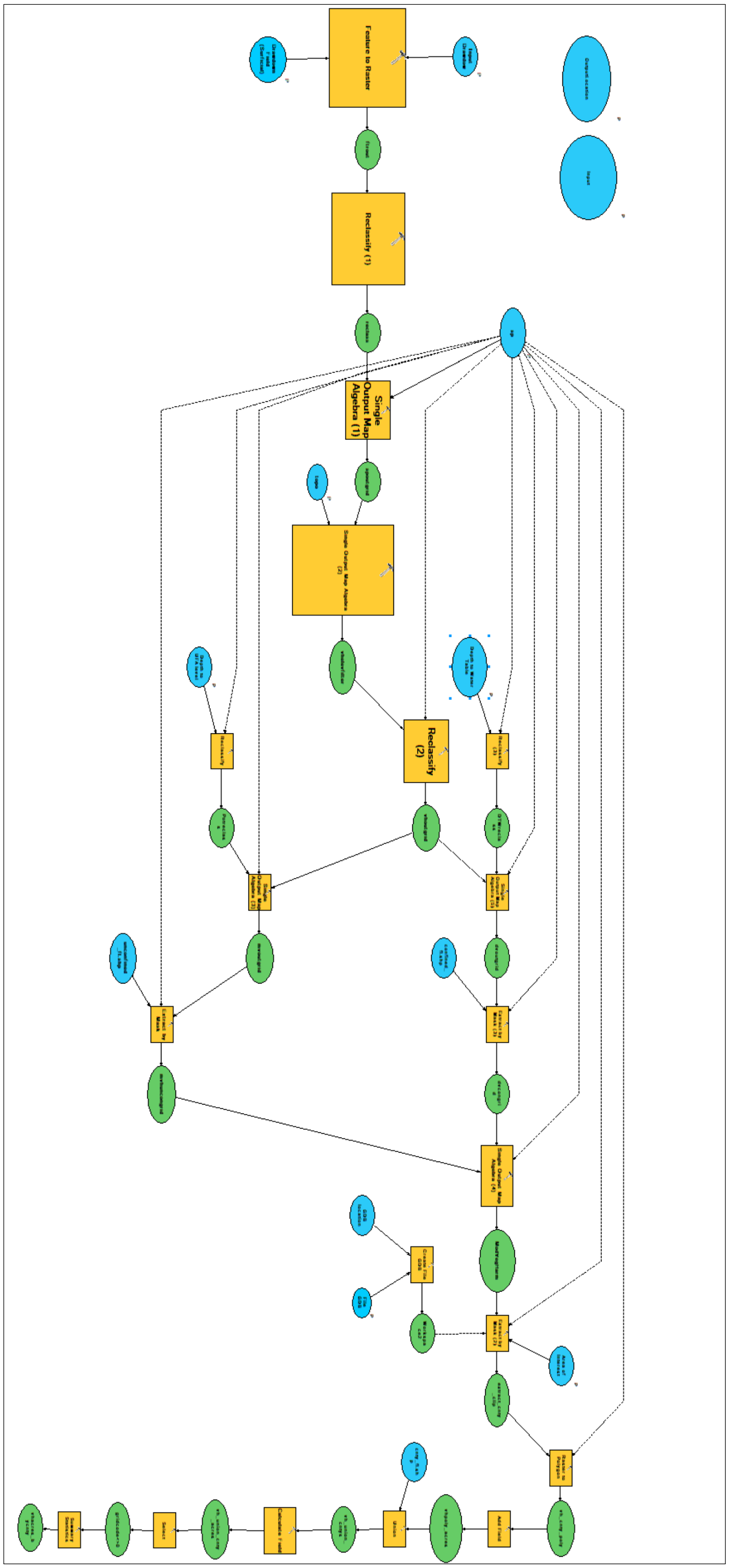


Figure 3. The updated 2022 Kinser-Minno Model Builder.

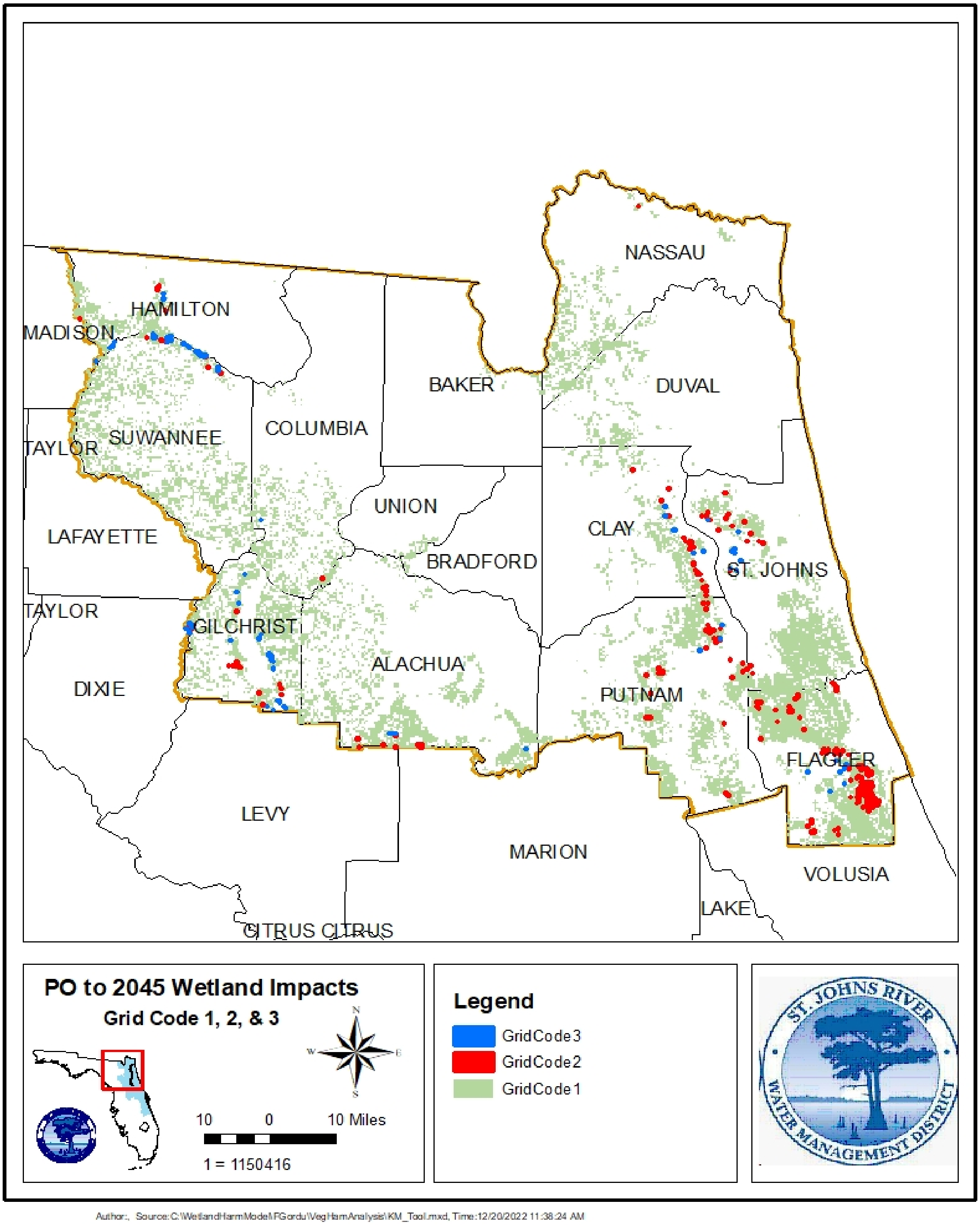
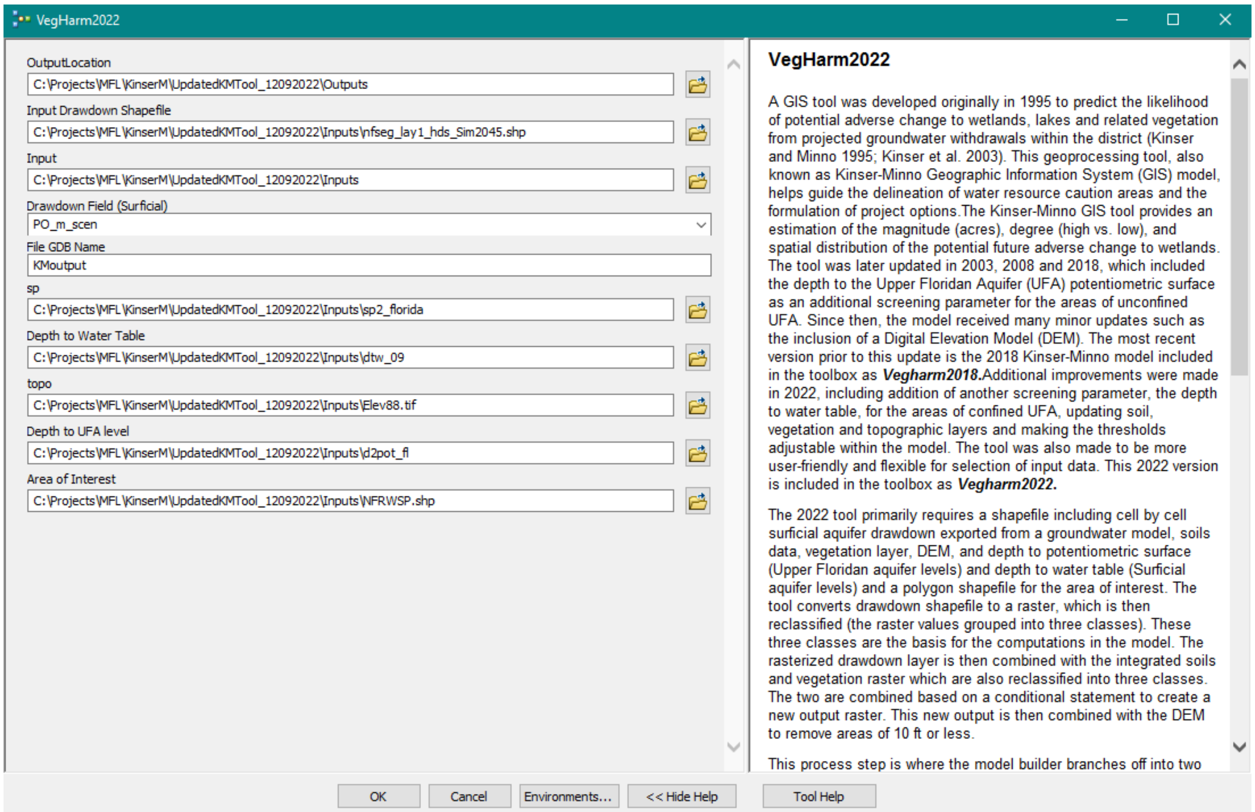


Figure 4. Wetlands at risk of adverse change due to projected withdrawal within the PO to 2045 NFSEG drawdown shapefile for the NFRWSP area.

Kinser Minno Wetland Assessment Tool 2022 12/9/22 Revision

1. Open KM Tool.mxd
2. Add "KMVegharm2022.tbx" to Arctoolbox if it is not already there.
3. Activate spatial analyst extension if it is not already active.
4. Double click "VegHarm2022". The following window will pop up.



5. Enter the output folder location where the results will be stored. You can create your own folder or use "Outputs" folder already created.
6. Enter the surficial aquifer system (SAS) drawdown file location. The SAS drawdown from NFSEG model already exists in the input folder.
7. Enter the input folder location. This folder already exists so you just need to put the path there.
8. Choose the SAS drawdown scenario. For NFRWSP, *PO_m_scen* is for pumps off minus 2045 and CP_*m_scen* is Current Pumping minus 2045 in "*nfseg_lay1_dd_nfrwsp.shp*".
9. Enter the name of the output geodatabase file the tool will create and save into output folder. You can keep the name as it is or change it if you want.
10. Enter soil permeability layer location. This layer already exists in the input folder. Change it if you want to use a different one.
11. Enter depth to water table layer location. This layer already exists in the input folder. Change it if you want to use a different one.
12. Enter DEM location. This layer already exists in the input folder. Change it if you want to use a different one
13. Enter depth to UFA level layer location. This layer already exists in the input folder. Change it if you want to use a different one

14. Enter the location of a shapefile including the area of interest. NFRWSP region layer already exists in the input folder. Change it if you want to run the tool for a different area
15. Hit OK.
16. Once it is successfully run, add the output files stored in the output gdb file into the mxd.

Important Note

Due to the way the screening criteria are applied, the input SAS drawdowns should be based on pumps off condition. The tool will not correctly predict the likelihood of potential adverse change to wetlands from projected groundwater withdrawals if drawdowns are calculated using a baseline other than pumps-off condition. If a different baseline is desired, the following steps should be followed:

For example, assume the prediction of likelihood of potential adverse change to wetlands from 2020 to 2045 is desired:

1. Run the tool using the drawdown from pumps-off to 2020 (2020 results)
2. Run the tool using the drawdown from pumps-off to 2045 (2045 results)
3. Calculate the difference between the 2045 results and the 2020 results

Disclaimer

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Appendix G

Coastal Resiliency Assessment

Purpose

The Suwannee River Water Management District (District) conducted a planning level assessment to determine if fresh water supplies in coastal counties (Dixie, Jefferson, Levy, and Taylor) are likely to become constrained due to sea level rise (SLR) throughout the planning horizon.

Methods

Based on guidance established by the Resilient Florida Grant Program (section 380.093, F.S.), this planning level assessment evaluated the effects of both intermediate-low and intermediate-high SLR projections reported by the National Oceanic and Atmospheric Administration (NOAA) for the year 2050 (Sweet et al., 2017). The University of Florida (UF) GeoPlan center developed a model to map NOAA's SLR projections by county in the State of Florida, which added the projected increase in sea levels for a range of scenarios to mean higher high water (MHHW) conditions (UF GeoPlan Center, 2020). The GeoPlan Center's model indicated that SLR projections range from 0.8 to 1.0 ft and 1.9 to 2.1 ft for the intermediate-low and intermediate-high projections, respectively, across the state of Florida. In the Western Water Supply planning (WWSP) region, the intermediate-low projection represents 0.9 ft of SLR, and the intermediate-high projection represents 1.9 ft of SLR. This assessment used the GeoPlan Center's hydro-connectivity inundation model that excluded isolated inundated areas that were not hydrologically connected to an ocean or bay via a major waterway. Using geographic information systems (GIS) software, the spatial extent of surface inundation for the intermediate-low and intermediate-high SLR scenarios was intersected with the locations of current water treatment plants (WTP), wastewater treatment plants (WWTP), and permitted consumptive use wells to determine potential constraints posed by SLR. For any infrastructure that directly intersected with the inundation surfaces, site-specific information was gathered and summarized in a table to assist with the development of any necessary water supply development (WSD) or water resource development (WRD) project.

Results

Surface inundation due to projected SLR at both the intermediate-low and intermediate-high scenarios is expected to occur across all coastal counties in the WWSP region (Figure G1). The resiliency assessment indicated that no WTPs or WWTPs are likely to be constrained by projected surface inundation due to SLR at both the intermediate-low and intermediate-high projections (Figures G2-G5). Four consumptive use wells are likely to be constrained by projected SLR in both scenarios (Table G1; Figures G2-G5). Site-specific information will be used to determine the need for WSD or WRD projects to mitigate or prevent adverse impacts caused by projected SLR.

Table G1. Impacted consumptive use wells at intermediate-low and intermediate-high SLR projections

County	Use Type	Status	Aquifer	Permit ID	Station ID
Levy	LRA[a]	Active	UFA	221192	-151320001
Levy	CII[b]	Active	UFA	217164	-131306004
Levy	LRA	Active	UFA	219520	-111335001
Taylor	CII	Active	UFA	218799	-70736001

[a]Landscape/Recreational
[b]Commercial/Industrial/ Institutional

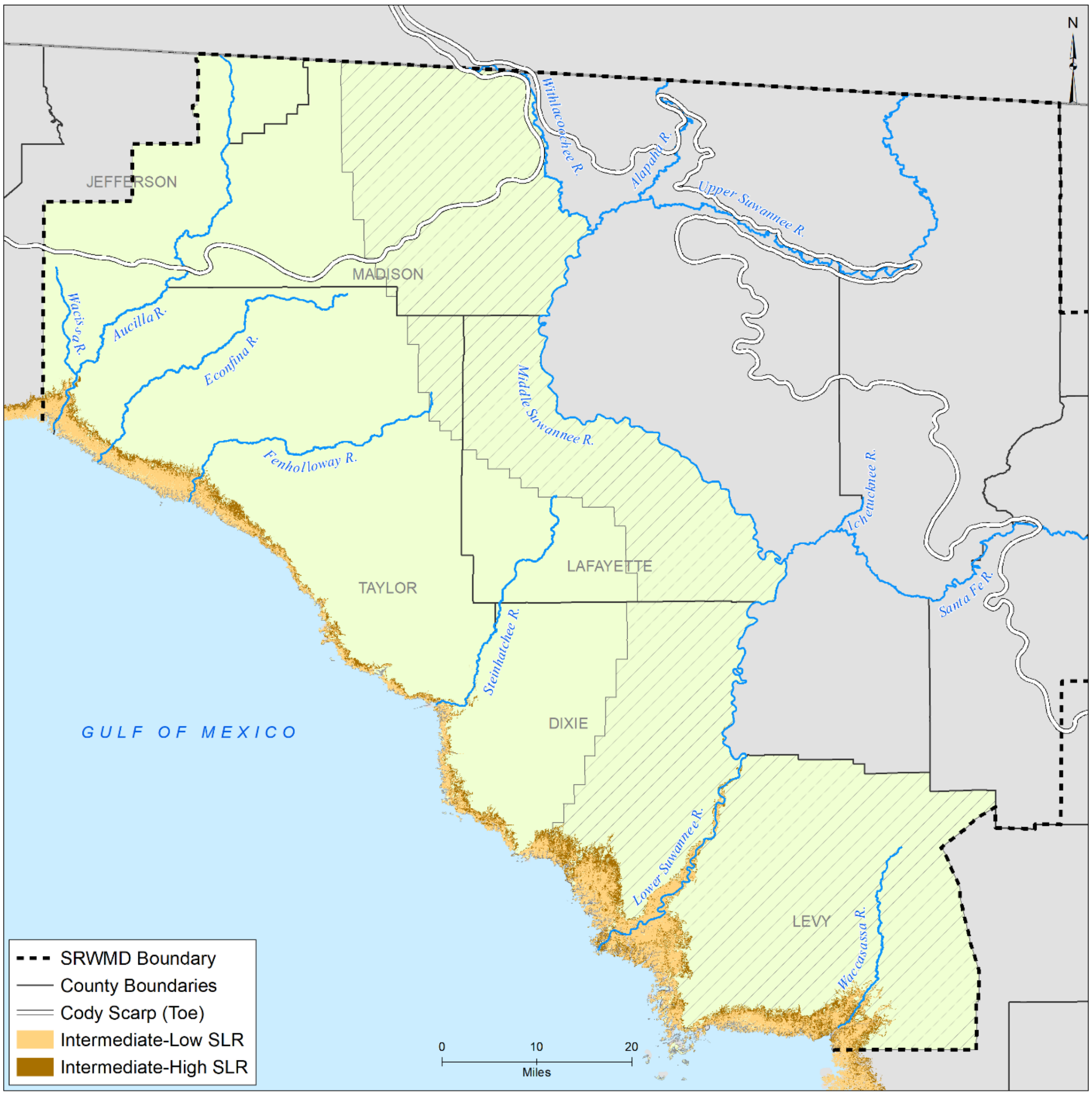

Figure G1. Overview of projected SLR inundation surfaces in the WWSP region

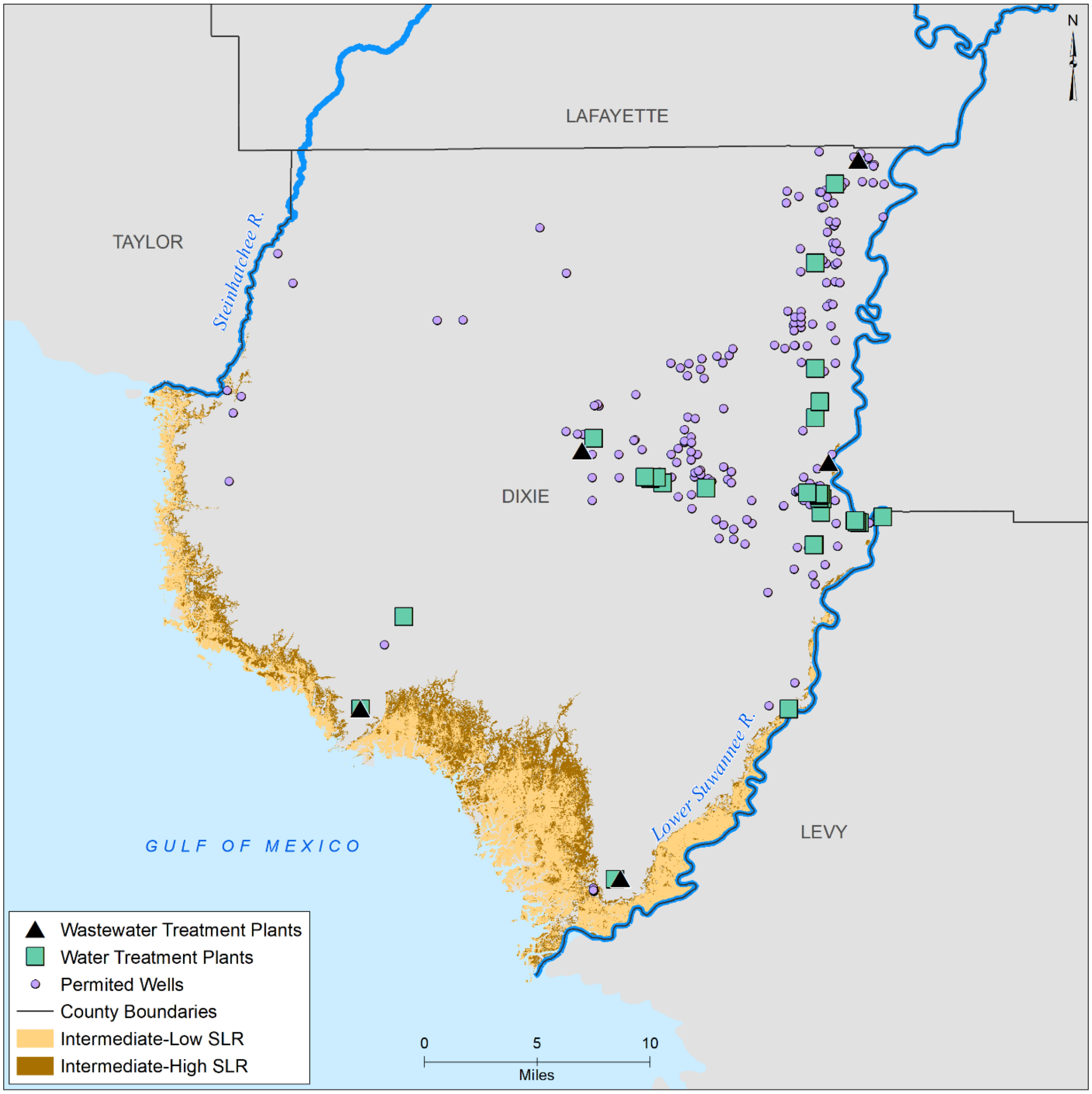

Figure G2. Map of projected SLR inundation surfaces and water supply infrastructure in Dixie County

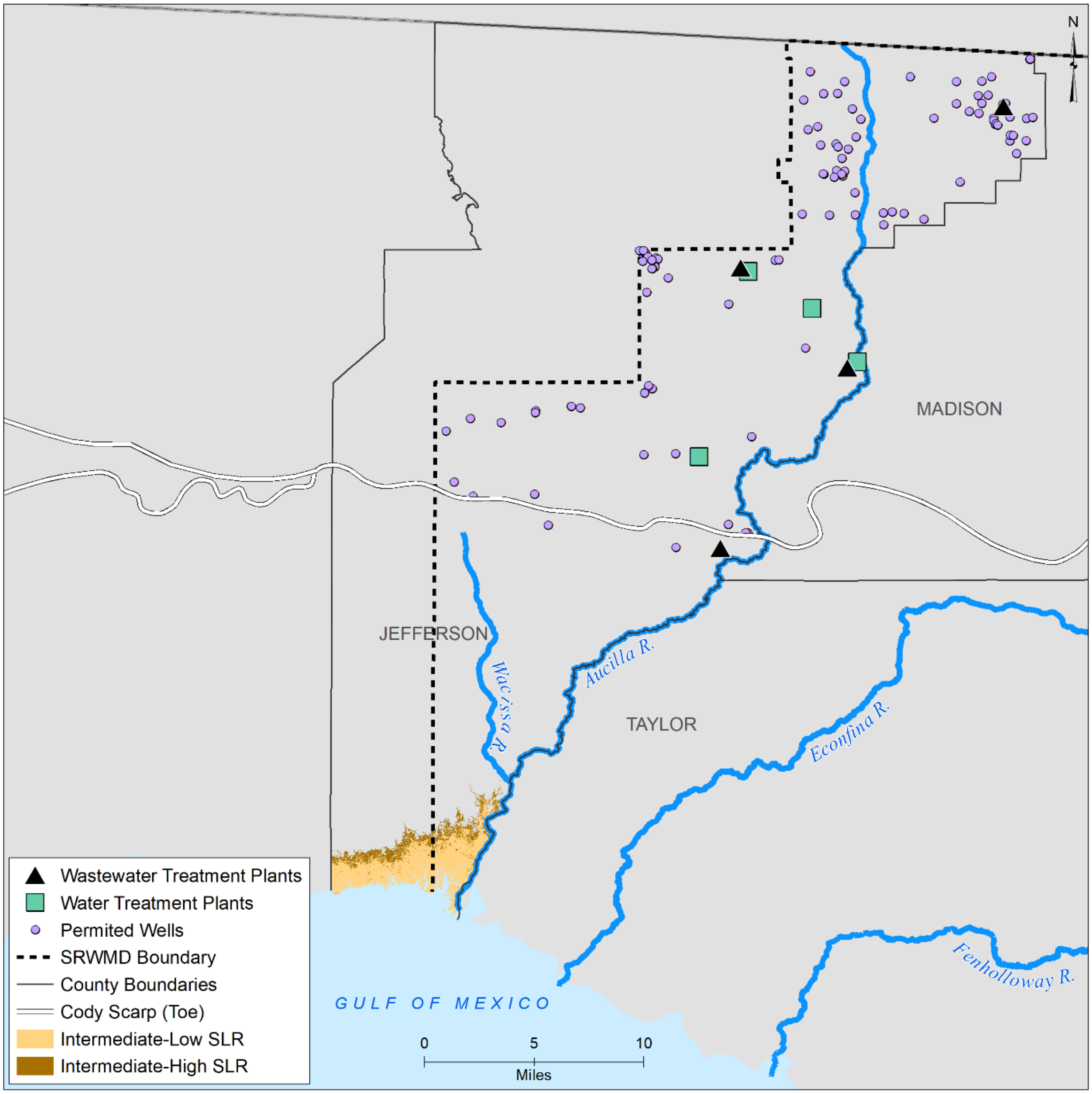

Figure G3. Map of projected SLR inundation surfaces and water supply infrastructure in Jefferson County

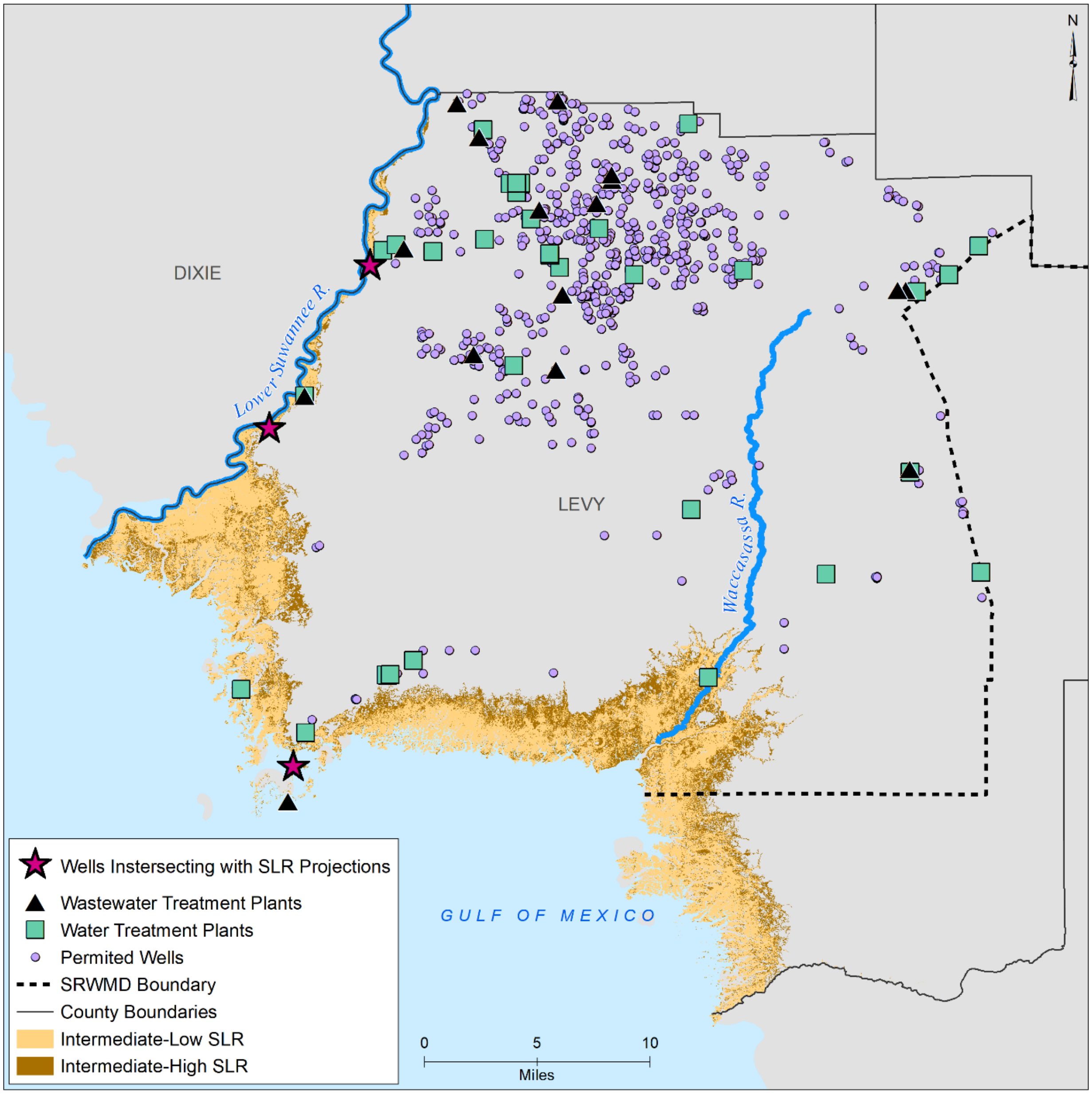

Figure G4. Map of projected SLR inundation surfaces and water supply infrastructure in Levy County

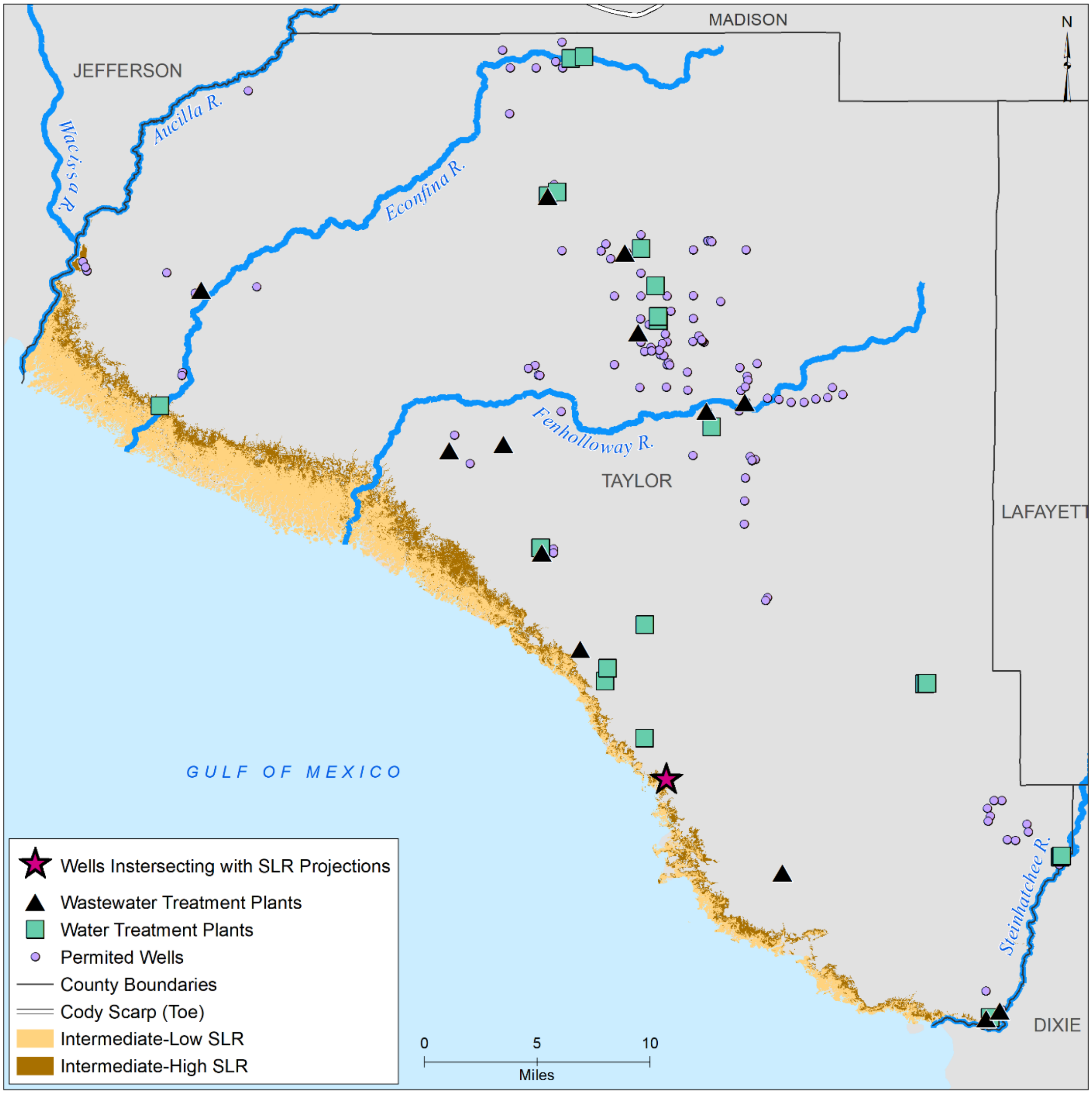

Figure G5. Map of projected SLR inundation surfaces and water supply infrastructure in Taylor County

References

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Appendix H

Land Reclamation Assessment

Introduction

Mines provide an opportunity for water supply development (WSD) or water resource development (WRD) projects through the process of land reclamation (373.709(2)(j), F.S.). These projects may help to meet future water supply demands or assist in meeting the goals of minimum flows and levels (MFL) prevention or recovery strategies.

Methods

The District completed an analysis, using geographic information system (GIS) software, to identify current mining sites in the planning region. Spatial data layers used for this analysis included Florida statewide land use and land cover (DEP, 2022b), 2019 mandatory phosphate boundaries 2019 (DEP, 2021), and 2022 mandatory non-phosphate mines (DEP, 2022a). The spatial coverage for these layers was restricted to the WWSP region, however there were no phosphate mines identified.

First, the spatial data layers were projected, if necessary, to the Florida State Plane coordinate reference system (EPSG:2883) for consistency in geoprocessing. Land use data was then filtered to include only land use codes associated with mining activities (Table H1). Next, the processed land use and mandatory non-phosphate layers were combined into a single layer and instances of redundant spatial overlap were eliminated. The results were exported to a spreadsheet and processed to summarize the acreage results by county.

Table H1. Selected land use codes related to mining activities in Florida.

Land Use Code	Description
1530	Mineral Processing
1531[a]	Clays
1532[a]	Phosphate
1533	Limerock
1534[a]	Magnesia
1535[a]	Heavy Minerals
1600	Extractive
1610	Strip Mines
1611	Clays
1612	Peat
1613	Heavy Minerals
1620	Sand and Gravel Pits
1630	Rock Quarries
1631	Limerock
1632	Dolomite
1633	Phosphate
1634[a]	Heavy Minerals
1650	Reclaimed Lands
1670	Abandoned Mining Lands
7420	Borrow Area (Borrow Pit)

[a]Land use codes 1531, 1532, 1534, 1535, and 1634 do not have any spatial coverage in the WWSP region and were excluded from this analysis.

Results

In summary, 6,674 acres of mining land was identified in the WWSP region (Table H2 and Figure H1). Taylor County had the largest total mining land area (4,424 acres; 66%) and Madison County has the least total area (93 acres; 1%). Mining sites will be evaluated, as needed, in areas where WSD or WRD projects may provide an improvement in water availability in the basin and do not cause adverse impacts to water resources in the basin.

Table H2. Mining land area by county in the WWSP region

County	Mine Area (acres)
Dixie	113
Jefferson	433
Lafayette	435
Levy	1,176
Madison	93
Taylor	4,424
Total	**6,674**

*Totals may be slightly different due to rounding of individual values.

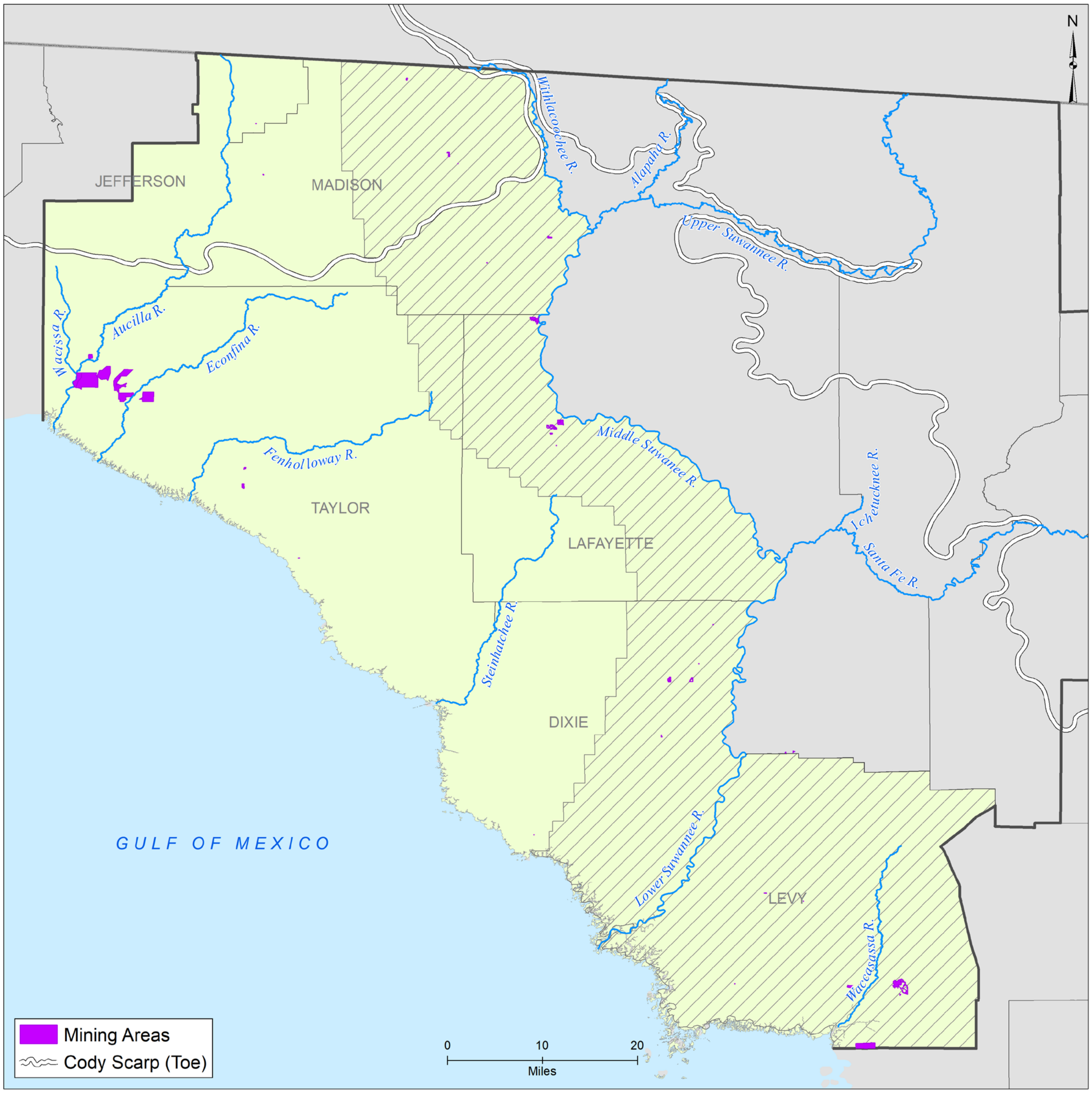

Figure H1. Map of mining operations in the WWSP region

References

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Appendix I

Project Options

Introduction

This appendix provides a list of 15 potential water supply development (WSD), water resource development (WRD), and water conservation (WC) project options for the WWSP region. The project options listed include projects that are in progress and new projects identified by the District or submitted by stakeholders. The District solicited new projects from area water users via targeted letters to municipalities, permittees, and stakeholder email lists. A standard project submittal form or project submittal portal was made available to ensure the submittals were consistent from stakeholders.

There is one WSD project with a total estimated benefit of 0.03 mgd and a total estimated cost of $60.0 million. For WRD projects, there are four projects with a total estimated benefit of 4.1 mgd and a total estimated cost of approximately $17.84 million. Additionally, the 10 water conservation projects are estimated to have a total benefit of 8.94 mgd, incurring a total estimated cost of $42.79 million. Overall, these project options offer a comprehensive approach to water management and supply, providing 15 projects that lead to an estimated total benefit of 13.07 mgd and an estimated total cost of $120.63 million. There are sufficient project options for the development of water supplies to meet future demand while sustaining the natural systems in the WWSP region through 2045.

Figure I1 displays the approximate locations of the project options, which were assigned during the project solicitation process. The locations may not be exact but are in general areas where projects are likely to be located. Projects mapped outside of the WWSP region and span multiple counties are mapped at District headquarters. The projects that do not have locations assigned are not displayed on the map.

The projects are organized by project category (WSD, WRD, WC), then by project type. The projects are numbered based on the District's project database tracking system. The listed projects are in different phases, which is shown under the project status column. For those projects in the planned or proposed phase, their actual water supply yield may change after the project is implemented. Table I1 provides detailed information on the individual project options.

A project identified for inclusion in this 2024 WWSP may not necessarily be selected for development by the listed implementing agency or entity. In accordance with subsection 373.0361(6), Florida Statutes (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, or other water suppliers to select that identified project.

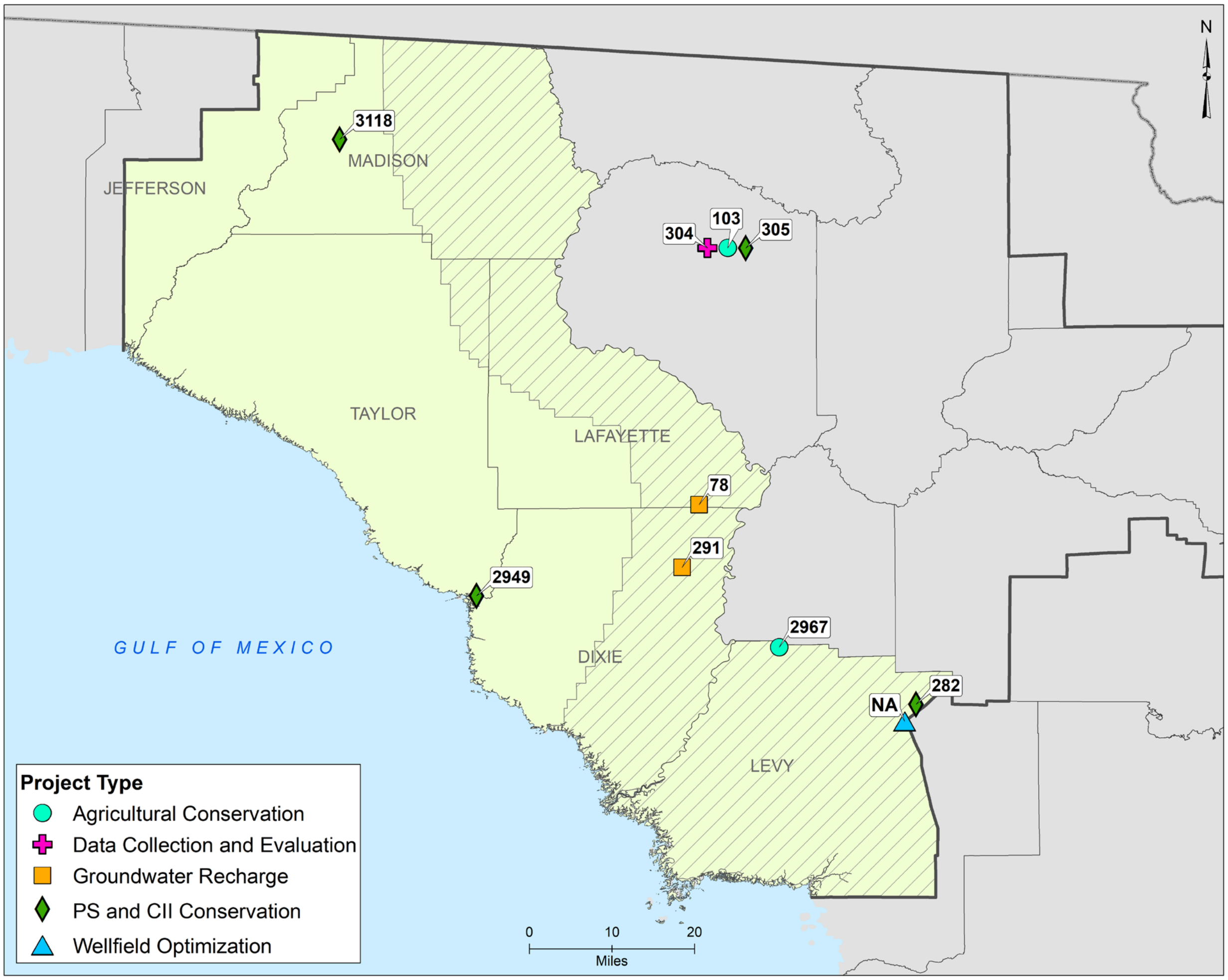

Figure I1. Proposed project options in the WWSP region

RWSP Project No.	Project Category	DEP Project ID	District	County	Project Type	Project Name/Description	Implementing Agency or Entity	Project Description	Project Status	Estimated Completion Date	Estimated Benefit (mgd)	Storage Capacity Increased (MG)	Total Capital Cost ($M)	Estimated Annual O&M ($M)
NA	WSD	NA	SRWMD	Levy	Wellfield Optimization	Waccasassa Water and Wastewater Cooperative (W3C)	W3C	Creating the Regional Water and Wastewater Authority. This project includes design and construction of the Water Treatment Plant (WTP) and Wastewater Treatment Facility (WWTF). Project 3214 is part of this project.	Planned	2030	0.032	NA	$60.00	$0.06
304	WRD	SRWS00156A	SRWMD	Dixie, Jefferson, Lafayette, Levy, Madison, Taylor	Data Collection and Evaluation	Alternative Water Supply Feasibility Studies	Local Governments, Water Authorities, Wastewater Treatment Facilities	Conduct advanced wastewater treatment facility (AWTF) analysis and feasibility studies including treatment wetlands and reclaimed water alternatives.	Underway	2024	0.00	NA	$4.00	NA
409	WRD	NA	SRWMD	Dixie, Jefferson, Lafayette, Levy, Madison, Taylor	Groundwater Recharge	Ecosystem Services	SRWMD	This project will focus on establishing a framework to implement silvicultural management practices on forested lands to benefit the WWSP region and additional areas benefitting Outstanding Florida Springs (OFS). Reducing forest evapotranspiration (ET) will result in increased aquifer recharge, spring flows, and water yield to nearby streams and wetlands.	Proposed	2037	1.00	NA	$6.00	NA
291	WRD	SRWS00142A	SRWMD	Dixie	Groundwater Recharge	Dixie County Multiple Basin Aquifer Recharge	Dixie County	Design and construct a wetland restoration system in Dixie County to re-establish natural drainage patterns and provide aquifer recharge.	Underway	2024	1.10	NA	$5.94	$0.005
78	WRD	SRWS00036A	SRWMD	Dixie	Groundwater Recharge	Middle Suwannee River and Springs Restoration and Aquifer Recharge	Dixie County	Hydrologic restoration activities for ponds and wetlands to recharge the aquifer.	Underway	2024	2.00	NA	$1.90	$0.005
2760	WC	NA	SRWMD	Dixie, Jefferson, Lafayette, Levy, Madison, Taylor	Agricultural Conservation	Agriculture Springs Protection	Producers	District wide Cost-share to reduce nutrient load and water usage in the Basin Management Action Plans (BMAPs) and Water Supply Planning Areas (WSPAs).	Underway	2027	3.00	NA	$3.75	TBD
2967	WC	NA	SRWMD	Gilchrist/Levy	Agricultural Conservation	Smart Soakers	UF/IFAS	Reduce water usage through the use of Smart soaker for cattle cooling.	Planned	2026	0.04	NA	$0.49	$0.003
103	WC	SRWS00082A	SRWMD	Dixie, Jefferson, Lafayette, Levy, Madison, Taylor	Agricultural Conservation	Sustainable Suwannee Ag Pilot Program - Low Input*	DEP	Pilot program for agricultural operations, landowners, counties and cities, private companies, and other entities within specific geographical areas to submit proposals to reduce water use and improve water quality by reducing and removing nutrients.	Underway	2026	2.55	NA	$2.50	TBD
228	WC	SRWS00108B	SRWMD	Dixie, Jefferson, Lafayette, Levy, Madison, Taylor	Agricultural Conservation	Accelerating Suwannee River Restoration and Silviculture Management	Alachua Conservation Trust; Rayonier Conservation Trust	Incentivize silviculture and rural land conservation to reduce groundwater pumping and nitrogen loading in the Middle Suwannee springshed.	Underway	2025	3.03	NA	$2.38	TBD
3266	WC	NA	SRWMD	Suwannee, Lafayette, Levy, Madison, Dixie	Agricultural Conservation	UDFF Sustainable Suwannee Dairy Implementation	Ray Hodge - United Dairy	Master Project. Implement new technologies to reduce nutrients and groundwater withdrawals.	Planned	2027	0.20	NA	$15.00	$1.00
2993	WC	NA	SRWMD	Suwannee, Lafayette, Levy, Madison, Dixie	Agricultural Conservation	UDFF Sustainable Suwannee Dairy Implementation	Ray Hodge - United Dairy Phase 1	Implement new technologies to reduce nutrients and groundwater withdrawals. Linked to project 3266	Planned	2027	TBD	NA	$5.00	$1.00
282	WC	NA	SRWMD	Levy	PS and CII Conservation	University Oaks Phase 4	Levy County	Infrastructure replacement of water mains to reduce water loss.	Underway	2024	0.015	NA	$0.30	$0.001
3118	WC	NA	SRWMD	Madison	PS and CII Conservation	Greenville Water Distribution System Improvements	Greenville	Replace water lines, associated fittings, and fire hydrant assemblies to reduce water loss.	Proposed	2025	0.010	NA	$4.10	$0.007
305	WC	SRWS00158A	SRWMD	Dixie, Jefferson, Lafayette, Levy, Madison, Taylor	PS and CII Conservation	Water Supply Infrastructure Improvements	Public Water Supply Entities	Includes replacement of aging infrastructure, distribution and safety improvements.	Proposed	2033	0.05	NA	$4.00	$0.04
2949	WC	NA	SRWMD	Taylor, Dixie	PS and CII Conservation	Water System Improvements	Big Bend Water Authority	Replace leaking water lines and install new meters to reduce water loss.	Underway	2026	0.05	NA	$5.27	$0.01