

**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)

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**ORDER APPROVING THE**  
**2024 WESTERN WATER SUPPLY PLAN**

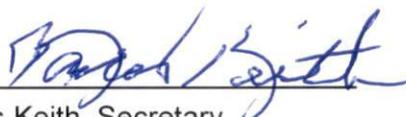
THIS MATTER came before the Governing Board of the Suwannee River Water Management District ("District") on March 12, 2024. The Governing Board, having been fully advised of the matter, hereby approves the 2024 Western Water Supply Plan with appendices (2024 WWSP), recognizing that the District's authority 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**

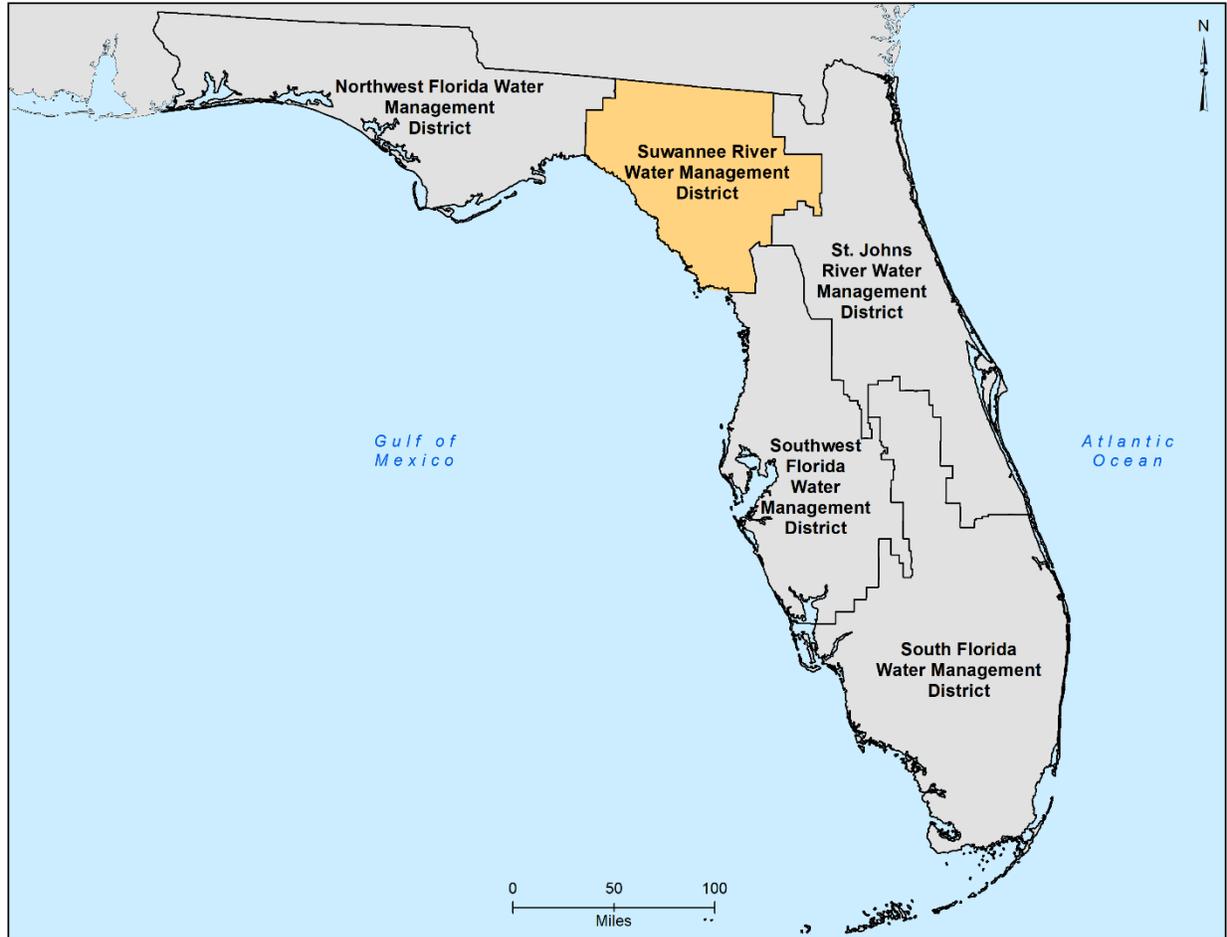


Figure 1. Location and boundary of the Suwannee River Water Management District

## 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](https://www.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).

# Table of Contents

2024 Western Water Supply Plan (2020-2045)	1
Acknowledgements	2
Executive Summary	3
Table of Contents	5
List of Appendices	8
List of Figures	9
List of Tables	11
List of Abbreviations	12
Chapter 1: Introduction to Water Supply Planning	15
Introduction	15
Base Year and Projected Years	15
Legislative Mandates	15
Regulatory Program	16
Outreach and Approval Process	17
Requirements for Plan Approval	17
Chapter 2: About the Western Water Supply Planning Region	19
Background	19
Introduction	20
Land Use	21
Hydrology	22
Geology	26
Chapter 3: Water Demand, Reclaimed Water, and Water Conservation Projections	27
Purpose	27
Future Water Demand Projections and Methodology	29
Assumptions	29
Population Projections	29
Public Supply	31
Domestic Self-Supply	33
Agriculture	34
Commercial/Industrial/Institutional and Mining/Dewatering	36
Landscape/Recreation	37
Power Generation	39
Reclaimed Water Projections	39

Water Conservation and Irrigation Efficiency .....	42
Chapter 4: Assessment of Groundwater Conditions Associated with Future Water	
Demand Projections .....	44
Purpose .....	44
Hydrologic Assessment .....	44
Methodology .....	45
Results.....	46
Chapter 5: Water Resource Assessment.....	48
Purpose .....	48
Water Resource Assessment Methods and Results.....	48
Groundwater Quality .....	48
Minimum Flows and Levels.....	54
Waterbodies without Adopted Minimum Flows and Levels .....	57
Wetlands .....	61
Resiliency.....	62
Chapter 6: Sufficiency Analysis.....	66
Purpose .....	66
Sufficiency Analysis.....	66
Water Quality .....	67
Minimum Flows and Levels.....	67
Waterbodies without Adopted Minimum Flows and Levels .....	67
Wetlands .....	68
Water Supply Planning Areas .....	68
Chapter 7: Project Options .....	70
Purpose .....	70
Project Options .....	70
Project Cost and Volume Estimation Methodology .....	71
Water Supply Development Project Options .....	73
Water Resource Development Project Options.....	73
Water Conservation Project Options.....	75
Other Potential Project Options.....	79
Mining Operation Land Reclamation Variances .....	82
Chapter 8: Funding.....	84
Purpose .....	84
Water Supplier and User Funding Options .....	84

Water Utility Revenue Funding Sources .....	84
Water Management District Funding Options .....	85
Water Resource Development Work Program .....	86
State Funding Options .....	86
Agricultural Conservation .....	86
Springs Protection .....	86
State of Florida Alternative Water Supply and Development Program .....	87
Drinking Water State Revolving Fund Program .....	87
Florida Forever Program .....	87
Water and Land Conservation Amendment .....	88
Resiliency Funding .....	88
Federal Funding .....	88
Environmental Quality Incentive Program .....	88
State and Tribal Assistance Grants .....	89
Water Infrastructure Finance and Innovation Act .....	89
Public-Private Partnerships, Cooperatives and Other Private Investment .....	89
Summary of Funding Mechanisms .....	89
Chapter 9: Conclusion .....	90
Summary .....	90
References .....	92

## List of Appendices

**Appendix A:** Population and Water Demand Projections

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

**Appendix C:** Water Quality Assessment

**Appendix D:** Minimum Flows and Levels (MFLs) Assessment

**Appendix E:** Waterbodies without Adopted Minimum Flows and Levels (MFLs) Assessment

**Appendix F:** Potential Adverse Change to Wetland Function Assessment

**Appendix G:** Coastal Resiliency Assessment

**Appendix H:** Land Reclamation Assessment

**Appendix I:** Project Options

## List of Figures

Figure 1. Location and boundary of the Suwannee River Water Management District ...	2
Figure 2. Western Water Supply Plan Region.....	19
Figure 3. Watersheds (8-digit hydrologic unit code) in the WWSP region.....	20
Figure 4. Springs (fourth magnitude or greater), OFS, rivers, and river gages in the WWSP region.....	21
Figure 5. Land use types (Level I) in the WWSP region.....	22
Figure 6. Wetland types (Level III) in the WWSP region with identification .....	25
Figure 7. 2015 water use estimates and 2045 water demand projections in the WWSP region by category.....	28
Figure 8. 2015 total water use estimates and 2045 water demand projections in the WWSP region.....	29
Figure 9. 2015 population estimates and 2045 population projections in the WWSP region by category.....	30
Figure 10. 2015 total population estimates and 2045 population projections in the WWSP region.....	31
Figure 11. 2015 large public supply water use estimates and 2045 water demand projections in the WWSP region.....	33
Figure 12. 2015 domestic self-supply water use estimates and 2045 water demand projections in the WWSP region.....	34
Figure 13. 2015 agriculture self-supply water use estimates and 2045 water demand projections in the WWSP region.....	35
Figure 14. 2015 agriculture self-supply acreage estimates and 2045 acreage projections in the WWSP region.....	36
Figure 15. 2015 commercial/industrial/institutional and mining/dewatering self-supply water use estimates and 2045 water demand projections in the WWSP region .....	37
Figure 16. 2015 landscape/recreational self-supply water use estimates and 2045 water demand projections in the WWSP region.....	39
Figure 17. Summary of 2018 reclaimed water flows in the WWSP region .....	41
Figure 18. NFSEG model domain and the FAS .....	45
Figure 19. Changes in UFA water levels from current pumping to 2045 within the WWSP region.....	47
Figure 20. Chloride status and trend assessment by station ID .....	50
Figure 21. TDS status and trend assessment by station ID .....	51
Figure 22. Specific conductivity status and trend assessment by station ID .....	53
Figure 23. MFL assessment results .....	57
Figure 24. Waterbodies without adopted MFLs assessment results .....	60
Figure 25. Locations with moderate to high potential for adverse change to wetlands .	62

Figure 26. Water supply infrastructure in the WWSP region that intersects with intermediate-low and intermediate-high SLR inundation surface projections ..... 64

Figure 27. Existing WSPA in the WWSP region ..... 69

Figure 28. Project options in the WWSP region ..... 72

## List of Tables

Table 1. Land use types in the WWSP region.....	22
Table 2. Summary of water use (mgd) by use type in the WWSP region.....	28
Table 3. 2045 water conservation and irrigation efficiency potential in mgd.....	43
Table 4. Status of assessed MFLs .....	56
Table 5. Waterbodies without adopted MFLs assessment summary .....	59
Table 6. Wetland acreage identified as having moderate or high potential for adverse change to wetland function between CP and 2045 projected pumping .....	61
Table 7. Summary of infrastructure potentially affected by intermediate-low and intermediate-high projections of SLR .....	63
Table 8. Summary of project options.....	72
Table 9. Summary of WRD project options .....	74
Table 10. Summary of water conservation project options.....	76
Table 11. UF H <sub>2</sub> O SAV quantified outdoor practices.....	78

## List of Abbreviations

<b>Abbreviation</b>	<b>Description</b>
<b>µmhos/cm</b>	Micromhos per centimeter
<b>AG</b>	Agricultural irrigation self-supply
<b>AMI</b>	Advanced metering infrastructure
<b>AMR</b>	Automatic meter reading
<b>ASR</b>	Aquifer storage and recovery
<b>AWS</b>	Alternative water supply
<b>BEBR</b>	Bureau of Economic and Business Research
<b>BMP</b>	Best management practice
<b>cfs</b>	Cubic feet per second
<b>CFWI</b>	Central Florida Water Initiative
<b>CII/MD</b>	Commercial/industrial/institutional and mining dewatering self-supply
<b>CP</b>	Current pumping
<b>CUP</b>	Consumptive use permit
<b>DEP</b>	Florida Department of Environmental Protection
<b>District</b>	Refers to SRWMD
<b>districts</b>	Refers to all Florida water management districts
<b>DPR</b>	Direct potable reuse
<b>DSS</b>	Domestic self-supply and small public supply systems
<b>EDR</b>	Electrodialysis reversal
<b>EPA</b>	Environmental Protection Agency
<b>EQIP</b>	Environmental Quality Incentive Program
<b>ET</b>	Evapotranspiration
<b>F.A.C.</b>	Florida Administrative Code
<b>F.S.</b>	Florida Statute
<b>FAS</b>	Floridan aquifer system
<b>FDACS</b>	Florida Department of Agriculture and Consumer Services
<b>FDOT</b>	Florida Department of Transportation
<b>FFL</b>	Florida Friendly Landscaping
<b>FSAID</b>	Florida Statewide Agricultural Irrigation Demand
<b>FWCA</b>	Florida Water and Climate Alliance
<b>FY</b>	Fiscal year
<b>GIS</b>	Geographic information system
<b>gpcd</b>	Gallons per capita per day
<b>H<sub>2</sub>OSAV</b>	Water Savings, Analytics, and Verification
<b>IAS</b>	Intermediate aquifer system
<b>ICU</b>	Intermediate confining unit
<b>IFAS</b>	Institute of Food and Agricultural Sciences
<b>IPCC</b>	International Panel on Climate Change
<b>IPR</b>	Indirect potable reuse
<b>LFA</b>	Lower Floridan aquifer
<b>LR</b>	Landscape/recreational irrigation self-supply

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

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

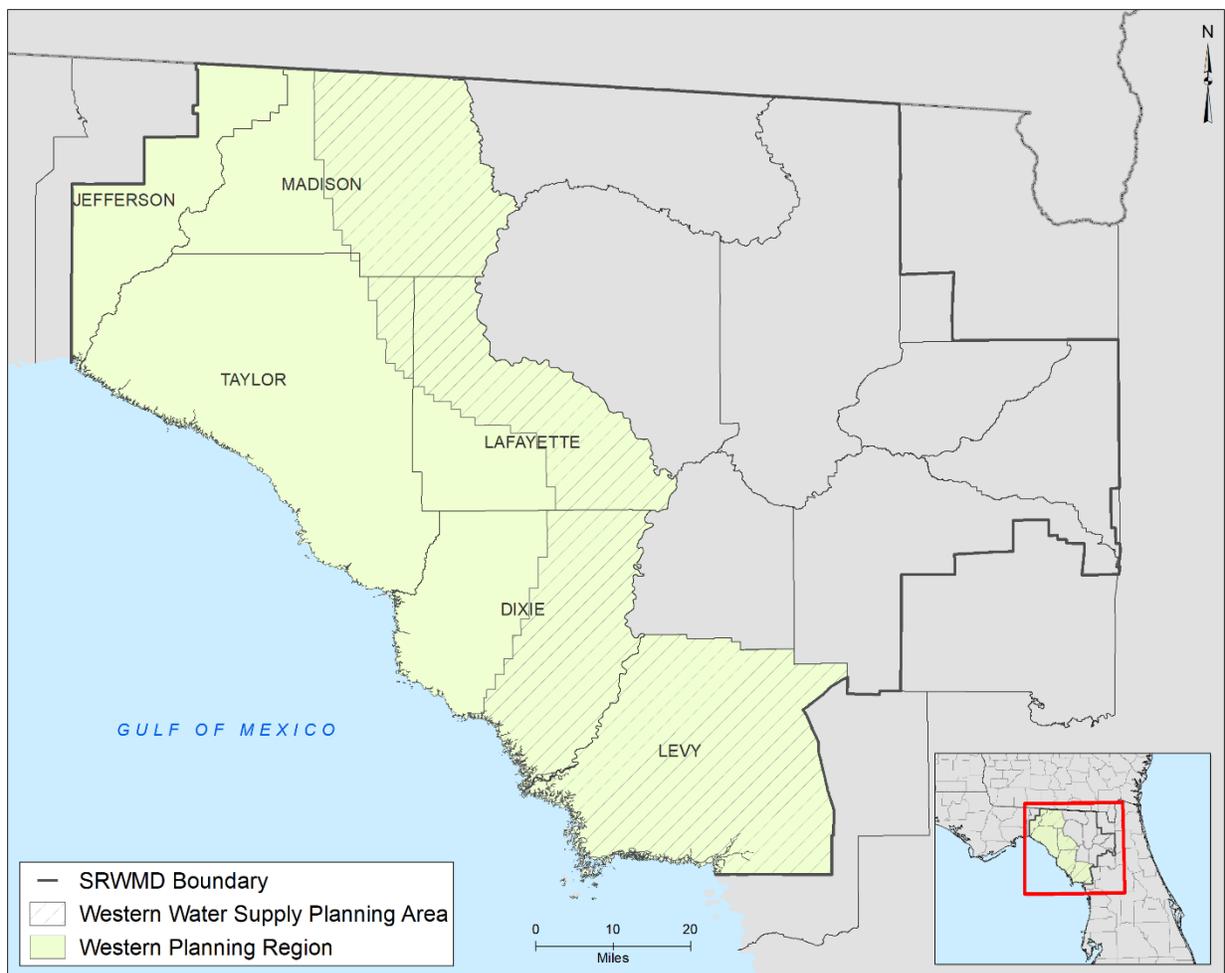


Figure 2. Western Water Supply Plan Region

## 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 4<sup>th</sup> 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.

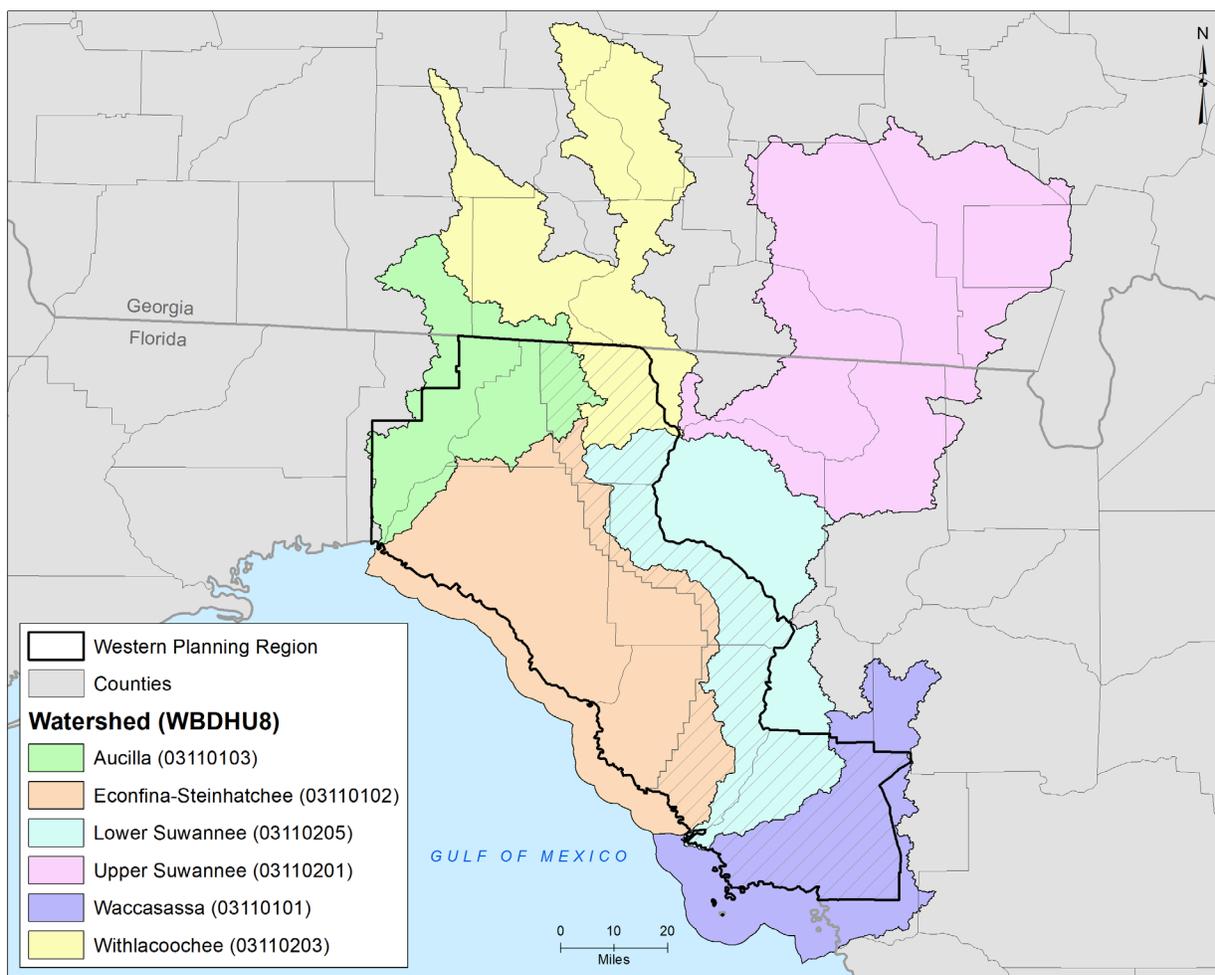


Figure 3. Watersheds (8-digit hydrologic unit code) in the WWSP region (USGS, 2023b)

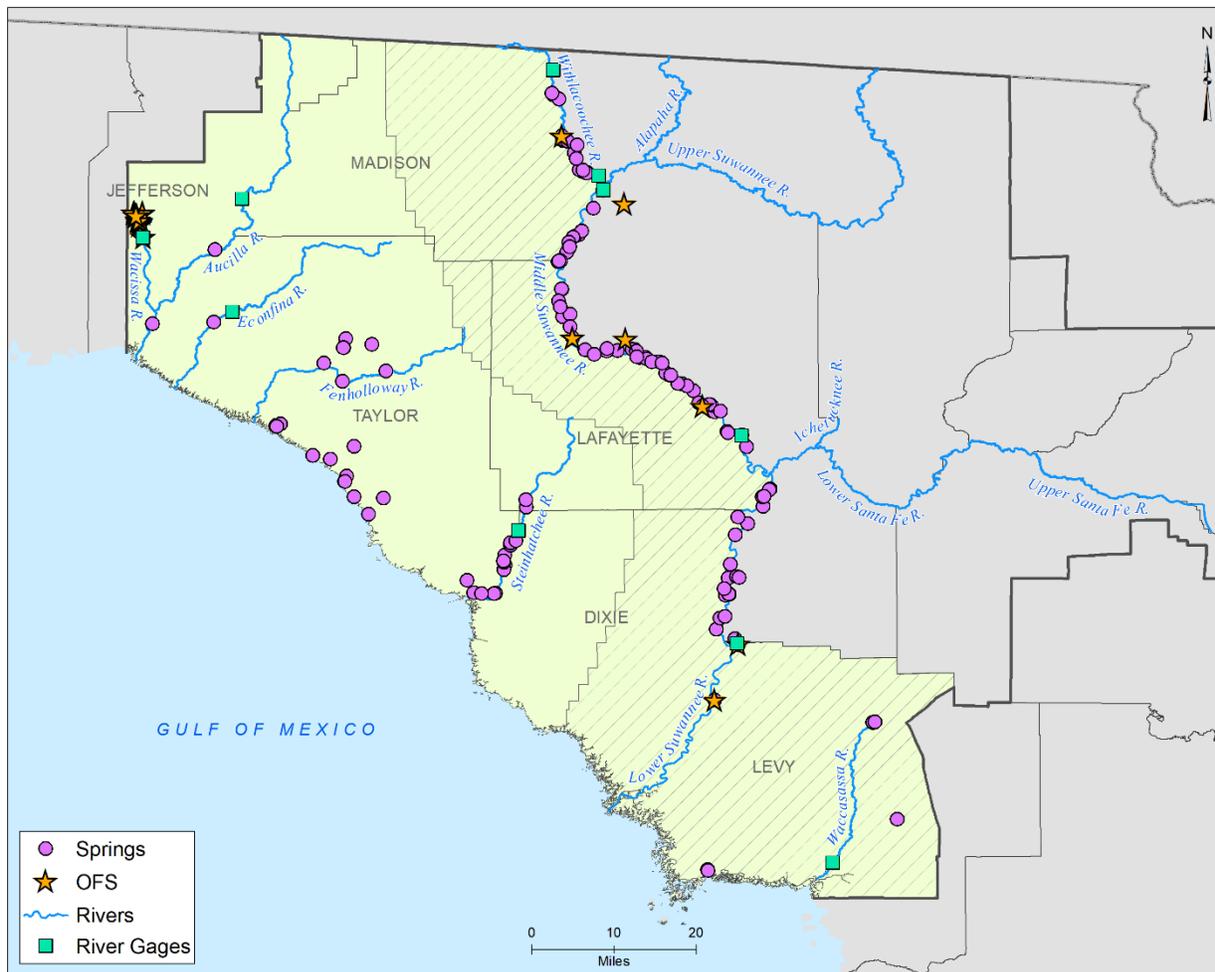


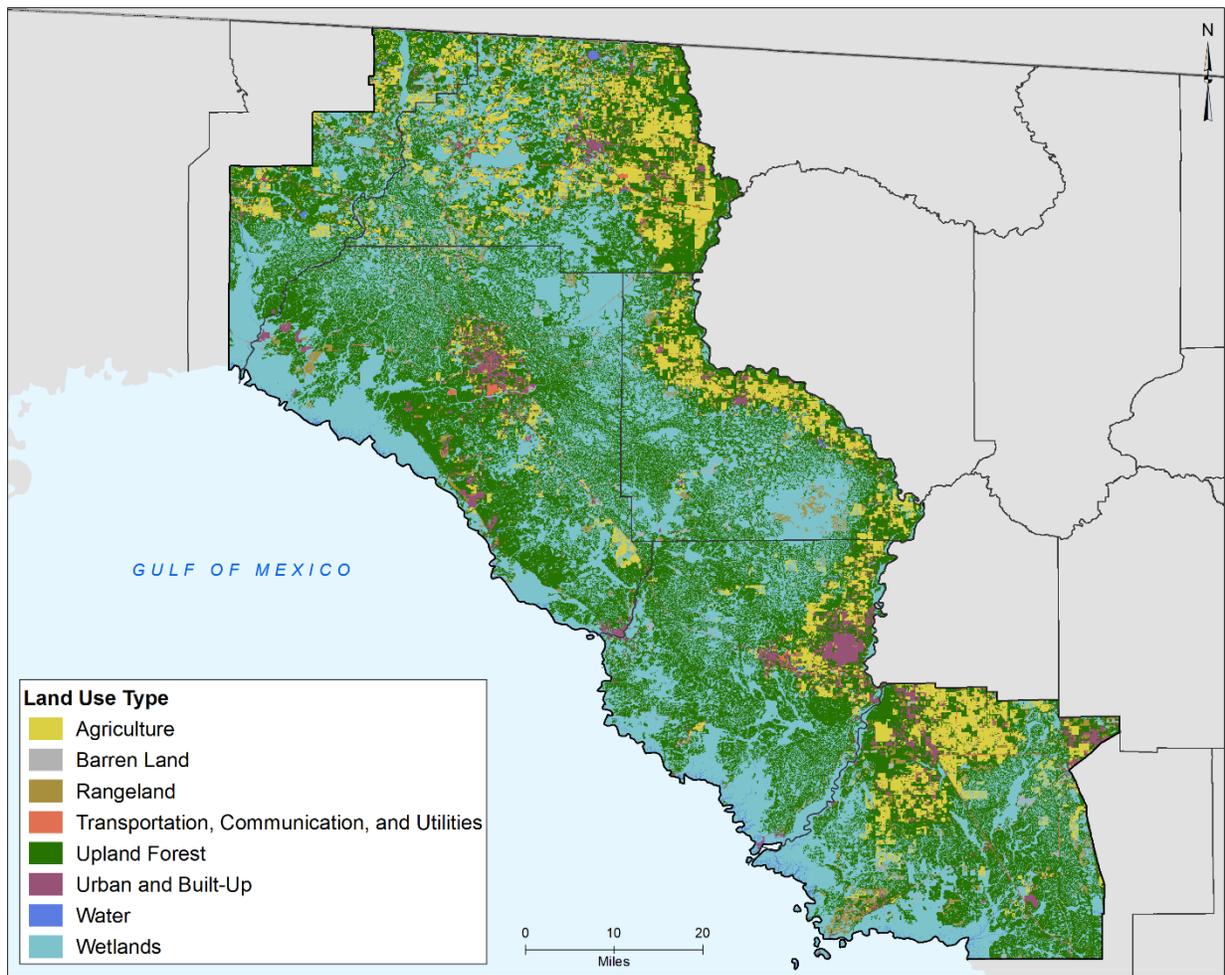
Figure 4. Springs (fourth magnitude or greater), OFS, rivers, and river gages in the WWSP region

## 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 4<sup>th</sup> 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. Other 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.

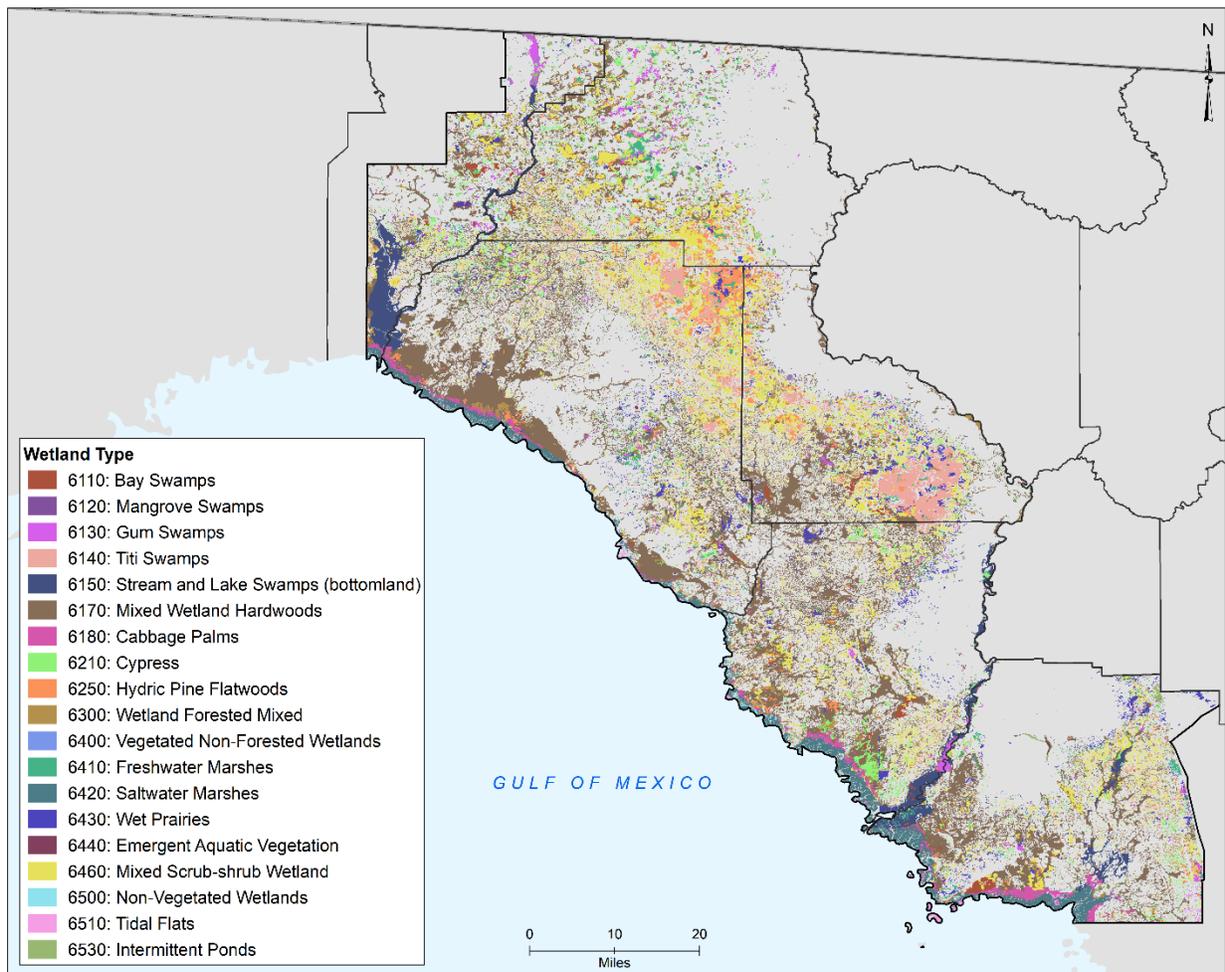


Figure 6. Wetland types (Level III) in the WWSP region with identification (DEP, 2022)

## 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 (Durdan 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.

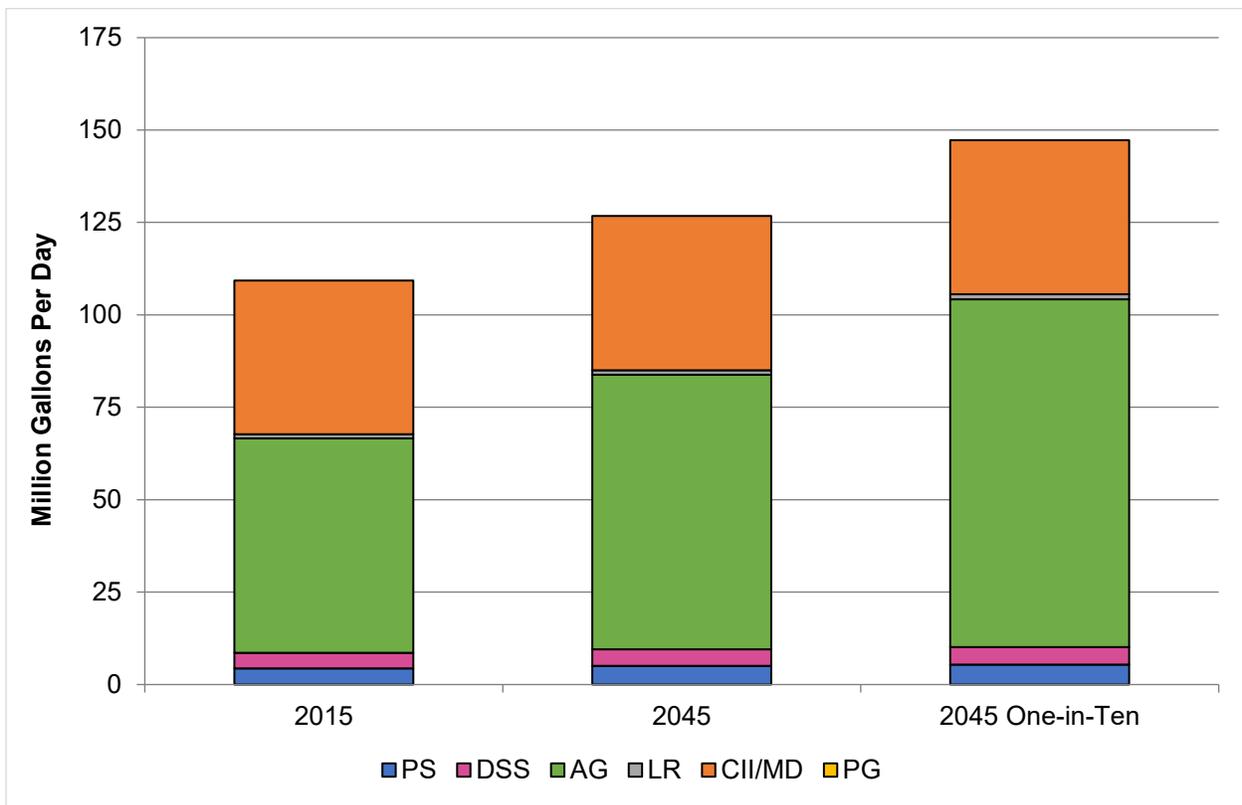
Total water demand in the WWSP region is anticipated to increase from 109 million gallons per day (mgd) in 2015 to 127 mgd in 2045 (16%; Table 2; Figure 8). Agriculture represents the largest demand in the WWSP region (58.0 mgd; 53%), followed by CII/MD (41.5 mgd; 38%) and PS (4.4 mgd; 4%) in 2015 (Table 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
<b>Total</b>	<b>109.3</b>	<b>126.8</b>	<b>16%</b>

\*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*

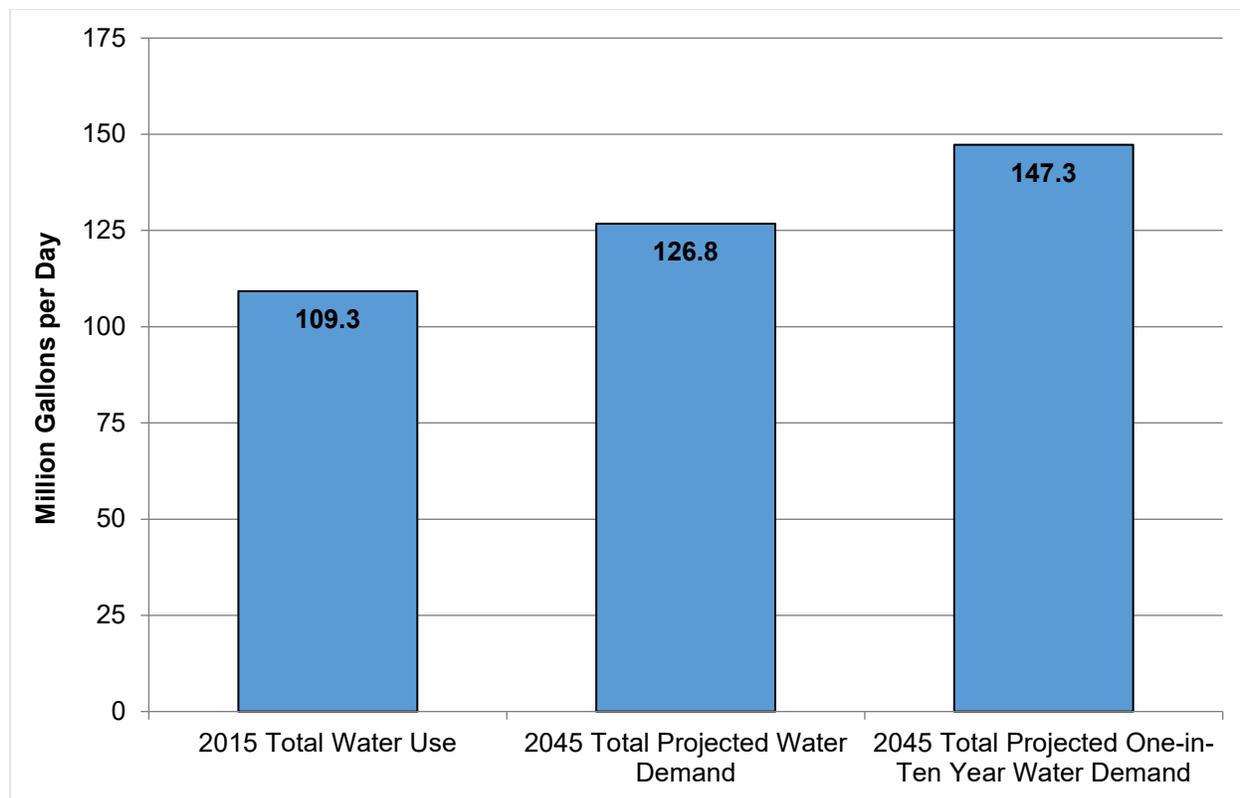


Figure 8. 2015 total water use estimates and 2045 water demand projections in the WWSP region

## 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.

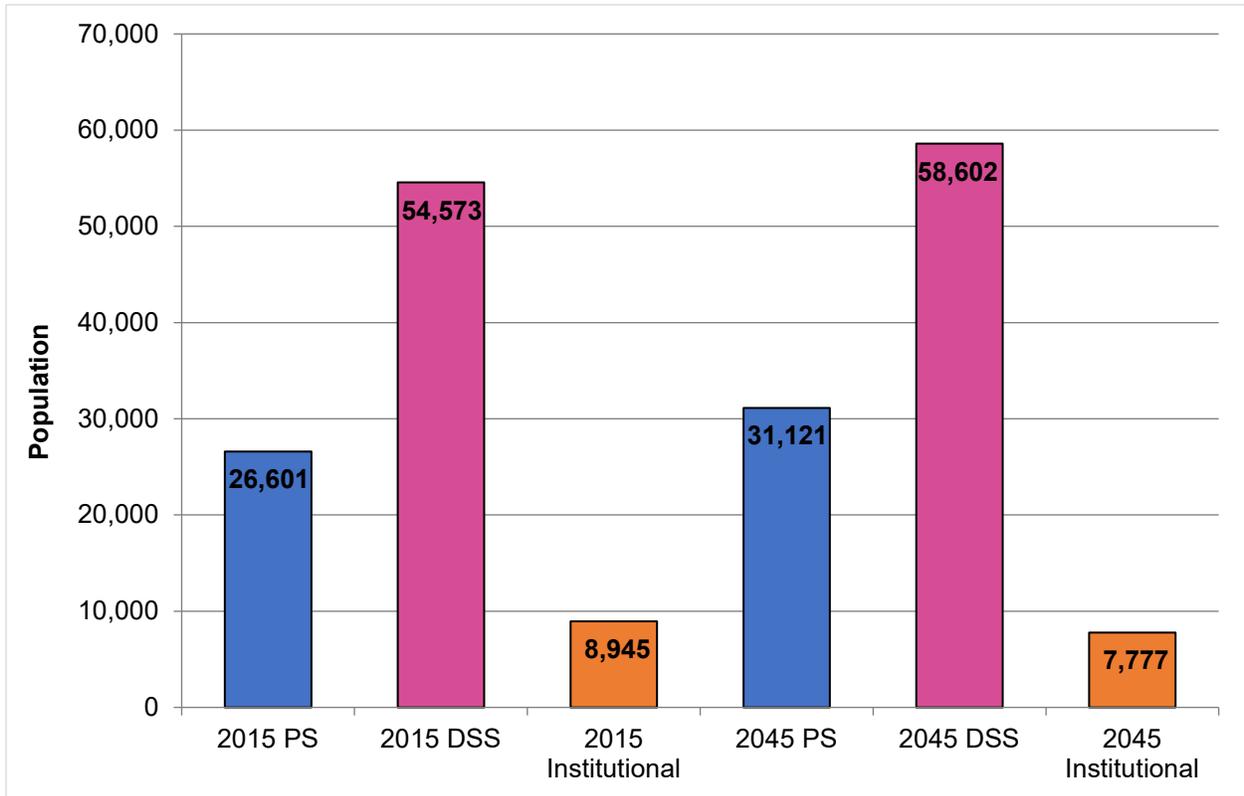


Figure 9. 2015 population estimates and 2045 population projections in the WWSP region by category

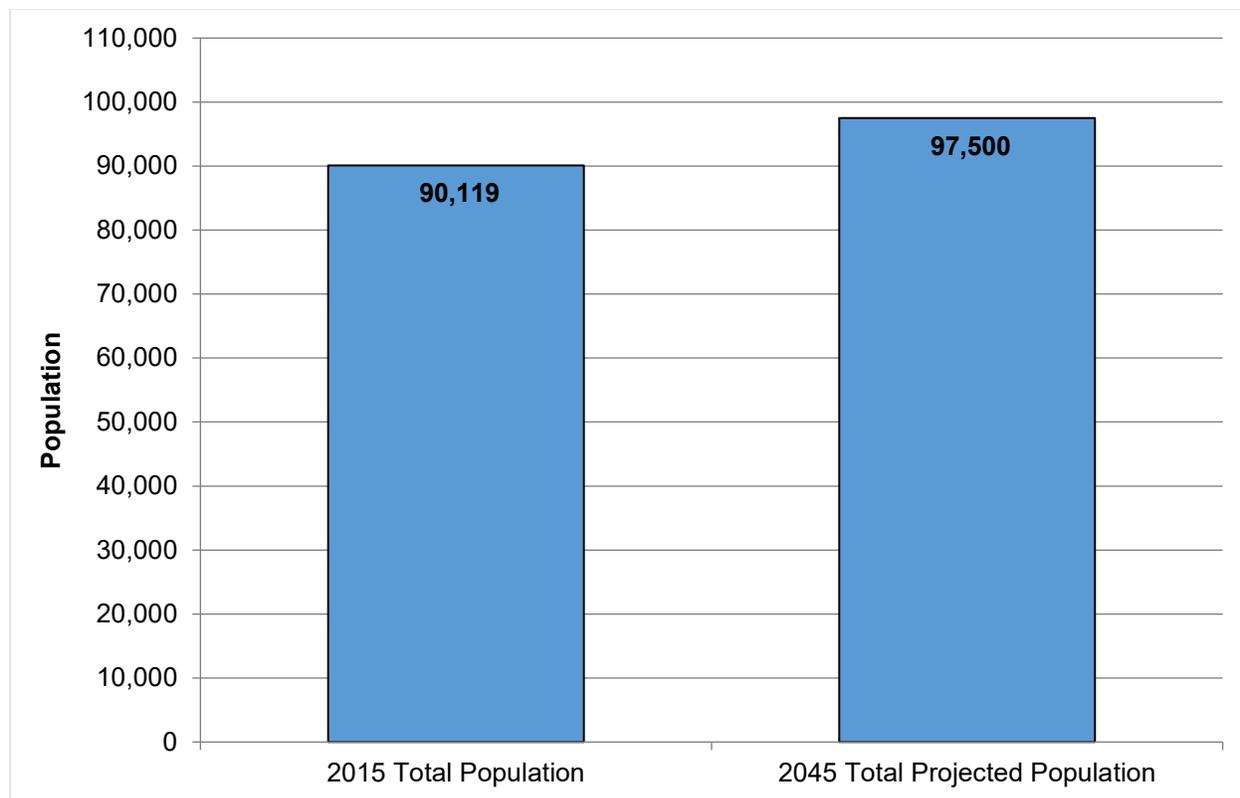


Figure 10. 2015 total population estimates and 2045 population projections in the WWSP region

## 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.

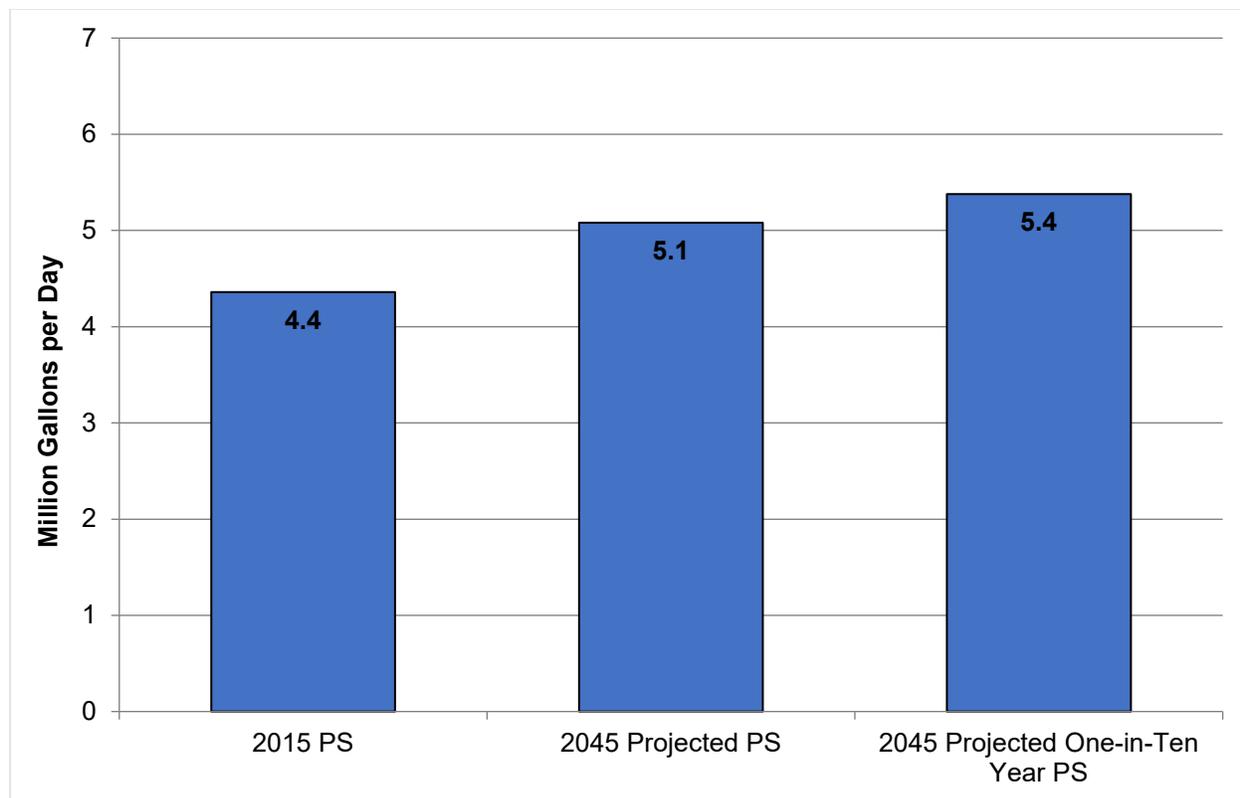


Figure 11. 2015 large public supply water use estimates and 2045 water demand projections in the WWSP region

## 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.

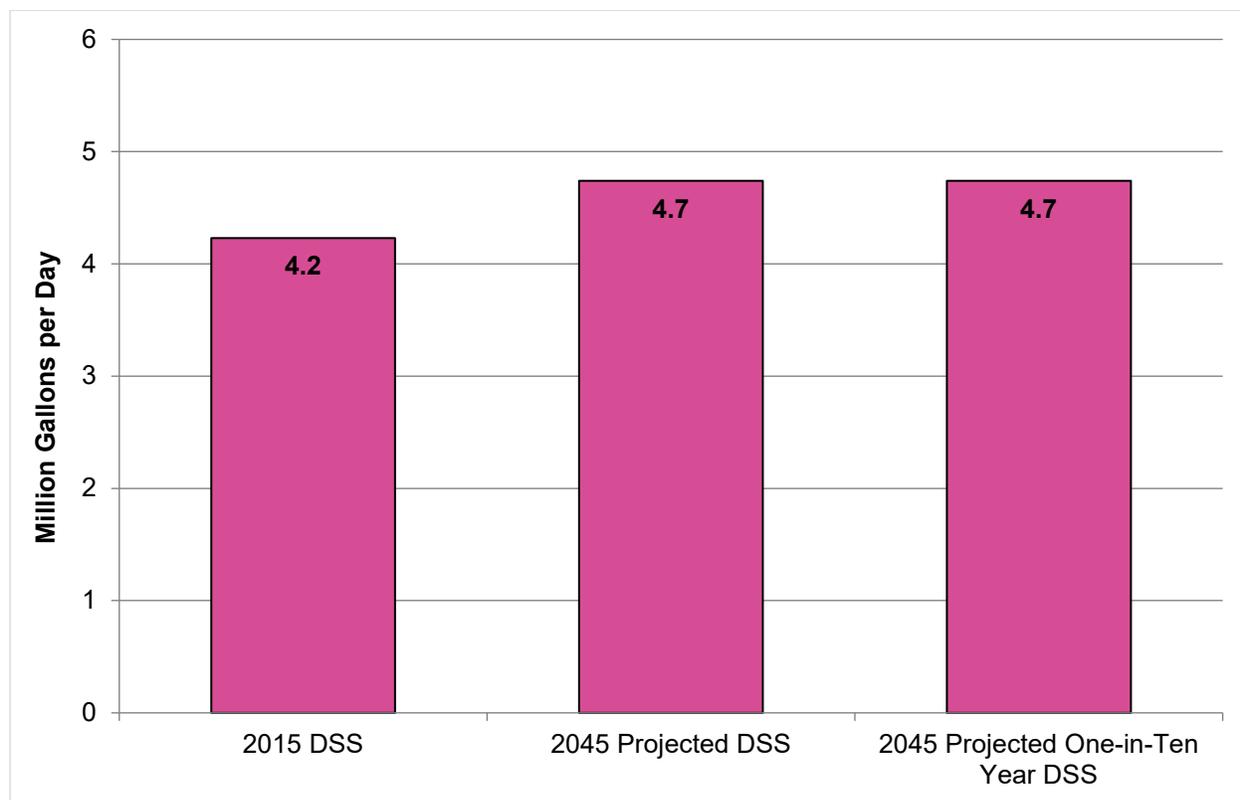


Figure 12. 2015 domestic self-supply water use estimates and 2045 water demand projections in the WWSP region

## 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).

### Acreeage 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).

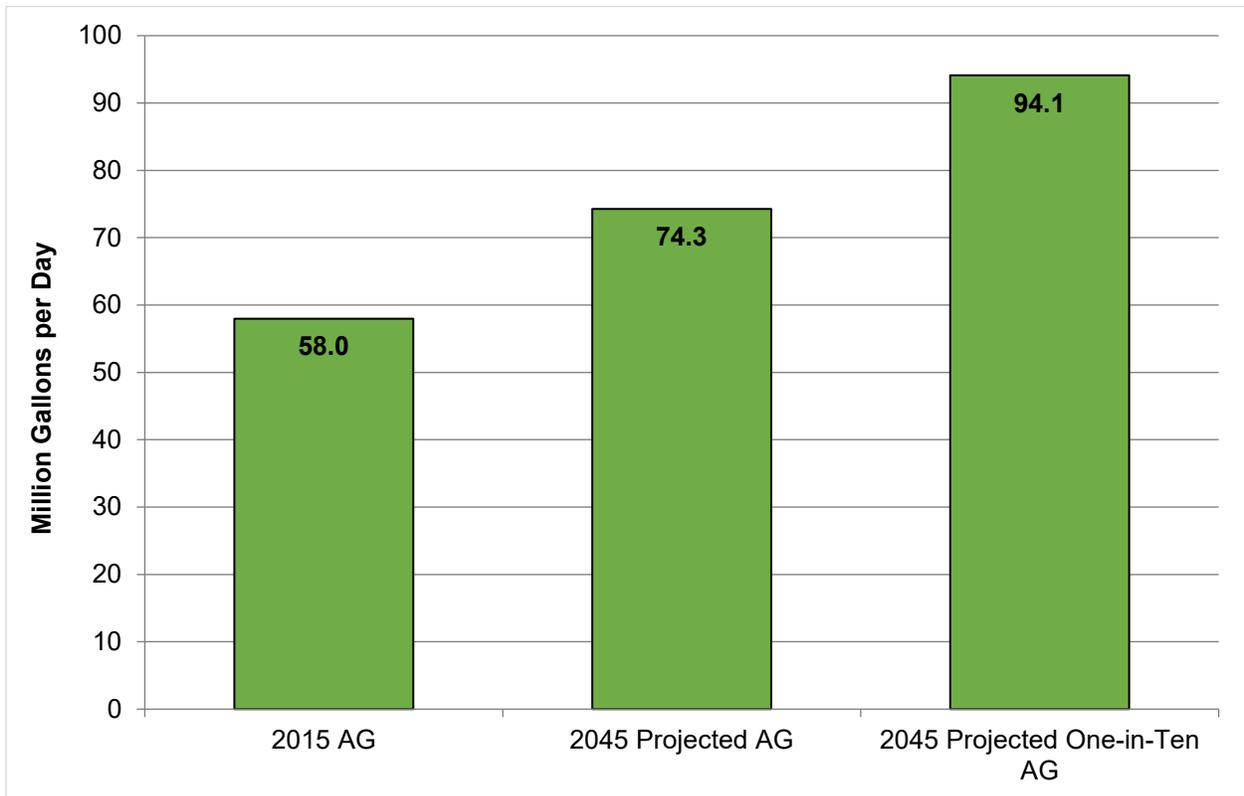


Figure 13. 2015 agriculture self-supply water use estimates and 2045 water demand projections in the WWSP region

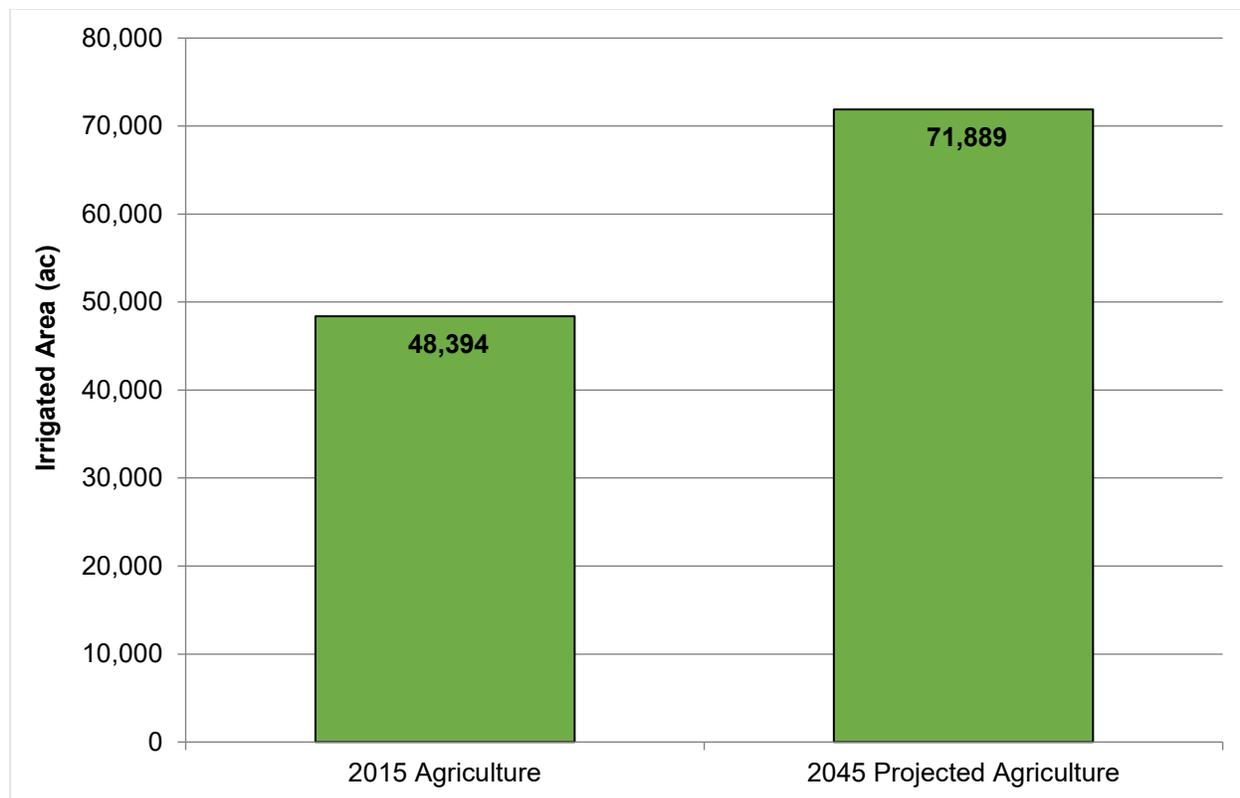


Figure 14. 2015 agriculture self-supply acreage estimates and 2045 acreage projections in the WWSP region

## 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.

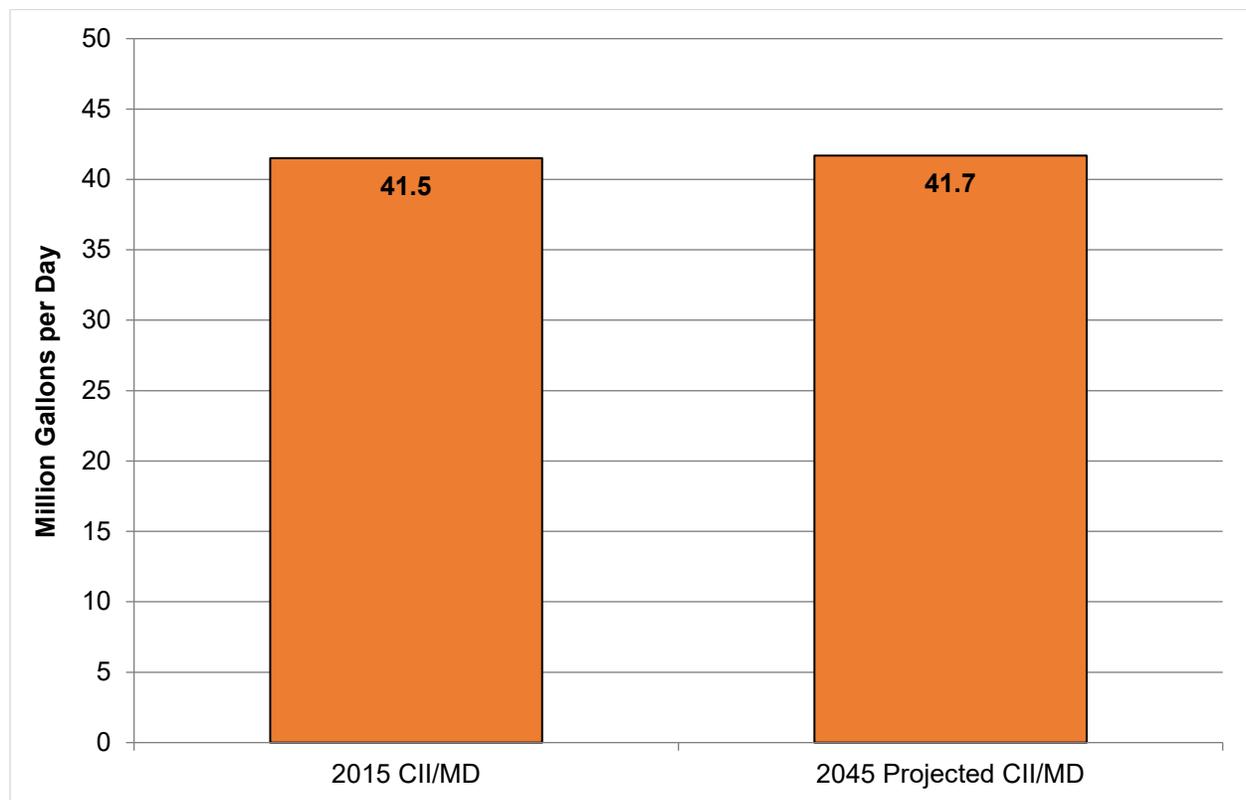


Figure 15. 2015 commercial/industrial/institutional and mining/dewatering self-supply water use estimates and 2045 water demand projections in the WWSP region

## 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.

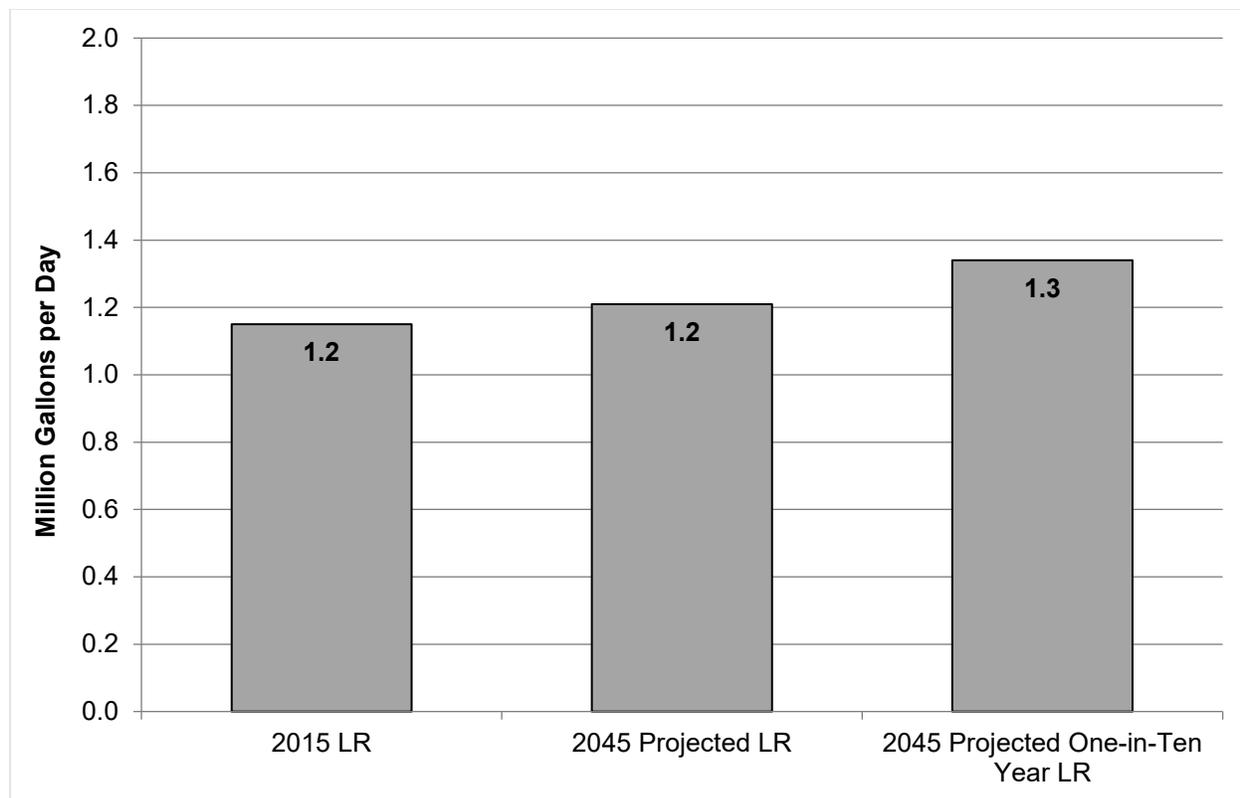


Figure 16. 2015 landscape/recreational self-supply water use estimates and 2045 water demand projections in the WWSP region

## 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.

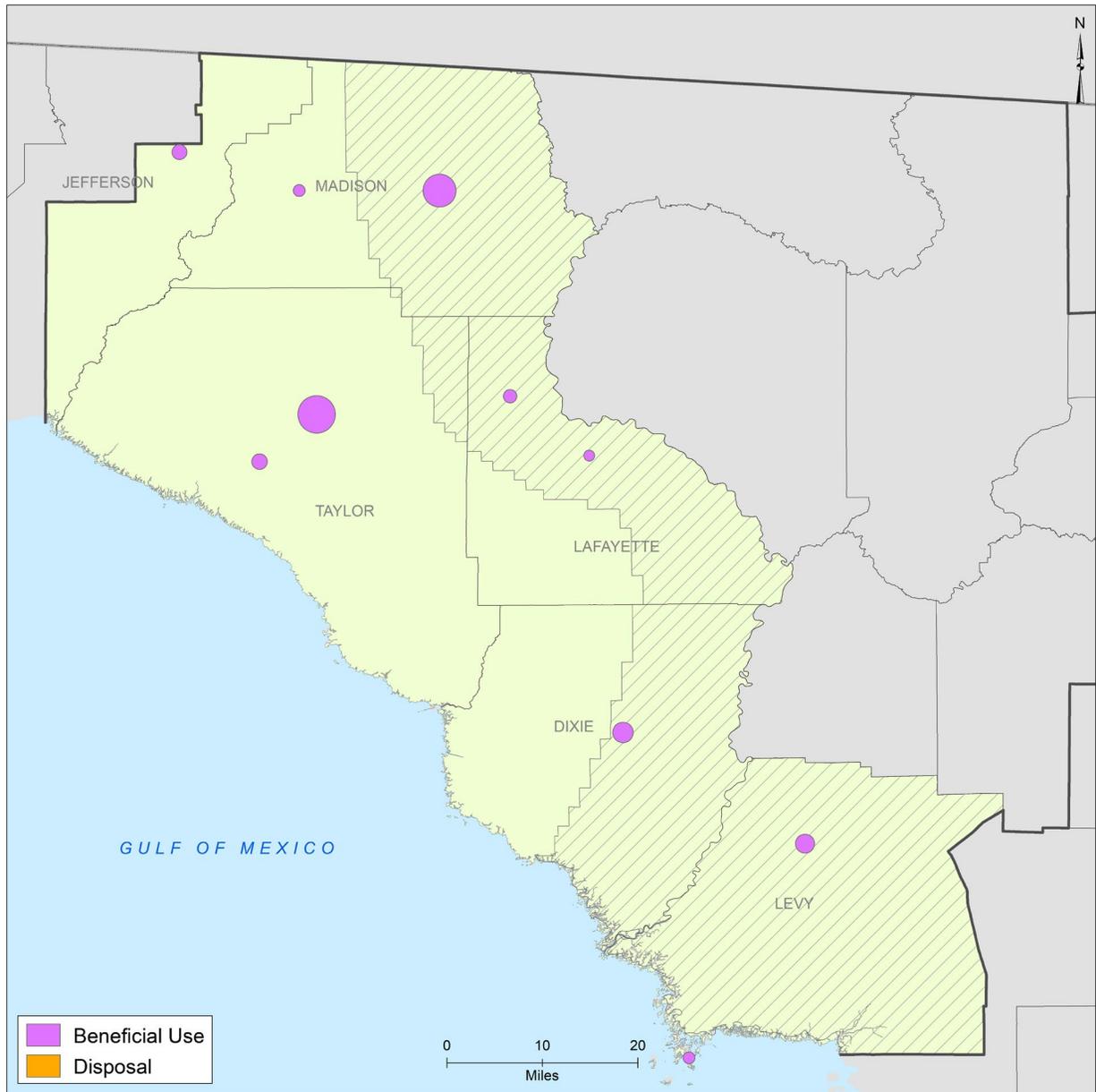


Figure 17. Summary of 2018 reclaimed water flows in the WWSP region

## 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](https://www.awwa.org/Drinktap)) 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*

<b>Category</b>	<b>2045 Low Conservation Potential</b>	<b>2045 High Conservation Potential</b>
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
<b>Total</b>	<b>13.28</b>	<b>14.65</b>

\*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](http://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.

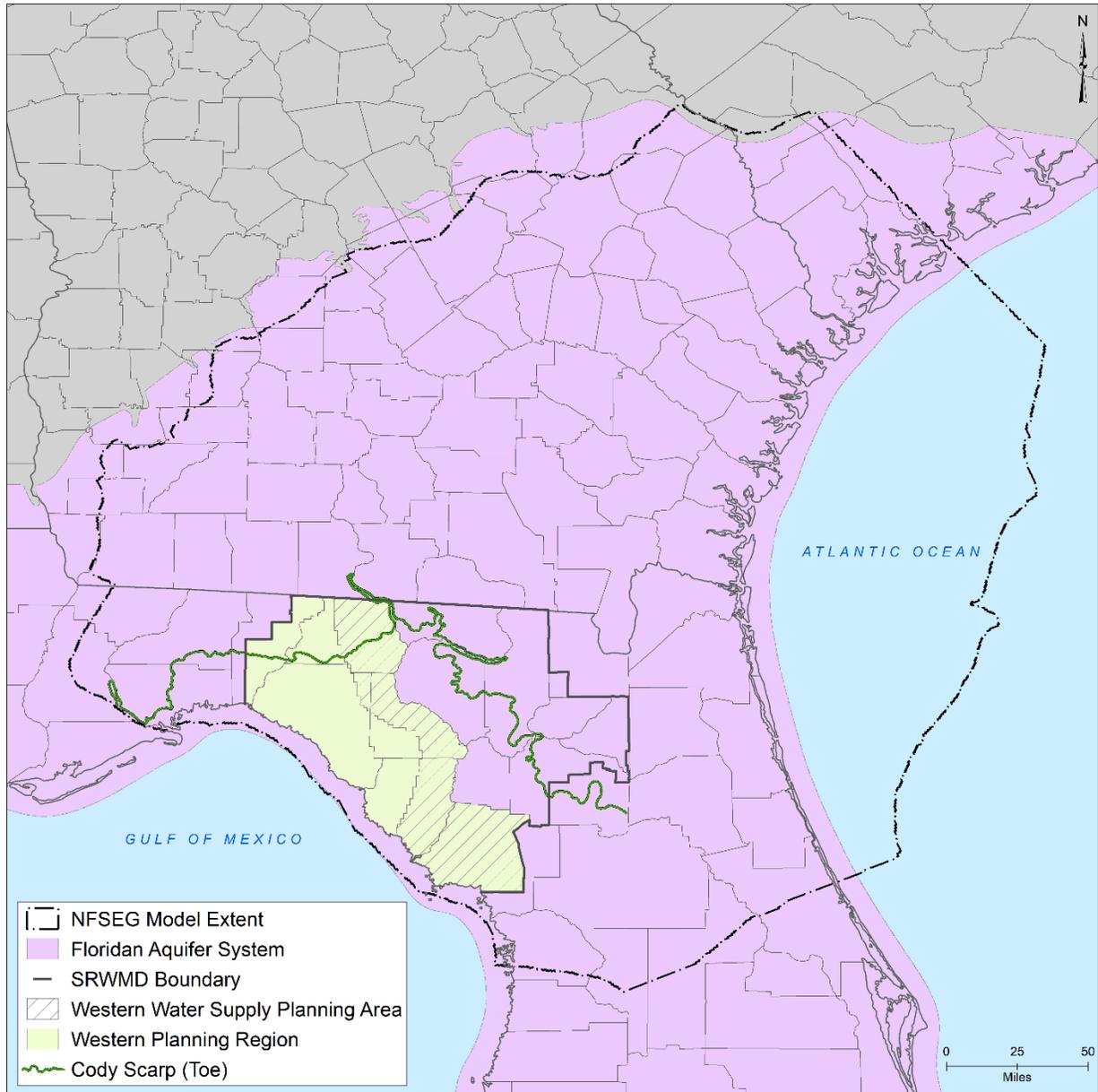


Figure 18. NFSEG model domain and the FAS

## 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.

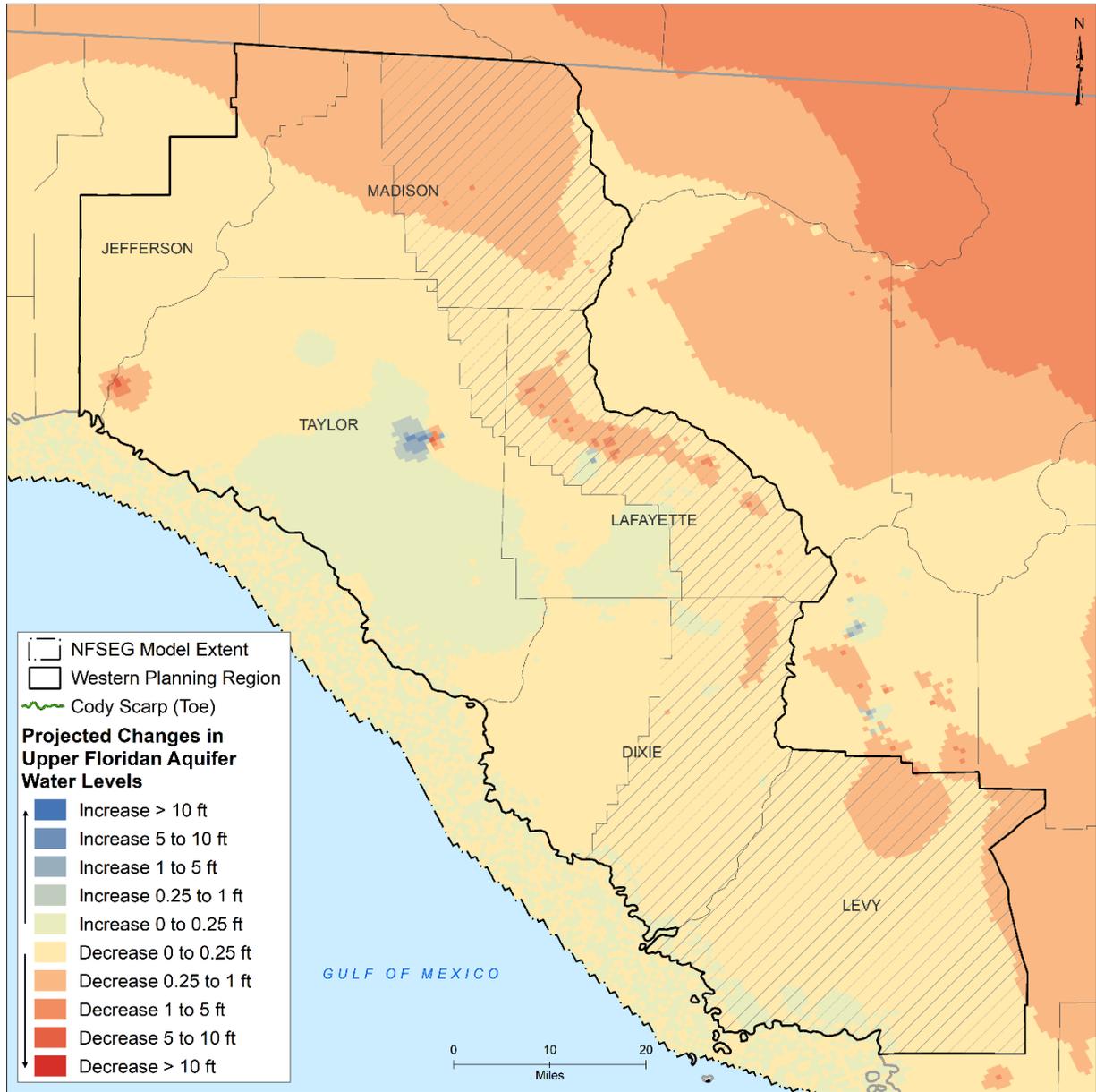


Figure 19. Changes in UFA water levels from current pumping to 2045 within the WWSP region

# 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 ( $\mu\text{mhos/cm}$ ) 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.

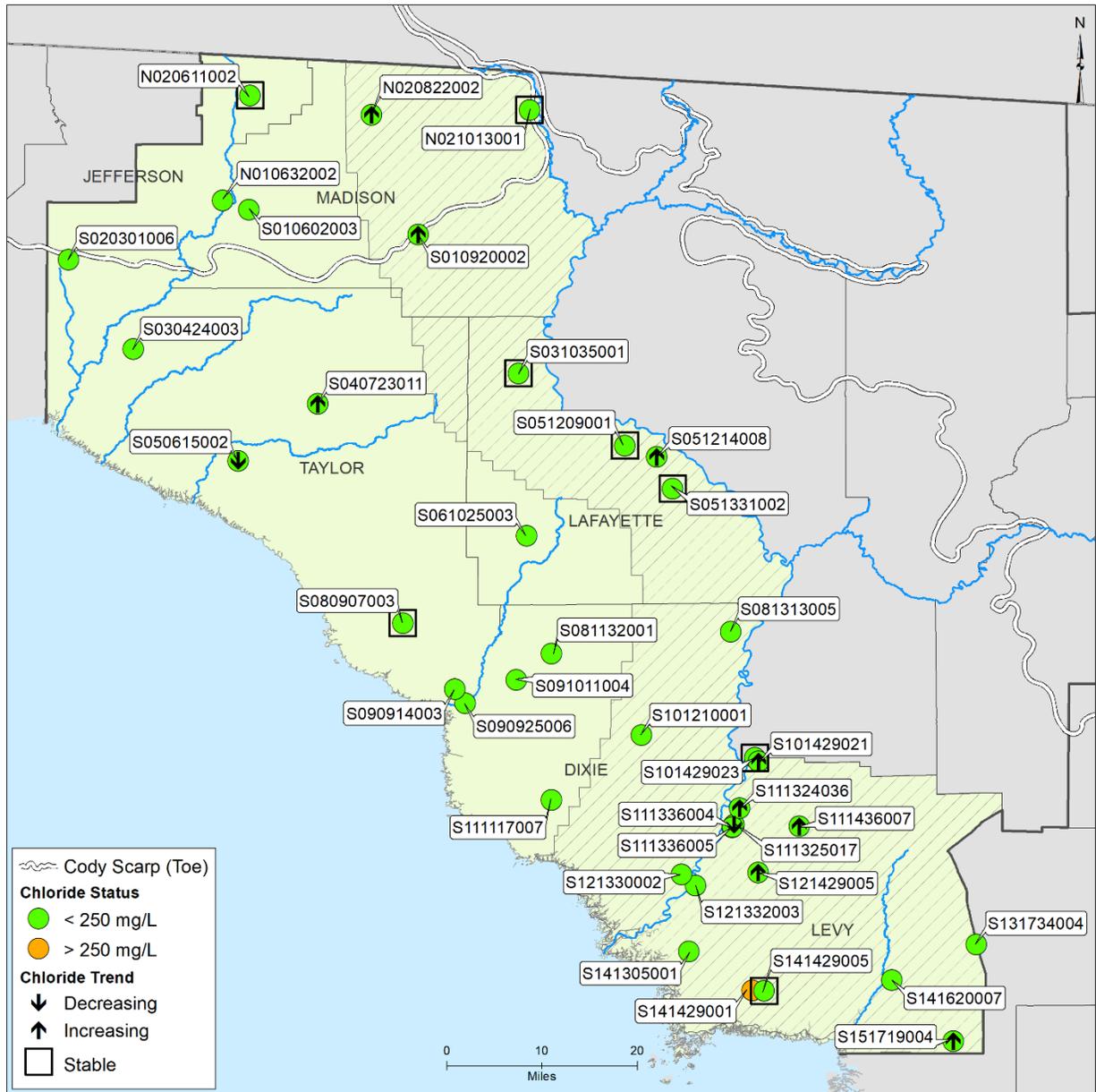


Figure 20. Chloride status and trend assessment by station ID

### 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.

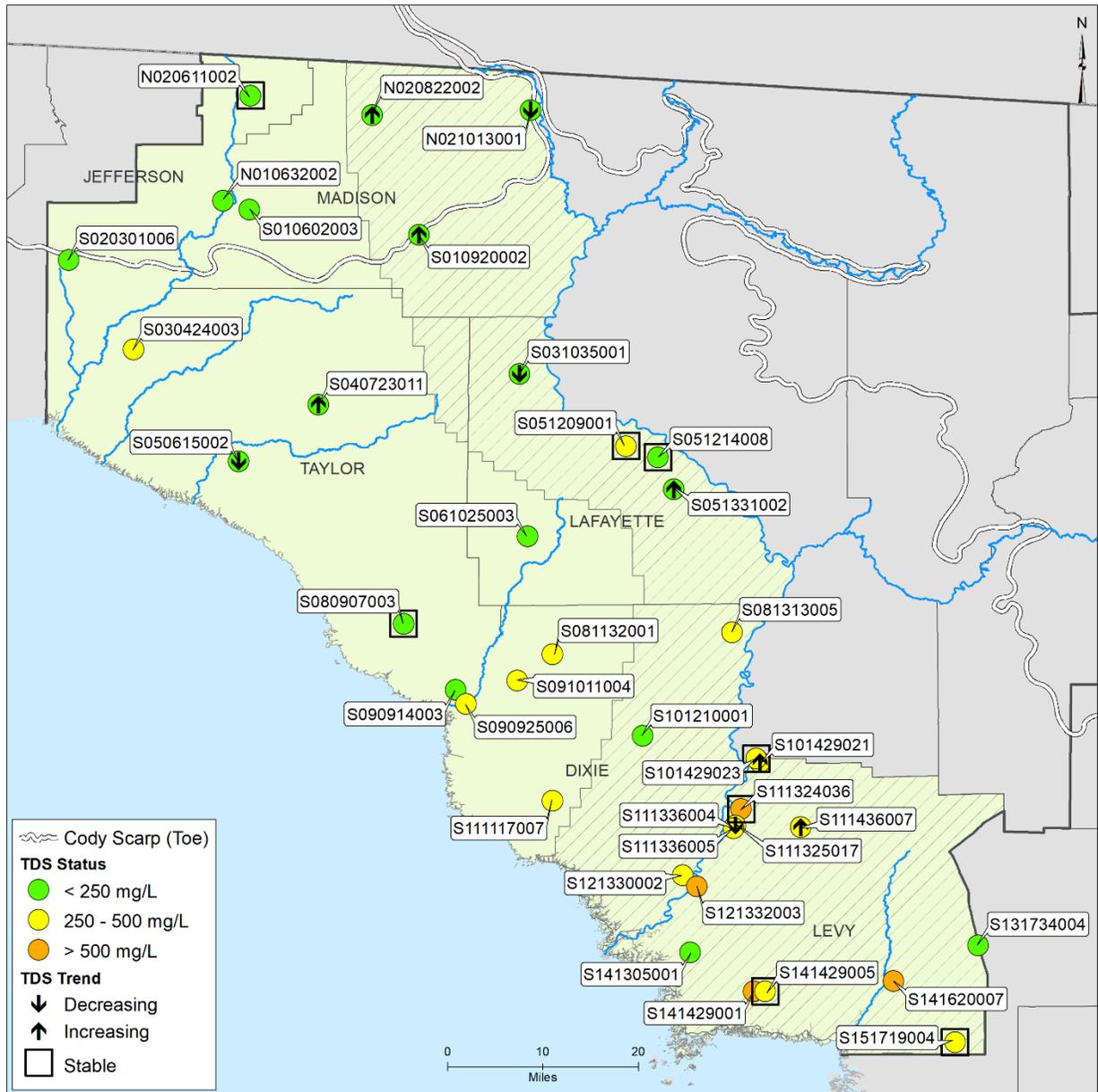


Figure 21. TDS status and trend assessment by station ID

## Specific Conductivity

The specific conductivity status assessment determined there were 34 wells with concentrations less than 1,000  $\mu\text{mhos/cm}$ , one well with a concentration between 1,000 and 1,500  $\mu\text{mhos/cm}$ , and two wells with a concentration above 1,500  $\mu\text{mhos/cm}$ . The two wells with concentrations above 1,500  $\mu\text{mhos/cm}$  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.

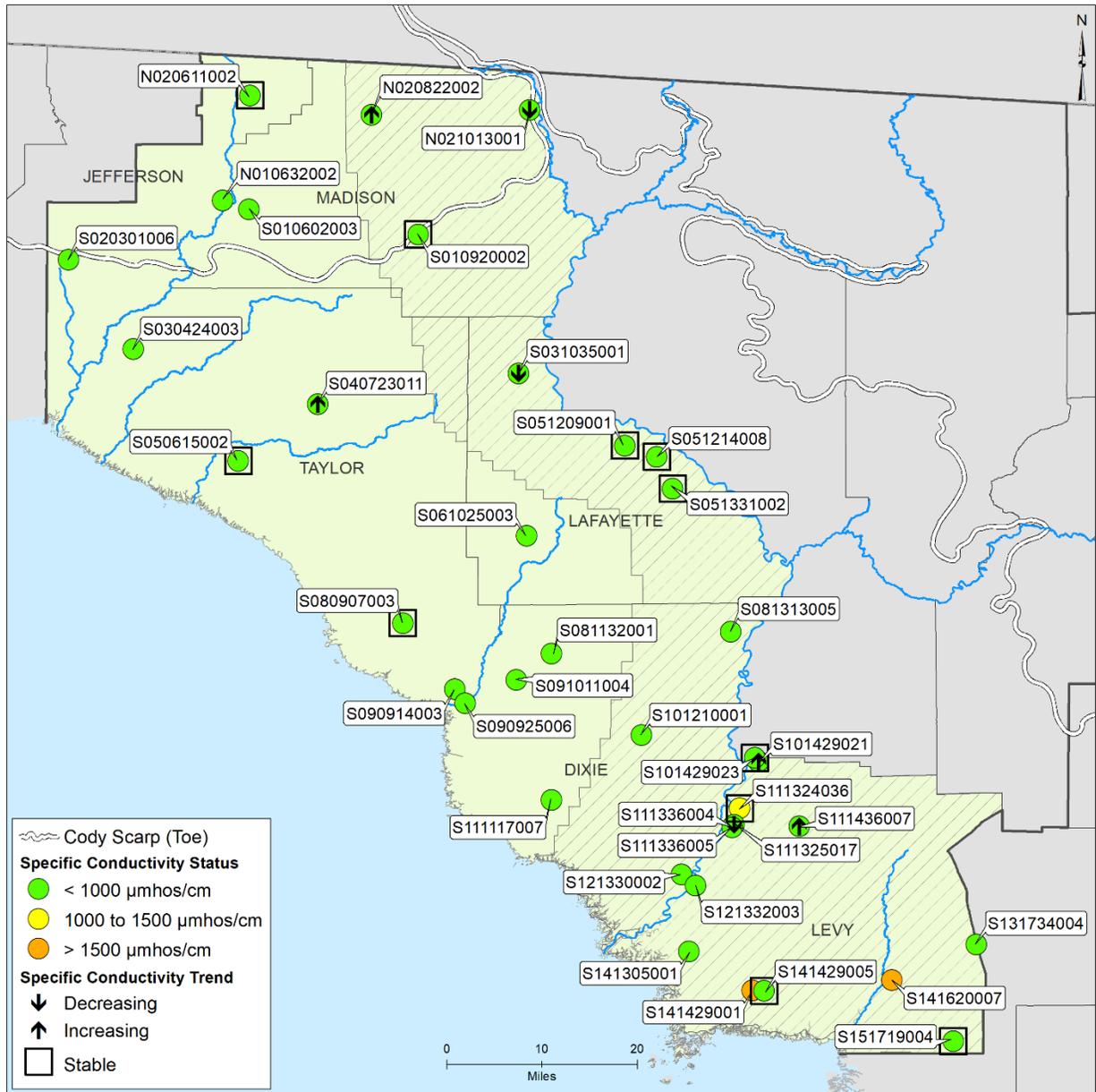


Figure 22. Specific conductivity status and trend assessment by station ID

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**

<b>Waterbody Type</b>	<b>Waterbody Name</b>	<b>Basin</b>	<b>Exceeds Screening Criteria at CP</b>	<b>Exceeds Screening Criteria at 2045</b>
River	Aucilla River at Lamont	Aucilla River	No	Yes
Spring	Big Blue Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Buzzard Log Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Cassidy Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
River	Econfina River Near Perry	Econfina River	No	No
Spring	Falmouth Spring <sup>1</sup>	Middle Suwannee River	No	Yes
Spring	Fanning Springs <sup>1</sup>	Lower Suwannee River	No	No
Spring	Garner Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	JEF63991 <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	JEF63992 <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	JEF63993 <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Jefferson Blue Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Lafayette Blue Spring <sup>1</sup>	Middle Suwannee River	No	Yes
Spring	Levy Blue Spring	Waccasassa River	Yes	Yes
Spring	Little Blue Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Little Fanning Spring	Lower Suwannee River	No	No
Spring	Log Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Madison Blue Spring <sup>1</sup>	Withlacoochee River	Yes	Yes
Spring	Manatee Spring <sup>1</sup>	Lower Suwannee River	No	No
Spring	Minnow Spring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Nuttall Rise	Aucilla River	No	No
Spring	Peacock Springs <sup>1</sup>	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 <sup>1</sup>	Wacissa Springs Group	Yes	Yes
Spring	Troy Spring <sup>1</sup>	Middle Suwannee River	No	No
River	Waccasassa River at Gulf Hammock	Waccasassa River	No	No
Spring	Wacissa Headspring <sup>1</sup>	Wacissa Springs Group	Yes	Yes
River	Wacissa River Near Wacissa	Wacissa River	Yes	Yes

<sup>1</sup>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*

<b>Waterbody Type</b>	<b>Waterbody Name</b>	<b>County/Basin</b>	<b>Exceeds Screening Criteria at 2045</b>
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

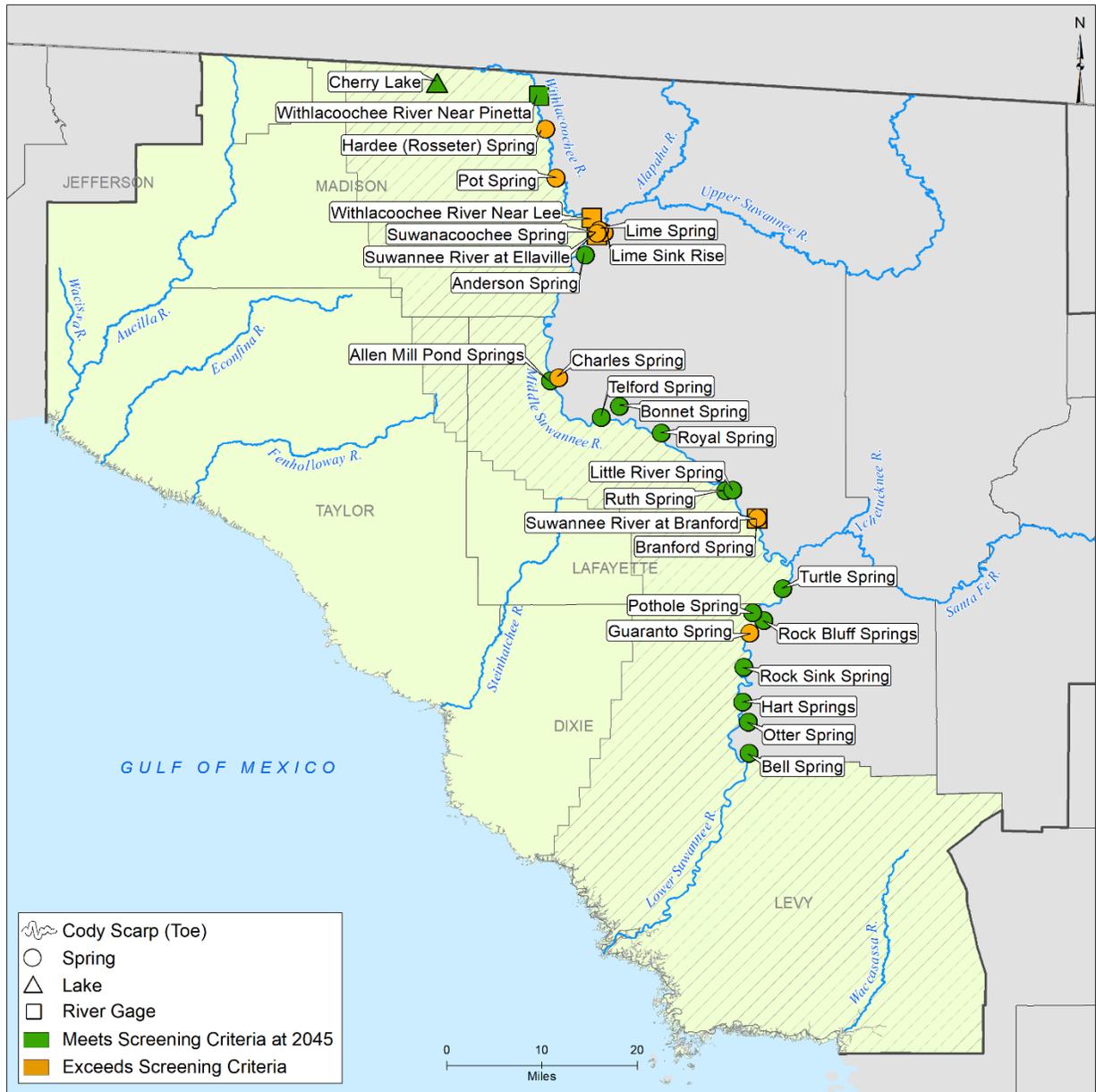


Figure 24. Waterbodies without adopted MFLs assessment results

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
<b>Total</b>	<b>23,162</b>



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*

<b>County</b>	<b>Wells</b>	<b>WTPs</b>	<b>WWTPs</b>
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](http://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 regional 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).

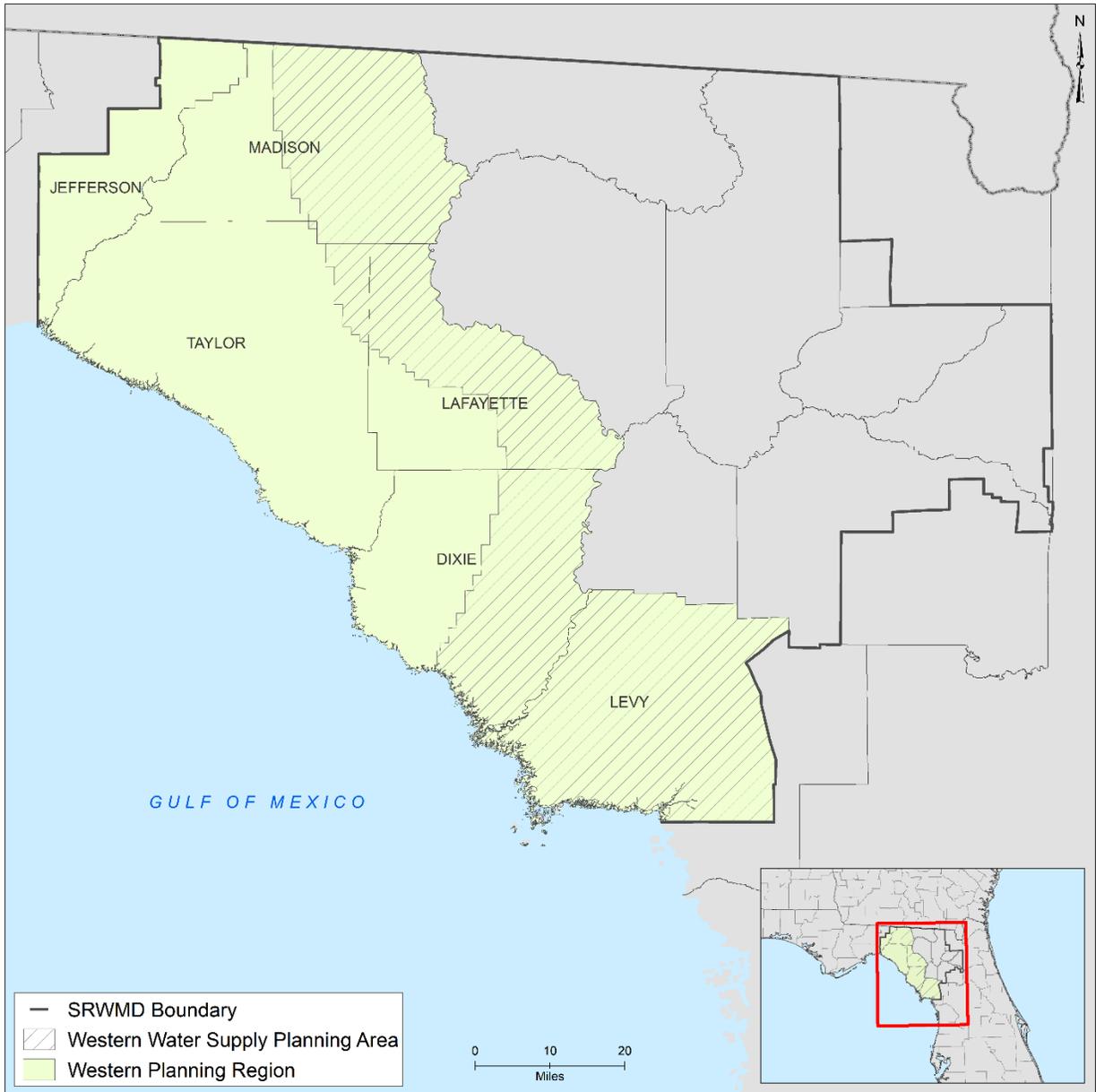


Figure 27. Existing WSPA in the WWSP region

# 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.

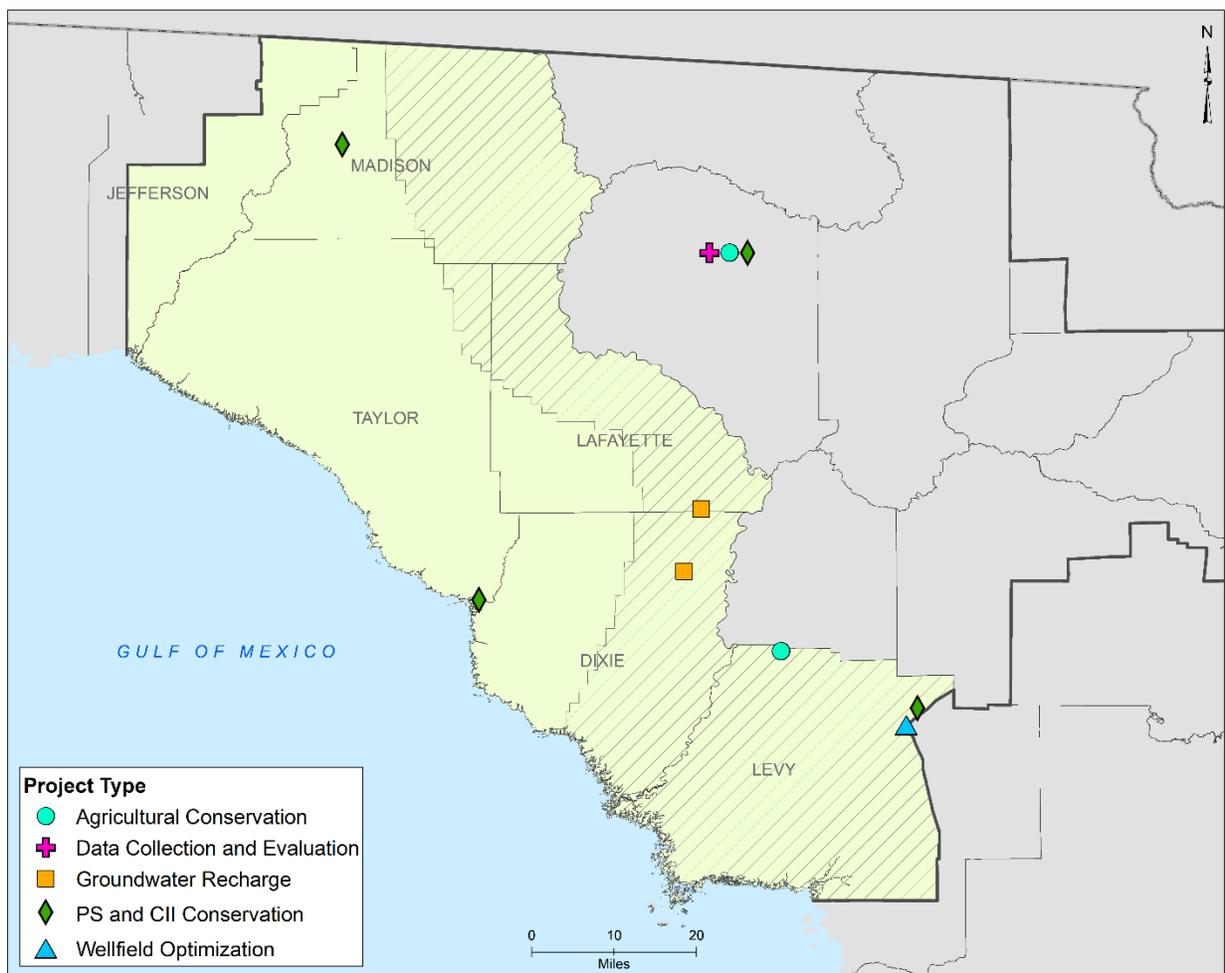
Figure 28 displays the approximate locations of project options, which were assigned during the project solicitation process. The locations may not be exact but are in general areas where projects are likely to be located. Projects that are mapped outside of the WWSP region span multiple counties and 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
<b>Total</b>	<b>15</b>	<b>13.07</b>	<b>\$120.63</b>

\*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 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
<b>Total</b>	<b>4</b>	<b>4.1</b>	<b>\$17.84</b>

\*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
<b>Total</b>	<b>10</b>	<b>8.94</b>	<b>\$42.79</b>

\*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<sub>2</sub>OSAV) 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<sub>2</sub>OSAV 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<sub>2</sub>OSAV quantified outdoor practices*

<b>Conservation Measure</b>	<b>Average Savings</b>
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<sub>2</sub>OSAV 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](https://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](https://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 be 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 electro dialysis 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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