2018 Water Supply Assessment Update

Northwest Florida Water Management District

WRA 18-01

December 2018

Cash Bayou (Apalachicola River)

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

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ACKNOWLEDGEMENTS

The Northwest Florida Water Management District (NWFWMD or District) water supply assessment relies on a large team of District professionals primarily within the Division of Resource Management. Primary authors and contributors are noted below.

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EXECUTIVE SUMMARY

The purpose of this Northwest Florida Water Management District (NWFWMD or District) Water Supply Assessment (WSA) update is to determine, per section 373.036(2)(b)4.b., Florida Statutes (F.S.), *"Whether existing and reasonably anticipated sources of water and conservation efforts are adequate to supply water for all existing legal uses and reasonably anticipated future needs and to sustain the water resources and related natural systems."* This determination is made for each water supply planning region on at least a 20-year planning horizon and is updated at least once every five years.

The District has seven water supply planning regions. The first NWFWMD Districtwide WSA was completed in 1998, and it was updated in 2003, 2008 and 2013. The water use estimate and projection data and methodologies used in the current assessment are similar to those used in previous WSAs. Refinements include the incorporation of seasonal population estimates and use of the Florida Department of Agriculture and Consumer Services (DACS) Florida Statewide Agricultural Irrigation Demand (FSAID) data for agricultural water use estimates and projections.

The District currently has two regional water supply plans in effect: the Region II Regional Water Supply Plan (RWSP) for Santa Rosa, Okaloosa, and Walton counties first approved in 2000, with updates approved in 2006 and 2012; and the Region III RWSP for Bay County, first approved in 2008 and updated in 2014. The Region V RWSP for Gulf and Franklin counties was approved in 2007 and discontinued following the completion of the 2013 WSA.

In 2015, Districtwide water use was estimated at approximately 324 million gallons per day (mgd). The largest water use category was public supply, followed by industrial/commercial/institutional (ICI) and agriculture. Together these three categories comprised 79 percent of all water use. Most of the District's agricultural water use is in Region IV, while most ICI and power generation water use is in Region I, Escambia County, and Region III, Bay County. Groundwater provides over three-fourths of District water supply, with the major aquifers being the Floridan aquifer system and the sand-and-gravel aquifer. The Deer Point Lake Reservoir is a major potable surface water source in Bay County.

The total projected Districtwide water use by 2040 is 406 mgd, an increase of 82 mgd or 25 percent. Public supply, ICI and agriculture are expected to remain the largest water use categories in 2040, collectively increasing to 81 percent of all water use under normal precipitation conditions. In drought conditions, the 2040 projected water use of about 450 mgd reflects an increase of nearly 127 mgd or 39 percent over 2015 water use. The greatest projected percentage increases in drought conditions are for agriculture and recreational irrigation.

The 2015 District population estimate based on University of Florida, Bureau of Economic and Business Research (BEBR) data was 1,416,819. The total estimated seasonally-adjusted population was 1,517,943. About 84 percent of District population was estimated to be served by public supply utilities, with the remaining 16 percent served by domestic self-supply. Seasonally adjusted, by the year 2040, there will be an estimated additional 319,250 residents, with close to half of this projected increase in Region II. Region III and Region VII are both anticipated to increase in population by about 23 percent by 2040. Estimated population increases in other regions by year 2040 range from six to nine percent.

The regional resource assessments identified water resource limitations in several regions. The potentiometric surface remains below sea level in coastal areas of Region II and Region III, creating associated risks of saltwater intrusion. In Region II, inland wellfield development has reduced withdrawals from the coastal Floridan aquifer. This has enabled water levels to recover in some areas and has slowed, but not eliminated, the risk of saltwater intrusion. Concerns related to water quality degradation and water supply availability remain. In Region III, Bay County has extended potable water from Deer Point Lake Reservoir to additional coastal service areas. In addition, to increase the resiliency of the reservoir to withstand storm surge impacts, an alternative upstream water intake at Econfina Creek was completed in 2015. Management of coastal water resources in Region III will remain important to preventing lateral intrusion and vertical upconing of saline water.

Continued monitoring of water levels and water quality of groundwater and surface water resources will address most resource limitations in Region I and in regions IV-VII. However, water withdrawals in Georgia have impacted the ecology of the Apalachicola River and Bay system and a positive resolution of that interstate conflict is necessary to sustain the resources of the watershed and related natural systems and economic resources for current and future generations.

Existing Region II 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. Implementation of the Region II RWSP should be continued, including plan updates as needed. Due to successful completion of the alternative water supply project in 2015, and with continued management of coastal water resources, the Region III RWSP may be discontinued. No other regional water supply plans are needed at this time. The need for regional water supply plans will be re-evaluated following the District's next WSA and in coordination with the development of minimum flows and minimum water levels (MFLs).

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ACRONYMS AND ABBREVIATIONS

ADR	Average Daily Rate
AFB	Air Force Base
AFSIRS	Agricultural Field Scale Irrigation Requirements Simulation (Model)
ARC	Area of Resource Concern
AWT	Advanced Wastewater Treatment
BEBR	Bureau of Economic and Business Research, University of Florida
bls	Below Land Surface
cfs	Cubic Feet per Second
DACS	Florida Department of Agriculture and Consumer Services
DEP	Florida Department of Environmental Protection
District	Northwest Florida Water Management District
DSAP	Detailed Specific Area Plan
DSS	Domestic Self Supply
EDR	Office of Economic & Demographic Research, Florida Legislature
F.A.C.	Florida Administrative Code
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Demand
ft^2/day	Feet Squared Per Day
gpcd	Gallons Per Capita Per Day
gpm	Gallons Per Minute
gpm/ft	Gallons Per Minute per Foot
GWUP	General Water Use Permit
ICI	Industrial/Commercial/Institutional
in/yr	Inches per Year
IWUP	Individual Water Use Permit
MCL	Maximum Contaminant Level
MFL	Minimum Flows and Minimum Water Levels
mgd	Million Gallons per Day
mg/L	Milligrams per Liter
MSL	Mean Sea Level
NAVD88	North American Vertical Datum 1988
NWFWMD	Northwest Florida Water Management District
PS	Public Supply
Q_{xx}	Water Flow Exceedance Probability ($_{xx}$ percent)
RWSP	Regional Water Supply Plan
SWIM	Surface Water Improvement and Management
TDS	Total Dissolved Solids
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WRCA	Water Resource Caution Area
WRF	Water Reclamation Facility
WSA	Water Supply Assessment
WPSPTF	Water Protection and Sustainability Program Trust Fund
WWTF	Wastewater Treatment Facility

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CHAPTER 1. INTRODUCTION

Background

The mission of the Northwest Florida Water Management District (NWFWMD or District) is to implement the provisions of Chapter 373, Water Resources, Florida Statutes (F.S.), in a manner that best ensures the continued welfare of the residents and water resources of northwest Florida. The District works with state and federal agencies and local governments to achieve its mission through four primary functions and interrelated areas of responsibility - water supply, water quality, flood protection and natural system protection.

In accordance with the District's mission and responsibilities, and pursuant to Florida Statutes and rule,[1] the purpose of this Water Supply Assessment (WSA) is to determine, per section 373.036(2)(b)4.b., F.S., *"Whether existing and reasonably anticipated sources of water and conservation efforts are adequate to supply water for all existing legal uses and reasonably anticipated future needs and to sustain the water resources and related natural systems."* The WSA makes this determination for each water supply planning region on at least a 20-year planning horizon at least once every five years to make recommendations to the District's Governing Board whether to initiate, continue and update, or discontinue regional water supply plans (RWSPs).

Water supply planning regions delineated for the District's first WSA were defined by county boundaries and similarity of water supply conditions that include primary water sources, relative availability of water, and any water supply problems or issues (Figure 1).

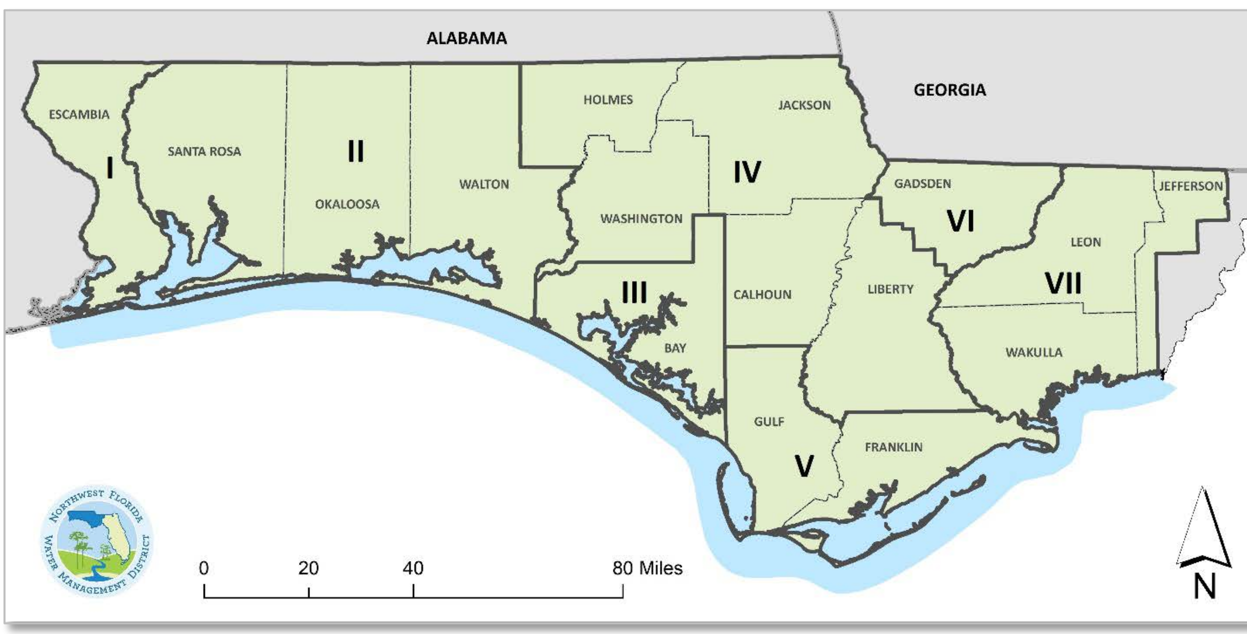

Figure 1. Water Supply Planning Regions

The District's previous WSAs in 1998, 2003, 2008 and 2013 made recommendations for regional water supply planning, in summary noted below.

[1] Section 373.036, F.S., and Chapter 62-40, Water Resource Implementation Rule, Florida Administrative Code (F.A.C.).

- Region II RWSP for Santa Rosa, Okaloosa and Walton counties: First established in 2000 due to coastal groundwater withdrawals, a decline in coastal Floridan aquifer levels and concern regarding saltwater intrusion; the Region II RWSP was continued in 2006 and again in 2012.
- Region III RWSP for Bay County: First established in 2008 to further transition groundwater production away from coastal areas; the Region III RWSP was continued in 2014 to address potential storm surge saltwater intrusion affecting dependability of water supply.
- Region V RWSP for Franklin and Gulf counties: First established in 2007 due to potential saltwater intrusion concerns and to develop alternative water sources; the Region V RWSP was discontinued following recommendations identified in the 2013 WSA.

WSA Process

The water supply assessment process has three basic steps:

1. Estimate water use for 2015 and project water demand for the 2020-2040 planning period;
2. Identify existing and reasonably anticipated sources of water and conservation efforts, and evaluate adequacy of water resources to meet future reasonable-beneficial uses; and,
3. Make recommendations to the District's Governing Board to initiate, continue and update, or discontinue RWSPs.

Water use estimates are compiled for a base year (2015) and future demand projections are developed in five-year increments through a minimum 20-year planning horizon (2020-2040). The level-of-certainty planning goal associated with identifying the water supply needs of existing and future reasonable-beneficial uses must be based upon meeting those needs for a 1-in-10 year drought. See Appendix 1 for all methodologies used in this WSA.

Once the need for RWSPs are approved by the Governing Board, the regional water supply planning process continues in coordination and cooperation with local governments, utilities, self-suppliers, and other affected and interested parties.

Regulatory Framework

Consumptive Use Permitting

The District issues Individual Water Use Permits (IWUPs), and General Water Use Permits (GWUPs) by rule[2] that authorize the withdrawal of water from surface and/or groundwater sources for reasonable and beneficial uses. For permitting purposes, the District is divided based on resource concern. Special permit conditions apply in areas designated as a Water Resource Caution Area or an Area of Resource Concern, as illustrated in Figure 2 and further defined below.

- Water Resource Caution Area: A geographic area, officially designated by the Governing Board by rule that is experiencing, or is anticipated to experience within the next 20 years, critical water resource problems as provided by the criteria in section 40A-2.801(1), F.A.C.

- Areas of Resource Concern: Areas delineated on the map contained in section 40A-2.902, F.A.C., where resource concerns exist related to water availability, water quality, high anticipated growth in demand or other factors.

[2] Chapter 40A-2, Florida Administrative Code (F.A.C.).

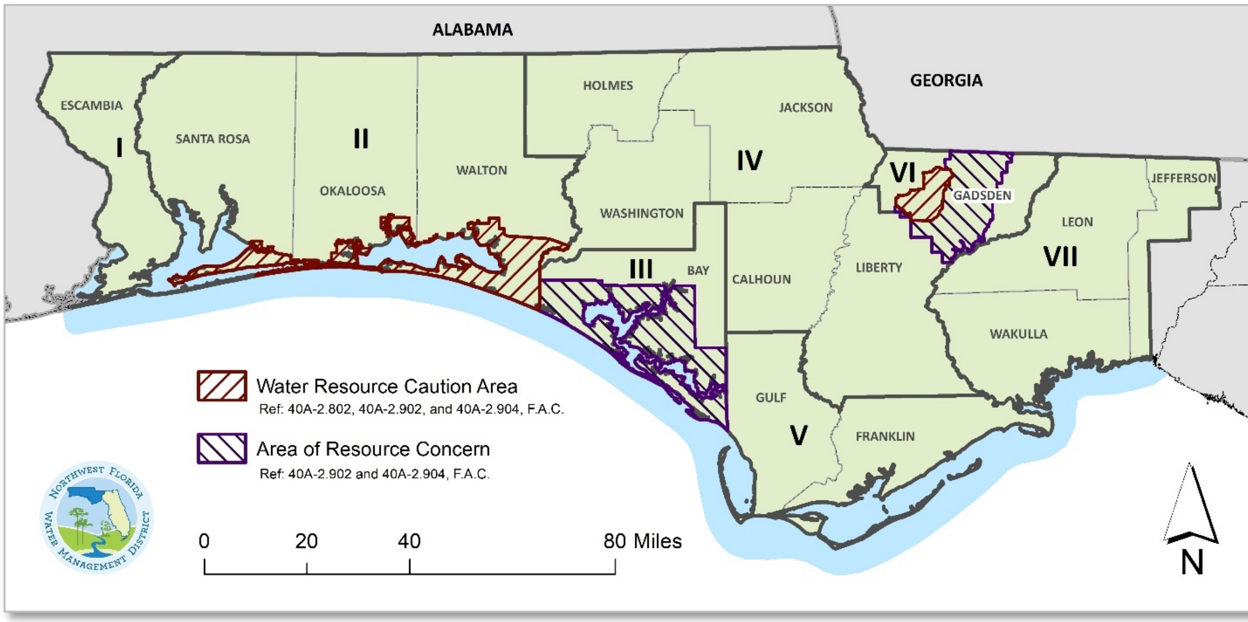

Figure 2. Water Resource Caution Areas and Areas of Resource Concern

<u>Recent Initiatives</u>

Consumptive use permitting was amended statewide in 2014 and updated in 2015 through Consumptive Use Permitting Consistency (CUPcon) - a collaborative effort by Florida's water management districts and the Florida Department of Environmental Protection (DEP) to improve consistency and streamline permitting processes statewide.

Minimum Flows and Minimum Water Levels (MFLs)

Section 373.042, F.S., requires each water management district to develop minimum flows and minimum water levels (MFLs) for specific surface and ground waters within its jurisdiction. The MFL for a given waterbody is the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. Minimum flows and minimum water levels are established using best available data and consideration is given to natural seasonal fluctuations, non-consumptive uses, and environmental values associated with coastal, estuarine, riverine, spring, aquatic, and wetlands ecology as per Chapter 62-40.473, F.A.C. The MFL program complements other efforts, including consumptive use permitting and regional water supply planning.

The District's MFL program was initiated in 2012 and is ongoing. There are no adopted MFLs and no recovery or prevention strategies established to date. Minimum flows and minimum water levels adopted by rule, associated recovery or prevention strategies, and reservations of water will eventually be fully integrated into water supply assessments and RWSPs, as and where appropriate. Recovery and prevention strategies may also be developed in areas outside of RWSPs. Any water supply and water resource development projects identified in a recovery or prevention strategy shall be included in the applicable regional water supply plan. The District's MFL Priority List and Schedule are updated annually and may be found on the District's website: www.nwfwater.com.

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CHAPTER 2. REGIONAL RESOURCE ASSESSMENTS

INTRODUCTION TO REGIONAL ASSESSMENTS

The Northwest Florida Water Management District is one of Florida's five water management districts. The District's unique hydrology, physiography, land use, and climate extend from Escambia County at the western end of the panhandle to Jefferson County, shared with Suwanee River WMD, on the east. The western boundary of the NWFWMD Eastern District Groundwater Model, under development, is aligned with the Apalachicola River and extends east into the Suwannee River WMD and north in to Georgia (Figure 3).

NWFWMD is just under twenty percent of the land area of Florida with around seven percent of the total state population in 2017. The District has many of the lowest population densities in the state (for example, Liberty County) yet also some of the fastest growing areas including Walton and Santa Rosa counties (2017 population in Figure 4).

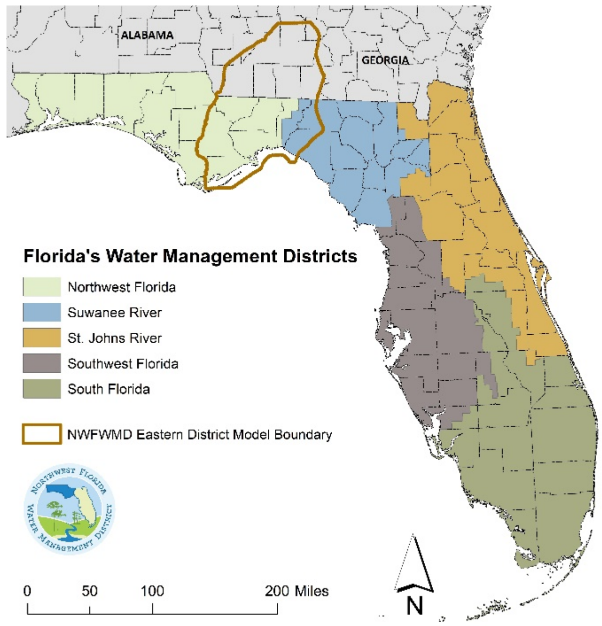

Figure 3. Florida's Water Management Districts

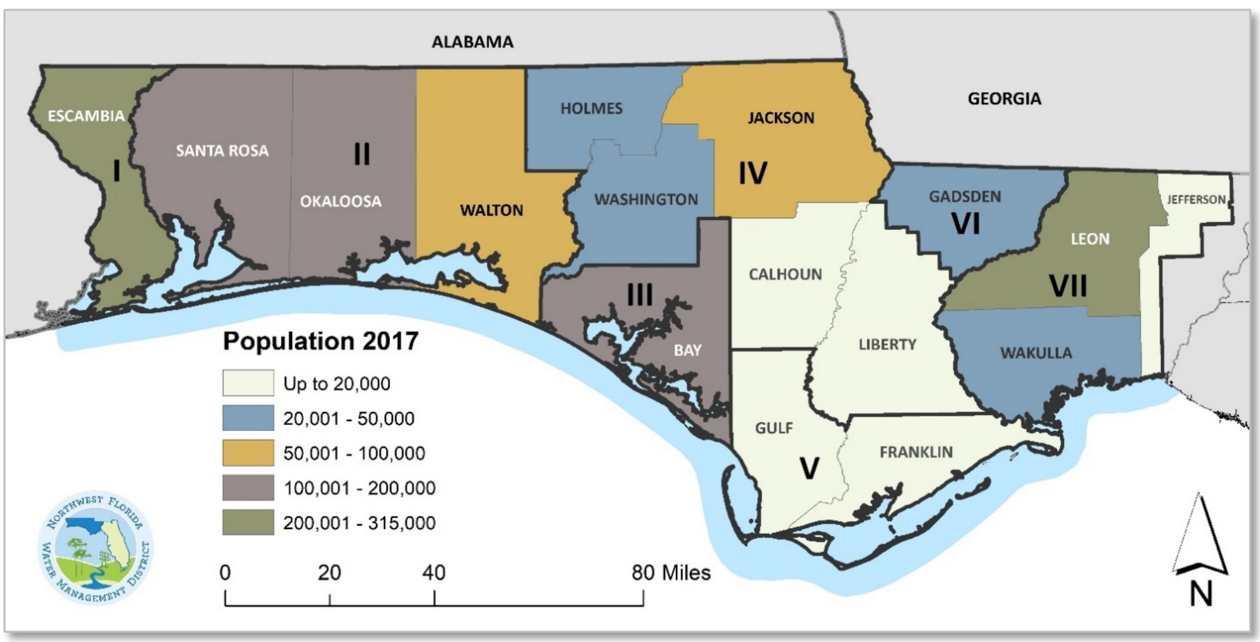

Figure 4. Population by County

Hydrology

There are seven major watersheds in northwest Florida - six that extend into portions of Alabama and Georgia. The District has some of the state's largest rivers and most diverse estuaries, and more than

250 springs. The District's major rivers include the Apalachicola, Blackwater, Chipola, Choctawhatchee, Escambia, Ochlockonee, Shoal, St. Marks, Wakulla, and Yellow.

District groundwater resources are primarily the Floridan aquifer and the sand-and-gravel aquifer in western portions of the District. Smaller aquifer systems used to a lesser degree include the surficial aquifer, intermediate aquifer system, and Claiborne aquifer.

Groundwater resources are divided into four major groundwater regions: the Western Panhandle, Dougherty Karst, Apalachicola Embayment, and Woodville Karst (Figure 5). The groundwater resources within these regions vary in quantity and quality, and all but the Dougherty Karst Region have a near-coastal sub-region where the ground water is highly influenced by the position of the freshwater and saltwater interface (Pratt, et al., 1996).

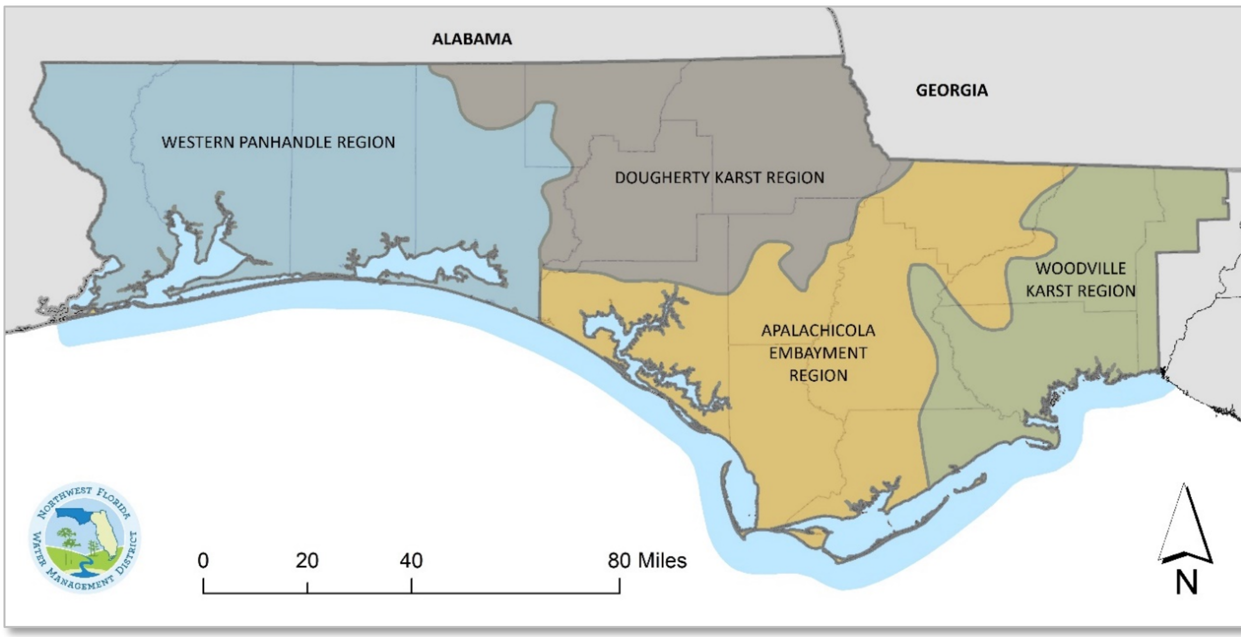

Figure 5. Groundwater Regions

Deer Point Lake Reservoir is a major potable surface water source in Bay County, and a canal connecting the Chipola River to Port St. Joe supplies potable water in Gulf County. Other surface water resources across the District serve agriculture, recreational, ICI, and power water uses.

Topography and Physiography

Major physiographic features include the northern highlands and the Marianna Lowlands; and the Coastal Lowlands, which extend across all coastal areas of the District (Figure 6). Significant northern highland landforms include the Western Highlands, Tallahassee Hills, New Hope Ridge, and Grand Ridge.

Elevations in the highlands area range from 50 to 340 feet above sea level. Coastal Lowland elevations range from sea level to about 100 feet above sea level, and land in many coastal areas is poorly drained due to flat topography and associated high water table (Pratt, et al., 1996). The elevation values of the digital elevation model are based on LiDAR (light detection and ranging) data.

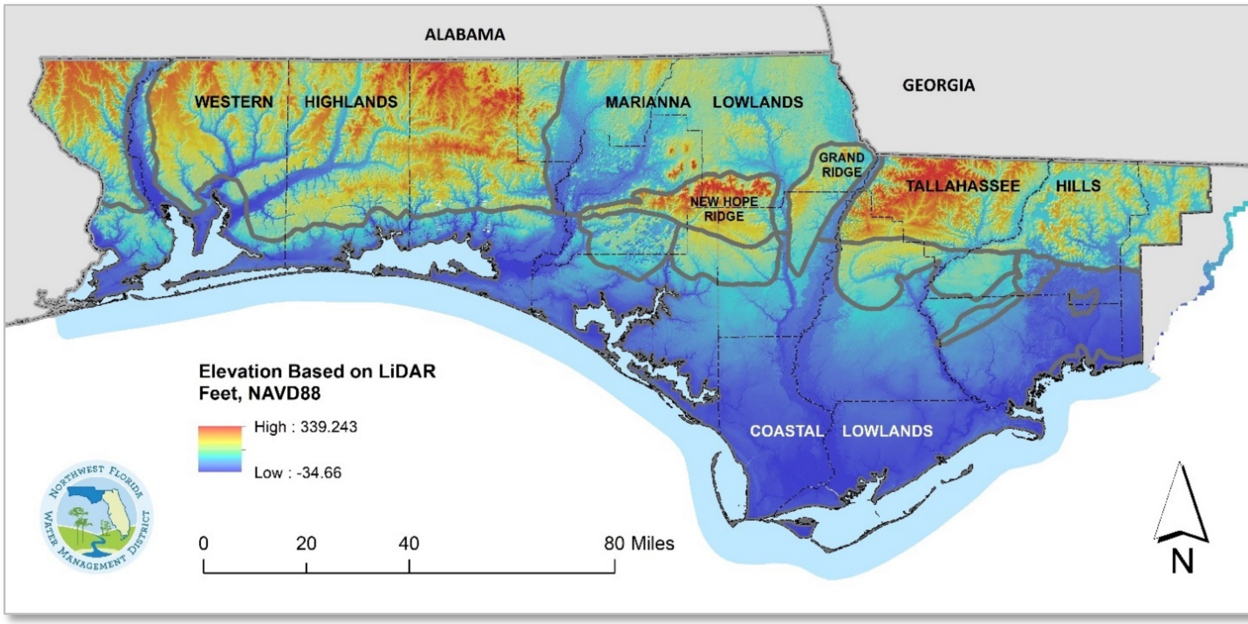

Figure 6. Topography and Physiography with LiDAR Elevation Model

Land Use

Major human settlement and commercial-industrial centers in northwest Florida include the Pensacola metropolitan region in Escambia County, the City of Tallahassee in Leon County, and the Lynn Haven-Panama City metropolitan region in Bay County (Figure 7). There are also numerous urban and unincorporated developed areas across both coastal and inland areas of Region II: Santa Rosa, Okaloosa and Walton counties. District sector plans are in regions I, II and III: the Escambia County Optional Sector Plan and the Bay-Walton Sector Plan. More information on sector plans follows below.

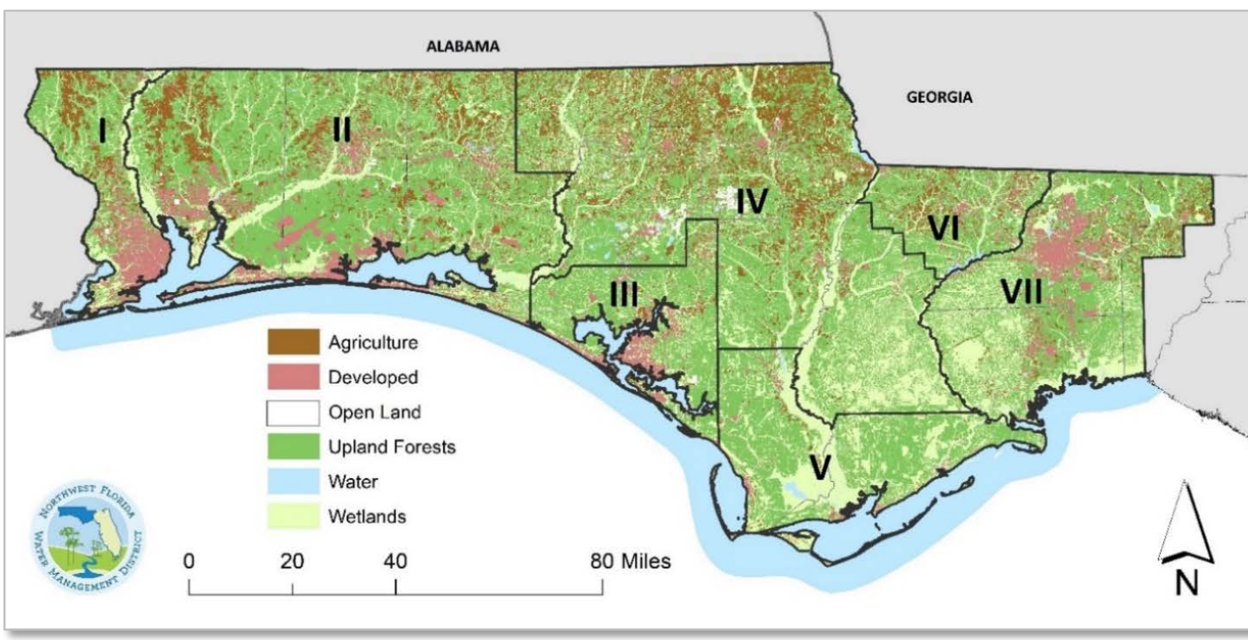

Figure 7. Land Use and Land Cover

Agricultural lands - both irrigated and non-irrigated - are heavily concentrated in Jackson County, which has 30 percent of all agricultural land and two-thirds of all irrigated agricultural acreage Districtwide. The five counties of Region IV comprise over half of all agricultural lands and over three-fourths of all irrigated agricultural acreage in the District. There are also agricultural lands in northern portions of regions I and II and throughout Gadsden County (Region VI). Open space and natural areas include a national wildlife refuge, state forests and preserves, state parks, and large military landholdings.

Sector Plans

Section 163.3245, F.S., authorizes local governments to adopt sector plans into their comprehensive plans. Sector plans are substantial geographic areas of at least 15,000 acres that emphasize urban form and protection of regionally significant resources and public facilities. Sector plans are implemented in two main parts: adoption of a long-term master plan for the entire planning area, and detailed specific area plans (DSAPs) that implement the long-term master plan. County-adopted DSAPs are required before development can occur.[3]

Per section 163.3245, F.S., water management districts must account for the water needs, sources and water resource and water supply development projects identified in adopted sector plans in their water supply assessments and regional water supply plans. Available data about water needs associated with sector plans are incorporated in to this WSA.

Bay-Walton Sector Plan

The Bay-Walton Sector Plan covers approximately 110,500 acres with a 50-year vision for directing growth, development, and environmental resource protection across Bay and Walton counties. The long-term master plan includes commercial employment, residential, agriculture, and conservation lands extending from St. Andrews Bay and West Bay in Bay County to Choctawhatchee Bay in Walton County. In June 2015, the Bay-Walton Sector Plan was found to be in compliance with statute and was fully enacted. This plan encompasses multiple smaller previous plans, including the West Bay Sector Plan approved by Bay County in 2003 and the WaterSound North Development of Regional Impact (DRI) approved by Walton County in 2005. The previously approved West Bay Detailed Specific Area Plan (DSAP) and the Airport DSAP totaling about 20,000 acres in an around the Northwest Florida Beaches International Airport in Bay County remain in effect. No DSAP has been approved for the Walton County portion of the sector plan area. Further information is in the Region II and Region III resource assessments that follow and at: http://bay-waltonsectorplan.com.

Escambia County Optional Sector Plan

The Escambia County Optional Sector Plan is approximately 15,000 acres of land north and west of Pensacola along the Perdido River north of I-10 and west of Cantonment. Further information is in the Region I Resource Assessment that follows and at: https://myescambia.com/our-services/development-services/planning-zoning/optional-sector-plan.

Additional analysis of water needs, and water resource and water supply development projects will be required in Escambia, Bay and Walton counties in future water supply assessments, relevant regional water supply plans, development of applicable MFLs, and in permitting processes.

[3] Florida Department of Economic Opportunity (DEO), Sector Planning Program.

Climate and Drought

Northwest Florida is generally sub-tropical with warm humid summers, mild winters, and abundant rainfall. Normal average precipitation levels range from 53 to 67 inches per year but vary considerably across the panhandle with wetter areas in the west and drier locations around northeastern parts of the District, as illustrated in Figure 8. Recent drought periods in northwest Florida are during 2006-2007 and 2011-2012, which were about 12 and 14 inches below normal average precipitation levels respectively.

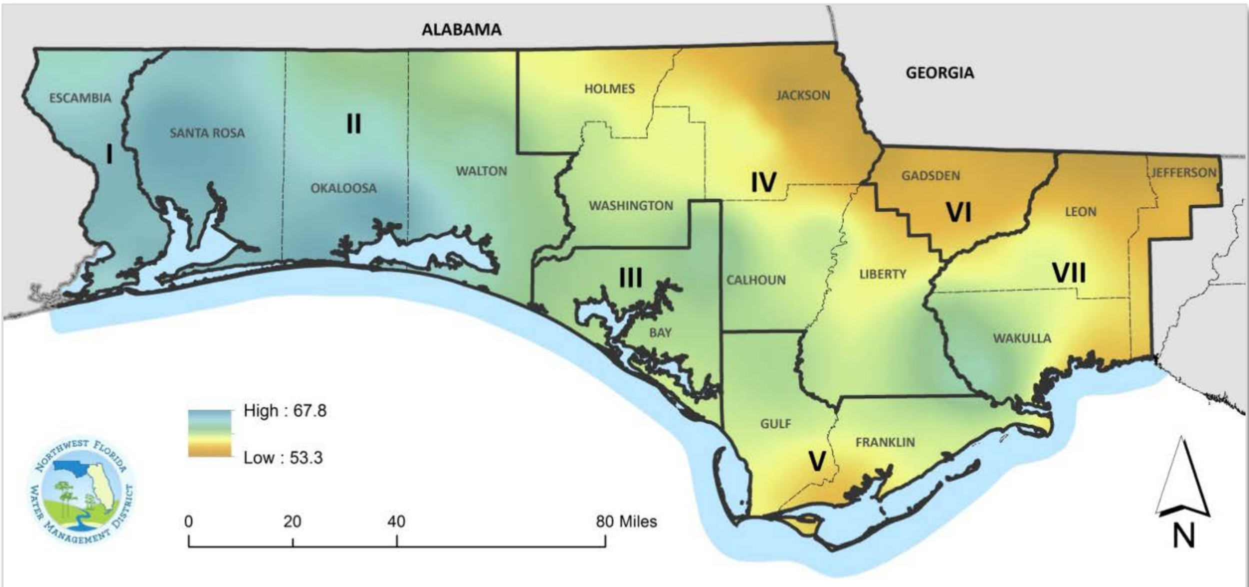

Figure 8. 30-Year Normal Average Annual Precipitation Inches Per Year (1981-2010)[4]

Wells

There are over 210,000 active groundwater wells in the NWFWMD. About one-third of all wells are non-consumptive, i.e., for testing, monitoring, remediation, or aquifer recharge. Test and monitoring wells are used for many purposes, including measuring and tracking changes in water levels and water quality. The number of wells withdrawing water for water uses is estimated to be over 140,000; and 94 percent, or over 131,000, are small GWUPs in the recreation and DSS water use categories. Many of these small wells are located along coastal areas and in older developed areas, i.e., Pensacola and Tallahassee.

General Notes on Regional Assessments

The District's seven water supply planning regions each have unique water resources, hydrogeology, physiography, land use, water use, and climate characteristics. The seven planning regions are:

- Region I Escambia County
- Region II Santa Rosa, Okaloosa, and Walton counties
- Region III Bay County
- Region IV Washington, Holmes, Jackson, Calhoun, and Liberty counties
- Region V Gulf and Franklin counties

[4] Source: PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, data created July 10, 2012.

- Region VI   Gadsden County
- Region VII   Leon, Wakulla, and (portion of) Jefferson counties

The NWFWMD share of Jefferson County is just under half of the county's total land area with the remainder in the Suwanee River Water Management District. Approximately 71 percent of the total Jefferson County population is estimated to be in NWFWMD.

General notes for the seven regional assessments that follow:

- All population estimates are seasonally adjusted, except as noted. See Appendix 1, Methodologies, for more information.
- Population growth rates are calculated from 2015 BEBR population projection data.
- Agricultural estimates and projections are provided by DACS through the FSAID report.
- Economic data from Florida Legislature, Office of Economic and Demographic Research (EDR), County Profiles, May 2017. Date of data is 2015 unless otherwise noted.
- Data may contain minor differences due to rounding.

REGION I: ESCAMBIA COUNTY

Overview

Escambia County covers about 875 square miles and is the westernmost county in Florida's panhandle, bordered by the State of Alabama on the north and west (Figure 9).

Escambia County straddles two primary watersheds: Perdido River and Bay, and the Pensacola Bay System. Water management lands in the region include areas within the Perdido River and Escambia River water management areas. Public military lands near Pensacola include the Pensacola Naval Air Station, Corry Station, and Saufley Field.

Region I Snapshot

	2015	2040
Population	316,766	344,275
Water Use (mgd)	80.25	103.08

Primary Water Source(s):	Sand-and-gravel aquifer, Escambia River
MFL Waterbodies:	None
Water Reservations:	None
RWSP Status:	No RWSP Recommended

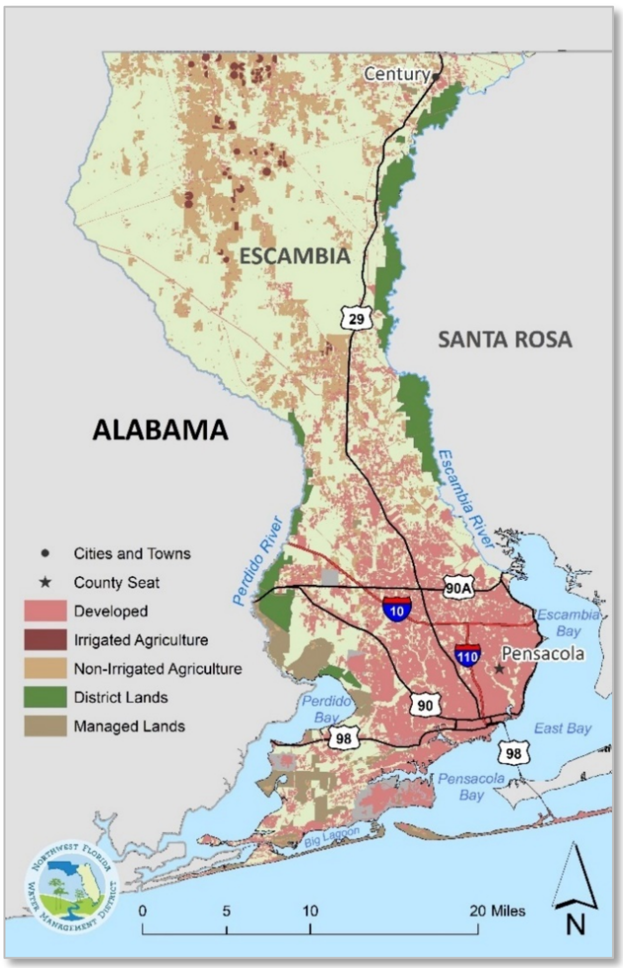

Figure 9. Region I - Escambia County

Other public lands located in the southern portion of the county include the Jones Swamp Preserve and Big Lagoon, Perdido Key, and Tarkiln Bayou Preserve state parks.

Escambia's two incorporated areas are the City of Pensacola on Pensacola Bay and the Town of Century in the northeastern corner of the county. Unincorporated communities in the county include Bellview, Cantonment, Ensley, Gonzalez, Molino, Warrington, and Walnut Hill.

Escambia has a low projected population growth rate, averaging less than 0.4 percent annually over the planning period. According to EDR, Escambia County's per capita personal income and median family incomes were both higher than District averages, and the poverty rate was lower than both state and Districtwide averages (EDR, 2017).

The Escambia County Optional Sector Plan was approved by Escambia County in April 2008. The Mid-West Sector Plan DSAP, encompassing the entire sector plan area (+/-15,000 acres), was adopted in September 2011. Proposed land uses include regional employment districts, town and village centers, traditional urban neighborhoods, and suburban and conservation neighborhoods.

Population

The 2015 BEBR population estimate for Escambia County was 306,944. The 2015 seasonally-adjusted population estimate was 316,766, reflecting an estimated seasonal population rate of 3.2 percent. Most seasonal populations are in the Pensacola Beach and Perdido Key coastal areas. Unless noted otherwise all population data is seasonally adjusted.

2015 Water Use Estimates and 2020-2040 Demand Projections

In 2015, Escambia had about 21 percent of the District population and accounted for about 25 percent of all water use Districtwide (Figure 10 and Table 1). The largest water use categories were public supply and ICI at 47 and 32 percent respectively.

Three-fourths of all water withdrawn came from the sand-and-gravel aquifer, with the remainder from surface water sources - primarily from Governor's Bayou and the Escambia River providing cooling for Gulf Power's Crist Electrical Generating Plant. Thermoelectric power generation was about 13 percent of all 2015 Region I water use.

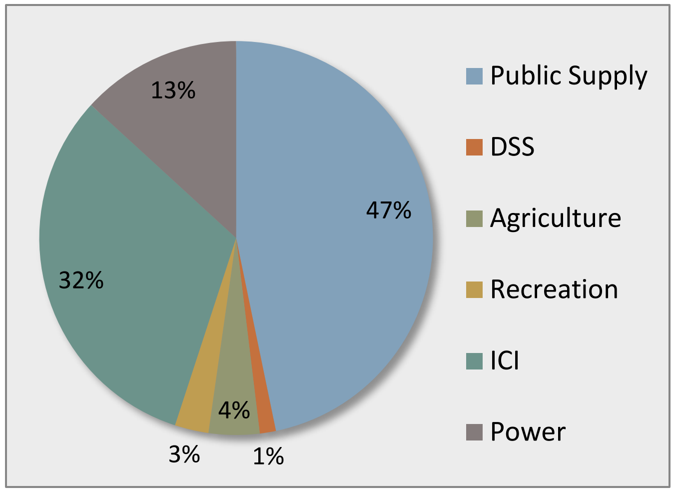

Figure 10. Region I - 2015 Water Use

Table 1. Region I - 2015 Water Use (mgd) and Population Estimates

County	Public Supply	DSS	Agri-culture	Rec-reation	ICI	Power	TOTAL	BEBR 2015 Population	Adjusted Population
Escambia	37.516	1.069	3.348	2.230	25.493	10.590	80.246	306,944	316,766
TOTALS	**37.516**	**1.069**	**3.348**	**2.230**	**25.493**	**10.590**	**80.246**	**306,944**	**316,766**
% of total*	46.8%	1.3%	4.2%	2.8%	31.8%	13.2%	100%	21.7%	20.9%

*Percent per water use category in this region, and percent of Districtwide population.

Water use in Region I is projected to increase by nearly 29 percent over the planning period (Table 2). The largest percentage increase in water demand is projected in the agricultural water use category, followed by ICI, which has the largest estimated water use increase of 15 mgd. Escambia County is expected to continue using about one-fourth of all water Districtwide through the planning horizon.

Table 2. Region I - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Average

Use Category	Estimates	Future Demand Projections - Average Conditions					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	37.516	38.423	39.272	39.984	40.457	40.858	3.342	8.9%
DSS	1.069	1.062	1.068	1.064	1.049	1.030	-0.039	-3.7%
Agriculture	3.348	3.775	4.306	4.956	5.566	6.156	2.808	83.9%
Recreational	2.230	2.283	2.333	2.374	2.401	2.424	0.194	8.7%
ICI	25.493	35.909	39.499	40.079	40.329	40.520	15.027	58.9%
Power	10.590	12.090	12.090	12.090	12.090	12.090	1.500	14.2%
TOTALS	**80.246**	**93.542**	**98.568**	**100.547**	**101.892**	**103.077**	**22.831**	**28.5%**

Public Supply: The Emerald Coast Utilities Authority (ECUA) in Escambia County is the largest public supply utility in the District. The ECUA had a reported water use of nearly 32 mgd in 2015, representing about 84 percent of all public supply water use in Region I. This utility serves the City of Pensacola and the greater metropolitan area across much of southern Escambia County. The ECUA population served is projected to grow from about 250,000 in 2015 to around 270,000 by the end of the planning period. Other public supply utilities in the region include People's Water Service, Cottage Hill Water Works, Farm Hill Utilities, and Molino Utilities. Farm Hill Utilities service area currently includes the Mid-West Sector Plan DSAP area. Additional public supply utility data is in Appendix 4.

DSS and Small Public Systems: Known domestic self-supply wells are fairly evenly distributed across Escambia County, with some concentrations in the central portion of the county. A slight projected decline in DSS water use may be attributable to expanding public supply service areas.

Agriculture: A water demand increase of about 2.8 mgd (83 percent) and 2,491-acre increase in irrigated agricultural lands are projected over the planning horizon. Additional fresh market vegetables and hay are projected within the region, along with minor increases in greenhouse/nursery and field crops.

Recreation: Escambia County has a number of golf courses and other recreational irrigation water uses primarily in and around the Pensacola metropolitan region. Reported water use from these permittees is about half of the recreational water use estimate. The other half is from residential and other small-scale irrigation uses from GWUPs with no water use reporting requirements. Most are also in and around the Pensacola metropolitan region.

ICI: Large ICI water users include International Paper, Ascend Performance Materials, and the Navy Public Works Center. To substantiate projected increases in future water demand, International Paper projected annual production increases, the Navy Public Works Center is planning for additional populations, and new buildings are in development at the University of West Florida.

Power: Gulf Power's Crist Plant north of Pensacola, at an estimated 1229 megawatts, is the largest electric generating plant in the District. An increase in water demand from the base year is projected based on future increased generating capacity.

Table 3. Region I - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Drought

Use Category	Estimates	Future Demand Projections - Drought Year Events					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	37.516	41.113	42.021	42.783	43.289	43.718	6.202	16.5%
DSS	1.069	1.136	1.143	1.139	1.122	1.103	0.034	3.1%
Agriculture	3.348	4.856	5.676	6.626	7.506	8.366	5.018	149.9%
Recreational	2.230	3.059	3.126	3.182	3.218	3.248	1.018	45.6%
ICI	25.493	35.909	39.499	40.079	40.329	40.520	15.027	58.9%
Power	10.590	12.090	12.090	12.090	12.090	12.090	1.500	14.2%
TOTALS	**80.247**	**98.163**	**103.555**	**105.899**	**107.554**	**109.045**	**28.798**	**35.9%**

Total Region I water demand is projected to be 103 mgd by 2040 in an average year (Table 2) and about 109 mgd in a drought year event (Table 3), an estimated 6.2 percent increase in water demand over average conditions. Over half of the projected increases by year 2040 are in the ICI water use category.

Assessment of Water Resources

Escambia County depends on both surface and groundwater, with groundwater supplying the majority of all fresh water used in the region. Due to highly mineralized water in the Floridan aquifer system in this region, the sand-and-gravel aquifer is the principal source of groundwater for Escambia County. Given the high availability of good quality water, this use pattern is anticipated to continue through the year 2040. Local rivers and bays in the region are part of large watersheds that extend into Alabama and other areas of Northwest Florida. The estuaries in the region depend substantially upon surface water inflows, with only minor groundwater contributions.

Groundwater Resources

In order of depth, the primary hydrostratigraphic units comprising the groundwater flow system are the surficial aquifer system, the intermediate confining unit, and the Floridan aquifer system.

In Region I, the surficial aquifer system is referred to as the sand-and-gravel aquifer. It ranges in thickness from 350 to 530 feet. In southern Escambia County, the sand-and-gravel aquifer includes a surficial zone, low-permeability zone, and main-producing zone. The surficial zone consists of fine to medium-grained sand, with gravel beds and lenses (Randazzo and Jones, 1997). The low-permeability zone is 20 to 100 feet thick. The relatively leaky nature of the low permeability zone enables water from the surficial zone to readily recharge the underlying main-producing zone to varying degrees. This leakiness ranges from excessive, where the zone is thinner and contains more sand, to non-leaky, where the zone is thicker and consists almost entirely of clay. The low permeability zone is typically much leakier in the southern half of the county.

The main-producing zone is comprised of highly productive sand and gravel layers interbedded with clayey layers. Well yields often exceed 1,000 gallons per minute (gpm) and may reach 2,500 gpm. Where the land surface elevations increase, and the relief is high, particularly in northern Escambia County, the main producing zone is divided by multiple low permeability zones. In addition, discontinuous clay layers in the unsaturated zone may locally cause perched water table conditions, which might support surface water features during wetter periods.

The intermediate confining unit is an effective, regional confining unit, that significantly restricts groundwater flow between the sand-and-gravel aquifer and the underlying Floridan aquifer system. The intermediate confining unit does contain a minor aquifer, the Escambia Sand. However, poor water quality, limited thickness, and depths of 600 to 900 feet to the top of the unit make the Escambia Sand an unviable groundwater source.

Below the intermediate confining unit is the Floridan aquifer system. The Bucatunna clay, a highly effective middle confining unit, separates the upper and lower carbonate units of the Floridan aquifer system in this region. Both the upper and lower Floridan aquifer contain highly mineralized water. The top of the upper Floridan aquifer unit ranges from approximately 350 feet below sea level in northeast Escambia County to approximately 1,450 feet below sea level in the southwest. The lower Floridan aquifer is hydraulically isolated from the potable water flow system and is used for injection of acidic industrial waste. Due to the depth of the upper Floridan aquifer and the poor quality of water, the sand-and-gravel aquifer, with its high availability of water in wells less than 300 feet deep, is a much-preferred source of water.

The potentiometric surface of the main-producing zone for May 2007 is shown in Figure 11. During this time, water levels were below average and dropping as the region was experiencing drought conditions.

The potentiometric surface had reached a height of approximately 220 feet above sea level in northern Escambia County. From this high point, water levels decline to the east, west, and south. The Escambia and Perdido rivers, along with some wells, are major discharge points for the aquifer in the northern half of the region.

South of Cantonment water levels in the main-producing zone increase, reaching an elevation of about 60 feet above sea level near the intersection of Interstate 10 and Highway 29. From here, groundwater elevations decline in all directions. Groundwater moves to points of discharge, including wells, the Perdido and Escambia rivers, small streams, Perdido Bay, and the Pensacola Bay System. Monitoring well locations referenced in subsequent discussions are also illustrated in Figure 11.

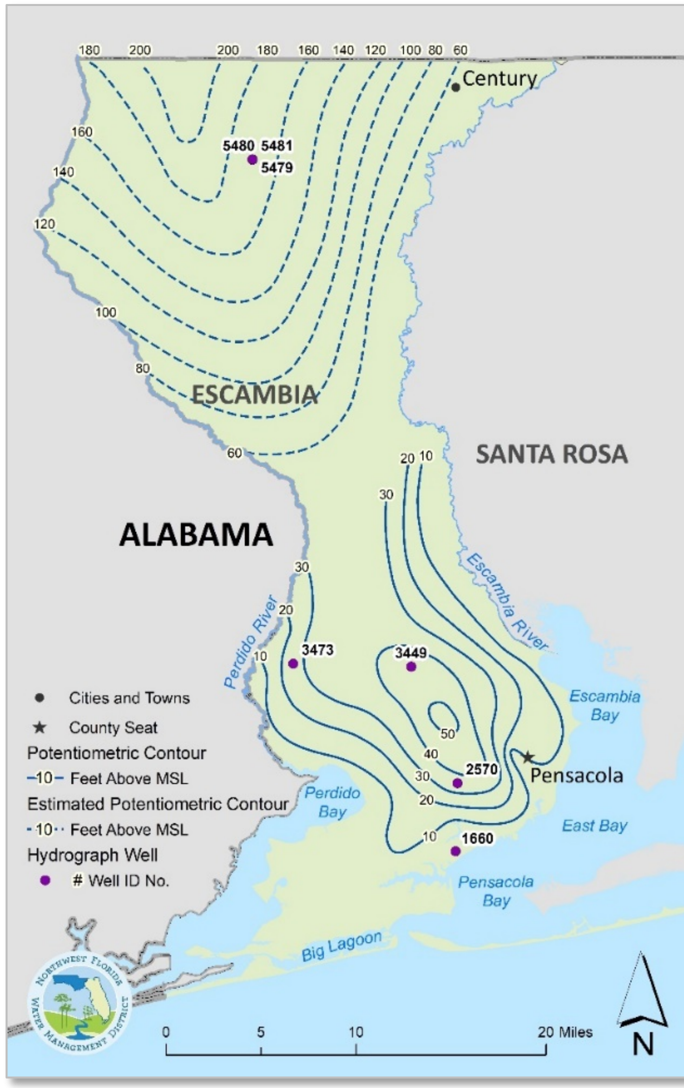

Figure 11. Potentiometric Surface (Observed and Estimated) of the Main-Producing Zone of the Sand-and-Gravel Aquifer, Escambia County, Florida, May 2007.

Groundwater Assessment Criteria

The criteria used to assess the impacts of groundwater withdrawals on water resources and associated natural systems include long-term depression of the potentiometric surface of the main-producing zone of the sand-and-gravel aquifer and alteration of groundwater quality and reductions in regional groundwater discharge to streams. A regional groundwater budget was also used to evaluate the relative magnitude of groundwater withdrawals.

Impacts to Groundwater Resources and Related Natural Systems

The sand-and-gravel aquifer is recharged primarily by local rainfall, which directly affects water level trends. Hydrographs for two well clusters show water level trends and the difference in low permeability zone leakiness between northern and southern Escambia County (Figure 12). Each well cluster consists of wells at the same site in the surficial zone, the shallow main producing zone, and the deeper main producing zone. Data are presented for a well cluster near Oak Grove (Map IDs 5479, 5480, 5481) in northern Escambia County and along Nine Mile Road (Map IDs 3447, 3448, 3449) in southern Escambia County.

In northern Escambia County, where low permeability zones in the sand-and-gravel aquifer are not as leaky, there is greater difference in measured water levels between the surficial zone and the underlying main producing zone. The water levels in the deeper part of the main producing zone are a subdued reflection of the water levels in the surficial zone.

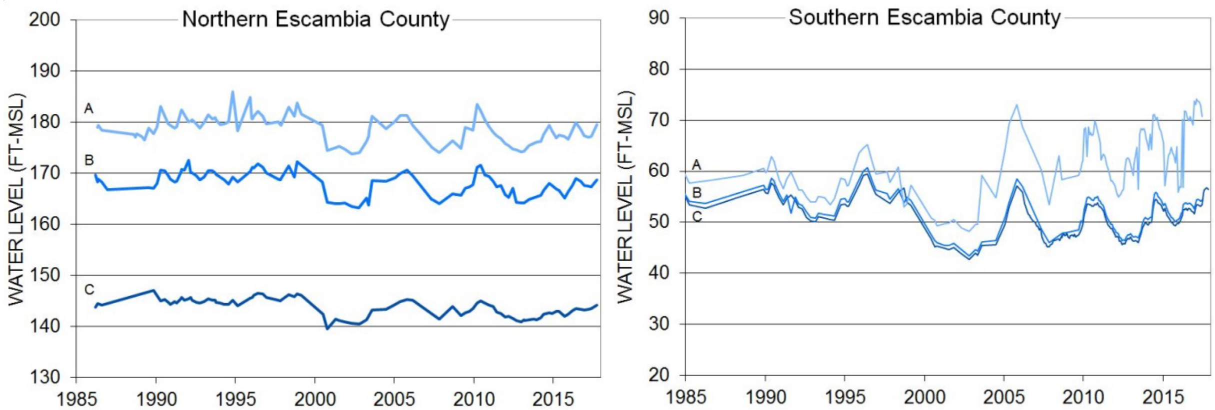

Figure 12. Hydrographs of Sand-and-Gravel Wells near Oak Grove (Northern Escambia County) and along Nine Mile Road (Southern Escambia County) in the A) Surficial Zone, B) Main Producing Zone, and C) Deep Main Producing Zone

Recharge from the surficial zone is less in the northern part of the county. A slight declining trend in water levels over the entire period of record exists for wells at the Oak Grove site. The hydrographs show dips in water levels associated with drought conditions during 2000-2001, 2006-2007, and 2011-2012 and increasing levels since 2012. Although there is currently much less groundwater development in northern Escambia County, a proposed power plant and increased agriculture may increase the use of the aquifer.

It is expected that southern Escambia County will continue to provide the majority of groundwater used in this region during the 2020 to 2040 planning period. In southern Escambia County, the main producing zone is less confined by the low permeability zone creating a smaller head gradient between aquifer zones and allowing more recharge to the main producing zone. Large fluctuations in water levels are observed in the Nine Mile Road wells due to the sites location near the groundwater high of the southern-county recharge area and its proximity to several large supply wells. The divergence of the Nine Mile Road hydrographs between the surficial zone and main producing zone, identified during the 2013 WSA update, continues to persist and suggests that development of groundwater in southern Escambia County has depressed the potentiometric surface of the main producing zone. A slight declining trend exists over the period of record for water levels in the main-producing zone at the Nine Mile Road site.

Additional long-term trends can be seen in the hydrographs below (Figure 13) for a well in Pensacola (USGS TH2, NWF_ID 2570) and a well near Beulah (USGS 032-7241A, NWF_ID 3473). Overall, the long-term fluctuation of water levels in these two wells appears to be primarily related to rainfall variations. Both hydrographs depict an increasing trend between 1975 and 1980. A regional drought between 1980 and 1983 caused groundwater levels to drop between five and seven feet. The hydrographs show recovering water levels throughout the rest of the decade as above normal rainfall occurred.

Through most of the 1990s, alternating wet and dry years resulted in modest variations in water levels, with a slight negative trend through the decade. The effects of the 2000-2001 drought can be seen in the hydrographs. Although normal rainfall returned in mid-2001, groundwater levels continued to drop as infiltrating groundwater had yet to reach the water table. By late 2002, groundwater levels had dropped about 7 feet from 1999 levels. Since 2002, water levels have responded to three drought periods of varying severity, each time rebounding with the return of above average rainfall. Period-of-record trend analyses for these wells indicate no significant trends for the well in Pensacola and a slight declining trend for the well near Beulah.

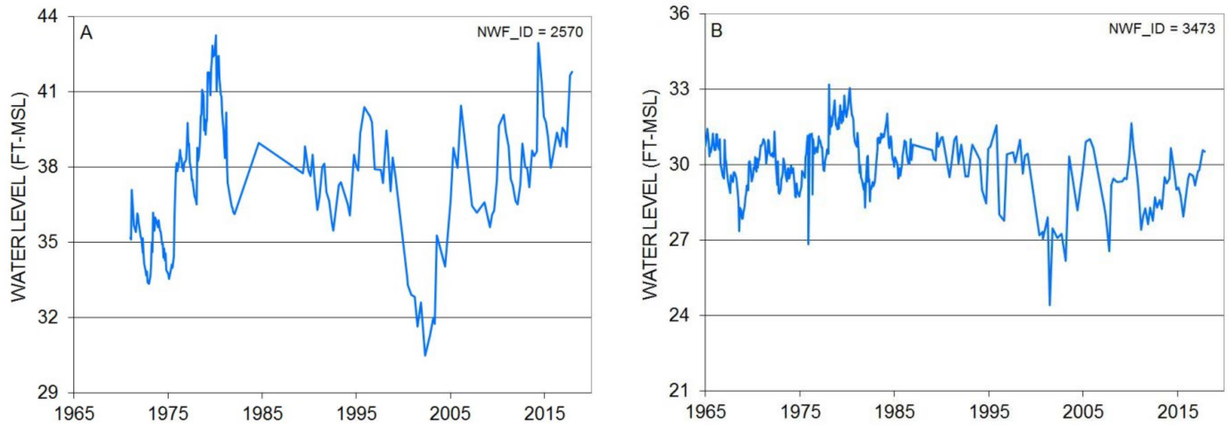

Figure 13. Hydrographs of Sand-and-Gravel Wells: A) USGU TH2 and B) USGS 032-7241A

In 2015, withdrawals from the sand-and-gravel aquifer were estimated at approximately 70.7 mgd. This is almost 10 mgd less than the 2010 demand estimate reported in the last WSA. This is best explained by the use of over 10 mgd of reclaimed water by International Paper and Gulf Power's Crist Plant to offset groundwater withdrawals in south-central Escambia County. At this pumping level, most impacts to the potentiometric surface of the main producing zone are limited due to well spacing and the substantial aquifer recharge rate.

Localized impacts occur in areas of concentrated withdrawals in the southern half of Region I. These areas include Cantonment, areas adjacent to the Escambia River southeast of Cantonment, and areas adjacent to Pensacola Bay in Warrington. Pumpage effects on water levels in the northern half of the region are significantly less due to limited pumpage in that area. Water levels below sea level have been periodically measured adjacent to the Escambia River near the Crist Plant and Solutia, Inc., and along Pensacola Bay in Warrington. Depressed water levels have been observed in these areas since the 1970s. These drawdowns are of concern due to their proximity to the saltwater interface, as discussed below. Water level and water quality monitoring are typically required of permitted users in these areas.

Groundwater Budget

The water budget developed in support of the 1998 WSA (Ryan et al., 1998) presents an order-of-magnitude approximation of the major sources and discharges to the main-producing zone of the sand-and-gravel aquifer in Region I (Figure 14). The recharge rate equates to approximately 5.3 in/yr over the region (Ryan et al., 1998). Major discharges include discharge to surface water features and groundwater withdrawals via wells. The simulated discharges to the Escambia and Perdido rivers were 40.4 mgd and 10.6 mgd, respectively.

Although not explicitly simulated, the 2015 groundwater use of 70.7 mgd represents approximately 43 percent of the water budget of the main-producing zone. The projected 2040 groundwater demand (89.2 mgd) represents approximately 54 percent of the water budget of the main producing zone in Region I. The groundwater demand for a 1-in-10 year drought event (94.4 mgd) represents 57 percent of the water budget of the main producing zone. Although the projected groundwater demands appear to represent a large percentage of the water budget, the groundwater budget does not account for flow within the surficial zone or additional recharge to the main producing zone induced by the increase in pumpage. Because this simulated water budget is only for the main-producing zone, the projected water demand was also compared to the estimated inflow for the entire sand-and-gravel aquifer in Region I.

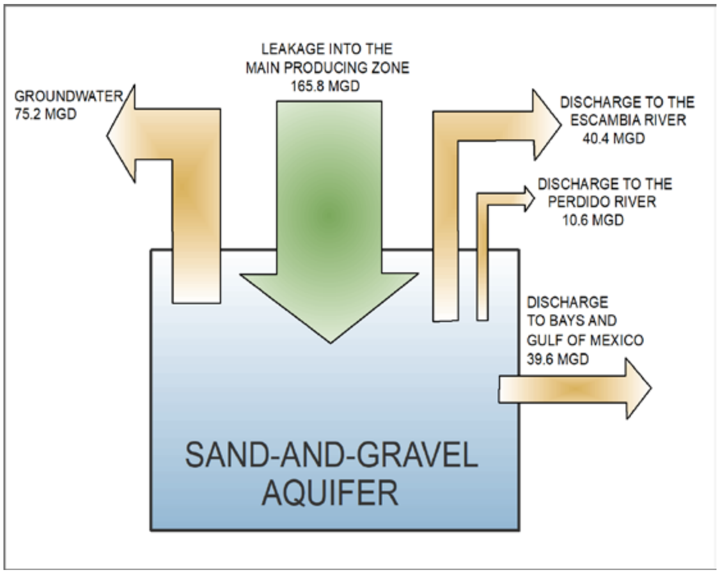

Figure 14. Region I Sand-and-Gravel Aquifer Main Producing Zone Steady-State Ground Water Budget

Vecchioli et al. (1990) calculated the average total recharge to the sand-and-gravel aquifer (including the surficial zone) for select sites in nearby Okaloosa County and portions of Santa Rosa and Walton counties to be approximately 20 in/yr. This recharge rate can generally be applied to Region I, based on the similarity of topography and the sand-and-gravel aquifer between regions.

Given an estimated recharge rate of 20 in/yr to the entire aquifer within Escambia County, the 2015 groundwater withdrawals of 70.7 mgd represent approximately 11 percent of the total sand-and-gravel aquifer water budget (629.4 mgd). The projected 2040 groundwater demand represents about 14 percent of the total sand-and-gravel aquifer water budget. The 2040 demand for a 1-in-10 year drought event represents approximately 15 percent of the total groundwater budget. Given the close hydraulic connection between the sand-and-gravel aquifer and surface waters, long-term groundwater withdrawals are expected to reduce discharge to surface waters by an amount somewhat less than the amount withdrawn (Barlow and Leake, 2012).

The Escambia and Perdido rivers have significant total flows and are not likely to be adversely impacted by relatively small changes in baseflow even under low flow conditions. The Q_{90} flow is the low flow exceeded 90 percent of the time for the period of record. The median flow and the Q_{90} flow in the Escambia River at Molino are estimated to be 2,630 mgd (4,070 cfs) and 1,002 mgd (1,550 cfs), respectively, for the 1983-2017 period of record. The median flow and the Q_{90} flow in the Perdido River at Barrineau Park are estimated to be 323 mgd (500 cfs) and 182 mgd (282 cfs), respectively, for the 1941-2017 period of record. Relatively small changes in discharge to coastal bays are also not likely to have an adverse impact.

Given the relative magnitude of projected 2040 demands compared to the groundwater budget for the entire sand-and-gravel aquifer in Region I, significant regional impacts to water resources and related natural systems due to groundwater withdrawals are not anticipated.

Water Quality Constraints on Availability

Groundwater from the sand-and-gravel aquifer has a low mineral content and is suitable for all uses. However, water quality constrains the availability of water from the sand-and-gravel aquifer in localized areas. The high permeability of the sand-and-gravel aquifer, which contributes to the high groundwater availability, also facilitates the movement of contaminants. The sand-and-gravel aquifer is highly susceptible to contamination from surface spills and waste disposal practices. Because the main-producing zone is readily recharged by leakage from the surficial zone, contamination has spread to the main-producing zone (Roaza et al., 1991). Numerous public supply wells in the region have documented the presence of chlorinated solvent, petroleum hydrocarbon, and pesticide contamination (Ma et al., 1999). Water from these wells is treated to remove these contaminants before being introduced into the water distribution systems.

The District, ECUA, and other local utilities have worked together to limit future contamination of public supply wells (Richards et al., 1997). Wellhead protection areas (WHPA) have been incorporated into the Escambia County Land Development Code. The WHPAs are based on the regional groundwater flow model (Roaza et al., 1993) with updates to the model completed by ECUA. This updated model is being used for the delineation of WHPAs for current (and future) public supply wells as well as for the evaluation of potential saltwater intrusion and wetland impacts of pumping from the proposed ECUA Central wellfield. Much of this ongoing effort is supported with new and existing data provided by the District.

The potential for saltwater intrusion constrains pumping near saline surface waterbodies since withdrawals in the coastal fringe can induce the movement of salt water towards these wells. Hydraulic heads in the sand-and-gravel aquifer in south-central Escambia County are currently 50 to 60 feet above sea level (Figure 11). This positive head gradient holds the saltwater interface just beyond the coastline beneath the bay system. Locating major supply wells away from coastal areas has prevented salt water from migrating inland. However, the fresh water within the sand-and-gravel aquifer is in close hydraulic connection with salt water beneath the coastal bays and estuaries.

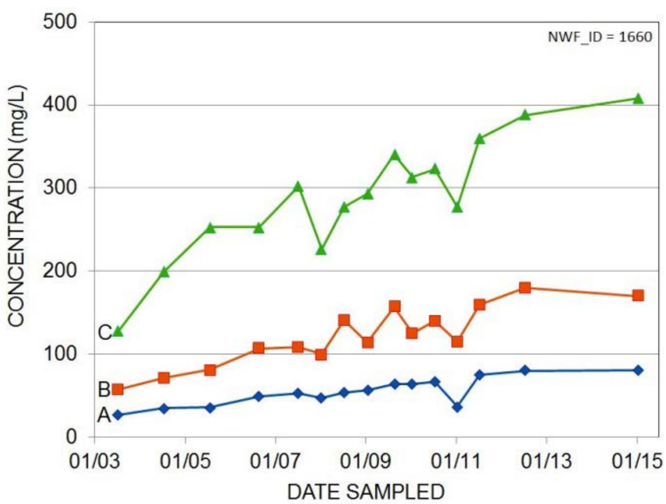

Figure 15. Peoples #4 Water Quality A) Sodium (Na^+), B) Chloride (Cl^-), and C) TDS

An indication of saltwater intrusion can be seen in water quality data from a public supply well located approximately 2,000 feet from Pensacola Bay in Warrington. Water levels averaged between 6 and 14 feet below sea level between July 2003 and July 2009. During this time, the annual average daily pumping rate for this well was approximately 0.5 mgd. Water quality data indicate that sodium, chloride, and total dissolved solids concentrations more than doubled by 2011 (Figure 15).

Since 2011, use of this well has decreased. In 2013, the annual average daily pumping rate was about 5,644 gallons per day. Records also show that no pumping was reported for this well in 2014 or 2015. Water levels currently average two feet below sea level and water quality standards for this well are being met.

<u>Surface Water Resources</u>

Surface water in Region I is used primarily for industrial use and as cooling water for power production. The primary sources used are the Escambia River and Governor's Bayou.

The Escambia River is 240 miles long and has its headwaters in Alabama. The watershed area is 4,233 mi^2 (Fernald and Purdum, 1998). Near the Town of Century, the median stream flow is 2,327 mgd (3,600 cfs), based on 78 years of data from the USGS. The low flow (Q_{90}) for the same period is 821 mgd (1,270 cfs). The USGS gauging station further south near Molino has data from 1983 through 2017. The median and Q_{90} flows estimated for this site are 2,630 mgd (4,070 cfs) and 1,002 mgd (1,550 cfs), respectively. Thus, the median flow for the Escambia River increases 303 mgd between these two sites. Increased rainfall between 2012 and 2017 has resulted in increased surface water runoff and groundwater baseflow contributions to the Escambia River. The median flow at the Molino gauging station has increased from 1,509 mgd (2,335 cfs) in 2012 to 3,871 mgd (5,990 cfs) in 2017.

Governor's Bayou, a source of water for power generation, is located just north of the Crist Plant, approximately 7 miles south of the Molino gage site. The bayou is formed by a diversion from the Escambia River that rejoins the main channel further downstream.

Surface Water Assessment Criteria

The primary assessment criterion for surface water availability is the sustainability of surface water resources and associated natural systems.

Impacts to Surface Water Resources and Related Natural Systems

Although approximately 195 mgd of surface water was withdrawn from the Escambia River and Governor's Bayou for industrial use and power production in 2015, only about 9.03 mgd was consumptively used. The remainder was returned to its source. This consumption represents only 0.9 percent of the Q_{90} flow at the Molino gage. The projected 2040 consumptive surface water withdrawals from the Escambia River represent 1.35% of the Q_{90} flow at the Molino gage.

Water Quality Constraints on Availability

Surface water quality is suitable for all intended uses and there are no current water quality constraints.

Alternative Water Supply and Conservation

Non-traditional sources of water in Region I are reuse of reclaimed water. District support to water supply development projects have contributed to water conservation, leak detection, water use efficiencies, and expanding reuse potential.

<u>Water Conservation</u>

Water conservation potential has not been estimated for Region I. District permit conditions that support water conservation measures include annual water use reporting; evaluation of water use practices to enhance water conservation and efficiency, reduce water demand and water losses; maximum water loss and residential per capita water use goals; and public education.

Water supply development projects that support leak detection and improved water use efficiencies include surveys and water line replacement with the Town of Century, Molino Utilities, and Escambia River Electric Cooperative.

<u>Reuse of Reclaimed Water</u>

In 2015, Escambia County utilized 10.6 mgd of potable offset reuse or half of the flows wastewater treatment facility (WWTF) flows, which totaled about 21.2 mgd (Table 4). Information on individual wastewater facilities used in this analysis is included in Appendix 7.

The ECUA owns and operates three large reuse systems in Escambia County. All three ECUA facilities have advanced treatment levels and disinfection levels range from basic to high. Potable offset reuse water was provided for power generation, industry, and for public access uses. The remaining wastewater flow was discharged to wetlands, rapid infiltration basins (RIBs), surface waters, and reuse at WWTFs. An ongoing Pensacola Beach WWTF reclaimed water system expansion project has an anticipated completion date of 2019. This project will support infrastructure improvements to expand access to reuse water for residential and commercial customers on Pensacola Beach.

Table 4. Region I - 2015 Reuse and Wastewater Flows (mgd)

County	Potable Offset Reuse Flow	Percent of Potable Offset Reuse to Total WWTF Flow	Total WWTF Flow	Number of Active Reuse Systems	Total WWTF Capacity
Escambia	10.621	49%	21.570	8	33.841
TOTALS	**10.621**	**49%**	**21.570**	**8**	**33.841**

Based on population projections, future reuse flows are estimated to be an additional 12.8 mgd by 2040. This additional availability added to existing 2015 reuse flows totals 23.5 mgd, or about 69 percent of the 2015 total facility capacities (Table 5).

Table 5. Region I - 2020-2040 Future Potential Reuse Availability (mgd)

County	Reuse Flow 2015	Future Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	mgd	Capacity %
Escambia	10.621	11.46	11.95	12.35	12.61	12.83	23.45	69.3%
TOTALS	**10.621**	**11.46**	**11.95**	**12.35**	**12.61**	**12.83**	**23.45**	**69.3%**

Future potable offset reuse assumptions are that WWTFs have treatment and disinfection levels suitable for the reuse end uses, and that transmission infrastructure is available to reuse customers.

Region I: RWSP Evaluation

The existing and reasonably anticipated water sources in Region I are considered adequate to meet the projected 2040 average and 1-in-10 year drought event demands, while sustaining water resources and related natural systems. Observed water level impacts and water quality issues are currently localized. Data indicates that the sand-and-gravel aquifer can sustain projected withdrawals through 2040. Therefore, a regional water supply plan for Region I, Escambia County, is not recommended.

REGION II: OKALOOSA, SANTA ROSA AND WALTON COUNTIES

Overview

At approximately 3,495 square miles in total area, Region II is the District's largest and fastest growing water supply planning region (Figure 16). Walton County has the fastest growing population in the District and is projected to be nearly double the 2010 census population by the end of the planning period.

Most of the Pensacola Bay System watershed is in Region II, in addition to about half of the Choctawhatchee River and Bay watershed. The Eglin Air Force Base (AFB) encompasses significant land across southern areas of all three counties.

Region II Snapshot

	2015	2040
Population	469,615	623,300
Water Use (mgd)	69.73	94.88
Primary Water Source(s):	Floridan aquifer system, and sand-and-gravel aquifer	
MFL Waterbodies:	Coastal Floridan Aquifer and Shoal River system	
Water Reservations:	None	
RWSP Status:	Update and Continue RWSP Recommended	

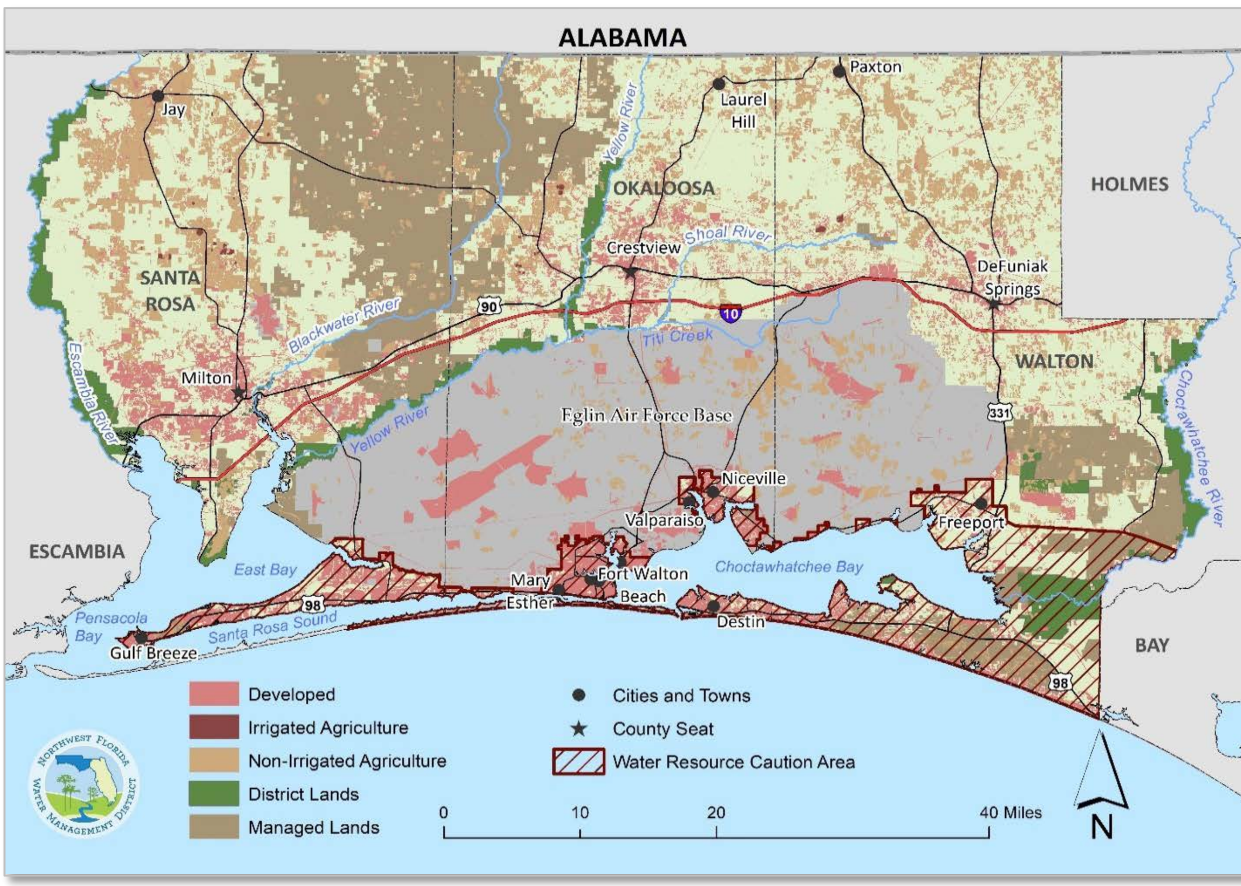

Figure 16. Region II - Santa Rosa, Okaloosa and Walton Counties

Region II has several growing municipalities and unincorporated communities. Many of the coastal communities are affected by substantial seasonal populations. Expanding public water utilities include Florida Community Services Corporation of Walton County, DBA Regional Utilities; South Walton Utility

Company, Inc., in Walton County; and Chumuckla, East Milton, and Holley-Navarre Water Systems. A complete list of Region II public supply utilities is in Appendix 4. The regional population is projected to grow at an average of 1.28 percent annually over the 2020-2040 planning period. According to EDR, Region II per capita personal income and median household income were the highest in the District and above statewide averages, and Santa Rosa County had the highest median household income Districtwide (EDR, 2017).

Public lands in Region II includes large federal and military lands, as well as state-owned lands. The Blackwater River State Forest covers over 210,000 acres in northeastern Santa Rosa and northwestern Okaloosa counties. The Gulf Islands National Seashore is on Santa Rosa Island, Santa Rosa County. The Point Washington State Forest encompasses over 15,400 acres on both sides of Hwy. 30 in southern Walton County. State parks in Walton County include Deer Lake, Grayton Beach, and Topsail Hill Preserve. District water management areas include lands adjacent to the Escambia River, Garcon Point, and Blackwater River in Santa Rosa County; the Yellow River in Santa Rosa and Okaloosa counties; and the Choctawhatchee River and Live Oak Point in Walton County.

In May 2015, Walton County adopted the Bay-Walton Sector Plan. About 12 percent of the Bay-Walton Sector Plan (13,284 acres) is in Walton County. Water use needs in that area of Walton County will likely be supplied by Regional Utilities. The Plan indicates that potable water supplies are sufficient through 2040, but further evaluation will be needed during development of the Detailed Area Specific Plans (DSAPs) and during the District's next water supply assessment.

Population

The 2015 BEBR population estimate for Region II was 415,510. The 2015 seasonally-adjusted population estimate was 469,615, reflecting a regional average seasonal rate of 13 percent. However, county average seasonal population rates in Region II range from a low of two percent in Santa Rosa County up to 49 percent in Walton County. Moreover, seasonal rates in individual water supply service areas sometimes vary considerably from the countywide average, for example, seasonal rates in Walton County service areas range from about two percent to well over 100 percent. Most seasonal residents are in coastal areas, for example, Destin, Navarre Beach, and in unincorporated coastal areas in Walton and Okaloosa counties. Unless noted otherwise all population data is seasonally adjusted.

2015 Water Use Estimates and 2020-2040 Demand Projections

In 2015, Region II had about 30 percent of the District population and an estimated one-fifth of all water use Districtwide (Figure 17 and Table 6). Public supply comprised 68 percent of all water use and collectively with DSS, nearly three-fourths of all Region II water use.

Region II recreational water use was 15 percent of the regional total. Agricultural water use is relatively minor but growing in northern Santa Rosa County. There are no thermoelectric power generating facilities in Region II. The seasonally-adjusted 2015 population estimate of 469,615 is expected to climb by about 33 percent to 623,300 by year 2040.

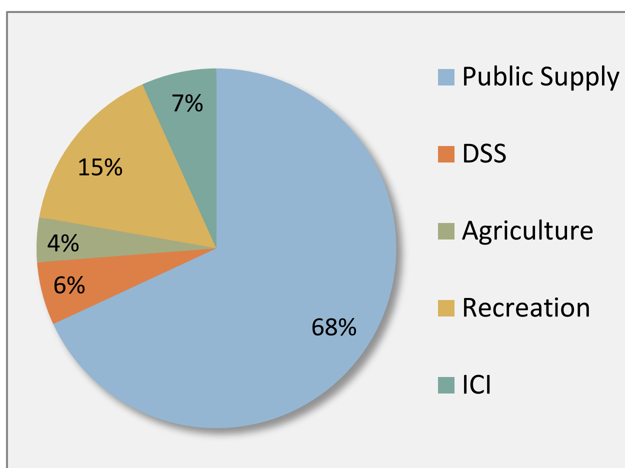

Figure 17. Region II - 2015 Water Use

Table 6. Region II - 2015 Water Use (mgd) and Population Estimates

County	Public Supply	DSS	Agri-culture	Rec-reation	ICI	Power	TOTAL	BEBR 2015 Population	Adjusted Population
Okaloosa	21.810	2.131	0.393	4.366	1.985	-	30.685	191,898	213,007
Santa Rosa	14.957	0.257	1.801	1.988	2.690	-	21.693	162,925	166,184
Walton	10.712	1.568	0.604	4.439	0.033	-	17.356	60,687	90,424
TOTALS	**47.480**	**3.956**	**2.798**	**10.793**	**4.708**	**-**	**69.734**	**415,510**	**469,615**
% of total*	68.1%	5.7%	4.0%	15.5%	6.8%		100%	29.3%	30.9%

*Percent per water use category in this region, and percent of Districtwide population.

Water demand is projected to increase by 36.1 percent over the planning period (Table 7). The largest percentage increase in water demand is projected in the agricultural water use category, followed by ICI and recreation. The largest total water use increase of 17.52 mgd - about 70 percent of total increases over the planning period - is in the public supply category. In total, the share of Region II water use to Districtwide total is expected to increase from 20 percent to over 23 percent by 2040.

Table 7. Region II - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Average

Use Category	Estimates	Future Demand Projections - Average Conditions					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	47.480	51.645	55.275	58.777	62.004	64.999	17.519	36.9%
DSS	3.956	4.328	4.672	4.627	4.580	4.444	0.488	12.3%
Agriculture	2.798	3.004	3.241	3.523	3.769	3.967	1.169	41.8%
Recreational	10.793	11.827	12.749	13.552	14.288	14.923	4.130	38.3%
ICI	4.708	6.073	6.315	6.546	6.546	6.546	1.838	39.0%
Power	-	-	-	-	-	-	n/a	n/a
TOTALS	**69.734**	**76.879**	**82.251**	**87.025**	**91.185**	**94.879**	**25.144**	**36.1%**

Public Supply: Walton and Santa Rosa counties are estimated to have the fastest growing populations in the District and Walton County also has the highest estimated seasonal population rate Districtwide. Projected increases in public water supply reflect these trends. Steady growth is projected regionwide and in particular in the following utility service areas: Navarre Beach, Regional Utilities, South Walton Utility Company, City of Freeport, and Inlet Beach.

DSS and Small Public Systems: Known domestic self-supplied wells are fairly evenly distributed across northern portions of Santa Rosa, Okaloosa, and Walton counties with some concentrated areas in southern portions of the county not served by public supply. Increases in DSS water use are consistent with population and public supply growth as noted above.

Agriculture: Agricultural water use is projected to increase, largely in Santa Rosa County, with some increase in Walton County and a decrease in Okaloosa County. Agricultural water use in Santa Rosa County is projected to increase by about 1.3 mgd. This is coincident with a projected 1,140-acre increase in irrigated land area by 2040 with an increase in production of fresh market vegetables and hay.

Recreation: Over half of all recreational water use Districtwide is in Region II, most of it in coastal areas. Of this 10.8 mgd, about 62 percent was reported by golf course and other recreational permittees and the remaining 38 percent was estimated from residential and other small-scale recreational irrigation wells that have GWUPs with no water use reporting requirements.

ICI: Region II has multiple large military, correctional, commercial, and industrial facilities. The Santa Rosa Energy Center in Santa Rosa County projected increasing water use associated with operational increases.

Table 8. Region II - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Drought

Use Category	Estimates	Future Demand Projections - Drought Year Events					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	47.480	55.259	59.144	62.891	66.344	69.548	22.068	46.5%
DSS	3.956	4.631	4.999	4.952	4.901	4.754	0.798	20.2%
Agriculture	2.798	3.612	3.975	4.389	4.751	5.047	2.249	80.4%
Recreational	10.793	15.848	17.083	18.160	19.146	19.997	9.204	85.3%
ICI	4.708	6.073	6.315	6.546	6.546	6.546	1.838	39.0%
Power	-	-	-	-	-	-	n/a	n/a
TOTALS	**69.734**	**85.423**	**91.516**	**96.938**	**101.688**	**105.892**	**36.158**	**51.9%**

Total Region II water demand is projected to be about 95 mgd by 2040 in an average year (Table 7) and about 106 mgd in a drought year event (Table 8), an estimated 11.6 percent increase over average conditions. Fifty-nine percent of the increases in drought conditions are projected in public supply.

Assessment of Water Resources

The aquifer system, especially in the coastal area in Region II, has been historically affected by groundwater withdrawals. Groundwater use along the coast that reached its peak in 2000 caused a depression of the Floridan aquifer potentiometric surface and induced saltwater intrusion. Based on the results of the 1998 WSA, the District developed a RWSP for Region II (Bartel et al., 2000) and it was subsequently updated in 2006 (NWFWMD, 2006) and 2012 (Busen and Bartel, 2012). Several water supply development projects identified in the RWSP have been implemented, reducing Floridan aquifer withdrawals along the coast. Although surface water has been evaluated as an alternative water supply, it is reasonable to anticipate that significant reliance on groundwater will continue through 2040.

Groundwater Resources

In order of depth, the primary hydrostratigraphic units that comprise the groundwater flow system are the sand-and-gravel/surficial aquifer system, the intermediate system, and the Floridan aquifer system. In most of Region II, the surficial aquifer system is referred to as the sand-and-gravel aquifer. The sand-and-gravel aquifer is the primary water source for Santa Rosa County, while the Floridan aquifer is the primary source for Okaloosa and Walton counties.

In 2015, groundwater from the sand-and-gravel aquifer system provided about 34 percent of the water used in the region, while the coastal Floridan aquifer provided about 23 percent, and the inland Floridan aquifer provided about 37 percent. The remaining six percent consisted of surface water and water from the undifferentiated-surficial and intermediate aquifers.

The sand-and-gravel aquifer consists of unconsolidated quartz sand, gravel, silt, and clay ranging in thickness from less than 50 feet in Walton County to more than 400 feet in Santa Rosa County. Considerable local variation in the thickness of the sand-and-gravel aquifer occurs due to local topography and the somewhat irregular surface of the intermediate system. The sand-and-gravel aquifer exists under unconfined to semi-confined conditions. Discontinuous layers of silt and clay provide for semi-confined conditions in the lower portions of the aquifer.

Recharge originates as rainfall. Based on hydrograph separation techniques applied to nine streams with at least 10 years of continuous flow records, recharge in and around Okaloosa County averages approximately 20 in/yr (Vecchioli et al., 1990). Because the intermediate system acts as a confining unit, most recharge to the sand-and-gravel aquifer discharges to local streams forming the stream baseflow component. Stream baseflow in this region is substantial and generally exceeds one cfs/mi^2 (Vecchioli et al., 1990). Sand-and-gravel aquifer wells in Santa Rosa County yield as much as 1,440 gpm. East of Santa Rosa County, the sand-and-gravel aquifer is less productive and is generally used for non-potable purposes. In coastal Okaloosa County, the sand-and-gravel aquifer has been evaluated as an alternative water supply. As much as 2.4 mgd may be available within the Ft. Walton Beach area (DeFosset, 2004).

The intermediate system forms an effective confining unit, restricting the vertical flow of water between the overlying sand-and-gravel aquifer and the underlying Floridan aquifer. The intermediate system consists of fine-grained clastic sediments along with clayey limestone and shells, ranging in thickness from about 50 feet in northeast Walton County to over 800 feet in southwestern Santa Rosa County. Withdrawals from the intermediate system are mostly limited to the coastal area of southeastern Walton County and well yields are quite low.

Underlying the intermediate system, the Floridan aquifer system consists of a thick sequence of carbonate sediments of varying permeability and a regionally extensive clay confining unit. The top of the Floridan aquifer system dips from the northeast to the southwest, with the elevation of the top of the system ranging from approximately 100 feet above sea level to more than 1,200 feet below sea level. In Santa Rosa County and the western and coastal portions of Okaloosa County, the Floridan aquifer system is split into the upper and lower Floridan aquifer by the Bucatunna Clay. The Bucatunna Clay is a highly effective confining unit.

To the east, where the Bucatunna Clay is not present, the Floridan aquifer is one hydraulic unit. Where the Bucatunna is present, the upper Floridan aquifer thickness varies from about 50 feet in northern Santa Rosa County to more than 400 feet in southern Okaloosa and Walton counties. Where the Bucatunna is absent, the Floridan aquifer reaches a total thickness of over 700 feet. Well yields for the Floridan aquifer are highly variable; the most productive areas are the central portions of Okaloosa and Walton counties, the Midway area, and the Destin area; while poor well yields occur in the coastal fringe of Okaloosa and Walton counties.

Figure 18 shows the estimated Floridan aquifer potentiometric surface under September 2015 hydrologic conditions. In northwest Walton County, the potentiometric surface reaches an elevation of over 200 feet above sea level. From this point, water levels decline in all directions. Under non-pumping, pre-development conditions, groundwater flow was downgradient to discharge areas in southern Okaloosa and Walton counties, as well as to the Choctawhatchee River. Floridan aquifer water levels in the Fort Walton Beach area were historically about 50 feet above sea level under predevelopment conditions. A steady decline in water levels between the early 1940s and 2000 resulted in a loss of as much as 185 feet of head pressure in the Floridan aquifer along the coast. A large cone of depression in the potentiometric surface, centered in the Ft. Walton Beach – Mary Esther area, is evident on the map. This changed the coast from an area of natural discharge for the Floridan aquifer to an area of induced recharge. This has created the conditions for saltwater intrusion along coastal Region II.

Over the last 18 years, regulatory limits on the use of the Floridan aquifer in coastal Region II and the redistribution of those withdrawals to newly developed inland well fields have succeeded in recovering approximately 65 feet of head in the center of the cone of depression.

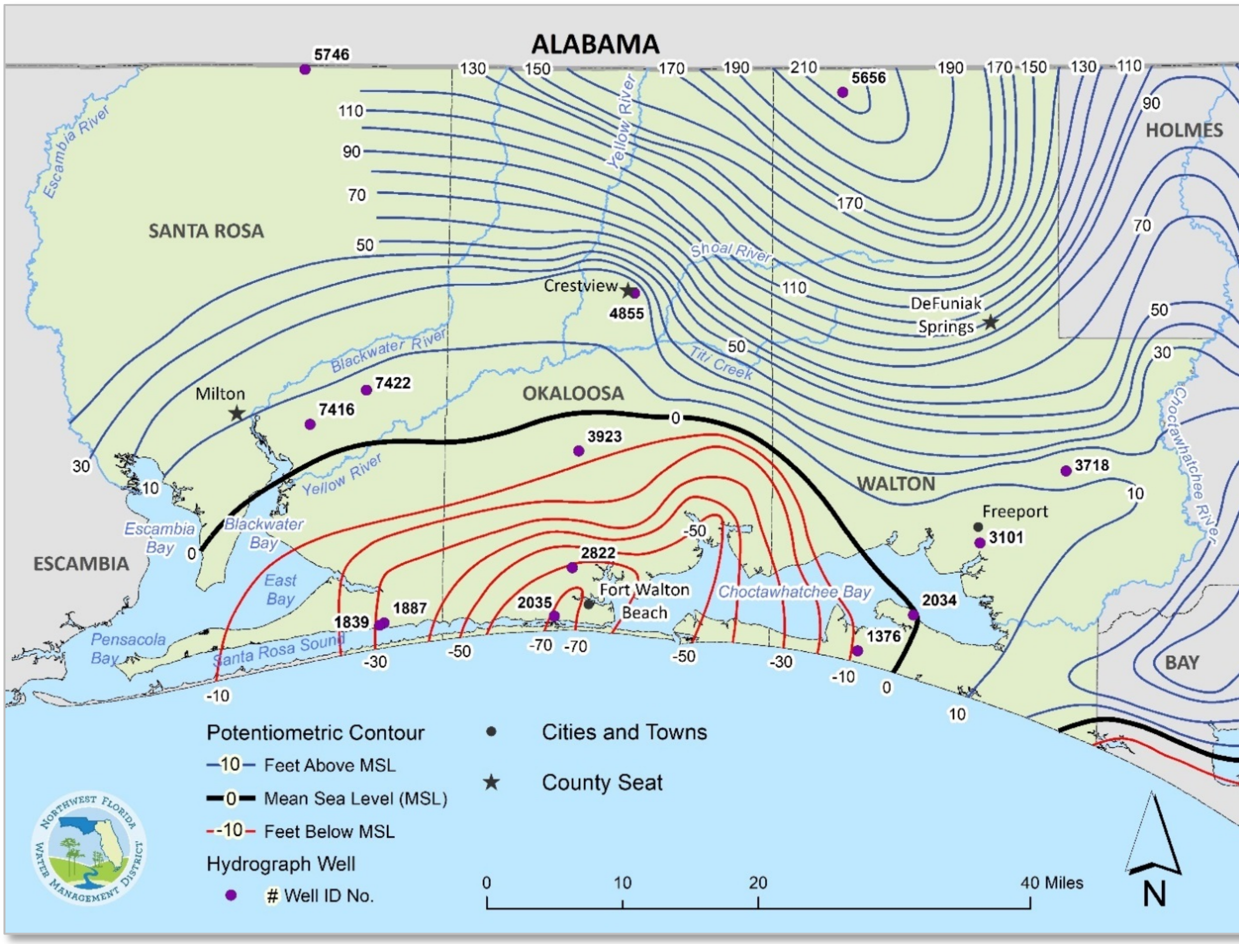

Figure 18. Potentiometric Surface of the Upper Floridan Aquifer in Region II for September 2015

Figure 18 shows that water levels in the Ft. Walton Beach area were at approximately 70 feet below sea level under September 2015 pumping conditions. However, increased Floridan aquifer pumping around Crestview and in the central Walton County wellfield have drawn down and flattened the potentiometric surface in those areas.

Groundwater Assessment Criteria

Two criteria were used to assess impacts to the sand-and-gravel aquifer and the Floridan aquifer system: long-term depression of the potentiometric surface and impacts to groundwater quality.

The 1998 WSA describes the history of water supply development in Region II and the resulting impacts to water resources (Ryan et al., 1998). Since 1998, water supply initiatives implemented and led by the District and project partners have successfully stabilized and partially recovered the coastal Floridan aquifer water levels and reduced the saltwater intrusion threat to coastal Floridan aquifer wells. This assessment focuses on the results of these initiatives and ongoing activities to manage and enhance the sustainability of the groundwater resources.

The sand-and-gravel aquifer provided over 90 percent of the groundwater used in Santa Rosa County in 2015. In 2004, Fairpoint Regional Utility System (FRUS) began operating an inland sand-and-gravel aquifer wellfield in Santa Rosa County as an alternative water source for coastal withdrawals. In 2015, public supply withdrawals from the FRUS wellfield averaged approximately 3.82 mgd and were provided to coastal utilities, thus reducing coastal Floridan aquifer withdrawals. The 2015 withdrawals from the FRUS wellfield were less than prior years due to a transmission line break in April 2014, as described below.

For all water use categories, a total of approximately 19.7 mgd was withdrawn from the sand-and-gravel aquifer in Santa Rosa County in 2015. These withdrawals took place with little impact to the water resources due to high sand-and-gravel aquifer recharge rates and adequate well spacing. No significant regional water level declines have occurred in Santa Rosa County. Hydrographs show that drawdown impacts are generally limited to the immediate vicinity of individual pumping wells and that water levels are influenced more by recharge rates.

The highly productive nature of the sand-and-gravel aquifer is illustrated by the well hydrographs shown in Figure 19. The locations of these monitor wells, east of Milton in Santa Rosa County, are shown on Figure 18. Nine public supply wells (East Milton Water System and the FRUS wellfield) are within 2.5 miles of well P3A. Monitoring well P5A is located approximately five miles northeast of well P3A, more than three miles from the nearest supply well, and is less influenced by pumping.

A comparison of the hydrographs for P3A, which is within the wellfield zone of influence, and P5A, outside the immediate vicinity of pumping, indicates water levels in the sand-and-gravel aquifer are more affected by variations in recharge than current pumping levels. Between 2000 and 2004, the East Milton Water System pumped approximately 0.8 mgd. During this time, the region was experiencing a drought (starting in 1999) and groundwater levels declined until late summer 2002. The water levels rose during 2003 in response to increased recharge from above average rainfall.

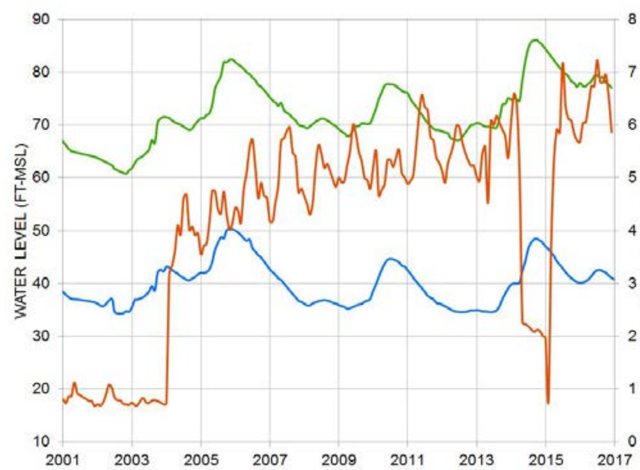

Figure 19. Water Levels in Sand-and-Gravel Aquifer Wells P3A (Blue) and P5A (Green) vs. Monthly Pumpage from Nearby Public Supply Wells (Red)

In February 2004, the FRUS wellfield came online and by June 2004 withdrawals from the wellfield increased to 3.8 mgd. Between 2004 and 2014 pumping steadily increased to between five and six mgd. Despite the increased pumping, water levels in well P3A fell in response to 2006-2007 and 2011-2012 drought conditions and rebounded during periods with above normal rainfall. Water levels in both P3A and P5A follow very similar trends in response to recharge and show no significant water level response to the increased pumping.

In April 2014, the water main supplying water from the FRUS inland wellfield to utilities along the coast was damaged. While the water line was being repaired, withdrawals from the FRUS wellfield area were dramatically reduced as can be seen in Figure 20. Water levels in the sand-and-gravel aquifer rose and fell during this time in response to rainfall recharge and appear to be little affected when regular pumping resumed in 2015. The impact to coastal Floridan aquifer water levels due to the FRUS water main break is discussed below.

Water levels in the coastal Florida aquifer have shown some recovery over the past two decades due to efforts by the District and utilities to reduce withdrawals along the coast. Initiatives included the 1989 designation of coastal Santa Rosa, Okaloosa, and Walton counties as a Water Resource Caution Area (WRCA). This designation, in part, prohibits new and expanded uses of the Floridan aquifer for non-potable purposes, mandates water conservation measures, and requires permittees to evaluate the feasibility of using reclaimed water.

The formation of the Walton/Okaloosa/Santa Rosa Regional Utility Authority (RUA) and cooperative efforts by member utilities in all three counties have resulted in establishment of inland wells and water transmission pipelines, moving the primary water supply sources from the coastal Floridan aquifer to the inland Floridan aquifer in Okaloosa County (2006) and Walton County (2001) and the inland sand-and-gravel aquifer in Santa Rosa County (2004). Public supply withdrawals from the Floridan aquifer on Santa Rosa Island have been eliminated. Other water supply initiatives have included development of reclaimed water systems and improved water conservation within the WRCA.

Figure 20 shows the effect of these initiatives on coastal withdrawals. In 1998, coastal withdrawals averaged 28 mgd and accounted for 78 percent of the Floridan aquifer pumping in the region. By 2007, coastal withdrawals were reduced by 20 percent to approximately 22 mgd. By 2015, coastal withdrawals had been reduced even further to approximately 16 mgd. By 2015, inland withdrawals had increased to approximately 25 mgd and accounted for 61 percent of the Floridan aquifer withdrawals in the region.

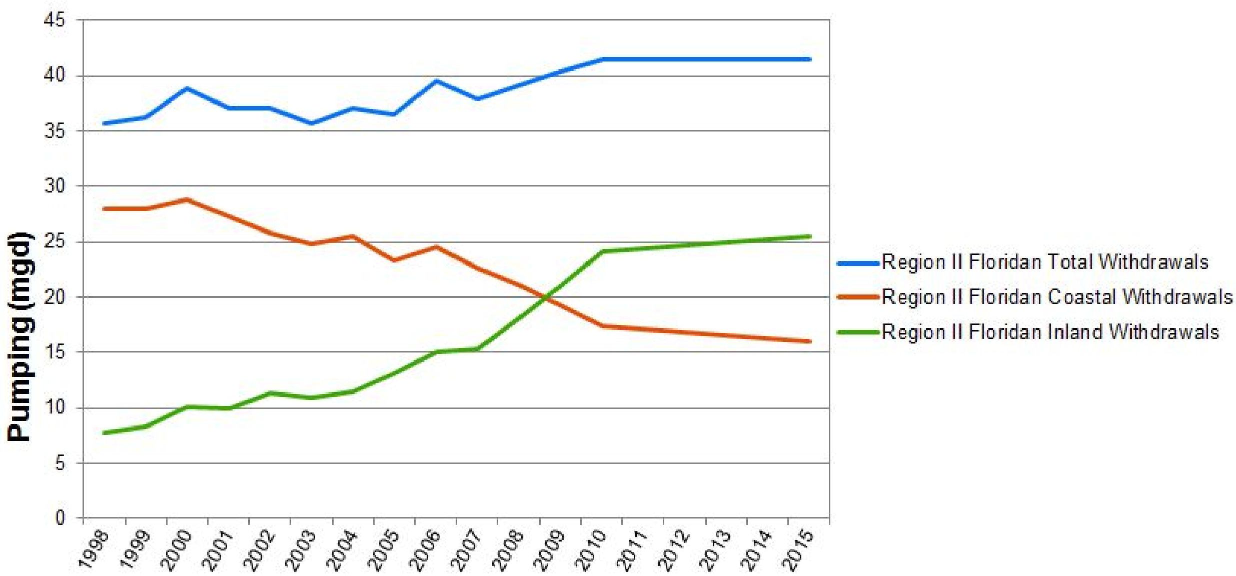

Figure 20. Withdrawals from the Floridan Aquifer in Region II

Hydrographs from Region II show the history of development of the cone of depression and the beneficial effect of reducing the coastal withdrawals. Historical water level trends along coastal Santa Rosa County are represented by the hydrograph for the Navarre Cement Plant well (Figure 21A) and show a significant water level decline over 30 years of groundwater development. This well was located just north of Santa Rosa Sound and was abandoned in the early 1990s. However, the negative trend continues through 2002 in the hydrograph for the nearby Midway #1 well (Figure 21B). Between 2002 and 2014 water levels in the Midway #1 recovered approximately 50 feet. The water main supplying water from the FRUS inland wellfield to utilities along the coast was damaged in April 2014. While the water line was being repaired, several coastal utilities temporarily increased their use of Floridan aquifer wells to ensure adequate water supply for their customers. Repairs to the water line were not completed for several months and the effects of the additional Floridan aquifer pumping can be seen on the hydrograph for Midway #1. While the inland wellfield was offline, water levels in the upper Floridan aquifer along the coast dropped approximately 23 feet. However, once the inland wellfield was back in service and the utilities returned to normal well operation, the positive trend in water level recovery continued.

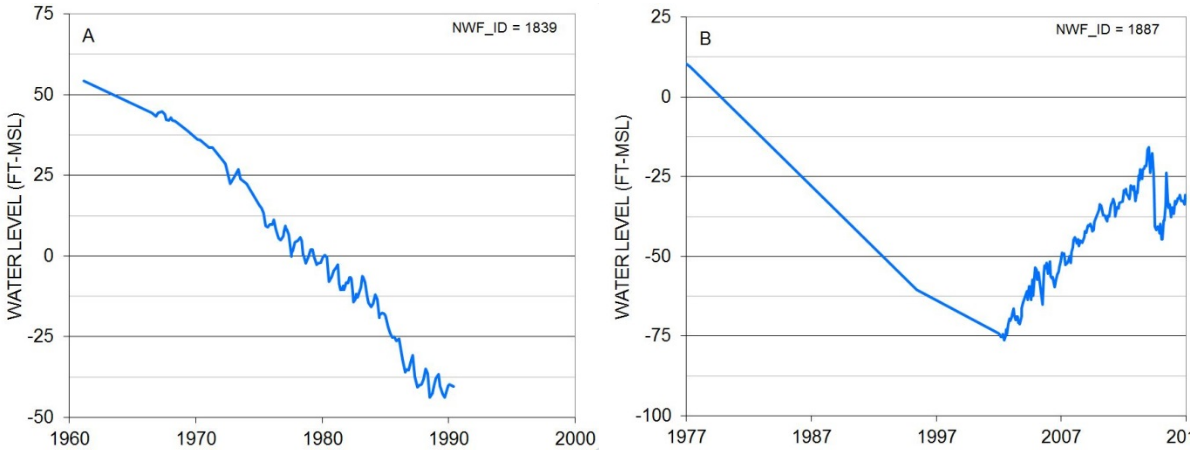

Figure 21. Hydrographs of the A) Navarre Cement Plant and B) Midway #1 Floridan Aquifer Wells in Southern Santa Rosa County

In Okaloosa County, hydrographs also show the mitigating effect of reduced withdrawals along the coast as Floridan aquifer pumping moved inland. Hydrographs are presented for wells along a south to north transect from the coast to the mid-county area (Figures 22-23).

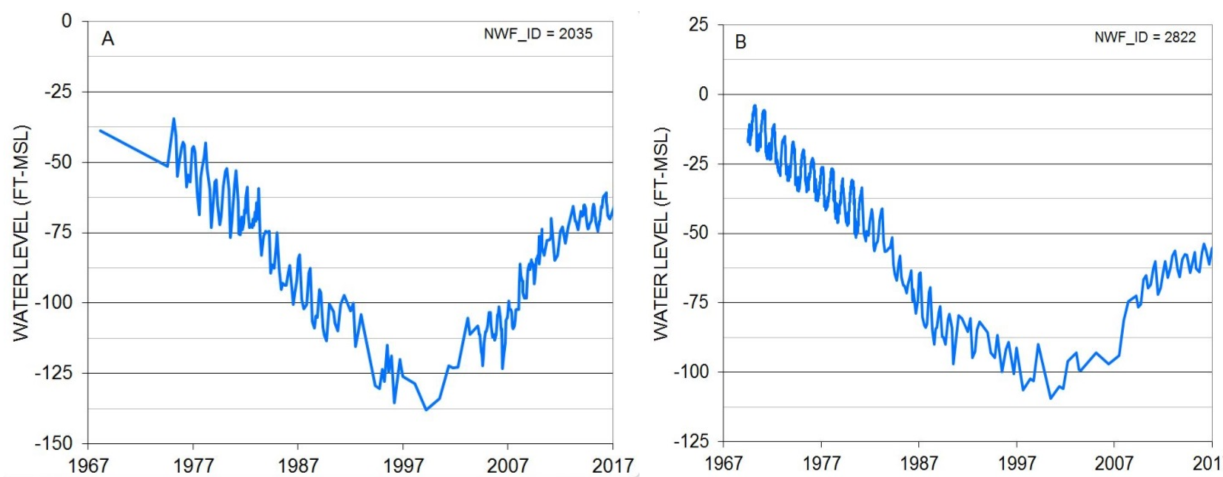

Figure 22. Hydrographs of the A) Mary Esther #2 and B) Wright Upper in Southern Okaloosa County

The Mary Esther #2 well (NWF_ID = 2035) is located just west of Ft. Walton Beach, near the center of the potentiometric surface cone of depression. Water levels have been observed in this well as low as 140 feet below sea level (Figure 22A). However, reductions in coastal withdrawals have increased water levels approximately 70 feet from 2000 to 2017. Water levels in the Wright Upper Floridan well (Figure 22B), located approximately two miles north of Ft. Walton Beach, and the Okaloosa County School Board well in Ft. Walton Beach have increased about 54 feet over the same period. The recovery of water levels in these coastal areas has reduced the threat of saltwater intrusion. Further north, the effect of reductions in coastal pumping is lessened by the effects of increased pumping further inland. Well #2 at Field #5 on Eglin AFB (Figure 23C) is located about halfway between the reduced pumping along the coast and the increased pumping in the mid-county region. Water level declines have stabilized in this well and levels are slowly starting to recover.

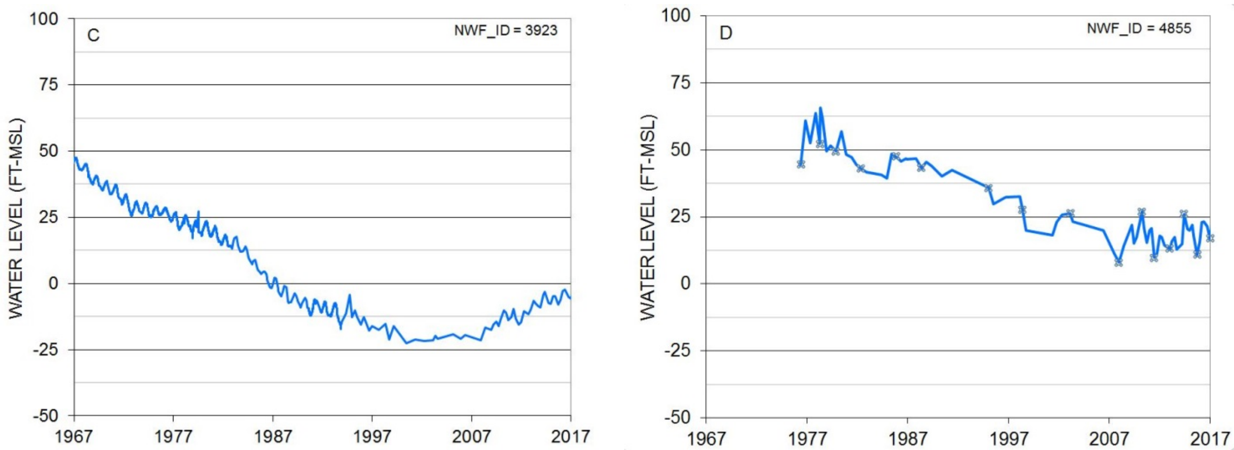

Figure 23. Hydrographs of the C) Eglin Air Force Base (AFB) Field #5/Well #2 and D) Crestview #4 in Central Okaloosa County

The hydrograph for the Crestview #4 well shows the slow decline in Floridan aquifer water levels in the Crestview area (Figure 23D) in response to increased inland withdrawals. These declines continued through 2007 but have stabilized. A similar shifting of impacts from coastal to inland areas is observed in Walton County. Regional Utilities has abandoned their coastal Floridan aquifer wells and moved their pumping north of Freeport. Destin Water Users and South Walton Utilities also obtain some of their supplies from inland wells and are committed to further reducing their coastal withdrawals.

Hydrographs are presented for a well located less than two miles east of South Walton Utility's coastal wells (West Hewett Street), a well approximately five miles to the northeast along the south side of Choctawhatchee Bay (S.L. Matthews), a well north of Choctawhatchee Bay in Freeport (USGS Freeport #17), and a monitor well at the former First American Farms (FAF #47) site north of Freeport (Figure 24). The historical loss in potentiometric head is evident in the coastal West Hewett Street (Figure 24A) and S.L. Matthews (Figure 24B) wells. These drawdowns are not as great as observed in the western part of Region II due to the thinner, leakier intermediate system along the eastern end of Choctawhatchee Bay. Since coastal pumping has been reduced, water levels in the West Hewett Street well have recovered almost 13 feet and water levels in the S.L. Mathews well have recovered about four feet to just above mean sea level.

Water levels in the USGS Freeport #17 well (Figure 24C) show seasonal fluctuations in the 1960s and 1970s due to the large-scale agricultural irrigation at the former First American Farms, historically located approximately five miles to the north. The long-term decline in water levels is evident in the Freeport area. Since 1948, about 30 feet of head has been lost in the Floridan aquifer at this well location. Declines in the potentiometric surface increased between 2001 and 2007 due to increased withdrawals by Freeport and the development of the inland Floridan aquifer wellfield in 2001 at the location of the former First American Farms. Since about 2007, water levels have averaged around seven feet above mean sea level. Drawdown in the potentiometric surface around Freeport is also evident in Figure 18.

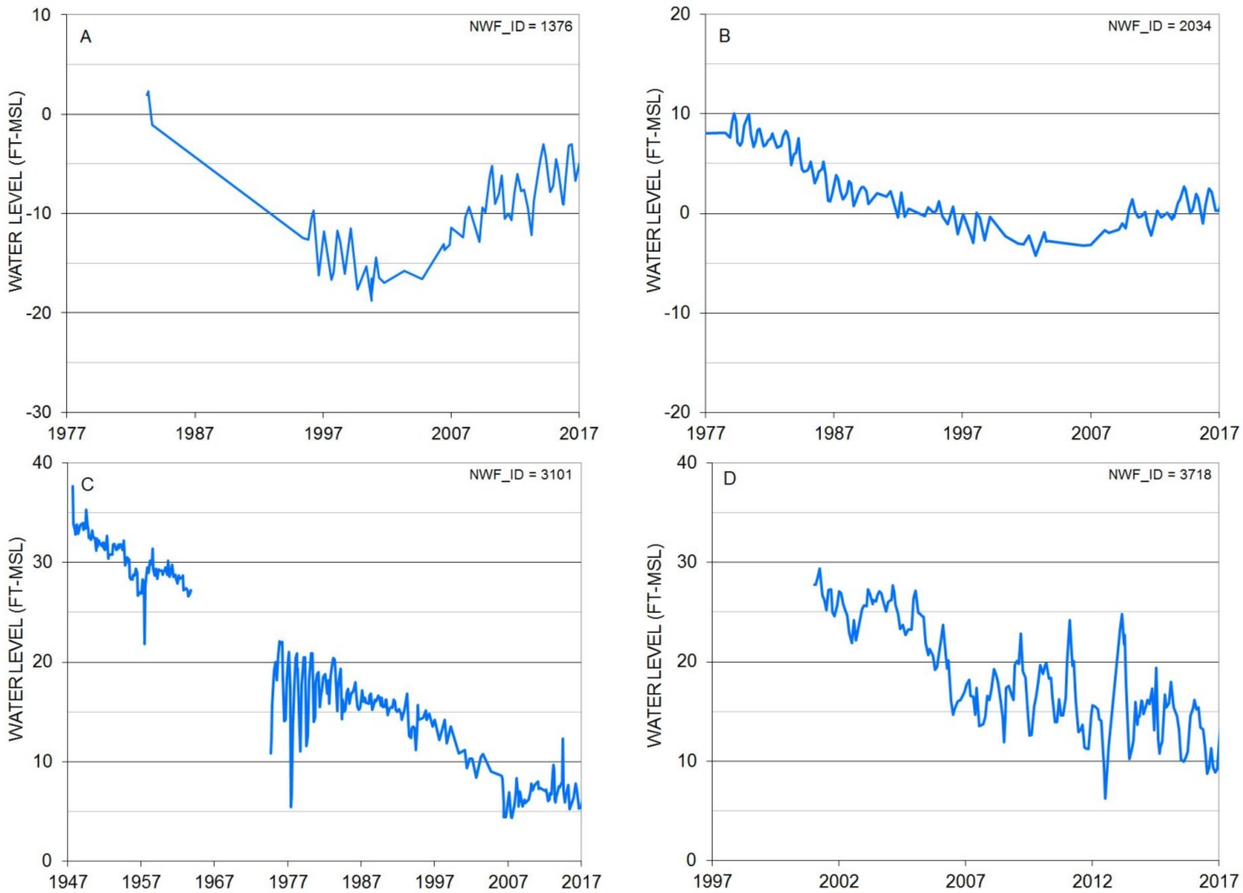

Figure 24. Hydrographs of the A) West Hewett Street, B) S.L. Matthews, C) USGS Freeport 17, and D) FAF #47 Floridan Aquifer Wells in Walton County

The FAF #47 well is located northeast of Freeport, about one mile east of the inland wellfield. This hydrograph (Figure 24D) shows the effect of the inland wellfield withdrawals. Water levels have declined approximately 16 feet. Although additional water level declines have occurred in inland areas where pumpage has increased, these areas are not currently threatened by saltwater intrusion and water level declines are currently manageable.

Along the northern boundary of Region II, far from the coast, two separate responses to historical pumping are evident in the hydrographs for the Paxton and Camp Henderson wells (Figures 25 and 26). The Paxton well is located in northernmost Walton County on the region's potentiometric high. Water levels do not appear to be affected by the coastal pumpage occurring approximately 40 miles to the south. In this area, recharge rates are expected to be somewhat greater than elsewhere in the region due to the intermediate system being relatively thin. This well exhibits no long-term water level declines, but short-term effects of the droughts between 1999 and 2011 are evident. Water levels have increased since the end of 2012.

In contrast, the Camp Henderson well, located approximately 40 miles west in northern Santa Rosa County and slightly further from the coastal pumping center, lost more than 20 feet of head between 1968 and 2013 (Figure 26). As is the case with the Paxton well, little pumping from the Floridan aquifer occurs in this area. Effects of coastal pumping have extended nearly 40 miles to the state line, due to the presence of a thick, effective confining unit and low rate of Floridan aquifer recharge in Santa Rosa

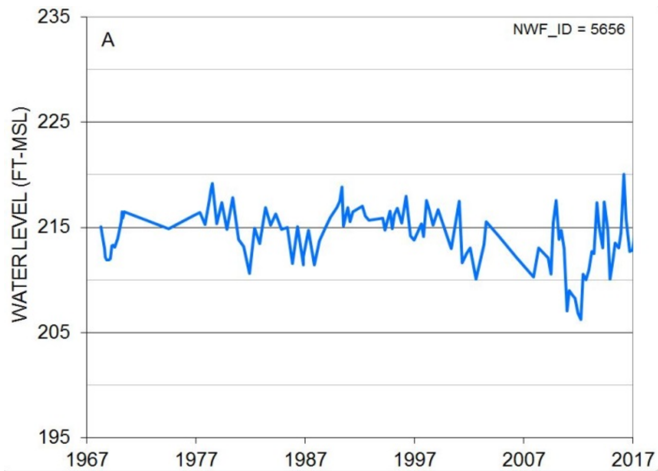

Figure 25. Hydrograph of the Paxton Floridan Aquifer Well in Northern Walton County

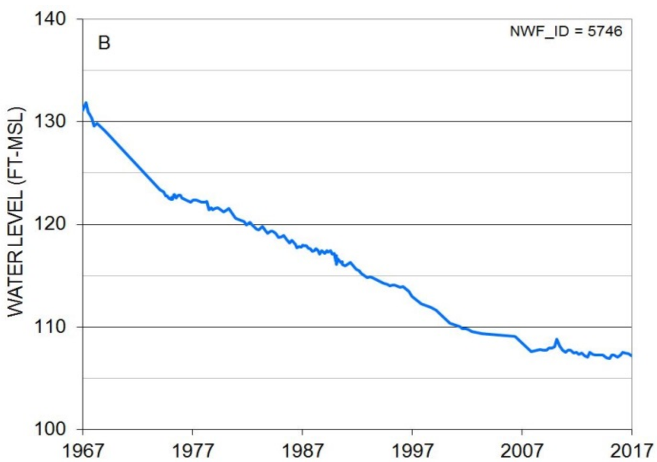

Figure 26. Hydrograph of the Camp Henderson Floridan Aquifer Well in Northern Santa Rosa County

County. Since 2013, water level drawdowns appear to have stabilized. The water level declines illustrated in hydrographs also extend over an unknown area offshore beneath the Gulf of Mexico. Water quality data shows poor quality, non-potable water present in the Floridan aquifer in southern Santa Rosa County and in south Walton County near the eastern extent of Choctawhatchee Bay (Pratt, 2001). Non-potable, saline water also occurs offshore beneath the Gulf of Mexico.

Floridan aquifer water becomes increasingly more mineralized to the west. Sodium and chloride concentrations exceed the drinking water standard just west of the Midway area and near Navarre Beach.

Moving east across the Santa Rosa-Okaloosa County line, the quality of water in the Floridan aquifer improves. Water quality in the Ft. Walton Beach area continues to meet drinking water standards with no increasing trends in constituents that are indicative of saltwater intrusion. Sampling from a well on Santa Rosa Island across from Ft. Walton Beach indicates water quality near the center of the cone of depression has not changed in forty years.

Sodium, chloride, and total dissolved solids concentrations for samples collected in the late 1970’s averaged 126 mg/L, 64 mg/L, and 368 mg/L, respectively. Recent pumped sampling results show concentrations of 120 mg/L, 63 mg/L, and 333 mg/L, respectively. In addition, discrete borehole sampling and geophysical logging performed in 2017 indicate that the upper Floridan Aquifer at this location is freshwater across the 324 feet of open hole with little variation in water quality.

Further east near Destin, water quality continues to be good based on sampling performed by the local utilities. The best water quality in the Floridan aquifer, along the coastal fringe, is found east of Destin in the South Walton Utility Company service area. However, immediately east of this area, the Floridan aquifer water quality deteriorates. This area of naturally-occurring poor quality water is extensive, covering much of coastal Walton County near the eastern extent of Choctawhatchee Bay. The average constituent concentrations for the 1990s are representative of conditions prior to development of groundwater resources. Throughout most of eastern coastal Walton County, the quality of water withdrawn has remained stable over time. Data, beginning in the 1950s and 1960s, shows no significant change in water quality in most areas. Increasing concentrations of sodium and chloride in the Floridan aquifer are generally limited to wells located in or very near the saltwater interface in southeast Santa Rosa County and near the eastern extent of Choctawhatchee Bay.

In July 1997, a lower Floridan aquifer monitoring well was constructed in Destin to determine the feasibility of reverse osmosis treatment of water from the lower Floridan aquifer for potable use. The well was drilled to a total depth of 1,460 feet, and water quality samples were taken from the lower Floridan aquifer at 11 intervals between 928 feet to 1,422 feet. Just below the Bucatunna Clay, a sodium concentration of 690 mg/L and a chloride concentration of 1,200 mg/L yielded a sodium/chloride ratio of 0.58, approximately that of sea water (0.55). Water in this well became progressively more mineralized with depth, but the sodium/chloride ratio remained between 0.50 and 0.71. The results of the 1997 study concluded that the quality of groundwater in the Lower Floridan aquifer below the Bucatunna Clay is non-potable.

The well was subsequently back-plugged to 1,083 feet for long-term monitoring. Annual water quality monitoring between 2008 and 2017 indicate that pumped concentrations of sodium, chloride and total dissolved solids have varied little from the original sampling in 1997. In October 2017, geophysical logging and discrete-interval sampling of the open borehole performed for the District revealed water quality stratification of the denser more saline water. Samples were collected at 955 feet and 1,070 feet below land surface (bls). Pumped and discrete interval sampling results are summarized in Table 9, below.

Table 9. Destin Lower Floridan Aquifer Monitoring Well Water Quality Summary

Sample type	Specific conductance (µg/L)	Sodium (mg/L)	Chloride (mg/L)	Total Dissolved Solid (mg/L)	Na/Cl ratio
1997 pumped sample	6,160	1,010	1,700	3,220	0.59
2008-2017 average pumped sample (n = 9)	6,130	1,220	1,856	3,195	0.66
Oct 2017 discrete sample - 955 ft bls	3,495	738	708	1,340	1.04
Oct 2017 discrete sample - 1,070 ft bls	11,574	2,540	4,240	7,700	0.60

n = number of samples averaged

The discrete sampling results provide a conceptual understanding of how water quality-based density variations are distributed within the aquifer. This understanding may guide improvements to the regional solute transport model developed as part of the Region II coastal Upper Floridan minimum aquifer level evaluation and regional water supply planning.

Groundwater Budget

To further assess withdrawals from the Floridan aquifer, a groundwater budget prepared for the 2013 WSA update was compared to 2015 Floridan aquifer withdrawals (Figure 27). The groundwater budget was prepared using output from an updated calibrated steady-state regional groundwater flow model (HydroGeoLogic, 2000) and 2010 regional Floridan aquifer pumping. The water budget presents an order-of-magnitude approximation of the major inputs to and discharges from the Floridan aquifer system in Santa Rosa, Okaloosa, and Walton counties. Use of the model output was deemed acceptable for comparison with 2015 pumping as 2010 and 2015 total and distributed (coastal vs. inland) withdrawals are similar. The water budget indicates that the 2015 Region II Floridan aquifer withdrawals of 41.5 mgd represent approximately 46 percent of the inflows to the Floridan aquifer in Region II.

Both the magnitude and the spatial distribution of Floridan aquifer withdrawals are important within this region. Although pumpage accounts for a relatively large fraction of the water budget, District and utility projects have successfully shifted Floridan aquifer withdrawals away from the coast and lessened the threat of saltwater intrusion. Efforts to manage groundwater withdrawals and develop alternative water sources in Region II will continue.

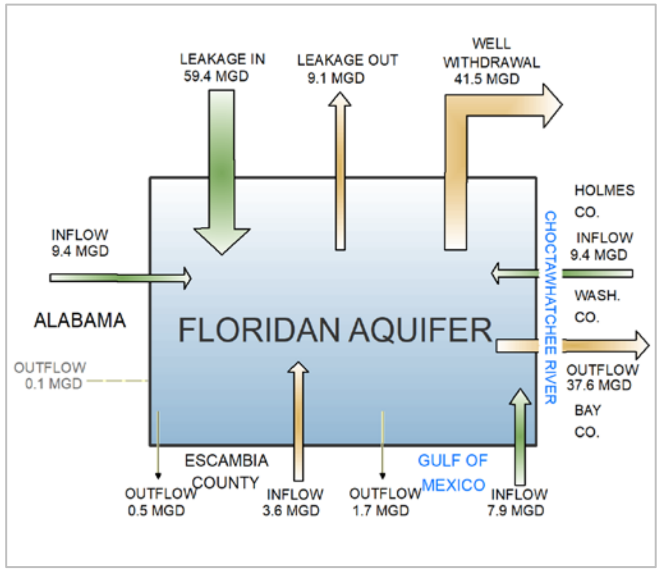

Figure 27. Region II Floridan Aquifer Groundwater Budget

Inflow to the Floridan aquifer from beneath the Gulf of Mexico remains a concern. Although the exact distribution of saltwater in the Floridan aquifer beneath the Gulf of Mexico is uncertain, saltwater is certainly present. The simulated inflow of 7.9 mgd from the Gulf of Mexico can potentially have a significant effect on the quality of groundwater withdrawn from the Floridan aquifer (HydroGeoLogic, 2000).

Model results indicate that approximately one mgd of the approximately 59.4 mgd leakage into the Floridan aquifer through the intermediate system may represent induced saltwater recharge (HydroGeoLogic, 2000). This induced recharge is due to the aquifer drawdown beneath Choctawhatchee Bay. Although the induced recharge is only a small fraction of the total leakage into the aquifer, it has the potential to degrade the quality of water being withdrawn. This issue is of greatest concern in the Choctawhatchee Bay area of Walton County where the intermediate system is leakier.

Pumpage from the sand-and-gravel aquifer in Region II totaled approximately 24 mgd in 2015, with 15 mgd of this pumpage occurring in the northern two-thirds of Santa Rosa County. Withdrawals in this area account for nearly all of the public supply and ICI water use, and most of the domestic self-supply and agricultural water use, of the sand-and-gravel aquifer in Region II. Based on a model-simulated recharge of 584 mgd in this area, the pumpage (15 mgd) represents approximately three percent of the sand-and-gravel aquifer water budget. Local streams and rivers are the primary discharge areas for the sand-and-gravel aquifer. Other discharge components include leakage (recharge) to the underlying Floridan aquifer, pumpage, and outflow to surrounding areas such as the Choctawhatchee Bay.

Water Quality Constraints on Groundwater Availability

High recharge rates and the leaky nature of the sand-and-gravel aquifer make it susceptible to anthropogenic contamination that may constrain use locally or necessitate water treatment. Deterioration of Floridan aquifer water quality within the cone of depression constrains water availability along the coast. Water quality has very slowly degraded where the saltwater interface has been identified as a transition zone from freshwater to salt water, including areas near Navarre Beach and Midway to the west; in the coastal area to the south of the easternmost Choctawhatchee Bay to the east; and the lower Floridan aquifer near north Ft. Walton Beach where the underlying Bucatunna Clay confining unit tapers.

As part of water supply planning for Region II, saltwater intrusion modeling was performed to analyze the effect of Floridan aquifer pumping on the movement of the saltwater interface and water quality (HydroGeoLogic, 2005 and 2007a). Forecast simulations were performed that included increasing Floridan aquifer withdrawals to approximately 62 mgd by the year 2025 with slightly more than half of the projected pumping (32 mgd) assigned to inland areas. Pumping was held constant at that rate from 2025 to 2100, assuming the development of surface water sources to provide for additional demands beyond the simulated withdrawals of 62 mgd (HydroGeoLogic, 2007b and 2007c). These model forecasts show the withdrawals to be sustainable through year 2040. This evaluation is still valid as the 2040 projected Floridan aquifer withdrawals for public supply are 46.4 mgd. Public supply will continue to be the largest use of the Floridan aquifer in Region II through the 2040 planning period, with most of the pumping occurring inland.

In 2015, a work plan was prepared for the development of minimum aquifer levels for the upper Floridan aquifer in coastal Region II. Establishment of minimum aquifer levels will determine minimum levels in the Upper Floridan aquifer needed to avoid saltwater intrusion into public supply wells and enhance the sustainability of the aquifer as a source of potable water. Additional water quality data collection and updates to regional groundwater flow and transport models are ongoing. The technical assessment for the determination of minimum aquifer levels is scheduled to be complete in 2020.

Surface Water Resources

Historically, surface water has not played a major water supply role in Region II. Surface water withdrawals totaled approximately 3.8 mgd in 2015 and largely reflect water withdrawn from streams and ponds for golf course and agricultural uses. At the same time, because of the Region II RWSP, surface water continues to be evaluated as a future alternative source.

Alternative Water Supply and Conservation

Non-traditional sources of water used in 2015 include reuse of reclaimed water and aquifer storage and recovery (ASR). Surface water in Okaloosa County is also under evaluation and development as an alternative source for future uses. District support to water supply development projects have advanced water conservation efforts such as leak detection and water use efficiencies. Past projects include development of inland sources of groundwater and associated infrastructure to offset coastal pumping.

Water Conservation

Water conservation potential in Region II may be up to 14 mgd by the year 2040 if all cost effective options are implemented and about six mgd if a ten percent water demand reduction goal is realized (Table 10). If all cost-effective options are implemented, two-thirds of the conservation potential is within the Region II WRCA. Close to half of all conservation potential is in Okaloosa County, 35 percent in Santa Rosa County, and 18 percent in Walton County.

Table 10. Region II - Conservation Potential (mgd) 2040

County	10% Reduction Goal			All Cost Effective Options[A]		
	Within WRCA	Outside WRCA	10% Reduction Goal Conservation Potential	Within WRCA	Outside WRCA	All Conservation Potential
Okaloosa	1.9	0.7	2.6	5.1	1.4	6.5
Santa Rosa	0.8	1.4	2.2	2.2	2.7	4.9
Walton	1.0	0.2	1.3	2.1	0.4	2.5
TOTALS	**3.7**	**2.3**	**6.0**	**9.4**	**4.5**	**13.9**

Note (A): Costs reflect 2010 dollars and exclude maintenance and administrative expenses.

The all cost effective options estimates were determined based on public supply utilities implementing all conservation options costing less than $3 per thousand gallons (kgal) saved. Over 90 percent of the potential savings would be from residential indoor plumbing fixture and appliance retrofits or replacements. Conservation potential by county is in Table 10. Water conservation best management practices in Region II include annual water loss audits, water loss targets, leak detection programs, water meter calibration and replacement, residential water use per capita targets, conservation or inclining block rate structures, educational materials and public outreach, Florida Friendly Landscaping and irrigation efficiency ordinances, and plumbing fixture retrofits.

Water supply development projects that have increased water use efficiency include water system improvements with Chumuckla Water System, Holt-Baker Water System, Fairpoint Regional Utility System, Regional Utilities, and the City of Laurel Hill.

<u>Reuse of Reclaimed Water</u>

In 2015, Region II was utilizing 9.6 mgd potable-offset reuse or about 33 percent of the total wastewater treatment facility (WWTF) flows of 28.6 mgd (Table 11). Okaloosa County is a major reuse contributor in Region II. All of the facilities included have secondary treatment levels except for South Walton Utility Company in Walton County, which has an advanced treatment level. Information on individual wastewater facilities used in this analysis is included in Appendix 7.

Table 11. Region II - 2015 Reuse and Wastewater Flows (mgd)

County	Potable Offset Reuse Flow	Percent of Potable Offset Reuse to Total WWTF Flow	Total WWTF Flow	Number of Active Reuse Systems	Total WWTF Capacity
Okaloosa	3.977	26%	15.192	12	28.649
Santa Rosa	3.083	50%	6.230	9	11.092
Walton	2.509	35%	7.201	10	13.198
TOTALS	**9.569**	**33%**	**28.623**	**31**	**52.939**

Based on population projections, future potential reuse flow is estimated to be an additional 28.2 mgd by 2040 (Table 12). These additional flows added to existing 2015 reuse flows total 37.8 mgd, or about 71 percent of the 2015 total facility capacities. Future potable offset reuse flow assumptions are that WWTF's have treatment and disinfection levels suitable for the reuse end uses, and that transmission infrastructure is available to reuse customers.

Projects that support the expansion of reuse include a reclaimed watermain upgrade in the City of Niceville, Pace Water System reclaimed water line extension, Holley-Navarre reuse line replacement, and a reclaimed water storage elevated tank in the City of Gulf Breeze.

Table 12. Region II - 2020-2040 Future Potential Reuse Availability (mgd)

County	Reuse Flow 2015	Future Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	mgd	Capacity %
Okaloosa	3.977	11.95	12.55	12.99	13.38	13.72	17.70	61.8%
Santa Rosa	3.083	3.75	4.30	4.76	5.20	5.51	8.59	77.4%
Walton	2.509	5.72	6.66	7.51	8.36	9.02	11.53	87.4%
TOTALS	**9.569**	**21.43**	**23.50**	**25.27**	**26.94**	**28.24**	**37.82**	**71%**

Other Alternative Water

Region II has the only aquifer storage and recovery (ASR) system in the District. Destin Water Users in Okaloosa County has an IWUP with 1.06 mgd of permitted withdrawals from the surficial aquifer for landscape and recreational use, and an associated ASR injection well.

With the implementation of the RWSP, surface water continues to be evaluated as an alternative source. Feasibility analysis of surface water alternatives in Okaloosa County was conducted in 2006 (PBS&J, 2006). Okaloosa County is planning to construct an offline reservoir along the Shoal River to meet future water supply needs. The Shoal River MFL technical assessment, initiated in 2018, will determine the minimum river flows needed to maintain the ecology and water resources of this area.

Region II: RWSP Evaluation

The sand-and-gravel aquifer in Santa Rosa County is a productive aquifer system and, due to its high rate of recharge, is capable of providing regionally-significant quantities of water to meet demands through 2040. District and utility water supply initiatives have successfully reduced coastal pumping in the Floridan aquifer along the coast. This reduction in pumpage has enabled water levels to recover over much of the area and has slowed, but not eliminated, the threat of saltwater intrusion. A significant cone of depression is still present, and concerns related to saltwater intrusion remain. Efforts to stabilize or reduce coastal withdrawals and develop alternative water sources are anticipated to continue along with efforts to better understand the uncertainty regarding movement of the saltwater interface.

Based on these conclusions, 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. Therefore, pursuant to section 373.709, F.S., updating and continued implementation of the Regional Water Supply Plan (RWSP) for Region II is recommended.

Region III: Bay County

Overview

Bay County is Region III. The primary water sources in the approximately 1,033 square mile region include Deer Point Lake Reservoir and the Floridan aquifer system. The District's Econfina Creek Water Management Area, which extends into Washington County in Region IV, encompasses the primary recharge area for Deer Point Lake Reservoir. The Gainer Springs Group and spring run in northern Bay County is a first magnitude spring and Outstanding Florida Spring. Region III is primarily within the St. Andrew Bay watershed. Tyndall Air Force Base encompasses a coastal peninsula in southern Bay County (Figure 28).

Region III Snapshot

	2015	2040
Population	194,107	238,784
Water Use (mgd)	64.42	72.93
Primary Water Source(s):	Deer Point Lake Reservoir	
MFL Waterbodies:	Gainer Spring Group, and Coastal Floridan Aquifer	
Water Reservations:	None	
RWSP Status:	Discontinuation Recommended	

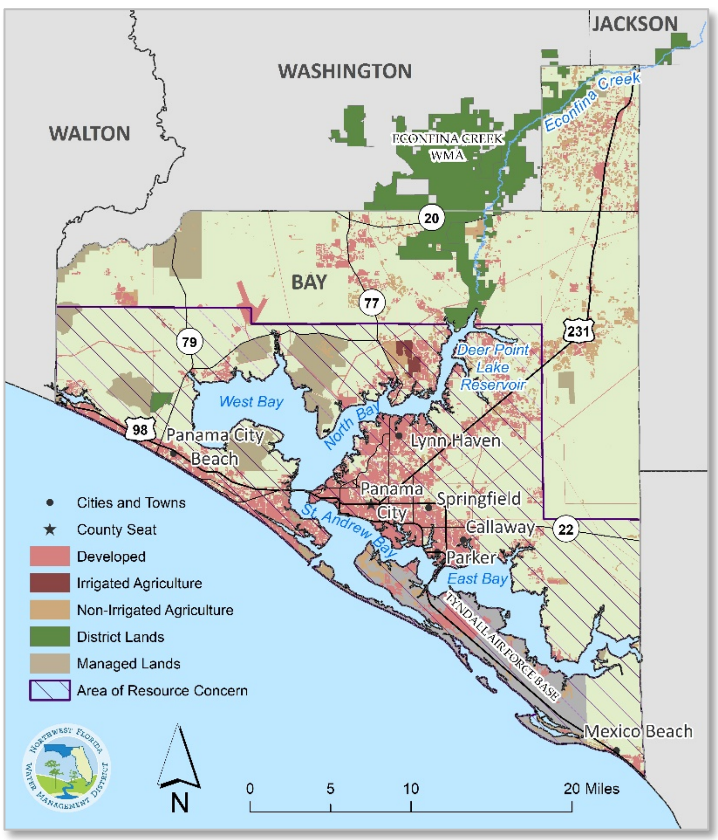

Figure 28. Region III - Bay County

Region III has fast growing cities and water supply service areas, e.g., Panama City Beach, Lynn Haven, and Bay County Utilities; and others that are growing more slowly but are affected by substantial seasonal populations, for example, Mexico Beach.

Bay County's population is projected to grow by an average of 0.76 percent annually over the 2020-2040 planning period. According to EDR, the county's per capita personal income and median household income were above District averages, while the poverty rate was lower than the District average (EDR, 2017). An Area of Resource Concern covering more than half of Bay County was identified in the District's 1998 WSA based on the potential for saltwater intrusion into the Floridan aquifer. A regional water supply plan was developed for Region III in 2008 and updated in 2014.

The RWSP's primary water supply development project, construction of an alternative, upstream water intake facility, has been completed. Water demands through the planning period are met primarily by Deer Point Lake Reservoir. In May 2015, Bay County adopted the Bay-Walton Sector Plan. About 88 percent (97,216 acres) of the Plan is in Bay County. The Plan indicates that there are sufficient potable water supplies beyond 2040 and sufficient non-potable water through 2027, with some potential non-potable deficiencies through the 50-year build out (through 2064). Water supply needs will be further evaluated in the District's next water supply assessment.

Population

The 2015 BEBR population estimate for Bay County was 173,310. The 2015 seasonally-adjusted population estimate is 194,107, reflecting an estimated seasonal population rate of 12 percent. Most seasonal populations are in Panama City Beach and in Mexico Beach. Unless noted otherwise all population data is seasonally adjusted.

2015 Water Use Estimates and 2020-2040 Demand Projections

In 2015, Bay County had about 13 percent of the District population and accounted for about 20 percent of all water use Districtwide. Public supply, ICI, and power generation are the largest water use categories in Region III, and collectively represent about 93 percent of all Bay County water use (Figure 29, Table 13). Close to 90 percent of all water used was supplied by the Deer Point Lake Reservoir. Other surface waters are North Bay via Alligator Bayou, which was used in power generation cooling processes; and stormwater, recycling, and reclaimed water for other power operation water needs.

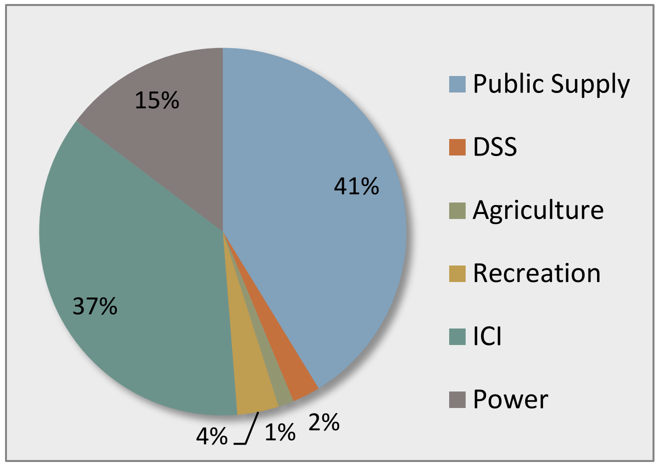

Figure 29. Region III - 2015 Water Use

Table 13. Region III - 2015 Water Use (mgd) and Population Estimates

County	Public Supply	DSS	Agri-culture	Rec-reation	ICI	Power	TOTAL	BEBR 2015 Population	Adjusted Population
Bay	26.600	1.579	0.880	2.361	23.547	9.472	64.439	173,310	194,107
TOTALS	**26.600**	**1.579**	**0.880**	**2.361**	**23.547**	**9.472**	**64.439**	**173,310**	**194,107**
% of total*	41.3%	2.5%	1.4%	3.7%	36.6%	14.7%	100%	12.2%	12.8%

*Percent per water use category in this region, and percent of Districtwide population.

Projected water demands are provided in Table 14. The largest increase is projected in public supply. Large percentage increases are also projected for recreational and DSS water uses.

Public Supply: Bay County provides public water supply to multiple municipal water systems, including Panama City, Panama City Beach, Lynn Haven, Mexico Beach, Springfield, and Callaway, as well as for portions of unincorporated Bay County. Moderate population growth is expected to continue over the planning horizon. Considerable seasonal populations in Panama City Beach and other coastal areas are also projected to continue. The highest growth rates are in Panama City Beach, Lynn Haven, and the North Bay and Lake Merial areas. Bay County's population is expected to increase by about 45,000 over the planning horizon with an estimated 92 percent of the population in public supply service areas by 2040. Additional public supply utility data is in Appendix 4.

Table 14. Region III - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Average

Use Category	Estimates	Future Demand Projections - Average Conditions					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	26.600	28.227	29.613	30.869	32.039	33.249	6.669	25.1%
DSS	1.579	1.652	1.760	1.805	1.836	1.865	0.286	18.1%
Agriculture	0.880	0.899	0.910	0.929	0.952	0.970	0.089	10.1%
Recreational	2.361	2.495	2.615	2.717	2.809	2.905	0.543	23.0%
ICI	23.547	23.548	24.016	24.521	25.026	25.531	1.983	8.4%
Power	9.472	5.815	6.988	8.390	8.390	8.415	-1.057	-11.2%
TOTALS	**64.439**	**62.636**	**65.901**	**69.230**	**71.052**	**72.934**	**8.514**	**13.2%**

DSS and Small Public Systems: Known domestic self-supply wells are clustered around Lynn Haven, Panama City, northern Bay County near Southport, and communities around Highway 231. Growth in DSS water use is consistent with public supply and population projections.

Agriculture: Region III is projected to have a nominal increase of 88 irrigated acres over the planning horizon for fresh market vegetables and field crops. About 1,100 acres of sod production are expected to continue through the planning horizon.

Recreation: Sixty-five percent of Bay County’s recreational water use is reported by golf course and other recreational permittees, with the remaining 35 percent estimated from residential and other small-scale recreational irrigation wells that have GWUPs with no water use reporting requirements. Most recreational irrigation uses are in coastal areas and in the Panama City metropolitan region.

ICI: Large ICI water users include West Rock, Arizona Chemical, and Tyndall Air Force Base. All three have individual water use permits for groundwater consumption and obtain surface water from Bay County via the Deer Point Lake Reservoir.

Power Generation: The second largest power generating facility in the District at just over 1,000 MW is Gulf Power’s Lansing Smith Plant. Future demand projections provided by the permittee referenced the cessation of coal operations in 2016, and an associated reduction in surface water withdrawals. New reclaimed water sources are planned to become available to serve power cooling needs.

Table 15. Region III - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Drought

Use Category	Estimates	Future Demand Projections - Drought Year Events					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	26.600	30.203	31.686	33.030	34.281	35.576	8.996	33.8%
DSS	1.579	1.767	1.884	1.931	1.964	1.996	0.417	26.4%
Agriculture	0.880	1.194	1.209	1.237	1.270	1.295	0.415	47.2%
Recreational	2.361	3.343	3.504	3.640	3.765	3.892	1.531	64.8%
ICI	23.547	23.548	24.016	24.521	25.026	25.531	1.983	8.4%
Power	9.472	5.815	6.988	8.390	8.390	8.415	-1.057	-11.2%
TOTALS	**64.439**	**65.870**	**69.286**	**72.748**	**74.695**	**76.704**	**12.285**	**19.1%**

Total Region III water demand is projected to be about 73 mgd by 2040 in an average year (Table 14) and close to 77 mgd in a drought year (Table 15), an estimated 5.2 percent increase over normal conditions.

Assessment of Water Resources

Prior to 1961, Bay County was dependent on groundwater for potable and industrial water supplies (Ryan et al., 1998). Following the construction of Deer Point Lake Reservoir in 1961, many water users reduced groundwater pumpage and began using surface water. Surface water is now the principal source of supply and is anticipated to remain so through 2040.

Surface Water Resources

From a water supply perspective, Deer Point Lake Reservoir and its tributaries comprise the principal surface water resources within Region III. Deer Point Lake Reservoir covers between 4,500 to 5,500 acres, depending on the lake stage.

The construction of Deer Point Lake Reservoir altered the natural estuarine system of North Bay. A new salinity regime was established in North Bay as the system adapted to the regulated freshwater flows from Deer Point Lake Reservoir.

Surface Water Assessment Criteria

The primary criterion is the sustainability of surface water resources and associated natural systems.

The four principal tributaries contributing to the Deer Point Lake Reservoir are Econfina, Bear, Bayou George, and Big Cedar creeks. Between 1998 and 2008, these tributaries contributed an average of 423 mgd (654 cfs) based on data collected by the District. Econfina Creek contributes approximately 60 percent of the inflow to Deer Point Lake Reservoir under average conditions and almost 80 percent under low flow conditions (Richards, 1997).

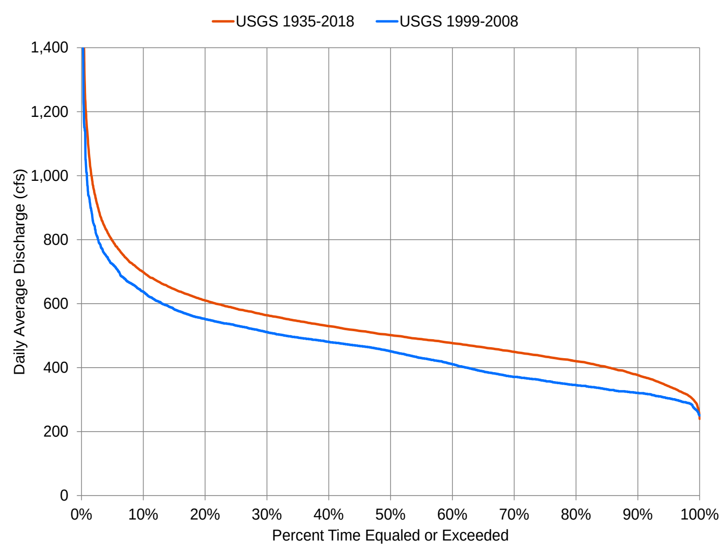

Figure 30. Flow Duration Curve for Econfina Creek at Highway 388

The long-term flow in Econfina Creek at Highway 388 (Figure 30) averages 343 mgd (530 cfs) (1935 to 2018). This streamflow results, in large part, from significant Floridan aquifer spring discharge along middle Econfina Creek.

The largest spring is the Gainer Spring Group, a first magnitude spring group with a median discharge of 103 mgd (159 cfs). An assessment of long-term trends in discharge from the Gainer Spring Group indicates a slight increase from 1962 to present. There are minimal groundwater withdrawals and the District has purchased and manages more than 41,000 acres of land along Econfina Creek and its recharge area.

Because of the high percentage of spring inflow and the District's protection of the recharge area, discharge from Econfina Creek into Deer Point Lake Reservoir is stable. To ensure continued protection of the system, Gainer Spring Group and several second magnitude springs on Econfina Creek are included on the District's MFL Priority List and Schedule. The schedule is updated annually and may be found on the District's website: www.nwfwater.com.

The District also performed an assessment of freshwater inflows into Deer Point Lake Reservoir and the potential impacts of additional withdrawals from the reservoir on the salinity of North Bay (Crowe et al., 2008). The study concluded that the increases in withdrawals from the reservoir up to 98 mgd and periodic drawdowns of lake levels will not adversely affect the salinity of the North Bay estuarine system. Surface water withdrawals from Deer Point Lake Reservoir were approximately 48.5 mgd in 2015 and are projected to reach 64.2 mgd by 2040. The projected 2040 surface water demands for a 1-in-10 year drought event are 67.5 mgd. These quantities are within Bay County Utilities' allocation agreement and consistent with the District's impact assessment (Crowe et al., 2008).

Water Quality Constraints on Availability

Deer Point Lake Reservoir and its tributary creeks are classified as Class I Waters of the State due to their designation as the major potable water supply for Bay County. Water quality within the system has thus far been adequate for the designated uses. Past hurricane seasons highlighted concern regarding the susceptibility of the reservoir to storm surge. Based on the National Hurricane Center's Tropical Cyclone Reports, the Gulf Coast experienced a 10 to 15 foot storm surge from Hurricane Ivan (2004) and a 24 to 28 foot storm surge from Hurricane Katrina (2005). These two storms were Category 3 hurricanes at landfall. To increase the resiliency of Deer Point Lake Reservoir to withstand storm surge impacts and assure safe drinking water, Bay County completed the development of an alternative upstream water intake at Econfina Creek and associated transmission infrastructure in 2015.

Groundwater Resources

Groundwater is significant in Region III from two perspectives. First, a majority of freshwater flowing into the Deer Point Lake Reservoir originates as discharge from the Floridan aquifer. Second, use of the Floridan aquifer as a supply source is projected to continue. Management of aquifer withdrawals will be needed to minimize the risk of long-term saltwater intrusion near the coast.

In order of depth, the three primary hydrostratigraphic units are the surficial aquifer system, the intermediate system, and the Floridan aquifer system.

The surficial aquifer typically consists of unconsolidated quartz sand. Groundwater generally exists under unconfined conditions. The thickness of the surficial aquifer ranges between 40 feet and 80 feet in coastal Bay County and is typically 40 feet or less in inland areas. In low-lying areas along Econfina Creek, the surficial aquifer is absent. Along the coastal fringe, the saturated thickness and permeability are sufficient to form a locally important source of groundwater that is used to meet some water needs, particularly for non-potable uses such as landscape irrigation. Well yields range from 200 to 500 gpm.

The intermediate system consists of fine-grained low permeability sediments and functions primarily as a confining or leaky confining unit. In central and northern Bay County, the thickness of the intermediate system is typically 100 feet or less. Along Econfina Creek, this unit is very thin to absent. In coastal Bay County, this unit reaches a thickness of 200 to 300 feet and includes a locally significant aquifer. Well yields are on the order of 200 to 300 gpm and although not as productive as the surficial aquifer, the intermediate system in coastal Bay County can yield significant quantities of water.

The Floridan aquifer system is the source of most of the groundwater pumped in Region III. It consists of a sequence of carbonate sediments ranging in thickness from about 600 feet in northeast Bay County to more than 1,400 feet in the extreme southeast part of the county. The hydraulic conductivity is quite variable. In northwest Bay County, results of aquifer performance testing were on the order of 45,000 ft^2/day and specific capacity values averaged 120 gpm/ft. This is an area of active recharge, flow and dissolution of the Floridan aquifer system.

The Floridan aquifer system's zone of contribution for Region III extends into southern Washington and eastern Calhoun and Gulf counties (Richards, 1997). In the far northeast corner of Bay County, the potentiometric surface reaches a maximum elevation of approximately 100 feet above sea level (Figure 31). From this high point, water levels decline in all directions, with the general direction of flow being toward the south and southwest.

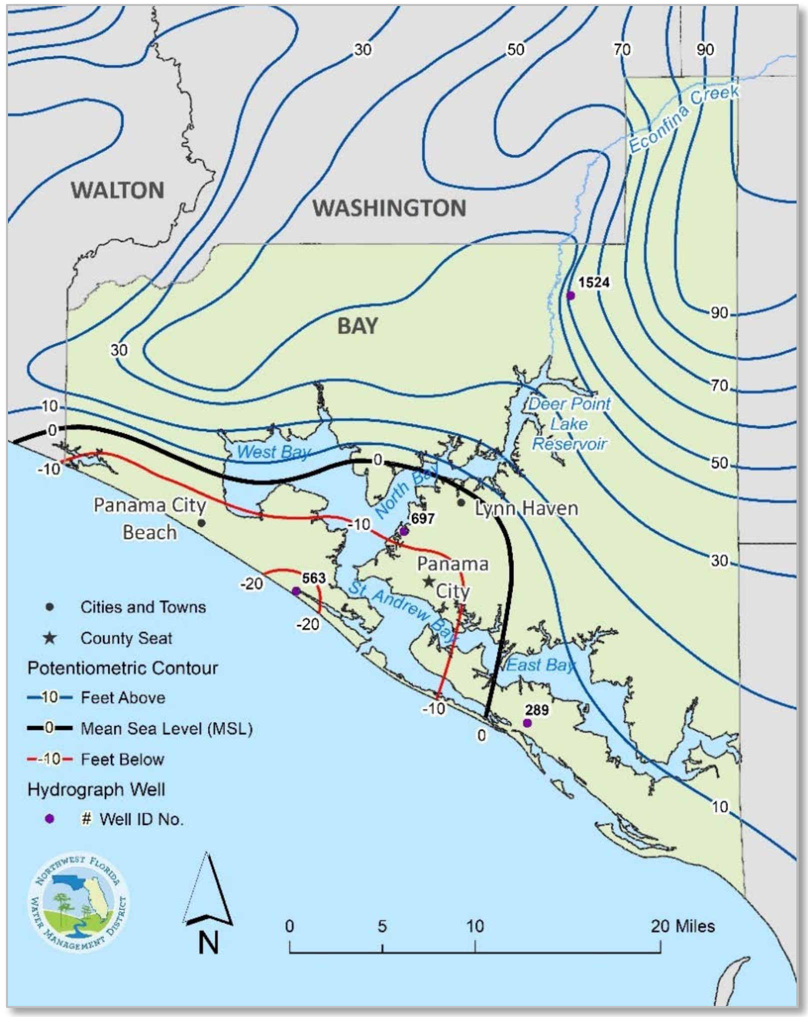

Figure 31. Potentiometric Surface of the Floridan Aquifer System in Bay County, September 2015

Assessment Criteria

The long-term depression of the potentiometric surface of the Floridan aquifer system and attendant alteration of groundwater quality were the primary criteria used to assess groundwater availability. A regional groundwater budget was also used to examine the relative magnitude of groundwater withdrawals.

Data presented in Figure 32 shows historical Florida aquifer water levels near the coast. Hydrographs include a well near the Panama City Airport (Fannin Airport well NWF_ID #697), a well at Tyndall AFB (Tyndall #10, NWF_ID #289), and a well near Panama City Beach (St. Thomas Square well, NWF_ID #563). A fourth well (Eddie Barnes well, NWF_ID #1524) is located north of Deer Point Lake Reservoir, away from the historical pumping centers. Locations of these monitor wells are shown on Figure 31.

The water level declines persisting in the Fannin Airport (Figure 32A) and Tyndall (Figure 32B) wells from the late 1930s to late 1960s, largely due to industrial withdrawals. Larger declines were in the Tyndall well, as it was closer to and downgradient from the former wellfields used prior to the switch to surface water. With the reduction in Floridan aquifer pumping, water levels in both wells rebounded in 1967. Subsequent to this recovery, water levels began again to decline. This downward trend largely represents increased withdrawals in the Panama City Beach area. As a result, a cone of depression again formed in the Floridan aquifer. The St. Thomas Square well (Figure 32C) indicates that the Panama City Beach cone of depression has existed since at least 1987. Water levels in the St. Thomas Square well ranged between 80 and 35 feet below sea level during the 1990s. In 2002, deteriorating water quality associated with the local cone of depression prompted Panama City Beach to abandon their supply wells and begin purchasing its potable water from Bay County Utilities.

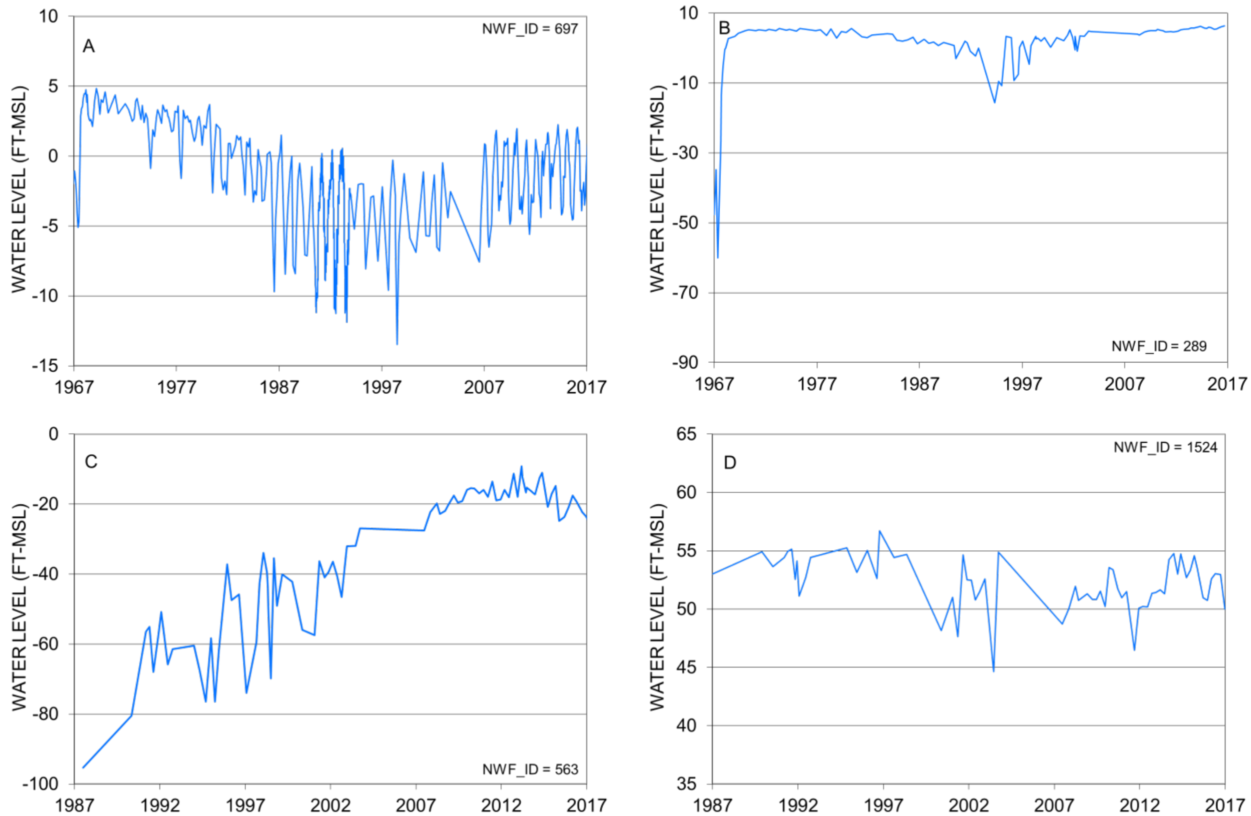

Figure 32. Hydrographs of the A) Fannin Airport, B) Tyndall #10, C) St. Thomas Square, and D) Eddie Barnes Floridan Aquifer Wells

Following the cessation of pumping, water levels in the Floridan aquifer recovered approximately 35 feet between 2002 and 2013. As shown in Figure 32(C), water levels had recovered to approximately 10 feet below sea level. Since 2013, groundwater levels have again begun to decline due to an increase in coastal groundwater withdrawals. In 2017, water levels averaged 25 feet below sea level at the St. Thomas Square well in the Panama City Beach area. The Floridan aquifer potentiometric surface continues to exhibit areas below sea level due to the continued limited use (approximately 8 mgd) of the Floridan aquifer for public supply, industrial, irrigation, and domestic self-supply water use. Along the coast the Floridan aquifer is susceptible to saltwater intrusion due to the persistent cone of depression in the potentiometric surface.

By contrast, the Eddie Barnes well, located in northeast Bay County just east of Econfina Creek, is minimally affected by drought and withdrawals (Figure 32D). Water levels have fluctuated about 12 feet between 1985 and 2017. The lowest water levels are associated with the droughts experienced during 2000-2001, 2006-2007, and 2011-2012. This well indicates that the groundwater levels that control stream baseflow in northeast Bay County are relatively stable and only moderately affected by drought.

Groundwater Budget

The water budget (Figure 33) presents an order-of-magnitude approximation of the major inflows and outflows to the Floridan aquifer system in Bay County (Ryan et al., 1998). It was prepared using output from a calibrated groundwater flow model. When analyzing the groundwater budget, it is important to realize that the most active portion of the flow system is in the northern part of Bay County, away from the coastline. This is the part of Region III lying on the southernmost edge of the Dougherty Karst Plain.

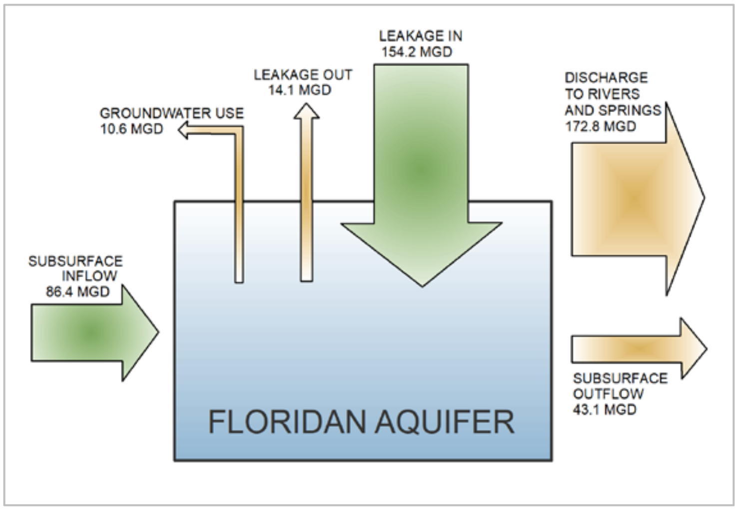

Figure 33. Region III Floridan Aquifer Steady-State Groundwater Budget

The Dougherty Karst Plain is significant for being both a recharge and a discharge area for the Floridan aquifer. Recharge occurs within the karst terrain and discharge occurs into Econfina Creek. As a result, much of the inflow to and outflow from the Floridan aquifer occurs in the northern half of Region III.

The southern half of the region, where the majority of groundwater usage occurs, is relatively removed from the active part of the flow system. This has implications for the vulnerability of the Floridan aquifer to saltwater intrusion and upconing impacts from pumping. Being in a relatively sluggish, low-velocity part of the flow system, with a natural background of elevated sodium, chloride and TDS concentrations, the coastal area is vulnerable to both lateral saltwater intrusion and vertical upconing of saline water.

Water Quality Constraints on Availability

Over most of Region III, the quality of groundwater is suitable for most uses. However, concerns regarding water quality constrain the availability of the Floridan aquifer in coastal Bay County.

Alternative Water Supply and Conservation

Non-traditional sources of water in Region III include reuse of reclaimed water and surface water. District support to water supply development projects have expanded reuse potential and contributed to water conservation.

Water Conservation

Water conservation potential in Region III is up to six mgd by the year 2040 if all cost-effective options are implemented and about 3.8 mgd if a ten percent water demand reduction goal is realized. The all cost effective options estimates are determined based on public supply utilities implementing all conservation options costing less than $3 per thousand gallons (kgal) saved. Eighty-six percent of the potential savings would be from residential indoor plumbing fixture and appliance retrofits or replacements. Water supply development projects that have increased water use efficiency include water system improvements in the cities of Parker, Springfield, and Lynn Haven.

Reuse of Reclaimed Water

In 2015, seven wastewater treatment facilities (WWTFs) in Region III utilized 2.6 mgd of potable offset reuse or 17 percent of the total WWTF flows, which totaled 15.4 mgd (Table 16). Three facilities currently discharge treated wastewater to St. Andrews Bay - Millville, St. Andrews, and Military Point. The Panama City Beach reuse system has advanced treatment levels and other Bay County facilities have secondary treatment level. Information on individual wastewater facilities used in this analysis is included in Appendix 7.

Table 16. Region III - 2015 Reuse and Wastewater Flows (mgd)

County	Potable Offset Reuse Flow	Percent of Potable Offset Reuse to Total WWTF Flow	Total WWTF Flow	Number of Active Reuse Systems	Total WWTF Capacity
Bay	2.581	16.7%	15.428	7	35.072
TOTALS	**2.581**	**16.7%**	**15.428**	**7**	**35.072**

Based on population projections, future reuse flows are estimated to be an additional 16.4 mgd by 2040. This additional availability added to existing 2015 reuse flows totals about 19 mgd, or about 54 percent of the 2015 total facility capacities (Table 17). Future potable offset reuse assumptions are that WWTF's have treatment and disinfection levels suitable for the reuse end uses, and that transmission infrastructure is available to reuse customers.

Table 17. Region III - 2020-2040 Future Potential Reuse Availability (mgd)

County	Reuse Flow 2015	Future Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	mgd	Capacity %
Bay	2.581	13.72	14.50	15.17	15.78	16.40	18.98	54%
TOTALS	**2.581**	**13.72**	**14.50**	**15.17**	**15.78**	**16.40**	**18.98**	**54%**

Region III: RWSP Evaluation

Surface water resources are adequate to meet the requirements of existing and reasonably anticipated future average water demands and demands for a 1-in-10 year drought through 2040, while sustaining water resources and related natural systems.

The 2040 projected groundwater demand of 8.24 mgd is relatively small, approximately 3.4 percent of the estimated regional water budget. Regional groundwater resources are adequate to provide for the projected average annual withdrawals and the 1-in-10 year drought event withdrawals of 8.61 mgd. The District has included the establishment of minimum aquifer levels for the Floridan aquifer in coastal Bay County on its MFL Priority List and Schedule.

Based on the analysis and conclusions above, existing and reasonably anticipated water sources are considered adequate to meet existing and future reasonable-beneficial water demands and to sustain the water resources and related natural systems for the planning period. The Region III RWSP was first approved in 2008 and updated in 2014. The major water supply development project included in the plan, establishment of an upstream water intake and associated water transmission facility, has been completed. Additionally, water demands through the planning period are met, primarily by the Deer Point Lake Reservoir. Therefore, pursuant to section 373.709, F.S., discontinuation of the Region III Regional Water Supply Plan (RWSP) is recommended.

REGION IV: CALHOUN, HOLMES, JACKSON, LIBERTY AND WASHINGTON COUNTIES

Overview

Region IV consists of Calhoun, Holmes, Jackson, Liberty, and Washington counties (Figure 34). At about 3,477 square miles, Region IV is the District's second largest water supply planning region. All Region IV counties have low population densities and slow growth rates. The region is primarily rural and agricultural in land use and economy. Jackson Blue Spring, an Outstanding Florida Spring, is located in Jackson County. There are numerous second magnitude and smaller springs located on Econfina and Holmes creeks. The District manages several water management areas along surface water and springs resources in Region IV.

Region IV Snapshot

	2015	2040
Population	122,263	133,112
Water Use (mgd)	47.98	58.86
Primary Water Source(s):	Floridan aquifer system	
MFL Waterbodies:	Jackson Blue Spring	
Water Reservations:	Apalachicola and Chipola rivers	
RWSP Status:	No RWSP Recommended	

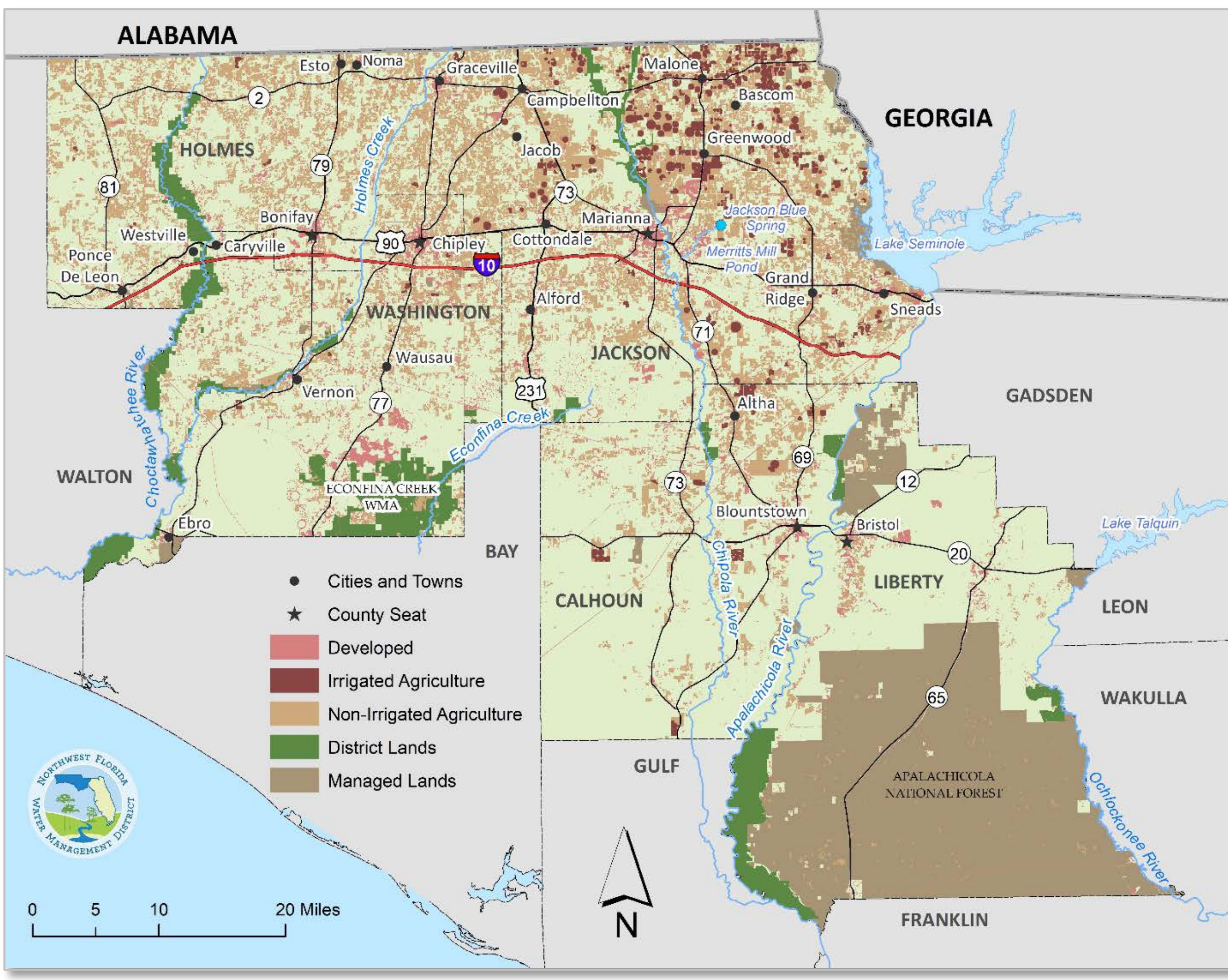

Figure 34. Region IV - Calhoun, Washington, Holmes, Jackson and Liberty Counties

The largest municipality in Region IV is the City of Marianna in Jackson County, with a 2015 estimated population of 6,500. Region IV has multiple smaller municipalities and public supply service areas, most with a population under 1,000 and with little to no growth projected.

The 2015 Region IV poverty and 2016 unemployment rates are well above District and state averages in all five counties. According to EDR, the per capita personal income is the lowest Districtwide and the median household income is second only to Gadsden as being the lowest in the District (EDR, 2017). All five counties are within the Northwest Florida Rural Area of Opportunity (RAO).

Jackson County and other northern portions of Region IV continue to be the District's largest agricultural region and in 2015 represented over half of all agricultural water use Districtwide. The Apalachicola National Forest covers over half of southern Liberty County. The updated Jackson Blue Spring and Merritts Mill Pond BMAP was adopted in 2018.

Population

The 2015 BEBR population estimate for Region IV is 118,582. Region IV has relatively low estimated seasonal population rates of one to three percent, apart from a nine percent rate in Liberty County. The 2015 seasonally-adjusted population estimate is 122,263, an increase of 3,681 from the BEBR 2015 permanent population estimate. Seasonal populations include migratory workers employed in agricultural work during crop seasons.

Water Use 2015 Estimates and Demand Projections 2020-2040

In 2015, Region IV had about eight percent of the District population and approximately 15 percent of all water use Districtwide. Agriculture (61%) and domestic self-supply (15%) are the largest water use categories and together comprise over three-fourths of all water use in Region IV (Figure 35 and Table 18).

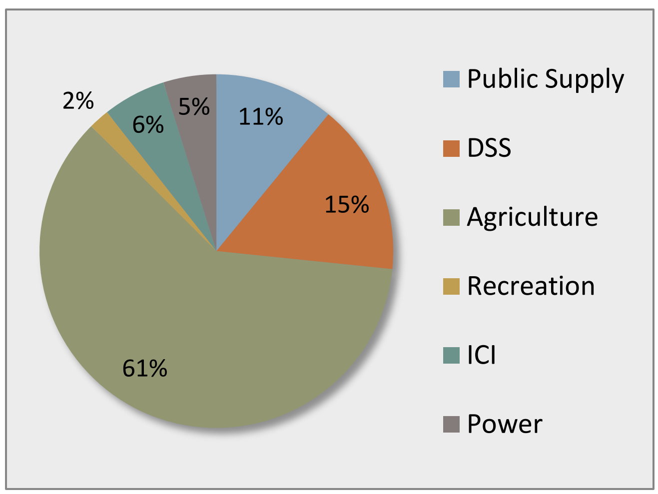

Figure 35. Region IV - 2015 Water Use

Public Supply: Holmes, Jackson, and Calhoun counties have some of the lowest projected population growth rates in the District. Liberty is projected to be the fourth fastest growing county in the District. Jackson County has the largest number of public utility systems in Region IV. Most of the projected public supply growth is in Liberty, Jackson and Washington counties. Additional public supply utility data is in Appendix 4.

DSS and Small Public Systems: Known domestic self-supply wells are fairly evenly distributed across Holmes, Jackson and Washington counties. In Calhoun and Liberty counties, DSS wells are concentrated around urban areas, road infrastructure, and river routes. The greater percentage of DSS increases are in Washington, Calhoun and Holmes counties.

Agriculture: Over the planning horizon, Region IV is projected add about 5,800 acres of irrigated land and increase water use by an additional 9.27 mgd (32 percent). Projected crop changes include increases in fresh market vegetables and non-citrus fruits.

Table 18. Region IV - 2015 Water Use (mgd) and Population Estimates

County	Public Supply	DSS	Agri-culture	Rec-reation	ICI	Power	TOTAL	BEBR 2015 Population	Adjusted Population
Calhoun	0.404	0.927	3.008	0.005	0.175	-	4.519	14,549	14,985
Holmes	1.007	1.295	1.159	0.219	0.006	-	3.686	19,902	20,101
Jackson	2.142	3.151	24.227	0.386	1.43	1.834	33.816	50,458	51,972
Liberty	0.456	0.488	0.072	0.002	0.377	0.487	1.882	8,698	9,481
Washington	0.926	1.674	0.717	0.302	0.456	-	4.076	24,975	25,724
TOTALS	**4.935**	**7.536**	**29.183**	**0.914**	**2.417**	**2.322**	**47.979**	**118,582**	**122,263**
% of total*	10.9%	15.7%	60.9%	1.9%	5.8%	4.8%	100%	8.4%	8.1%

*Percent per water use category in this region, and percent of Districtwide population.

Recreation: Recreational water use in Region IV is about two percent of the total regional water use. Estimates are based on reported pumpage from golf course and other recreational permittees, and from residential and other small-scale recreational irrigation wells that have GWUPs with no water use reporting requirements. The Sunny Hills Golf Club is in Washington County.

ICI: Region IV has several correctional and industrial facilities, with most of them in Jackson and Liberty counties. The projected increase of 18 percent over the planning horizon totals about 0.5 mgd.

Power: Two power generating facilities in Region IV are Gulf Power's Scholz Plant in Jackson County and Telogia Power in Liberty County. The Scholz Plant was substantially decommissioned in 2015 and has nominal withdrawals to keep essential components in service. Telogia Power projections are based on the current permitted allocation.

Table 19. Region IV - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Average

Use Category	Estimates	Future Demand Projections – Average Conditions					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	4.935	5.315	5.372	5.415	5.446	5.479	0.221	4.2%
DSS	7.536	7.767	7.962	8.118	8.237	8.355	0.819	10.9%
Agriculture	29.183	30.638	32.911	34.506	36.543	38.453	9.271	31.8%
Recreational	0.914	0.935	0.953	0.965	0.974	0.983	0.069	7.6%
ICI	2.443	2.790	3.015	3.147	3.214	3.271	0.503	18.2%
Power	2.322	2.320	2.320	2.320	2.320	2.320	-0.002	-0.1%
TOTALS	**47.979**	**49.764**	**52.533**	**54.472**	**56.735**	**58.862**	**10.882**	**22.7%**

Table 20. Region IV - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Drought

Use Category	Estimates	Future Demand Projections - Drought Year Events					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	5.258	5.688	5.748	5.795	5.827	5.863	0.627	12.0%
DSS	7.536	8.310	8.519	8.686	8.814	8.940	1.404	18.6%
Agriculture	29.183	41.622	44.902	47.221	50.087	52.779	23.596	80.9%
Recreational	0.914	1.252	1.278	1.295	1.306	1.318	0.404	44.2%
ICI	2.767	2.790	3.015	3.147	3.214	3.271	0.503	18.2%
Power	2.322	2.320	2.320	2.320	2.320	2.320	-0.002	-0.1%
TOTALS	**47.979**	**61.982**	**65.782**	**68.464**	**71.568**	**74.491**	**26.533**	**55.3%**

Total Region IV water demand is projected to be about 59 mgd by 2040 in an average year (Table 19) and 74.5 mgd in a drought year event 2040 (Table 20), an estimated 27 percent increase over average year conditions. Most of this projected increase is in the agricultural water use category.

Assessment of Water Resources

Groundwater withdrawals in Region IV totaled 44.4 mgd in 2015. Approximately 1.6 mgd of surface water was withdrawn for power generation uses and less than 0.1 mgd for agricultural use. Because surface water use is minor (3 percent of total use in 2015) and water reservations have been established for the Apalachicola and Chipola Rivers that protect that magnitude, duration, and frequency of flows (40A-2.223, F.A.C.), this assessment focuses on groundwater resources. Criteria used to assess the potential impacts of groundwater withdrawals on regional water resources include evaluating changes in aquifer levels and spring flow and examination of a Floridan aquifer groundwater budget.

Groundwater Resources

Region IV has two primary hydrogeologic settings: the Dougherty Karst groundwater region and the Apalachicola Embayment (Figure 36). Holmes, Washington, Jackson and northern Calhoun counties are within the Dougherty Karst region, while southern Calhoun and Liberty counties are within the Apalachicola Embayment.

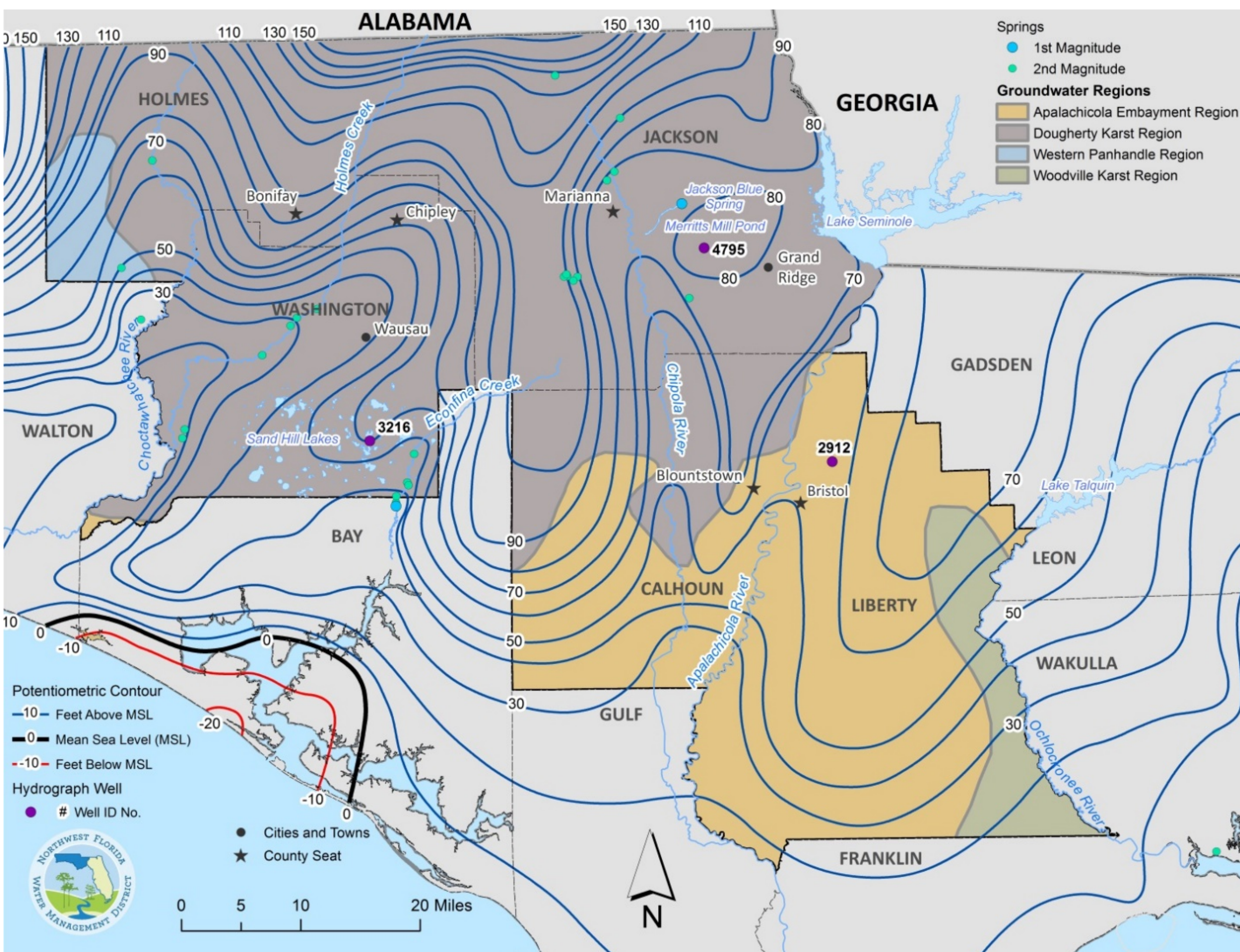

Figure 36. Potentiometric Surface of the Floridan Aquifer and Groundwater Regions in Region IV

In both regions, the groundwater flow system consists of three major hydrostratigraphic units: the surficial aquifer system, the intermediate system, and the Floridan aquifer system. The Claiborne aquifer is also present in the Dougherty Karst region. The Floridan aquifer system is the primary water source of water throughout Region IV.

The potentiometric surface of the Floridan aquifer is strongly influenced by groundwater discharging to local springs, creeks and rivers (Figure 36). The surface reaches a maximum elevation of approximately 160 feet above sea level in northern Holmes and Jackson counties. Groundwater flows towards discharge features and south toward the coast. Major discharge features include the Chipola, Choctawhatchee and Apalachicola rivers; Holmes and Econfina creeks, one first magnitude spring, 16 second magnitude springs, and 13 third magnitude springs (Barrios, 2005; Barrios and Chelette, 2004).

Dougherty Karst Groundwater Region

The Dougherty Karst region has a dynamic groundwater flow system characterized by a strong hydraulic connection between ground and surface waters, high aquifer recharge rates, and karst features. The surficial system is thin to absent. The intermediate system is between 50 and 100 feet thick across most of the Dougherty Karst region, is breached by sinkholes, and functions as a semi-confining unit.

The Floridan aquifer system consists of a carbonate sequence that ranges in thickness from less than 100 feet in northern Jackson County to nearly 600 feet in southern Washington County. The Floridan aquifer includes the Chattahoochee Formation (where present), the Marianna and Suwannee limestones, and the Ocala Limestone. The aquifer is highly transmissive and well yields can be up to 1,500 gpm.

Due to high recharge and transmissivity, withdrawals from the Floridan aquifer have not resulted in any discernible depressions in the potentiometric surface. Hydrographs for two wells are presented to illustrate fluctuations in the Floridan aquifer levels (Figure 37). Data are presented for a well located near Marianna in Jackson County (International Paper well) and a well near Wausau in Washington County (USGS 422A well). The locations of these wells are shown on Figure 36 and identified on the map by the NWF_ID numbers in the upper right-hand corner of each graph. At both wells, aquifer levels vary in response to seasonal and annual variations in rainfall and groundwater withdrawals. The effects of droughts on water levels are evident during 2000-2001, 2006-2007, and 2011-2012. No long-term trends are present at these wells or any other wells examined in the Dougherty Karst Region.

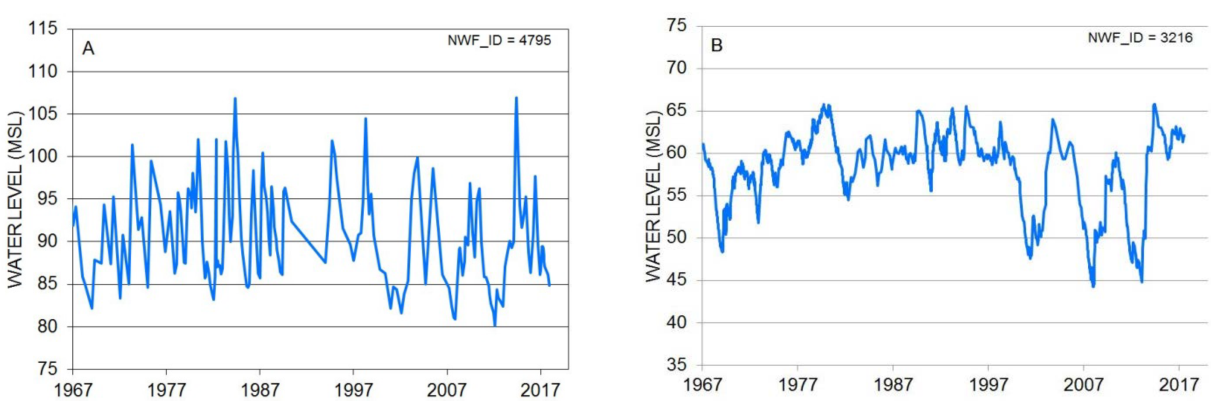

Figure 37. Hydrographs of Wells Located in the Dougherty Karst Area at A) International Paper Company Well, Jackson County, and B) USGS-422A Well, Washington County

The discharge of Jackson Blue Spring averages 105 cfs. There are no long-term declines in springflow indicative of persistent groundwater withdrawal effects. Seasonal pumpage can influence spring flows, particularly during low rainfall and high pumpage periods. The District is currently developing minimum flows for Jackson Blue Spring, with the MFL technical assessment scheduled to be complete in 2022 and rule adoption in 2023. Numerous second and third magnitude springs occur along Holmes Creek and the Choctawhatchee River (Holmes and Washington counties). There are relatively few groundwater withdrawals in these areas.

The middle to early Eocene aged Claiborne aquifer is also present in northern Jackson County. It is a minor source of supply and provides water for some agricultural and public supply uses. The aquifer consists of the permeable portions of the Lisbon and Tallahatta Formations. The aquifer is comprised of low to highly consolidated sandstones and siltstones with varying amounts of clay and small intervals of moderately to highly consolidated carbonates. The District performed an aquifer performance test in 2018 near the Town of Malone to assess the yield of the Claiborne aquifer and to estimate aquifer properties. The estimated transmissivity of the Claiborne aquifer is approximately 3,600 ft^2/day. The aquifer test analysis concluded that the Claiborne aquifer is not hydraulically connected with the Floridan aquifer and exhibits fully confined conditions in this area. No impacts from withdrawals have been identified.

Apalachicola Embayment Groundwater Region

In contrast to the Dougherty Karst region, the Apalachicola Embayment region is characterized by a poor connection between ground and surface waters, low recharge rates, and groundwater quality that deteriorates with depth. Within the Apalachicola Embayment, the intermediate system is generally 100 to 200 feet thick and functions as an effective confining unit that significantly restricts recharge to the underlying Floridan aquifer.

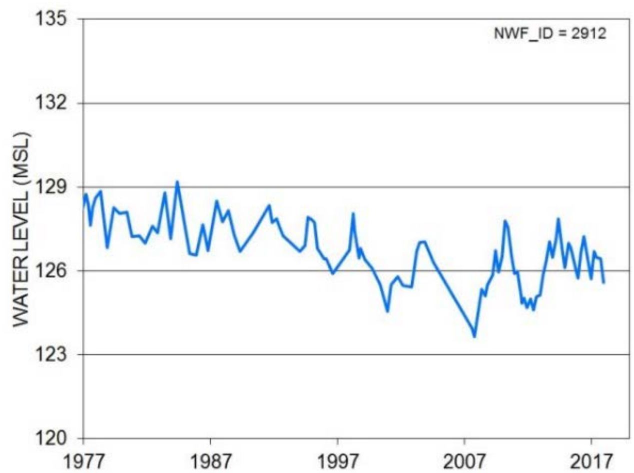

Figure 38. Hydrograph of St. Joe Tower Well Located in the Apalachicola Embayment Area

There has been limited dissolution, aquifer transmissivities are lower, and water quality decreases with depth. Only the upper few hundred feet of the Floridan aquifer is utilized in Liberty County and well yields are generally less than 250 gpm. The St. Joe Tower well (NWF_ID = 2912) is located within the Apalachicola Embayment in northern Liberty County. This well exhibits a gradual long-term water level decline of approximately two feet over the 1977 to 2017 period of record (Figure 39). This well is proximal to pumpage totaling approximately 0.5 mgd. Two other wells in Liberty County with data spanning 1996 to 2018 exhibited no water level trends.

Groundwater Budget

A region-wide groundwater budget (Figure 39) was prepared to estimate the relative magnitude of the inflows to and outflows from the Floridan aquifer in Region IV (Ryan et al. 1998). Major inflows to the Floridan aquifer are leakage, recharge, and subsurface inflow. Major discharges from the Floridan aquifer are discharges to rivers and springs (1,167 mgd) and groundwater withdrawals. In 2015, withdrawals totaled 44.4 mgd and represent 3.2% of the water budget. The projected 2040 Floridan aquifer demand of approximately 59.4 mgd in Region IV represents 4.3% of the groundwater budget.

The projected 2040 demand of approx.-imately 72.6 mgd for a 1-in-10 year drought condition represents about 5.3 percent of the regional groundwater budget for the Floridan aquifer.

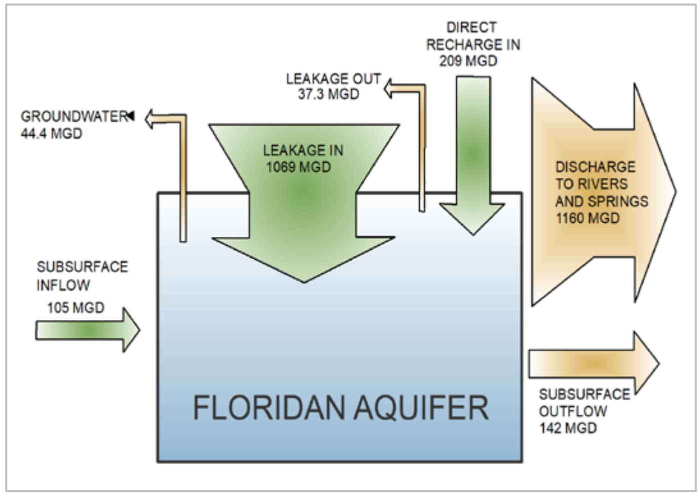

Figure 39. Region IV Floridan Aquifer Steady-State Groundwater Budget

Water Quality Constraints on Availability

Water quality issues may locally constrain groundwater availability in Region IV. Upconing of mineralized water may occur in response to large pumping rates and associated drawdowns. Mineralized water may also occur in wells that are open to deeper geologic formations in the Apalachicola Embayment region of Calhoun and Liberty counties. In the Dougherty Karst region, karst topography and high recharge rate makes the Floridan aquifer system susceptible to contamination by land use practices. Groundwater has been affected by historical agrichemical contamination, primarily ethylene dibromide. Contamination is generally of low concentration and is primarily limited to areas in northeast Jackson County (Roaza, 1989). In some areas, water treatment may be necessary for potable use.

Elsewhere, groundwater quality is generally good in the Dougherty Karst region; however highly mineralized water occurs in a limited area where Holmes Creek joins the Choctawhatchee River.

Alternative Water Supply and Conservation

In 2015, non-traditional sources of water in Region IV include reuse of reclaimed water. District support to water supply development projects have contributed to water conservation, leak detection, water use efficiencies, and expanding reuse potential.

Water Conservation

Water conservation potential has not been estimated for Region IV. District permit conditions that support water conservation measures include annual water use reporting; evaluation of water use practices to enhance water conservation and efficiency, reduce water demand and water losses; maximum water loss and residential per capita water use goals; and public education campaigns. Additional conservation initiatives in Region IV include an agricultural cost-share funding program in the Jackson Blue Spring contribution area and water supply development projects that support increased water use efficiencies.

Reuse of Reclaimed Water

In 2015, Region IV utilized 0.34 mgd of potable offset reuse or seven percent of the wastewater treatment facility (WWTF) flows, which totaled about 5.2 mgd (Table 21). Information on individual wastewater facilities used in this analysis is included in Appendix 7.

Based on population projections, future reuse flows are estimated to be an additional 5.3 mgd by 2040 (Table 22). This additional availability added to existing 2015 reuse flows totals 5.6 mgd, or about 46 percent of the 2015 total facility capacities. Future potable offset reuse assumptions are that WWTF's have treatment and disinfection levels suitable for the reuse end uses, and that transmission infrastructure is available to reuse customers.

Table 21. Region IV - 2015 Reuse and Wastewater Flows (mgd)

County	Potable Offset Reuse Flow	Percent of Potable Offset Reuse to Total WWTF Flow	Total WWTF Flow	Number of Active Reuse Systems	Total WWTF Capacity
Calhoun	0.000	0%	0.499	1	1.500
Holmes	0.000	0%	0.692	4	1.519
Jackson	0.000	0%	2.593	9	6.593
Liberty	0.000	0%	0.292	2	0.530
Washington	0.342	31%	1.108	5	1.946
TOTALS	**0.342**	**6.6%**	**5.184**	**21**	**12.088**

Table 22. Region IV - 2020-2040 Future Potential Reuse Availability (mgd)

County	Reuse Flow 2015	Future Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	mgd	Capacity %
Calhoun	0.000	0.51	0.52	0.54	0.55	0.55	0.55	36.7%
Holmes	0.000	0.71	0.71	0.72	0.72	0.73	0.73	48%
Jackson	0.000	2.63	2.66	2.68	2.69	2.71	2.71	41%
Liberty	0.000	0.31	0.33	0.34	0.36	0.37	0.37	70%
Washington	0.342	0.81	0.85	0.87	0.90	0.91	0.57	29.3%
TOTALS	**0.342**	**4.96**	**5.07**	**5.15**	**5.21**	**5.27**	**5.61**	**46.4%**

Region IV: RWSP Evaluation

Based on the Region IV projected water demands 2020-2040, demands during a 1-in-10 drought year event, and assessment of water sources above, existing sources of water are adequate to supply water for all existing and future reasonable-beneficial uses for the planning period. Therefore, a regional water supply plan for Region IV is not recommended.

However, water withdrawals in Georgia have impacted the ecology of the Apalachicola River and Bay system and a positive resolution of that interstate conflict is necessary to sustain the resources of the watershed and related natural systems and economic resources for current and future generations.

REGION V: FRANKLIN AND GULF COUNTIES

Overview

The Floridan aquifer is the primary water source in Gulf and Franklin counties, Region V. With a total of 1,782 square miles, Region V is the District's third largest water supply planning region (Figure 40). The Apalachicola River and Bay watershed encompasses the majority of these two counties. Region V has several small coastal communities with seasonal populations. Most of Franklin County, and many Region V coastal areas and barrier islands are state forest, parks, or preserves. The District's Apalachicola River Water Management Area (WMA) extends across Gulf and Liberty counties, with 13,134 acres or about 36 percent of WMA lands in Gulf County.

Region V Snapshot

	2015	2040
Population	36,400	38,569
Water Use (mgd)	5.48	5.63
Primary Water Source(s):	Floridan aquifer system, Chipola River	
MFL Waterbodies:	None	
Water Reservations:	Apalachicola and Chipola rivers	
RWSP Status:	No RWSP Recommended	

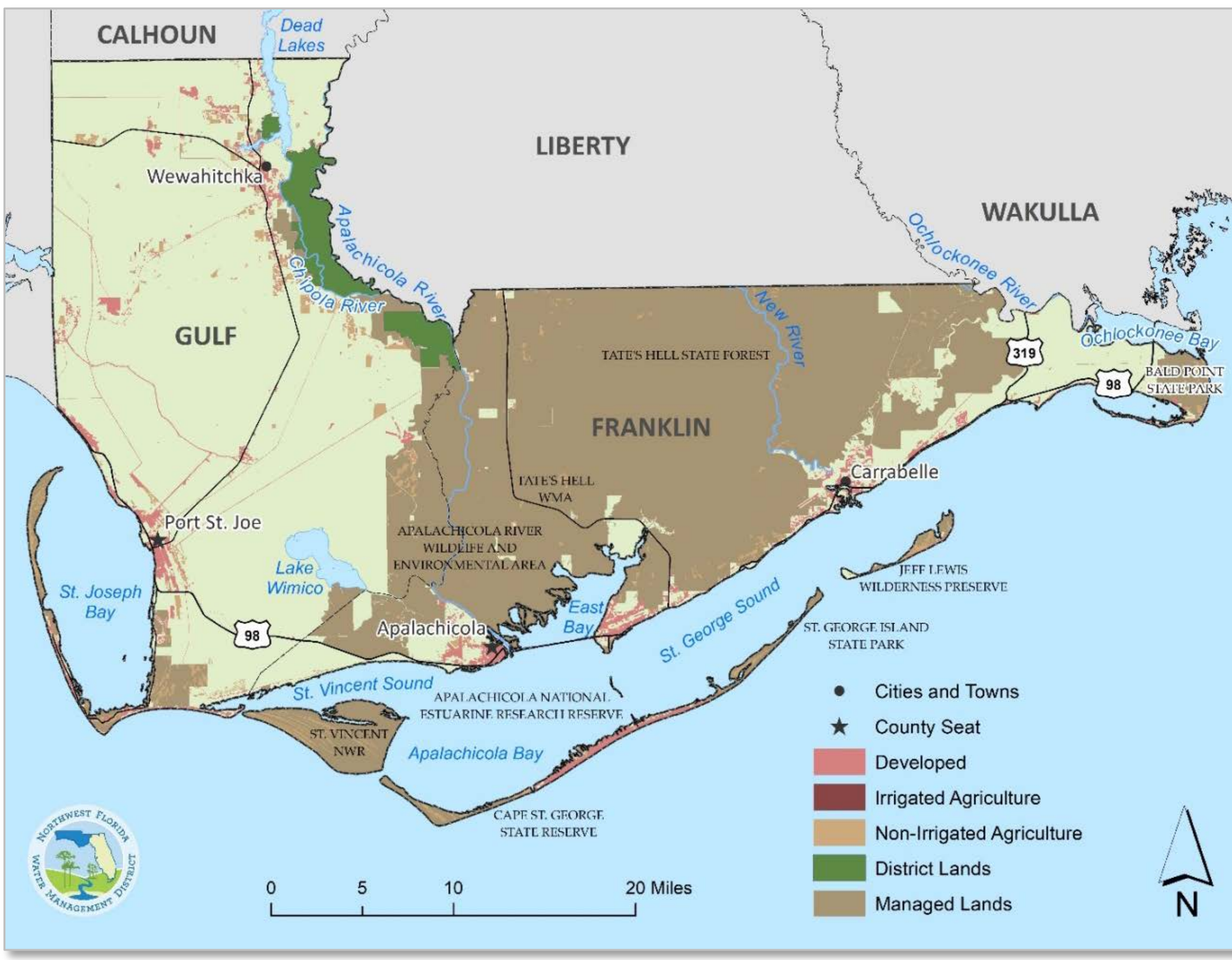

Figure 40. Region V - Gulf and Franklin Counties

Region V has several small municipalities and public supply service areas. Except for Port St. Joe, with a 2015 estimated population of about 10,150, the remainder all have service area populations under 4,250. The annual average projected growth rate in Region V is 0.27 percent over the 2020-2040 planning period. According to EDR, Region V had a low unemployment rate of 4.4 percent but one of the highest poverty rates in the District. The per capita personal income and median household income in Region V were below both District and state averages (EDR, 2017).

Population

The 2015 BEBR population estimate for Region V is 28,186. Region V had high estimated seasonal population rates across all public supply utility service areas and among DSS water users: An average of 22 percent in Gulf County and 39 percent in Franklin County. The highest percentage of seasonal populations were estimated in St. George Island, Alligator Point, and Cape San Blas.

2015 Water Use Estimates and 2020-2040 Demand Projections

In 2015, Region V had 2.4 percent of the District population and less than two percent of all water use Districtwide. Close to three-fourths of water use is in the public supply sector and over 80 percent of Region IV water use is collectively in public supply and domestic self-supply (Figure 41 and Table 23). There are no thermoelectric power generating facilities in Region V.

About 45 percent of water used came from the coastal Floridan aquifer, with the remainder from the inland Floridan, intermediate system, and surficial aquifer; in addition to surface water sources.

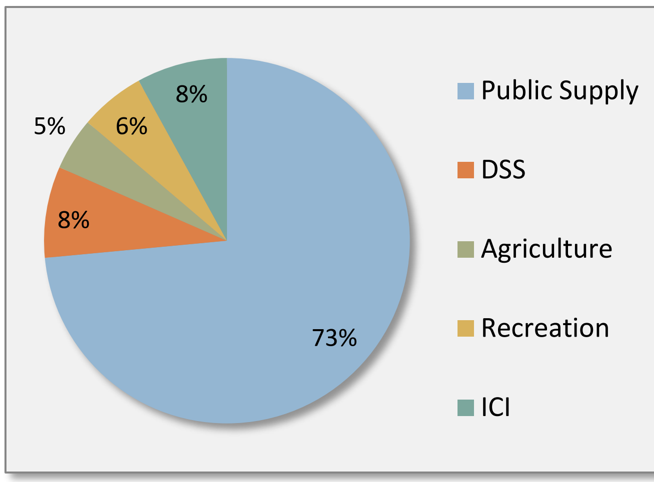

Figure 41. Region V - 2015 Water Use

Table 23. Region V - 2015 Water Use (mgd) and Population Estimates

County	Public Supply	DSS	Agri-culture	Rec-reation	ICI	Power	TOTAL	BEBR 2015 Population	Adjusted Population
Franklin	1.949	0.165	0.006	0.214	0.001	-	2.335	11,840	16,458
Gulf	1.966	0.265	0.241	0.093	0.426	-	2.992	16,346	19,942
TOTALS	**3.915**	**0.430**	**0.247**	**0.307**	**0.427**	**-**	**5.327**	**28,186**	**36,400**
% of total*	73.5%	8.1%	4.6%	5.8%	8.0%		100%	2%	2.4%

*Percent per water use category in this region, and percent of Districtwide population.

Projected water demands are provided in Table 24. The largest projected increase is in the public supply water use sector and the largest percentage increase is in ICI.

Public Supply: Franklin and Gulf counties are projected to be some of the slower growing counties in the District in terms of permanent population. Both, however, are significantly affected by seasonal populations. In addition, utility-provided information indicates that the City of Port St. Joe has plans to expand and become a regional supplier. Additional public supply utility data is in Appendix 4.

DSS and Small Public Systems: Known domestic self-supply wells in Gulf County are clustered in and around Wewahitchka. In Franklin County, DSS wells are primarily in coastal areas. Projected declines in DSS water use may be due to the proposed expansion of the City of Port St. Joe public water system.

Table 24. Region V - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Average

Use Category	Estimates	Future Demand Projections -- Average Conditions					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	4.011	3.949	4.001	4.061	4.120	4.166	0.155	3.9%
DSS	0.485	0.465	0.457	0.445	0.433	0.416	-0.069	-14.1%
Agriculture	0.247	0.247	0.247	0.247	0.247	0.248	0.001	0.3%
Recreational	0.307	0.312	0.316	0.319	0.322	0.323	0.015	5.0%
ICI	0.427	0.435	0.450	0.473	0.474	0.475	0.048	11.3%
Power	-	0.000	0.000	0.000	0.000	0.000	n/a	n/a
TOTALS	**5.477**	**5.409**	**5.471**	**5.545**	**5.596**	**5.628**	**0.151**	**2.8%**

Agriculture: There are no reported agricultural water uses in Franklin County. Gulf County is expected to maintain small acreage tracts of non-citrus fruit and greenhouse/nursery crops. Little to no changes are anticipated over the planning horizon.

Recreation: Recreational water use in Region V is less than six percent of the total regional water use. Seventy percent of the estimates are based on reported pumpage from golf course and other recreational permittees, and the remainder from residential and other small-scale recreational irrigation wells that have GWUPs with no water use reporting requirements.

ICI: There are several correctional facilities and industrial plants in Region V. Overall, the projected increases in ICI are about the same percentage as public supply but just one-tenth (in mgd) the anticipated public supply water use increases.

Table 25. Region V – 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Drought

Use Category	Estimates	Future Demand Projections - Drought Year Events					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	4.001	4.226	4.282	4.345	4.409	4.458	0.465	11.6%
DSS	0.485	0.498	0.488	0.476	0.463	0.445	-0.040	-8.3%
Agriculture	0.247	0.278	0.276	0.277	0.279	0.281	0.034	13.8%
Recreational	0.307	0.419	0.423	0.428	0.431	0.433	0.126	40.8%
ICI	0.427	0.435	0.450	0.473	0.474	0.475	0.048	11.3%
Power	-	0.000	0.000	0.000	0.000	0.000	n/a	n/a
TOTALS	**5.477**	**5.856**	**5.919**	**5.999**	**6.056**	**6.092**	**0.633**	**11.6%**

Total Region V water demand is projected to be about 5.6 mgd by 2040 in an average year (Table 24) and 6.1 mgd in a drought year event 2040 (Table 25), an estimated 8.2 percent increase in water demand. Although the projected increase in recreational irrigation during drought is 40 percent, the water use overall increase is minimal (0.126 mgd).

Assessment of Water Resources

Groundwater continues to be the primary water source in Franklin County. Historically, Gulf County depended upon groundwater for both public and industrial water supplies. Withdrawals began in the 1930s to supply water to the St. Joe Paper Company Mill and associated industries. By the early 1950s, groundwater withdrawals totaled approximately 9 mgd. Most of this water was pumped from the Floridan aquifer system. Recognizing that sufficient groundwater was not available to meet the expanding needs of the paper mill, an 18.5 mile long canal was constructed in 1953 between the City of Port St. Joe and the Chipola River to provide a surface water supply. The surface water pumping capacity was 51.48 mgd before the mill closed in 1998. Prior to the mill closing, surface water provided an average of 28 mgd for industrial use.

Due to historical groundwater withdrawals, the water levels in Floridan aquifer declined to more than 15 feet below sea level near Port St. Joe in the 1990s. Because of the potential for saltwater intrusion into the Floridan aquifer, coastal areas in Region V were identified as Areas of Special Concern in the District's 1998 WSA. A RWSP was developed for Region V in 2007.

In 2001, the District assisted the City of Port St. Joe in the acquisition of the canal as a public water supply source and contributed funding to construct a surface water treatment facility. The city owns the canal and began using this surface water source to meet public supply needs in 2010. The city simultaneously reduced its use of the Floridan aquifer and the RWSP was discontinued through the WSA 2013 process.

Groundwater Resources

In order of depth, the major hydrostratigraphic units that comprise the groundwater flow system in Region V are the surficial aquifer, the intermediate system, and the Floridan aquifer system.

The surficial aquifer consists of undifferentiated sands and clays. In Gulf County, the saturated thickness and permeability of the surficial aquifer are sufficient to form a locally important water source. Groundwater from the surficial aquifer tends to be less mineralized than water from the underlying Floridan aquifer. The average well yield is approximately 200 gpm. In Franklin County, the surficial aquifer is generally less than 50 feet thick. On the barrier islands, wells yielding up to 50 gpm are utilized for landscape irrigation and other small-scale domestic uses.

This intermediate system functions largely as a confining unit or semi-confining unit. It consists of soft, fossiliferous limestone overlain by a thin layer of sandy clay and clayey sand. The intermediate system is approximately 400 feet thick near Port St. Joe, thins to 50 to 100 feet in western Franklin County and is less than 50 feet thick in eastern Franklin County. As the intermediate system thins, leakage across it increases. In southern Gulf and Franklin counties, the intermediate system is used as a source of water for some domestic and landscape irrigation wells.

The Floridan aquifer is the main source of groundwater in Region V. The aquifer is a sequence of carbonate sediments ranging in thickness from about 1,000 feet in the northwestern Gulf County to more than 2,000 feet thick in southern Franklin County, although the freshwater portion of the aquifer is less. Region V lies primarily within the Apalachicola Embayment region. As a result, water availability from the Floridan aquifer is constrained by the presence of an effective confining unit, very low aquifer recharge, low aquifer transmissivities, and poor water quality at depth. Testing has yielded transmissivities of 6,000 ft^2/d in Apalachicola, 2,000 ft^2/d in coastal Gulf County (Wagner et al., 1980), and 6,500 ft^2/d 15 miles north of Port St. Joe (Barr and Pratt, 1981).

In eastern Franklin County, the Floridan aquifer transitions from the Apalachicola Embayment region toward the Woodville Karst plain region. Within this transition zone, the intermediate confining unit becomes thinner and leakier and the Floridan aquifer is more transmissive and occurs at a shallower depth. Test wells in Tate's Hell State Forest yielded transmissivities of 20,000 to 40,000 ft^2/day. In coastal Franklin County, transmissivities and well yields are lower.

In 2015, the potentiometric surface of the Floridan aquifer ranged from about 30 feet above sea level in northern Gulf County to less than 10 feet above sea level at Port St. Joe and along coastal Franklin County (Figure 42). Groundwater flows south and discharges at the coast. Approaching the coastline, the freshwater portion of the aquifer thins considerably, reflecting the loss of fresh water to the Gulf of Mexico discharge boundary.

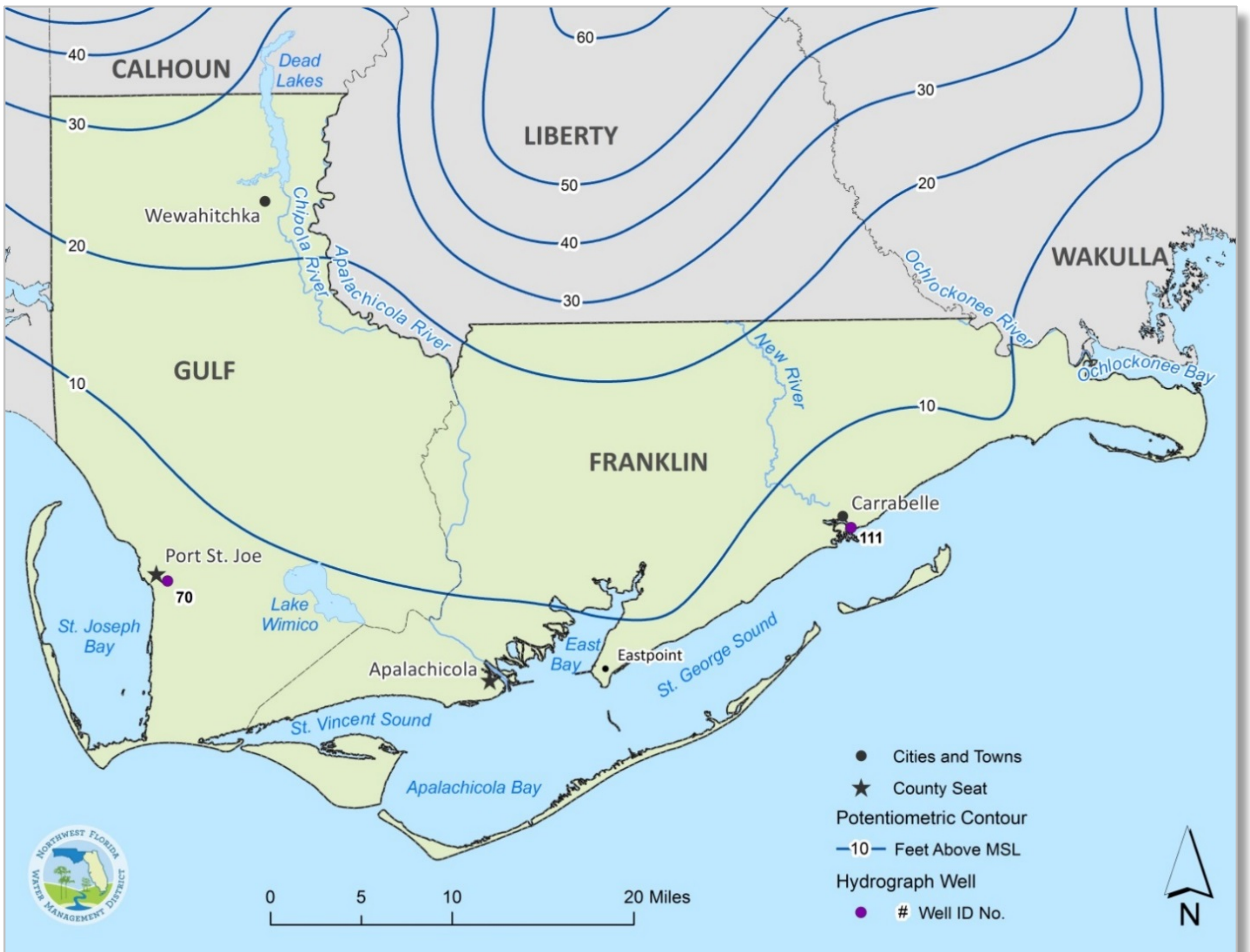

Figure 42. Potentiometric Surface of the Floridan Aquifer System in Region V, September 2015

In the coastal areas of Region V, the potential for lateral intrusion and vertical upconing of saltwater influences groundwater availability and water supply development. Groundwater quality degrades with increasing depth and the freshwater portion of the Floridan aquifer thins towards the coast. The thickness of the freshwater zone where the total dissolved solids (TDS) concentration is less than 10,000 mgd/L, is thickest in Gulf and western Franklin County where aquifer confinement is the greatest and thins toward the east where the aquifer is less confined. The estimated depth to the bottom of the freshwater zone decreases toward the east, from 657 feet below land surface in Apalachicola (Well No. 5) to 535 feet in St. James Bay (NWFID 8304) to less than 250 feet below land surface at Alligator Point.

To assess impacts on groundwater resources, changes in Floridan aquifer levels the associated potentiometric surface, water quality data, and a regional groundwater budget were evaluated. Approximately 3.68 mgd of groundwater was withdrawn to meet water demands in Region V in 2015.

Figure 43 presents examples of hydrographs for Floridan aquifer monitor wells located in Port St. Joe and Carrabelle. The locations of these monitor wells are shown on Figure 42 and are identified on the map by their ID number located in the upper right-hand corner of each graph.

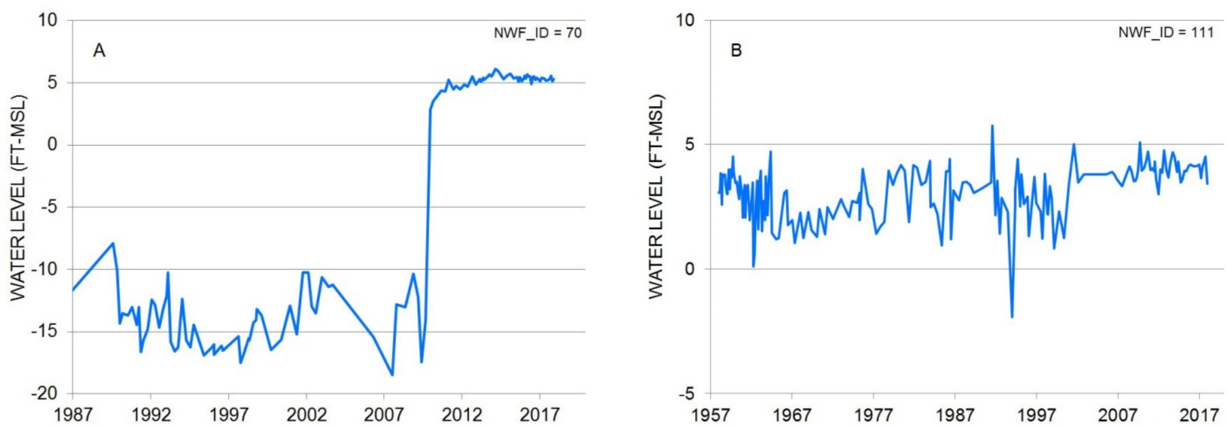

Figure 43. Hydrographs of the A) Port St. Joe and the B) Ice Plant Wells

The Port St. Joe well (Figure 43A) is located about one mile from the historical center of coastal groundwater pumping in Gulf County. Prior to the development of the surface water supply, water levels averaged approximately 15 feet below sea level and reflected an estimated 20 feet of drawdown caused by withdrawals of about 1.5 mgd in this area of low transmissivity. Once Port St. Joe began using the surface water supply, groundwater pumping was reduced, and water levels recovered. Water levels have currently stabilized at approximately five feet above sea level. Water quality data for this well does not show any increasing trends in sodium, chloride or total dissolved solids. The Ice Plant well in Carrabelle (Figure 43B) appears to exhibit a slight increasing water level trend over the 1957 – 2017 period of record. Withdrawals near Carrabelle are relatively small and increased slightly from about 0.2 mgd to 0.5 mgd between 1996 and 2015.

Data show a declining trend in aquifer levels and a slight increasing trend in chloride at the McCulloch Well #1, which is located at the southern tip of the East Point peninsula and has data extending back to about 1980. Chloride levels in this well are less than 100 mg/L, far below the drinking water standard of 250 mg/L. This monitor well is close to the Gulf of Mexico and located south of an area of concentrated groundwater withdrawals. Projected increases in groundwater withdrawals for the two public supply utilities on the Eastpoint peninsula total less than 0.05 mgd and water supplies are anticipated to be adequate through 2040. On the peninsula encompassing Bald Point and Alligator Point, the depth to the non-potable water is shallow and estimated to be between 210 and 230 feet (Alligator Point Well No. 8). Water quality data suggest that the vertical transition zone between potable and saline water approximates a sharp interface. At Well No. 8, chloride concentrations increase from 124 mg/L at a depth of 189 feet to 1,861 mg/L at a depth of 209 feet and 7,267 mg/L at a depth 229 feet.

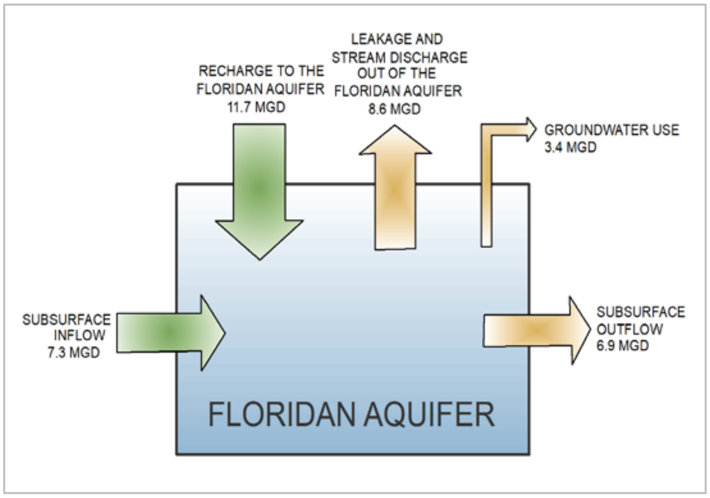

Figure 44. Region V Floridan Aquifer Steady-State Groundwater Budget

Groundwater Budget

A regional groundwater budget provides an estimate of the relative magnitude of inflows to and outflows from the Floridan aquifer (Figure 44). The groundwater budget indicates low groundwater availability within the region with inflows totaling 19 mgd. The recharge rate to the Floridan aquifer equates to less than 0.5 inches per year. The 2015 Floridan aquifer use of 3.36 mgd represents 18 percent of the estimated Floridan aquifer groundwater budget. The projected 2040 groundwater demand of 3.82 mgd for a 1-in-10 year drought represents 22 percent of the estimated Floridan aquifer groundwater budget.

Additional Water Quality Constraints on Availability

Coastal Gulf County has naturally-occurring elevated levels of fluoride and iron in the Floridan aquifer. Drinking water standards require a fluoride concentration of less than 4.0 mg/L and an iron concentration of less than 0.3 mg/L. Floridan aquifer water in this area can have fluoride levels as high as 10 mg/L (Ryan et al., 1998) and iron levels between 1.0 and 7.0 mg/L, thus treatment may be required in some areas.

Surface Water Resources

With the exception of authorized water withdrawals by the City of Port St. Joe, the District’s Governing Board has established water reservations for the Chipola and Apalachicola rivers that reserve that magnitude, duration, and frequency of flows for the protection of fish and wildlife (40A-2.223, F.A.C.).

Surface water withdrawals from the freshwater canal totaled 1.44 mgd in 2015. The current permitted average annual daily withdrawal from the canal for public supply use is 1.64 mgd. The projected 2040 demands are approximately 1.61 mgd for average conditions and 1.65 mgd for a 1-in-10 year drought event. The 2040 projected surface water demands for a 1-in-10 year drought event slightly exceed the currently permitted amount but surface water resources are more than adequate to meet future needs.

Alternative Water Supply and Conservation

Non-traditional sources of water used in Region V in 2015 include reuse of reclaimed water and surface water. District support to water supply development projects have contributed to water conservation, leak detection, water use efficiencies, and expanding reuse potential.

Water Conservation

Water conservation potential has not been estimated for Region V. District permit conditions that support water conservation measures include annual water use reporting; evaluation of water use practices to enhance water conservation and efficiency, reduce water demand and water losses; maximum water loss and residential per capita water use goals; and public education campaigns. Water supply development projects that support water use efficiencies include water system improvements in the City of Port St. Joe and with the Eastpoint Water and Sewer District.

Reuse of Reclaimed Water

In 2015, Region V utilized 0.36 mgd of potable offset reuse or 18 percent of their wastewater treatment facility (WWTF) flows, which totaled about two mgd (Table 26). Information on individual wastewater facilities used in this analysis is included in Appendix 7.

Table 26. Region V - 2015 Reuse and Wastewater Flows (mgd)

County	Potable Offset Reuse Flow	Percent of Potable Offset Reuse to Total WWTF Flow	Total WWTF Flow	Number of Active Reuse Systems	Total WWTF Capacity
Franklin	0.359	44%	0.811	6	2.568
Gulf	0.000	0%	1.148	5	3.803
TOTALS	**0.359**	**18.3%**	**1.959**	**11**	**6.371**

Based on population projections, future reuse flows are estimated to be an additional 1.7 mgd by 2040. This additional availability added to existing 2015 reuse flows totals approximately 2.1 mgd, or about 32 percent of the 2015 total facility capacities (Table 27). Future potable offset reuse assumptions are that WWTFs have treatment and disinfection levels suitable for the reuse end uses, and that transmission infrastructure is available to reuse customers.

Table 27. Region V - 2020-2040 Future Potential Reuse Availability (mgd)

County	Reuse Flow 2015	Future Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	mgd	Capacity %
Franklin	0.359	0.46	0.47	0.48	0.48	0.48	0.84	32.7%
Gulf	0.000	1.17	1.19	1.21	1.22	1.24	1.24	32.6%
TOTALS	**0.359**	**1.64**	**1.66**	**1.68**	**1.71**	**1.72**	**2.08**	**32.6%**

Region V: RWSP Evaluation

Based on the Region V projected water demands 2020-2040, demands during a 1-in-10 drought year event, and assessment of water sources above, the District determines that existing sources of water are 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. Therefore, a Region V regional water supply plan is not recommended.

However, water withdrawals in Georgia have impacted the ecology of the Apalachicola River and Bay system and a positive resolution of that interstate conflict is necessary to sustain the resources of the watershed and related natural systems and economic resources for current and future generations.

REGION VI: GADSDEN COUNTY

Overview

The Floridan aquifer is the primary water source in Gadsden County - Region VI (Figure 45). At about 529 square miles in total area Gadsden County is the District's smallest planning region. Due to limited surface water and groundwater resources, the District has designated the Telogia Creek Water Resource Caution Area and an Area of Resource Concern in Gadsden County.

Most of Gadsden County is in the Ochlockonee River and Bay watershed except for the northwestern area near the City of Chattahoochee that is in the Apalachicola River and Bay watershed.

Region VI Snapshot

	2015	2040
Population	49,475	53,146
Water Use (mgd)	11.66	13.18
Primary Water Source(s):	Floridan aquifer system	
MFL Waterbodies:	None	
Water Reservations:	Apalachicola River	
RWSP Status:	No RWSP Recommended	

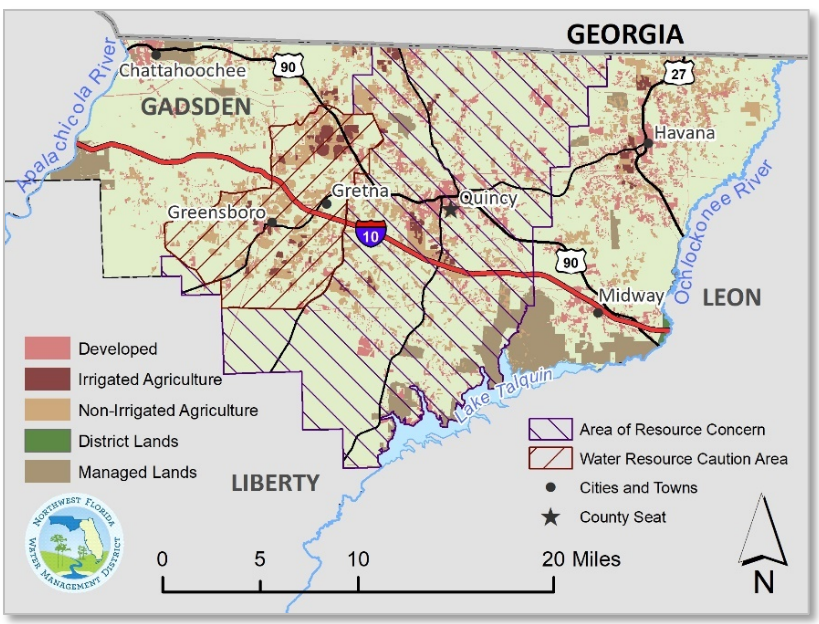

Figure 45. Region VI - Gadsden County

The City of Quincy is the largest incorporated area in the county with an estimated 2015 population of under 9,000. Smaller urban communities include the towns of Havana, Gretna, Greensboro and Midway; and the City of Chattahoochee.

Gadsden County has a low projected annual growth rate of about 0.34% over the planning horizon. In 2015 Gadsden had the highest rates of poverty in the District, and the highest unemployment rate Districtwide in 2016 (EDR, 2017).

In 2015, the median household income was less than three-fourths the statewide average (EDR, 2017). The 1,325-square mile Upper Wakulla River and Wakulla Springs BMAP was adopted in 2015 and covers portions of Gadsden, Leon, Wakulla, and Jefferson counties in Florida. The Apalachicola River is subject to a regulatory reservation by rule (40A-2.223, F.A.C.).

Population

The 2015, BEBR population estimate for Gadsden County is 48,315. The 2015 seasonally-adjusted estimate is 49,475. Seasonal residents include migratory workers employed in seasonal agricultural work, and the estimated seasonal rate is 2.4 percent.

2015 Water Use Estimates and 2020-2040 Demand Projections

In 2015, Gadsden County had about three percent of the total District population and less than four percent of all water use Districtwide. Agriculture comprised close to half (46 percent) of all water use. Public supply and domestic self-supply together were about 48 percent of all Region VI water use (Figure 46 and Table 28). There are no thermoelectric power generating facilities in Gadsden County. About 59 percent of water used came from the Floridan aquifer, with the remainder from surface and other water sources. Estimated future projected reasonable-beneficial water use demands are in Table 29, below.

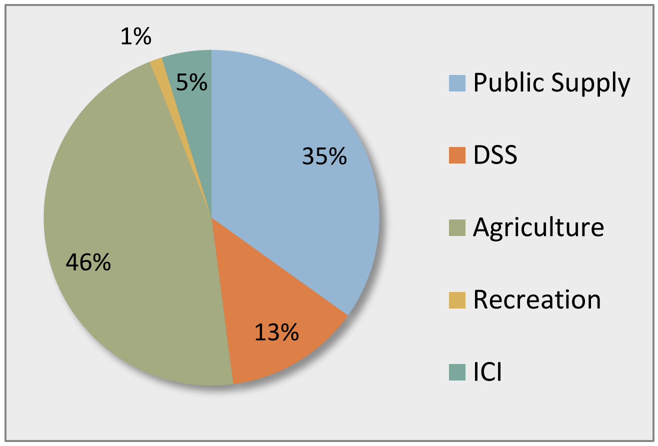

Figure 46. Region VI - 2015 Water Use

Table 28. Region VI - 2015 Water Use (mgd) and Population Estimates

County	Public Supply	DSS	Agri-culture	Rec-reation	ICI	Power	TOTAL	BEBR 2015 Population	Adjusted Population
Gadsden	4.069	1.521	5.370	0.141	0.560	-	11.661	48,315	49,475
TOTALS	**4.069**	**1.521**	**5.370**	**0.141**	**0.560**	**-**	**11.661**	**48,315**	**49,475**
% of total*	34.9%	13.0%	46.1%	1.2%	4.8%		100%	3.4%	3.3%

*Percent per water use category in this region, and percent of Districtwide population.

Public Supply: Projected increases in water demand are consistent with medium population growth projections. Residential subdivisions may grow around the Town of Havana. Additional public supply utility data is in Appendix 4.

DSS and Small Public Systems: Known domestic self-supply wells appear to be fairly evenly distributed across Gadsden County. Moderate projected declines in DSS water use may be due to expansion of public supply systems and/or agriculture with associated conversion or abandonment of DSS wells.

Table 29. Region VI -2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Average

Use Category	Estimates	Future Demand Projections – Average Conditions					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	4.069	4.145	4.317	4.427	4.530	4.622	0.553	13.6%
DSS	1.521	1.554	1.509	1.498	1.494	1.478	-0.043	-2.8%
Agriculture	5.370	5.388	5.559	5.707	5.878	6.034	0.664	12.4%
Recreational	0.141	0.144	0.146	0.148	0.150	0.151	0.010	7.4%
ICI	0.560	0.558	0.649	0.754	0.854	0.896	0.337	60.1%
Power	-						n/a	n/a
TOTALS	**11.661**	**11.789**	**12.180**	**12.534**	**12.907**	**13.182**	**1.521**	**13.0%**

Agriculture: Projected increases in water demand are attributed to an additional 341 irrigated acres. Projected crop changes include the introduction of non-citrus fruits and increases in both hay and fresh market vegetable production. Field crops and greenhouse/nursery production are expected to remain constant over the planning horizon.

Recreation: Recreational water use in Region VI is about one percent of the total regional water use. Estimates are based on reported pumpage from golf course and other recreational permittees, and from residential and other small-scale recreational irrigation wells that have GWUPs with no water use reporting requirements.

ICI: There are few industrial facilities in Region VI. Most of the projected increase in demand is attributed to historical trends in water use at the Florida State Hospital in Chattahoochee.

Table 30. Region VI – 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Drought

Use Category	Estimates	Future Demand Projections - Drought Year Events					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	4.069	4.435	4.619	4.737	4.847	4.946	0.877	21.6%
DSS	1.521	1.663	1.615	1.603	1.598	1.581	0.060	4.0%
Agriculture	5.370	6.955	7.206	7.427	7.682	7.913	2.543	47.4%
Recreational	0.141	0.192	0.195	0.198	0.201	0.203	0.062	44.1%
ICI	0.560	0.558	0.649	0.754	0.854	0.896	0.337	60.1%
Power	-	-	-	-	-	-	n/a	n/a
TOTALS	**11.661**	**13.803**	**14.284**	**14.719**	**15.182**	**15.539**	**3.879**	**33.3%**

Total Region VI water demand is projected to be just over 13 mgd by 2040 in an average year (Table 29) and about 15.5 mgd in a drought year (Table 30), an estimated 18 percent increase in water demand over average conditions. Agricultural water use is 65 percent of the projected increases in drought conditions.

Assessment of Water Resources

Both surface water and groundwater are used as water sources in Region VI. Water demands have not increased appreciably over time. The 2015 total water use of 11.66 mgd is similar to the 1995 total water use of 12.50 mgd (Ryan et al, 1998). The most significant change has been a shift in water sources by the City of Quincy. Prior to 2002, the City utilized surface water from Quincy Creek to meet public supply demands. In 2001-2002, the City discontinued its surface water supply due to water quality concerns and began utilizing groundwater from the Floridan aquifer.

Groundwater Resources

Groundwater accounted for approximately 9 mgd or 77 percent of the total water used in 2015 and is the source of water for all public supply uses. In order of depth, the major hydrostratigraphic units that comprise the groundwater flow system are the surficial aquifer, the intermediate system, and the Floridan aquifer system. Groundwater availability can be limited in some areas of Region VI due to the low water-yielding properties of the Floridan aquifer and poor water quality with increasing depth, particularly in the Upper Telogia Creek Water Resource Caution Area (WRCA) and the Area of Resource Concern (Figure 47).

The surficial aquifer consists primarily of interbedded layers of clayey sand and sandy clay and is negligible as a source of water supply in Region VI. Its importance derives from its role as a source of water for underlying systems and its discharge to streams throughout the region, which sustains streamflow during drought periods. The thickness is spatially variable across the county and is thin to absent along most stream channels. The thickness can be as large as 75 feet in the northwestern portion of the county where topographic elevations and surficial deposits are larger.

The intermediate system consists of low permeability sediments forming an effective confining unit that significantly restricts recharge to the underlying Floridan aquifer. The intermediate system is generally between 200 and 300 feet thick in central Gadsden County and thins to less than 100 feet in the far northwestern and eastern portions of the county. Although the intermediate system functions primarily as a confining unit, carbonates within the intermediate system form minor water-bearing zones that are occasionally utilized for domestic water supply. These carbonate units also supply some recharge to the underlying Floridan aquifer system.

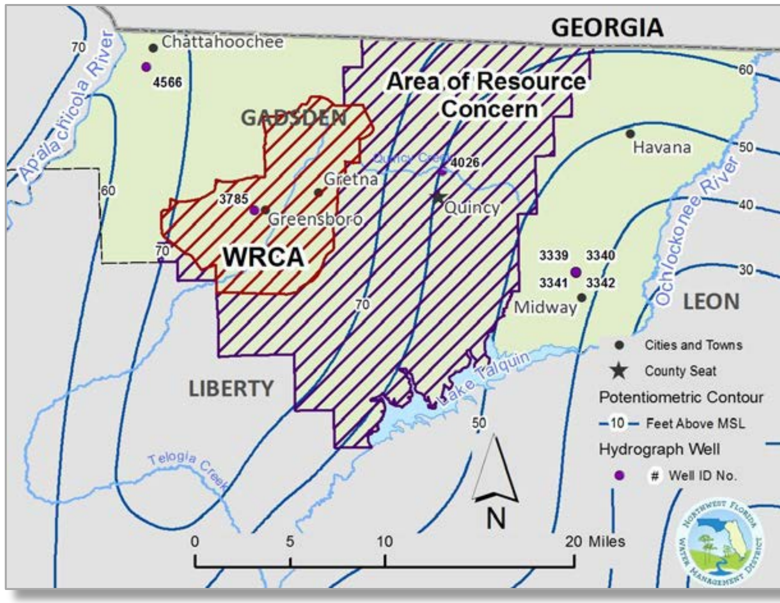

Figure 47. Potentiometric Surface of the Floridan Aquifer System in Gadsden County, September 2015

The Floridan aquifer system consists of a thick sequence, generally 450 to 600 feet, of carbonates across Gadsden County. In order of depth, the Floridan aquifer system includes the Chattahoochee Formation, Suwannee Limestone, and the Ocala Limestone. Typically, only the upper portion of the Floridan aquifer system is utilized for water supply, due to increasingly mineralized water with depth.

The Apalachicola Embayment is a geological structural trough, which is deepest along the axis that trends northeast to southwest through the Area of Resource Concern in Gadsden County. Within the Apalachicola Embayment, the Floridan aquifer is overlain by a thick intermediate system and recharge to the Floridan aquifer system is limited. As a result, very little secondary dissolution of the carbonates has taken place and transmissivities are low (generally less than 1,000 ft^2/day). In the upper Telogia Creek WRCA, wells typically exhibit low yields, with specific capacities less than three gpm/ft. Deeper wells (e.g. 400 feet below sea level) may have specific capacities of up to 15 gpm/ft.

In northwestern and eastern Gadsden County, on the outer edges of the embayment, the intermediate system thins and the Floridan aquifer system is closer to land surface and more permeable. These areas, located outside the WRCA and Area of Resource Concern, are adjacent to the active groundwater flow areas of the Woodville Karst Plain in Leon County and the Dougherty Karst region on the west. Due to the higher permeability of the Floridan aquifer in these areas, well yields are higher than other parts of the county. Near Chattahoochee, transmissivities increase to about 100,000 ft^2/day. To the east near the Ochlockonee River, aquifer testing resulted in a transmissivity of 40,000 ft^2/day (Richards and Dalton, 1987).

The Floridan aquifer system groundwater contribution area for Region VI extends into southwest Georgia (Davis, 1996). The potentiometric surface is at an elevation of 70 feet above sea level in northwest Gadsden County (Figure 47). From this high, groundwater flow flows west towards the Apalachicola River and southeast towards Leon County. Principal discharge areas include the Apalachicola River, Wakulla Spring, and other springs in the Woodville Karst plain. Throughout Gadsden County water levels within the upper portion of the Floridan aquifer historically were as much as 110 feet above sea level, or about 40 feet higher than the water levels in the middle and lower portions of the aquifer (Wagner, 1982).

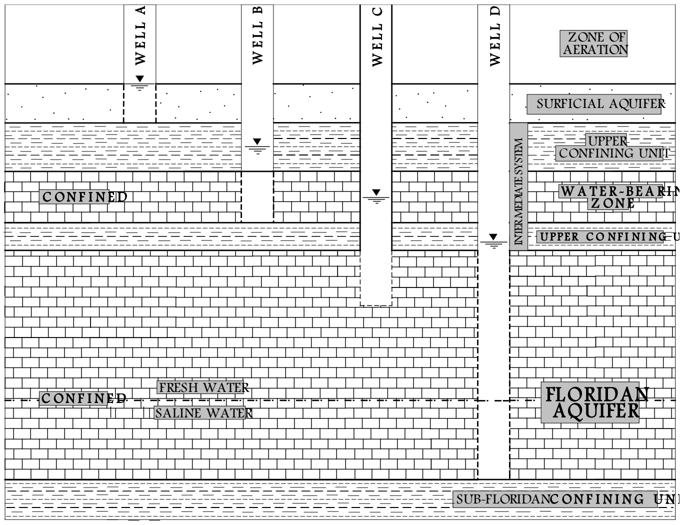

Figure 48. Hydraulic Head Variations among Hydrostratigraphic Units in Region VI

The higher aquifer levels in this interval are due to the presence of marl and other low permeability sediments that retard the downward movement of water. This upper portion of the Floridan aquifer is utilized by most domestic supply wells in the county. The middle, higher yielding portion of the aquifer is primarily utilized by agriculture and public water supply utilities. Figure 48 shows the relative water levels for the various hydrostratigraphic units in Region VI.

Criteria used to assess the adequacy of groundwater resources to meet projected future demands included a review of trends in aquifer levels, groundwater quality data, and a regional groundwater budget.

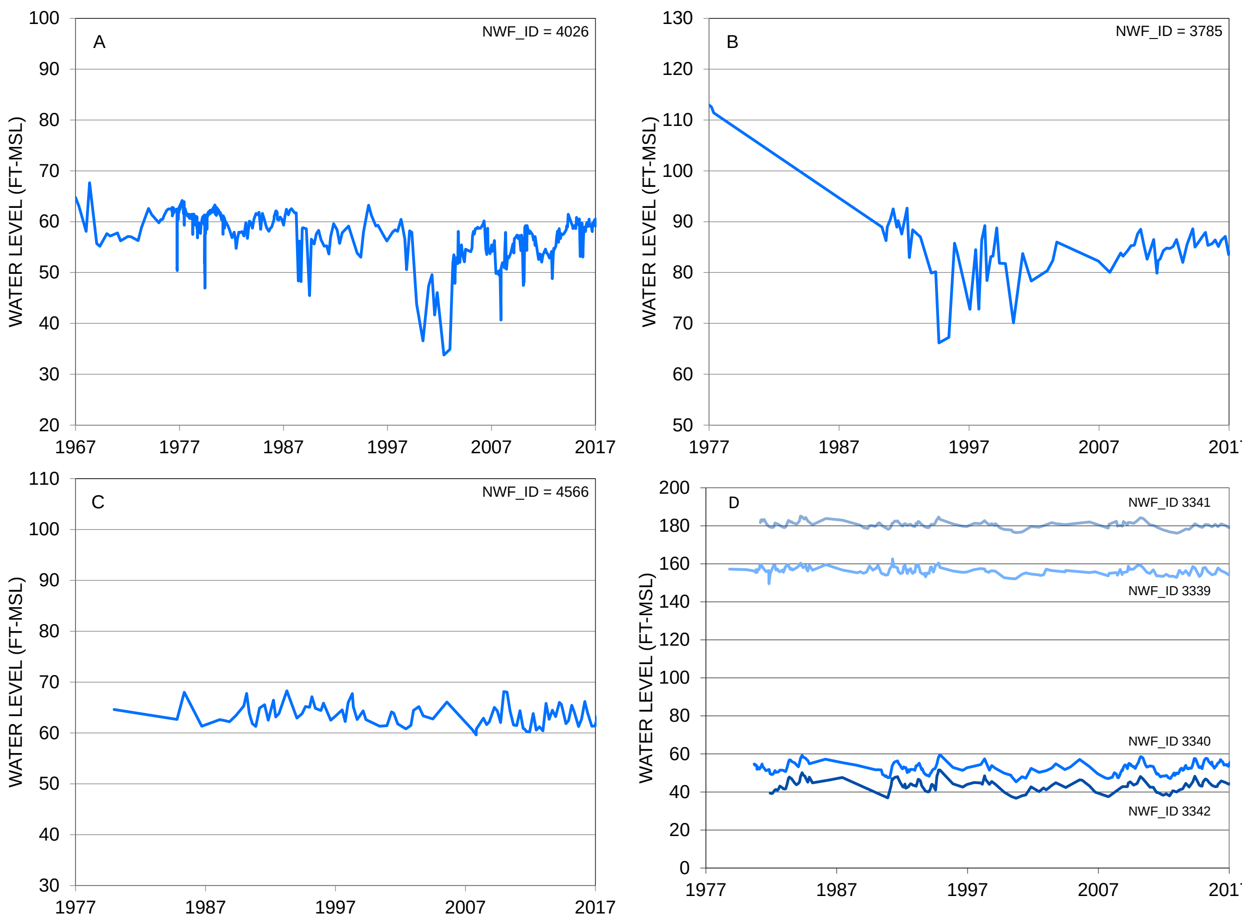

Figure 49. Hydrographs of Wells A) Quincy #3, B) Greensboro #3, C) Chattahoochee, and D) Midway

Hydrographs for four wells on the previous page depict long-term trends in Floridan aquifer water levels (Figure 49): Quincy (NWF_ID 4026), Greensboro (NWF_ID 3785), Chattahoochee (NWF_ID 4566), and Midway (NWF_IDs 3339 through 3342). The locations of these monitor wells are shown on Figure 47 and indicated on the map by their ID numbers shown on the upper right-hand corner of each graph.

The Quincy #3 well (Figure 49A) is located in the Area of Resource Concern but constructed in the more productive middle portion of the Floridan aquifer (total depth = 701 feet, cased depth = 430 feet). The effects of the 2000-2002, 2006-2007, and 2011-2012 droughts can be seen on the hydrograph, followed by a recent period of water level recovery. There are no long-term trends in aquifer levels at this location for the 1989 to 2017 period of record. Naturally occurring highly mineralized water in the lower portion of the Floridan aquifer can affect the development of groundwater resources in the region. Figure 50 presents data from the City of Quincy Well #2, which shows the decreasing water quality with increasing depth (Wagner, 1982).

The Greensboro well (Figure 49B) is completed in the upper portion of the Floridan aquifer (total depth 420 feet and cased depth 264 feet) and is representative of the primary interval utilized in the vicinity of Greensboro. This well is located in the Telogia Creek WRCA. In the mid-1970s, water levels were about 110 feet above sea level. Between 1974 and the late 1980s, water levels declined about 25 feet despite only a modest increase in groundwater use near Greensboro. Due to the very low transmissivities and low aquifer recharge, modest withdrawals in the WRCA can result in the propagation of relatively large aquifer drawdowns. Since the early 1990s, water levels have stabilized. Water quality data, although limited, does not show any increasing trends in chloride, sodium, or total dissolved solids indicative of the upconing of poor quality water at the Greensboro #3 well.

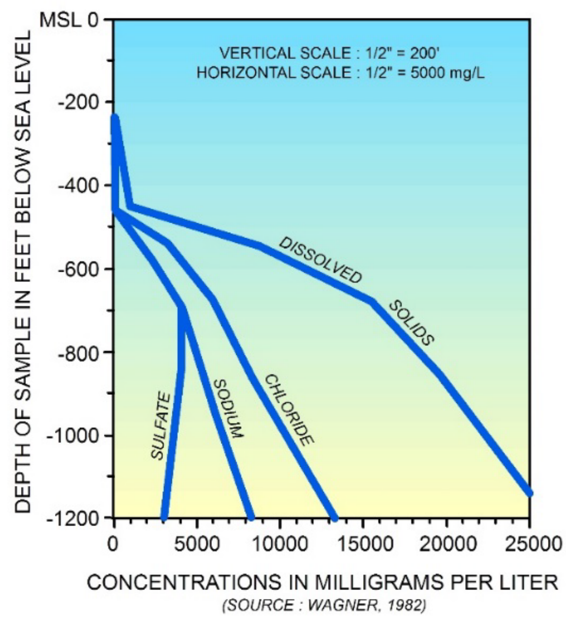

Figure 50. City of Quincy Well #2 Water Quality

The Chattahoochee well (Figure 49C), total depth = 214 feet, cased depth = 82 feet) is located in northwestern Gadsden County, outside of the Telogia Creek WRCA where the Floridan aquifer is more permeable. The hydrograph suggests that aquifer levels in this area are relatively stable and trend analysis indicated no long-term trends during the 1979 – 2017 period of record.

Water levels in the Midway wells (Figure 49D) are also stable. There is little pumping in the area and the wells are located near the edge of the embayment. The Midway wells are a cluster of water wells that also illustrate the hydraulic head variations among hydrostratigraphic units (see also Figure 48). The upper well is located in the surficial aquifer (well depth = 29 feet, cased depth = 20 feet) and has a hydraulic head that is 20 to 25 feet greater than the second well, located in the intermediate aquifer (well depth = 85 feet, cased depth = 77 feet). The lower two hydrographs represent wells in the upper (well depth = 356, cased depth = 232) and lower Floridan aquifer (well depth = 435, cased depth = 366) where there is a consistent 5 to 10 foot hydraulic head difference between these two units.

Groundwater Budget

A regional groundwater budget (Figure 51) provides an order-of-magnitude approximation of inflows to and outflows from the Floridan aquifer in Region VI (Ryan et al., 1998). The water budget was based on output from a steady-state three-dimensional ground-water flow model (Davis, 1996). The model was calibrated to conditions in October and November of 1991. Major inflows to the Floridan aquifer include flow from upgradient areas, leakage from the overlying intermediate system, surface infiltration, and direct recharge. Recharge and leakage to the Floridan aquifer equates to an annual rate of less than 0.5 inches per year.

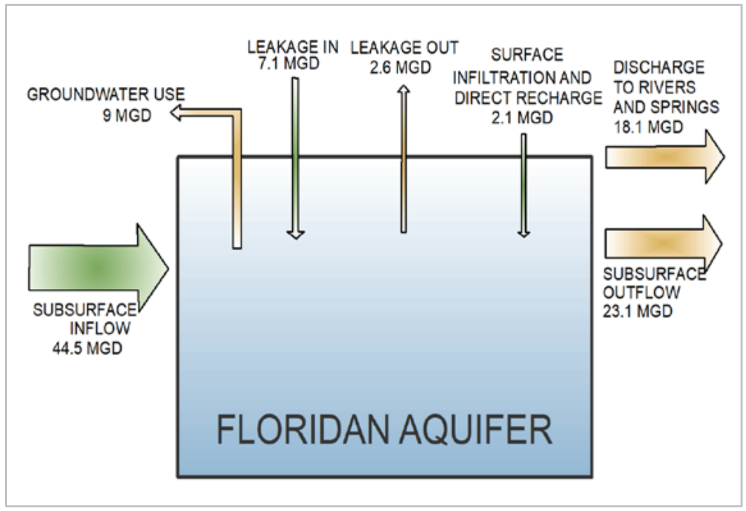

Figure 51. Region VI Floridan Aquifer Steady-State Groundwater Budget

The total inflow into the Floridan aquifer in Region VI was estimated to be 53.7 mgd. The 2015 groundwater use of approximately 9.0 mgd is 17 percent of the estimated Floridan aquifer groundwater budget in Region VI. The projected 2040 groundwater demand of 10.2 mgd represents approximately 19 percent of the regional groundwater budget.

<u>**Surface Water Resources**</u>

Surface water provides approximately 48 percent of the agricultural demand in Gadsden County and withdrawals totaled approximately 2.66 mgd in 2015. Surface water resources consist of a well-developed network of streams, wetlands and manmade impoundments. The impoundments were constructed primarily for agricultural irrigation, water-based recreation, and aesthetic uses. No natural lakes occur in the region. A well-developed stream network is typical of areas with clayey sub-soils, which limit infiltration rates and aquifer recharge. The soil characteristics result in high runoff rates and relatively high average total stream flow compared to baseflow. However, these characteristics limit the availability of surface water during periods of low rainfall or drought.

The primary surface water sources used for water supply in Region VI are Telogia and Quincy creeks. Table 31 provides summary statistics for both creeks. The District maintains a gauging station on Telogia Creek at County Road 65D. This is the most upstream long-term station in the watershed and it is downstream from many agricultural surface water withdrawals. Figure 52 shows the streamflow hydrograph for this station, which includes approximately 36.4 mi^2 of an intensely-farmed contributing area. Flows at this location range from zero (no flow) to 1,815 cfs. The mean annual flow for the years 1991 through 2017 is 37.6 cfs (24.3 mgd). The minimum annual flow during this period was 13.8 cfs (8.9 mgd) and was recorded during the drought of 2000-2001. Historically, the flow regime included a zero flow condition. This condition has occurred for at least 60 years, extending back to the region's tobacco farming era.

Numerous farm ponds and in-stream impoundments constructed throughout the Telogia Creek watershed have altered the historical flow regime. The USGS maintains a monitoring station on Telogia Creek near Bristol downstream of the WRCA.

Analysis of long-term trends in annual median flow for the USGS station Near Bristol was performed using a two-sided Mann-Kendall test with a confidence interval of 0.95. This test yielded no statistically significant long-term trends in flow at Telogia Creek from 1950 through 2018.

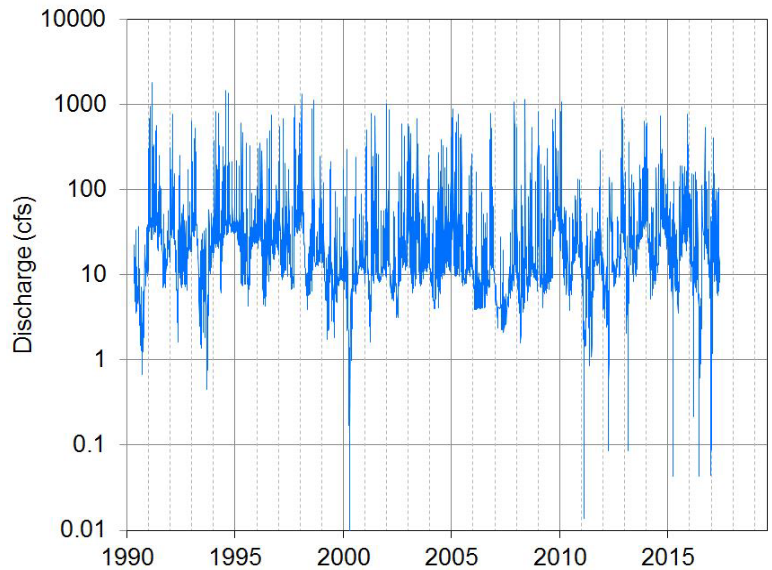

Figure 52. Telogia Creek Average Daily Discharge (cfs)

The Quincy Creek basin is similar to the Telogia Creek basin in that they are both relatively small basins with their headwaters located within the region. The USGS maintained a gauging station on Quincy Creek at SR 267 from 1974 to 1992. From 1992 to present, a station at this location has been maintained by the District. Flow statistics are similar for the periods of 1974 – 1992 and 1992 – 2018, although the latter period included three significant droughts.

Quincy Creek flows into the Little River, a tributary to the Ochlockonee River. An analysis of trends in median annual streamflow was performed at the USGS station on the Little River Near Midway, located downstream of the confluence of Quincy Creek and the Little River. The analysis indicated no upward or downward trends during the 1985 to 2018 period of record.

Table 31. Flow Statistics for Quincy Creek and Telogia Creek

Summary Statistics	Quincy Creek at SR 267 Oct. 1974 - Sept. 1992	Quincy Creek at SR 267 Nov. 1992 - 2018	Telogia Creek at CR 65D Jan. 1991 - Oct. 2017
Average Annual Runoff (in)	22.7	20.3	14
Annual Mean (cfs)	28	25	37.6
Q90 (cfs)	9.3	7.9	5.1
Highest Annual Mean (cfs)	47.2	46.2	76.1
Lowest Annual Mean (cfs)	17.3	9.5	13.8
Instantaneous Peak Flow (cfs)	2,910	2,019	1,815
Instantaneous Low Flow (cfs)	2.3	2.5	0

Since the declaration of the Upper Telogia Creek WRCA in October 1990, no large increases in surface withdrawals have been authorized and any impact on the frequency of low flows appears to have been stabilized. The variability of streamflows under drought conditions and the intensive historical use of the resource date back 60 years, and no widespread impairment, relative to historic flows, has been identified.

Alternative Water Supply and Conservation

Non-traditional sources of water in Region VI include reuse of reclaimed water. District support to water supply development projects have contributed to water conservation, leak detection, water use efficiencies, and expanding reuse potential.

Water Conservation

Water conservation potential has not been estimated for Region VI. District permit conditions that support water conservation measures include annual water use reporting; evaluation of water use practices to enhance water conservation and efficiency, reduce water demand and water losses; maximum water loss and residential per capita water use goals; and public education campaigns.

Water supply development projects that support water use efficiencies include water system upgrades in the City of Gretna, the Rosedale Water Association, and the towns of Greensboro and Havana.

Reuse of Reclaimed Water

In 2015, Region VI utilized no potable offset reuse and none of the wastewater treatment facility (WWTF) flows, which totaled about 2 mgd (Table 32). Information on individual wastewater facilities used in this analysis is included in Appendix 7.

Table 32. Region VI - 2015 Reuse and Wastewater Flows (mgd)

County	Potable Offset Reuse Flow	Percent of Potable Offset Reuse to Total WWTF Flow	Total WWTF Flow	Number of Active Reuse Systems	Total WWTF Capacity
Gadsden	0.000	0%	2.010	10	4.317
TOTALS	**0.000**	**0%**	**2.010**	**10**	**4.317**

Based on population projections, future reuse flows are estimated to be an additional 2.1 mgd by 2040. This additional availability added to existing 2015 reuse flows totals 2.1 mgd, or about 50 percent of the 2015 total facility capacities (Table 33).

Table 33. Region VI - 2020-2040 Future Potential Reuse Availability (mgd)

County	Reuse Flow 2015	Future Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	mgd	Capacity %
Gadsden	0.000	2.05	2.08	2.11	2.14	2.16	2.16	50%
TOTALS	**0.000**	**2.05**	**2.08**	**2.11**	**2.14**	**2.16**	**2.16**	**50%**

Future potable offset reuse assumptions are that WWTF's have treatment and disinfection levels suitable for the reuse end uses, and that transmission infrastructure is available to reuse customers.

Region VI: RWSP Evaluation

Water level declines in Region VI are generally limited to areas of low transmissivity. In the northwest and eastern portion of the county where aquifer transmissivities are higher, little or no long-term water level declines have occurred. Although groundwater resources are limited in the Telogia Creek WRCA and the Area of Resource Concern, and surface water resources can be limited during drought periods, existing water resources are 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. Therefore, a Region VI regional water supply plan is not recommended.

REGION VII: JEFFERSON, LEON AND WAKULLA COUNTIES

Overview

Region VII covers approximately 1,617 square miles and includes Leon and Wakulla counties and western Jefferson County (Figure 53). The eastern portion of Jefferson County is within the Suwannee River Water Management District. The Floridan aquifer is the primary water source in Region VII.

Region VII Snapshot

	2015	2040
Population	329,317	406,007
Water Use (mgd)	45.00	58.22
Primary Water Source(s):	Floridan aquifer system	
MFL Waterbodies:	St. Marks River Rise; Wakulla Spring; Sally Ward Spring	
Water Reservations:	None	
RWSP Status:	No RWSP Recommended	

The St. Marks River and Apalachee Bay watershed covers most of Region VII, although western Leon and Wakulla counties are within the Ochlockonee River and Bay watershed. Region VII has three first-magnitude springs: Wakulla Spring, an Outstanding Florida Spring, the St. Marks River Rise, and the Spring Creek Spring Group.

Region VII's major urban area and state capital, the City of Tallahassee, is in Leon County. In 2015 Leon County was ranked 17th in population density statewide. By 2040, the population of Leon is expected to be nearly the same as Escambia County (BEBR 2017).

The Apalachicola National Forest covers large areas of Wakulla and Leon counties, and the St. Marks National Wildlife Refuge encompasses much of coastal Wakulla County. The Leon and Wakulla county populations are projected to grow at an annual average rate of 0.85 percent. Conversely, Jefferson County has at times experienced population declines and has only marginal projected growth over the 2020-2040 planning period.

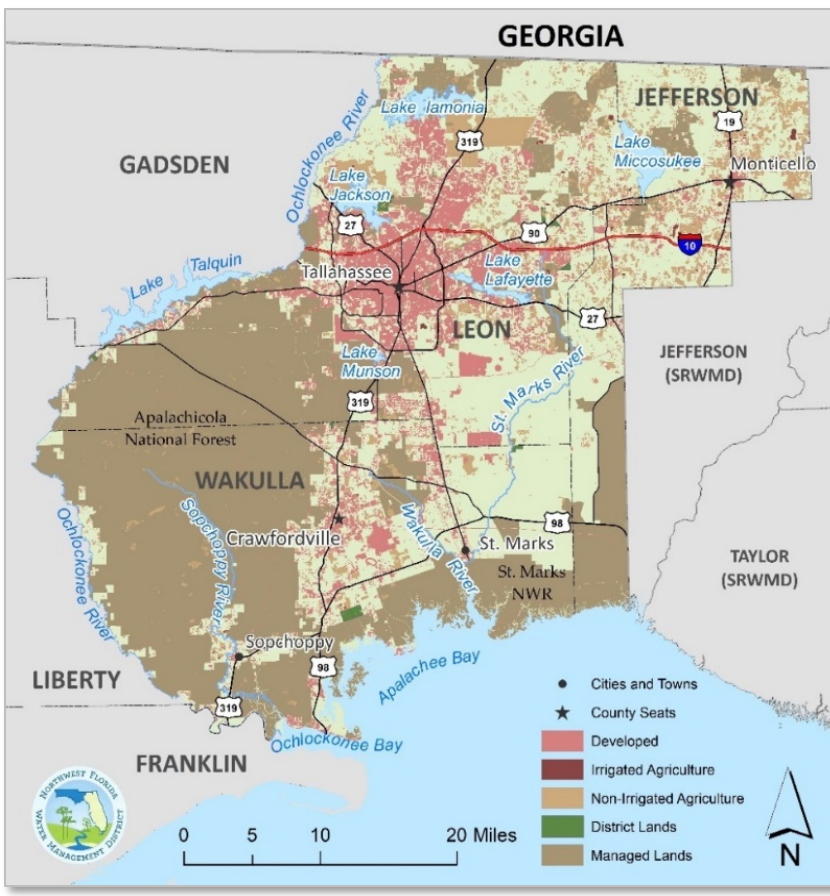

Figure 53. Region VII - Wakulla, Leon and Jefferson Counties

According to EDR, the per capita personal income in Region VII was close to the District average and the unemployment rate was less than both state and District averages. The poverty rate in Leon County is close to 22 percent (EDR, 2016). The 1,325-square mile Upper Wakulla River and Wakulla Springs BMAP was adopted in 2015 and covers portions of Gadsden, Leon, Wakulla and Jefferson counties in Florida; and portions of southern Georgia. An update to this BMAP is in progress.

Population

The 2015 BEBR population estimate for Region VII is 325,972. Region VII has relatively low estimated seasonal populations in all three counties with an estimated seasonal rate ranging from a low of 0.5 percent in Leon to five percent in Wakulla County. The 2015 seasonally-adjusted population estimate is 329,317. Seasonal population estimates exclude group quarters, for example, college and university housing and correctional facilities. Coordination with the Suwannee River Water Management District (SRWMD) substantiated the assumptions regarding the share of Jefferson County population in each water management district.

2015 Water Use Estimates and 2020-2040 Demand Projections

In 2015, Region VII had approximately 22 percent of the population and 14 percent of all water use Districtwide (Figure 54 and Table 34). About seventy percent of the region's water use is attributed to public supply, and over half of all Region VII water use is reported by the City of Tallahassee. Approximately half of the City of Tallahassee's reported pumpage is for residential public supply with the remainder serving commercial, industrial, and other non-residential water uses. Domestic self-supply and recreation comprise about 13 percent and six percent, respectively, of the region's water use. Power facilities are in Leon and Wakulla counties.

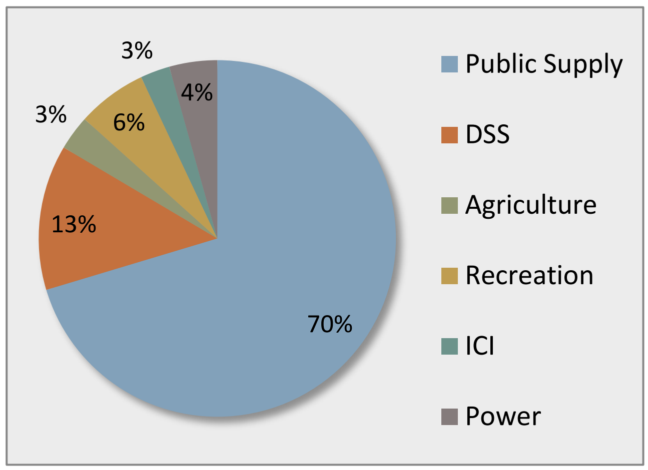

Figure 54. Region VII - 2015 Water Use

Table 34. Region VII - 2015 Water Use (mgd) and Population Estimates

County	Public Supply	DSS	Agri-culture	Rec-reation	ICI	Power	TOTAL	BEBR 2015 Population	Adjusted Population
Jefferson	0.626	0.459	0.774	0.553	-	-	2.412	10,246	10,605
Leon	28.725	4.618	0.446	2.091	0.096	1.950	37.925	284,443	285,865
Wakulla	2.306	0.854	0.194	0.205	1.105	0.002	4.666	31,283	32,847
TOTALS	**31.657**	**5.931**	**1.413**	**2.848**	**1.201**	**1.952**	**45.002**	**325,972**	**329,317**
% of total*	70.3%	13.2%	3.1%	6.3%	2.7%	4.3%	100%	23.0%	21.7%

*Percent per water use category in this region, and percent of Districtwide population.

The future projected reasonable-beneficial water use demands in Region VII are in Table 35, below.

Public Supply: Both Leon and Wakulla counties are projected to have relatively high population growth rates over the planning horizon. Projected future public supply demand is consistent with these growth trends. Additional public supply utility data is in Appendix 4.

Table 35. Region VII – 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Average

Use Category	Estimates	Future Demand Projections – Average Conditions					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	31.657	34.155	34.800	36.579	38.241	39.887	8.230	26.0%
DSS	5.931	5.855	6.904	6.881	6.800	6.688	0.757	12.8%
Agriculture	1.413	1.392	1.386	1.477	1.553	1.672	0.258	18.3%
Recreational	2.848	2.998	3.134	3.240	3.338	3.430	0.582	20.4%
ICI	1.201	1.246	1.305	1.482	1.537	1.609	0.408	34.0%
Power	1.952	4.932	4.932	4.932	4.932	4.932	2.980	152.6%
TOTALS	**45.002**	**50.578**	**52.460**	**54.591**	**56.402**	**58.219**	**13.216**	**29.4%**

DSS and Small Public Systems: Known domestic self-supply wells are fairly evenly distributed across the northern part of Jefferson County. In Leon County, DSS wells are adjacent to Lake Talquin on the west, near the Wakulla County border on the south; and in more rural parts of Leon County east, northeast, and north of Tallahassee. Wakulla County DSS wells are concentrated around the north-central part of the county between and around Crawfordville, St. Marks, and the Leon County border.

Agriculture: There is a projected decline in Jefferson County agricultural water use and crop production and anticipated increases in Leon and Wakulla counties. A reduction in greenhouse/nursery crops is projected in Jefferson County.

Recreation: Over half of all recreational water use in Region VII was reported by golf course and other permittees. The remaining 45 percent of recreational water use was estimated from residential and other small-scale recreational irrigation wells that have GWUPs with no water use reporting requirements.

ICI: There are three IWUP reporting ICI facilities in Wakulla County, two in Leon County, and none in Jefferson County. Numerous commercial, industrial and institutional enterprises in Region VII are served by public supply.

Power Generation: Region VII power generating facilities are owned and operated by the City of Tallahassee in Leon and Wakulla counties. Future demand projections are primarily attributed to the estimated water use of the Arvah B. Hopkins plant in Leon County.

Table 36. Region VII - 2015 Estimated Water Use and 2020-2040 Demand Projections (mgd) - Drought

Use Category	Estimates	Future Demand Projections - Drought Year Events					2015-2040 Change	
	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	31.657	36.546	37.237	39.140	40.918	42.679	11.022	34.8%
DSS	5.931	6.265	7.387	7.362	7.275	7.156	1.225	20.7%
Agriculture	1.413	1.793	1.815	1.960	2.059	2.228	0.814	57.6%
Recreational	2.848	4.017	4.199	4.342	4.474	4.596	1.748	61.4%
ICI	1.201	1.246	1.305	1.482	1.537	1.609	0.408	34.0%
Power	1.952	4.932	4.932	4.932	4.932	4.932	2.980	152.6%
TOTALS	**45.002**	**54.799**	**56.875**	**59.218**	**61.195**	**63.200**	**18.198**	**40.4%**

Total Region VII water demand is projected to be about 58 mgd by 2040 in an average year (Table 35) and around 63 mgd in a drought year event (Table 36), an estimated 8.6 percent increase in water demand over average conditions.

Assessment of Water Resources

Based on water demand projections, the Floridan aquifer will continue to be the primary water source through the year 2040 in Region VII. Total groundwater withdrawals in Region VII declined slightly from approximately 50 mgd in 2010 to approximately 45 mgd (70 cfs) in 2015. The largest consumptive use is the City of Tallahassee, which withdrew approximately 26 mgd in 2015. Surface water is withdrawn from the St. Marks River for power generation in Wakulla County; however, the net consumptive use is less than 0.01 mgd. No increases in surface water use are anticipated through 2040. Accordingly, the resource assessment focuses on groundwater availability and quality.

Groundwater Resources

Most of Region VII lies within the Woodville Karst region, which is one of four major groundwater regions in the District (Pratt et al., 1996). The groundwater flow system consists of three hydro-stratigraphic units. In descending order, the units are the surficial aquifer system (where present), the intermediate system (where present), and the Floridan aquifer system. The Cody Scarp is a prominent topographic feature that runs east-west along southern Leon County. The Cody Scarp marks the northern encroachment of the sea in the Pleistocene epoch and is identified by a significant drop in land surface elevation (Figure 55). North of the Cody Scarp, Plio-pleistocene and Miocene age materials thicken and act as a semi-confining unit for the Floridan aquifer. South of the Cody Scarp, these materials are largely absent and the Floridan aquifer system is unconfined.

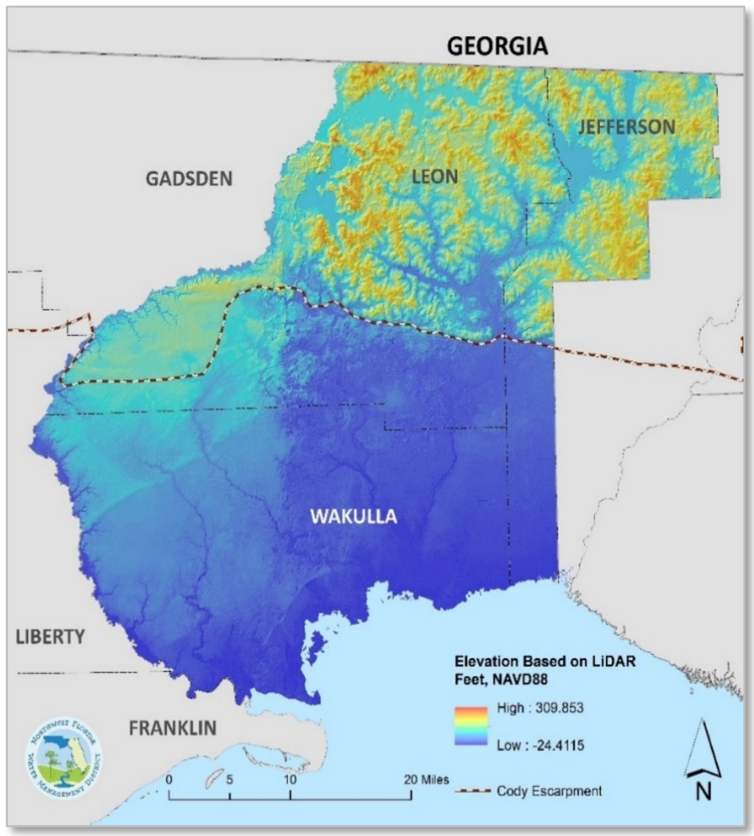

Figure 55. Land Elevation in Region VII, based on LiDAR Data

Where present, the surficial aquifer is generally 10 to 50 feet thick and comprised of undifferentiated sandy sediments. Its significance derives from its role as a source of recharge water to the Floridan aquifer system. The surficial aquifer is negligible as a water source in Region VII.

Throughout most of Leon County and northern Jefferson County, the intermediate system is less than 100 feet thick, breached by sinkholes, and functions as a semi-confining unit for the Floridan aquifer. It is generally comprised of the low permeability, clayey sediments of Miocene age. In eastern Wakulla County, southern Jefferson County, and the southeastern corner of Leon County, the intermediate system is absent due to erosional processes. In western Leon and Wakulla counties, the intermediate system thickens to 100 to 200 feet, is breached by fewer karst features, and functions as a confining unit. The intermediate system is negligible as a water source in Region VII.

The Floridan aquifer system ranges from 1,000 feet thick in northwestern Leon County to over 2,000 feet thick in southern Wakulla County. Most water production occurs from the St. Marks/Chattahoochee formations, the Suwannee Limestone and the Ocala Limestone, which comprise the upper productive portion of the Floridan aquifer. The region is characterized by a strong hydraulic connection between ground and surface waters, high aquifer recharge and high groundwater availability. Local recharge has resulted in dissolution within the aquifer and the widespread development of karst features such as sinkholes, springs, swallets, and underground conduits. The Floridan aquifer exhibits a high capacity for transmitting water. Estimated transmissivities are some of the highest in the panhandle ranging from 5,000 to greater than 1,000,000 ft^2/day.

In northern Leon and Jefferson counties, the potentiometric surface of the Floridan aquifer is approximately 60 feet above sea level (Figure 56).

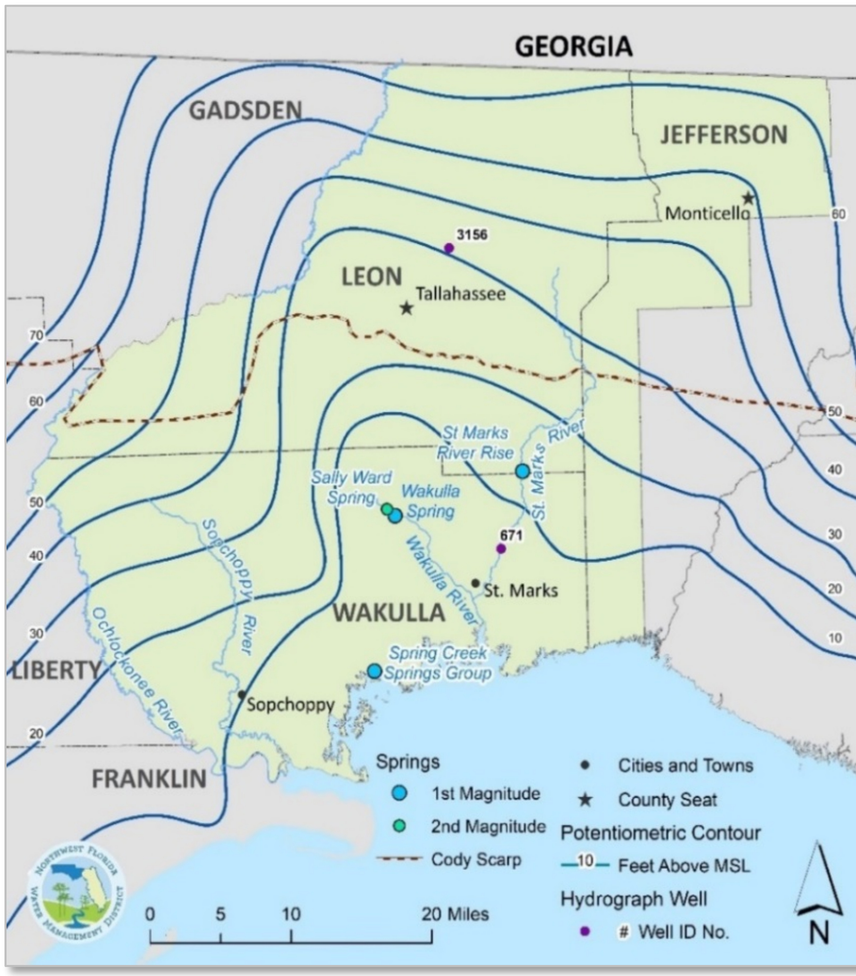

Figure 56. Potentiometric Surface of the Floridan Aquifer System in Region VII, September 2015

Groundwater generally flows to the south and discharges to numerous springs and the Gulf of Mexico. South of the Cody Scarp, the potentiometric surface is somewhat flatter. Near Wakulla Spring and the Spring Creek Spring Group, the aquifer transmissivity is very high due to secondary dissolution and the presence of karst features such as conduits. The gradient is relatively flat, with aquifer water levels in this area generally being within 10 feet of sea level.

Regional discharge features include at least 51 springs (Barrios, 2006), three of which are first magnitude springs. Wakulla Spring is the primary source of inflow for the Wakulla River. Similarly the St. Marks River Rise is a primarily source of inflow to the St. Marks River. The Spring Creek Spring Group is comprised of 14 offshore submarine spring vents that discharge into Apalachee Bay.

Criteria used to assess the sustainability of ground-water resources include review of long-term trends in groundwater levels, spring flows, river base-flows, and a regional groundwater budget. Well locations are shown on Figure 56 and correspond to the ID number on the upper right-hand corner of each graph.

For wells with sufficient long-term data, trends in aquifer levels were evaluated using a two-sided Mann-Kendall test with a confidence interval of 0.95. Data were aggregated to annual medians prior to trend evaluation to reduce the potential impact of autocorrelation on test results.

Hydrographs show examples of long-term trends in the Floridan aquifer levels (Figure 57). Between 1977 and 2017, aquifer levels at the Olson Road well in central Leon County varied between 23 feet and 44 feet above sea level (Figure 57A). Aquifer levels fluctuated in response to variations in climate and pumpage and exhibited short-term declines in response to the droughts of 2000-2001, 2006-2007, and 2011-2012. There are no trends in aquifer levels at this location during the 1977 - 2017 period of record. Long-term water levels in the Newport Recreation well (Figure 57B), located in southeastern Wakulla County, exhibit little fluctuation due to the high transmissivity, low pumpage, and relatively flat gradient of the potentiometric surface in this area. Although there is a small declining trend, current water levels at the Newport Well are similar to those measured in 1967.

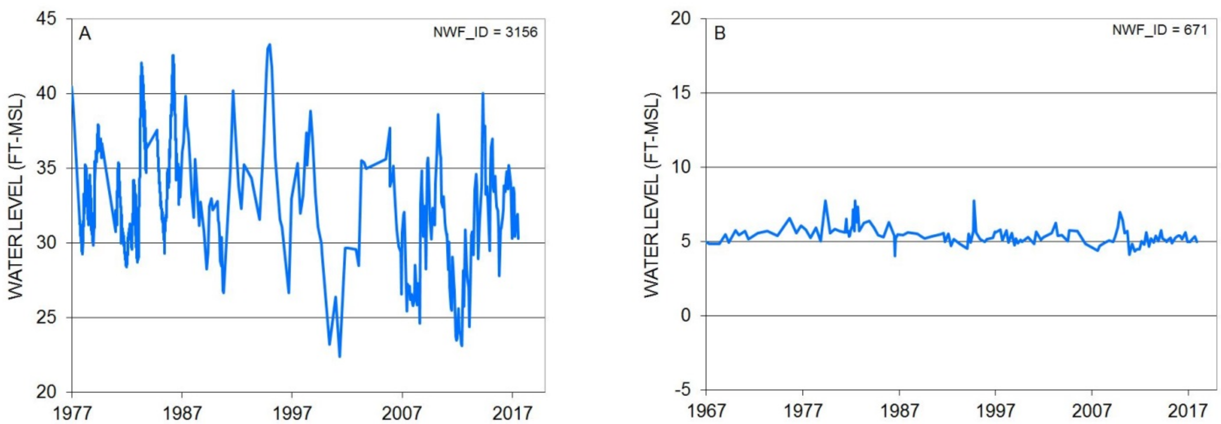

Figure 57. Hydrographs of the A) Olson Road and B) Newport Recreation Wells

No long-term declines in baseflow are present in the Wakulla, St. Marks, Sopchoppy or Ochlockonee rivers that are indicative of regional impacts to groundwater resources. There is a long-term decline in total streamflow and surface water runoff at Sopchoppy River, which is driven by climate. There are no long-term declines in spring flow at the St. Marks River Rise. Discharge from Wakulla Spring has increased over time. There is insufficient data to assess long-term trends in discharge from the Spring Creek Spring Group.

The relationship between Wakulla Spring and the Spring Creek Spring Group is complex (Davis and Verdi, 2014). Following periods of low rainfall, saltwater fills the vents and conduits associated with the Spring Creek Spring Group. The flow direction at Spring Creek Spring Group reverses and groundwater flows north and northeast toward Wakulla Spring. The District is establishing minimum spring flows for the St. Marks River Rise, Wakulla Spring and Sally Ward Spring that will quantify and protect the water needed to sustain these water resources. The minimum flow technical assessment report for the St. Marks River Rise is being completed in 2018, with the evaluations for Wakulla Spring and Sally Ward Spring scheduled for completion in 2020.

Additional trend analyses were performed for Floridan aquifer wells having at least 20 years of water level data (Table 37). Although this analysis provides some information regarding hydrologic changes at specific locations, the available period of record varies among wells confounding any conclusions regarding water level changes across the region. Efforts are ongoing to develop a regional groundwater flow model for the eastern portion of the District to facilitate future resource evaluations.

Table 37. Trends at Selected Floridan Aquifer Wells in Region VII

Well Name	Period of record	N (years)	Sen slope	p value	Trend
C. Donahue Deep	1989-2017	28	-0.032	0.009	Downward
USGS-Olson Rd./S677	1977-2017	40	-0.08	0.139	No trend
USGS-Lake Jackson	1966-2017	52	-0.1	0.01	Downward
Newport Recreation	1961-2017	57	-0.01	0.002	Downward
USGS-Lester Lewis/S788 all	1961-2017	42	-0.001	0.922	No trend
Lafayette Park	1945-2017	68	-0.053	0.043	Downward

Groundwater Budget

A regional groundwater budget was also utilized to assess the adequacy of the groundwater resources to meet future demands (Ryan et al., 1998). The water budget represents an order-of-magnitude approximation of major simulated inflows to and outflows from the Floridan aquifer (Figure 58). Water budget components were estimated using output from a calibrated steady state three-dimensional groundwater flow model (Davis, 1996). The model was calibrated to conditions observed in October and November 1991. Major inflows to the Floridan aquifer are direct recharge, leakage through overlying intermediate system and subsurface groundwater inflow from areas to the north (southwest Georgia and Gadsden County).

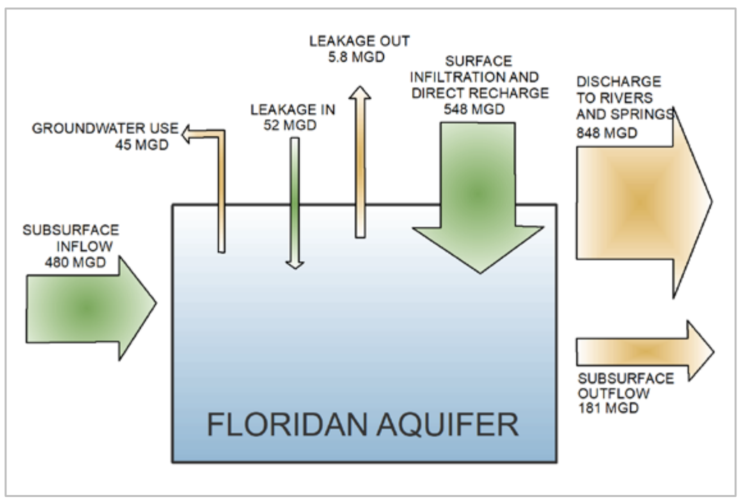

Figure 58. Region VII Floridan Aquifer Steady-State Groundwater Budget

Total inflow into the Floridan aquifer was estimated to be 1,080 mgd. Major outflows include discharge to rivers and springs, upward leakage into the intermediate system, groundwater pumpage, and subsurface flow to the Gulf of Mexico. Current groundwater withdrawals of 45 mgd comprise four percent (4%) of the water budget. The projected 2040 groundwater demand in Region VII totals 58 mgd or 5.7 percent of the total water budget of the Floridan aquifer. Land application of treated wastewater returns a relatively large percentage of pumped groundwater to the Floridan aquifer system as recharge. In 2015, the City of Tallahassee applied 19.2 mgd at their Southeast Farm Sprayfield. The high permeability of the soils results in local groundwater recharge, with estimated rates of 84in/yr to 142 in/yr at the sprayfield (Davis et al., 2011).

Water Quality Constraints on Availability

Only the upper several hundred feet of the Florida aquifer are utilized for water supply due to high groundwater availability and quality in this interval. Available data indicate reduced water yields and increased mineralization with depth. A well constructed at Florida State University (NWF_ID 2591) has an open hole interval from 265 to 375 feet below sea level. The specific capacity is 54 gpm/ft, which is much lower than nearby wells open to the shallower zones of the Floridan aquifer. Water quality data

(NWFWMD consumptive use permit files) showed that drinking water standards are exceeded at this depth, with the well having a chloride concentration of 648 mg/L, a sulfate concentration of 1,330 mg/L, and a TDS of 3,290 mg/L.

A monitor well constructed by the District within the St. Marks National Wildlife Refuge south of Crawfordville also exhibits declining water quality with depth. At a depth of 270 feet below land surface, sampling yielded a chloride concentration of 390 mg/L, sodium concentration of 230 mg/L, and total dissolved solids of 880 mg/L. These values exceed drinking water standards. Although water quality decreases with depth, there are few production wells located in coastal areas and water quality is not anticipated to pose a significant resource constraint in Region VII during the 2020 to 2040 planning period. Additional information regarding the lower St. Marks, Wakulla, and Apalachee Bay systems can be found in the St. Marks River Watershed SWIM plan (NWFWMD, 2017).

Alternative Water Supply and Conservation

Non-traditional sources of water in Region VII are reuse of reclaimed water. District support to water supply development projects have contributed to water conservation, leak detection, water use efficiencies, and expanding reuse potential.

Water Conservation

Water conservation potential has not been estimated for Region VII. District permit conditions that support water conservation measures include annual water use reporting; evaluation of water use practices to enhance water conservation and efficiency, reduce water demand and water losses; maximum water loss and residential per capita water use goals; and public education campaigns.

Water supply development projects that support water use efficiencies include water system improvements in the cities of Monticello and Sopchoppy.

Reuse of Reclaimed Water

In 2015 Region VII utilized 0.68 mgd of potable offset reuse or 3 percent of the wastewater treatment facility (WWTF) flows, which totaled about 21.8 mgd (Table 38). Information on individual wastewater facilities used in this analysis is included in Appendix 7.

Table 38. Region VII - 2015 Reuse and Wastewater Flows (mgd)

County	Potable Offset Reuse Flow	Percent of Potable Offset Reuse to Total WWTF Flow	Total WWTF Flow	Number of Active Reuse Systems	Total WWTF Capacity
Jefferson	0.000	0%	0.542	2	0.830
Leon	0.641	3%	20.238	11	28.008
Wakulla	0.036	4%	1.005	5	1.238
TOTALS	**0.677**	**3.1%**	**21.785**	**18**	**30.076**

Based on population projections, future reuse flows are estimated to be an additional 26 mgd by year 2040. This additional availability added to existing 2015 reuse flows totals 26.7 mgd, or nearly 89 percent of the 2015 total facility capacities (Table 39). Future potable offset reuse assumptions are that WWTF's have treatment and disinfection levels suitable for the reuse end uses, and that transmission infrastructure is available to reuse customers.

Table 39. Region VII - 2020-2040 Future Potential Reuse Availability (mgd)

County	Reuse Flow 2015	Future Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	mgd	Capacity %
Jefferson	0.000	0.55	0.56	0.57	0.57	0.58	0.58	70%
Leon	0.641	20.82	21.89	22.77	23.54	24.29	24.93	89%
Wakulla	0.036	1.04	1.06	1.09	1.11	1.13	1.17	95%
TOTALS	**0.677**	**22.41**	**23.52**	**24.43**	**25.23**	**26.00**	**26.68**	**88.7%**

Region VII: RWSP Evaluation

Based on the assessment of water sources and conclusions above; ground and surface water sources in Region VII are considered adequate to meet the projected water needs for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period. Therefore, a regional water supply plan for Region VII is not recommended.

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CHAPTER 3. CONCLUSIONS AND RECOMMENDATIONS

This Districtwide water supply assessment concludes that the Region II RWSP be continued and the Region III RWSP should be discontinued. No additional regional water supply plans are recommended. Each water supply planning region has water resource limitations that will continue to be monitored and assessed in future water supply assessments.

Region II RWSP: Okaloosa, Santa Rosa, and Walton Counties

Coastal development groundwater withdrawals affected Region II as early as the 1940s. A WRCA was established for coastal areas of all three counties in Region II in 1989 (section 40A-2.802, F.A.C.). The District's 1998 WSA led to the first Region II RWSP in 2000. Implementation of the Region II RWSP has successfully re-distributed groundwater withdrawals to inland wellfields, which has slowed, but not eliminated, the threat of saltwater intrusion. Conservation programs and development of alternative water sources have also contributed to the reduction of coastal groundwater withdrawals. Yet, a significant cone of depression in the upper Floridan aquifer persists and concerns related to saltwater intrusion and water quality degradation remain.

This WSA recommends the continuation of the Region II RWSP. Minimum flows and minimum water levels for the coastal Floridan aquifer and for the Shoal River system will support future water supply development, water resource development, and recovery and prevention strategies in Region II.

Region III RWSP: Bay County

Deer Point Lake Reservoir was constructed in 1961 to supply potable water and help alleviate the threat of saltwater intrusion. The 1998 WSA identified the need to continue shifting groundwater production away from coastal areas. The 2008 Region III RWSP identified strategies for additional alternative water supply sources, and the 2014 RWSP update proposed the development of an alternative upstream Deer Point Lake surface water intake to mitigate against the threat of saltwater intrusion during major weather events and storm surges. A cone of depression in the Floridan aquifer system is still present, however, most potable water needs in Bay County are now met by the Deer Point Lake Reservoir. Moreover, to increase the resiliency of the reservoir to withstand storm surge impacts and assure safe drinking water, Bay County completed development of the alternative upstream water intake at Econfina Creek in 2015.

Due to completion of the Region's major alternative water supply development project and given the adequacy of water supplies for the planning period, this WSA recommends discontinuation of the Region III RWSP. Development of MFLs for the Gainer Spring Group and the Floridan aquifer in coastal Bay County will support future water supply development, water resource development, and recovery and prevention strategies in Region III.

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GLOSSARY

List of hydrologic and technical terms. Some terminology is as defined by USGS, from the USGS Glossary of Hydrologic Terms: https://or.water.usgs.gov/projs_dir/willgw/glossary.html.

Attendant Alteration. A modification or alteration as a result of other preceding actions.

Baseflow. - That part of the stream discharge that is not directly attributable to runoff from precipitation; it is sustained by groundwater discharge (USGS, et al.).

Clastic. Rocks composed of broken pieces of older rock.

Dissolution. The action or process of dissolving or fragmentation or of being dissolved.

Drawdown. (1) The vertical distance the water elevation is lowered or the reduction of the pressure head due to the removal of water (after ASCE, 1985). (2) The decline in potentiometric surface at a point caused by the withdrawal of water from a hydrogeologic unit (USGS, et al.).

Ethylene Dibromide. Hazardous chemical (EPA has classified ethylene dibromide as a Group B2, probable human carcinogen).

Fossiliferous. Containing fossils.

Hydrogeologic Unit. (1) Any soil or rock unit or zone which by virtue of its hydraulic properties has a distinct influence on the storage or movement of groundwater (after ANS, 1980). (2) Any soil or rock unit or zone which by virtue of its porosity or permeability, or lack thereof, has a distinct influence on the storage or movement of groundwater (USGS, et al.).

Hydrostratigraphic Unit - See Hydrogeologic Unit.

Karst or Karst Features. Terrain usually characterized by barren, rocky ground, caves, sinkholes, underground rivers, and the absence of surface streams and lakes resulting from the excavating effects of underground water on massive soluble limestone.

Leakage. (1) The flow of water from one hydrogeologic unit to another. The leakage may be natural, as through semi-impervious confining layer, or human-made, as through an uncased well (USGS, et al.). (2) The natural loss of water from artificial structures as a result of hydrostatic pressure (USGS).

Lithology. The general physical characteristics of a rock or the rocks in a particular area, including color, composition, and texture.

Marl. A friable earthy deposit consisting of clay and calcium carbonate, used especially as a fertilizer for soils deficient in lime.

Physiography. Geography dealing with physical features of the earth. Physical geography.

Proximal. Relating to or denoting an area close to a center of a geological process such as sedimentation or volcanism.

Storage coefficient - The volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head (virtually equal to the specific yield in an unconfined aquifer) (USGS, et al.). The coefficient or *storativity* is a dimensionless quantity, and ranges between 0 and the effective porosity of the aquifer.

Storativity - See Storage Coefficient.

Transmissivity - The rate at which water of the prevailing kinematic viscosity is transmitted through a unit width of the aquifer under a unit hydraulic gradient. It is equal to an integration of the hydraulic conductivities across the saturated part of the aquifer perpendicular to the flow paths (USGS, et al.).

Upconing - Process by which saline water underlying freshwater in an aquifer rises upward into the freshwater zone as a result of pumping water from the freshwater zone (USGS).

Upgradient. A location that is the source groundwater for another location, similar to upstream.

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WSA 2018 Appendices

Contents

APPENDIX 1. METHODOLOGIES

Contents

WATER USE CATEGORIES

Data and methodologies used to estimate base year 2015 water use and to project future water demands 2020-2040 vary according to water use category defined in rule:[1]

1. Public Supply,
2. Domestic Self Supply,
3. Agriculture,
4. Recreational Irrigation,
5. Industrial/Commercial/Institutional,
6. Thermoelectric (power generation).

For each of the six water use categories, data and estimating methodologies are for existing and future projected reasonable-beneficial uses. Methodologies include drought-year projections and sources of uncertainty in demand projections. Data and methodologies are similar to the previous WSA 2013 except where modifications helped refine the data or enhance water use projections.

METHODOLOGIES AND DROUGHT YEAR EVENTS

Projecting future water demands depends on anticipated future needs and on future potential precipitation. Florida Statutes requires the anticipation of and planning for drought events:

> *"The level-of-certainty planning goal associated with identifying the water supply needs of existing and future reasonable-beneficial uses must be based upon meeting those needs for a 1-in-10 year drought event." (Section 373.709(2)(a)1., F. S.).*

A 1-in-10 year drought event has a 10 percent probability of occurring during any given year. The level of certainty planning goal is to assure that, in any given year, there is a 90 percent probability that all reasonable-beneficial water demand needs will be met.

Annual average streamflow and precipitation data were analyzed over a 30-year period to determine which years had a 1-in-10 drought event and which experienced normal or average rainfall. The year 2011 was selected as a dry year and compared to 2015 as a normal average year to analyze increased water demand in the public supply category. Further information on drought analysis and estimating methods is noted in each water use category methodology.

POPULATIONS AND WATER USE ESTIMATING

Estimating and projecting populations served are essential data in developing water use estimates and projections. Population estimates and projections used for determining future water supply needs must be based upon best available data.[2] Districts shall consider the University of Florida's Bureau of Economic and Business Research (BEBR) data, which includes annual estimates and projections of permanent residents only at the county level.

Public supply utilities submit pumping reports of all water withdrawals, which are attributable to seasonal, as well as permanent, populations. In addition, many utilities submit population estimates data and number of meter or service connections, differentiating between residential and non-

[1] Chapter 62-40, Water Resource Implementation Rule, section 62-40.531, Regional Water Supply Plans.
[2] Section 373.709, F.S., Regional water supply planning, (2)(a)1.a.

residential water uses. This WSA recognizes these seasonal populations and seasonal water use in data provided by utilities.

In 2014, the District commissioned a population study to estimate permanent, seasonal, and adjusted total populations for Public Supply (PS), Domestic Self-Supply (DSS), and total county populations. This study used 2012 population data from the United States Census Bureau, American Community Survey (ACS) and parcel data from the Florida Department of Revenue (DOR). Seasonal populations include tourists and migrant workers, as defined by the ACS below (ACS, 2012). Group quarters, i.e. correctional facilities, college housing and university dormitories, were excluded from the 2014 District study.

SUBJECT DEFINITIONS (SEASONAL POPULATIONS)

For Seasonal, Recreational, or Occasional Use – These are vacant units used or intended for use only in certain seasons or for weekends or other occasional use throughout the year. Seasonal units include those used for summer or winter sports or recreation, such as beach cottages and hunting cabins. Seasonal units also may include quarters for such workers as herders and loggers. Interval ownership units, sometimes called shared-ownership or time- sharing condominiums, also are included here.

For Migrant Workers – These include vacant units intended for occupancy by migratory workers employed in farm work during the crop season. (Work in a cannery, a freezer plant, or a food-processing plant is not farm work.)

The population study estimated seasonal populations in all housing units described above and then halved the estimates to approximate the impacts that transient residents have on populations and water use. The rationale for this methodology was to capture both seasonal and migrant workers as well as short-term tourists. For this WSA, this same methodology was applied: half of estimated seasonal populations were added to permanent populations to arrive at adjusted total population estimates.

All District counties have some seasonal populations, in both PS utility service areas and among DSS users. Counties with the greatest estimated percentage of seasonal residents are Walton, Franklin, Gulf, Bay, and Okaloosa; followed by Liberty and Wakulla. The study also produced seasonal population rates for each public supply utility, for the DSS use category in each county, and countywide averages. Seasonal population rates are half of the seasonal population estimate divided by the estimated permanent population.

The resulting seasonal rates were used to adjust BEBR medium county 2015 population estimates and 2020-2040 future population projections. Seasonal population rates were sometimes refined following review of public supply utility outreach results. The selected seasonal population rates and total adjusted 2015 population estimates are in Table A1.1, below.

Jefferson County population estimates in the NWFWMD were coordinated and compared with the Suwannee River Water Management District (SRWMD) estimated share of Jefferson County. The combined total of both WMDs population estimates and projections is within about two percent of BEBR Jefferson County estimates and projections. Ongoing collaboration and data sharing will provide additional future opportunities to refine population and water use estimate and projection data.

Table A1.1 BEBR Population Estimates, Seasonal Rates, and Adjusted Population Estimates 2015

Planning Region	County / Region	BEBR 2015 Population Estimates	Estimated Seasonal Rate %	Estimated Seasonal Populations	TOTAL 2015 Population Estimates	Estimated Populations Served			
						Public Supply		Domestic Self Supply	
						Population	% of	Population	% of
I	Escambia	306,944	3.2%	9,822	316,766	304,750	96%	12,017	4%
	Total/Average	**306,944**	**3.2%**	**9,822**	**316,766**	**304,750**	**96%**	**12,017**	**4%**
II	Okaloosa	191,898	11.0%	21,109	213,007	189,067	89%	23,940	11%
	Santa Rosa	162,925	2.0%	3,259	166,184	163,293	98%	2,890	2%
	Walton	60,687	49.0%	29,737	90,424	72,808	81%	17,616	19%
	Total/Average	**415,510**	**13.0%**	**54,104**	**469,615**	**425,168**	**91%**	**44,446**	**9%**
III	Bay	173,310	12.0%	20,797	194,107	176,364	91%	17,743	9%
	Total/Average	**173,310**	**12.0%**	**20,797**	**194,107**	**176,364**	**91%**	**17,743**	**9%**
IV	Calhoun	14,549	3.0%	436	14,985	4,568	30%	10,417	70%
	Holmes	19,902	1.0%	199	20,101	5,547	28%	14,554	72%
	Jackson	50,458	3.0%	1,514	51,972	16,563	32%	35,409	68%
	Liberty	8,698	9.0%	783	9,481	4,003	42%	5,478	58%
	Washington	24,975	3.0%	749	25,724	6,910	27%	18,814	73%
	Total/Average	**118,582**	**3.1%**	**3,681**	**122,263**	**37,591**	**31%**	**84,672**	**69%**
V	Franklin	11,840	39.0%	4,618	16,458	14,637	89%	1,821	11%
	Gulf	16,346	22.0%	3,596	19,942	16,313	82%	3,629	18%
	Total/Average	**28,186**	**29.1%**	**8,214**	**36,400**	**30,950**	**85%**	**5,450**	**15%**
VI	Gadsden	48,315	2.4%	1,160	49,475	32,390	65%	17,085	35%
	Total/Average	**48,315**	**2.4%**	**1,160**	**49,475**	**32,390**	**65%**	**17,085**	**35%**
VII	Jefferson(1)	10,246	3.5%	359	10,605	5,445	51%	5,160	49%
	Leon	284,443	0.5%	1,422	285,865	233,981	82%	51,884	18%
	Wakulla	31,283	5.0%	1,564	32,847	23,256	71%	9,591	29%
	Total/Average	**325,972**	**1.0%**	**3,345**	**329,317**	**262,682**	**80%**	**66,635**	**20%**
TOTALS / AVERAGES		**1,416,819**	**7.1%**	**101,123**	**1,517,943**	**1,269,895**	**84%**	**248,048**	**16%**

(1) NWFWMD portion of Jefferson County only.

Additional information on seasonally-adjusted population estimates is noted in the methodologies and in regional resource assessments that follow. Unless specifically noted otherwise, e.g. BEBR data, all population data and information in this WSA is seasonally adjusted.

WATER USE ESTIMATES AND PROJECTIONS

1. Public Supply

Data and methodology for Public Supply water use estimates and projections are similar to those used for the previous WSA (NWFWMD 2013), with the exception of incorporating seasonal populations. In brief, the public supply methodology applied incorporated the following:

1) Base year (2015) water use, and per capita rates, estimated from reported data;
2) Populations served for base year (2015) and future projections (2020-2040) estimated;
3) Future water demand = gross per capita water use rates x population projections;
4) Base year (2015) water production estimates and future projections.

The methodology includes drought year projections and sources of uncertainty in demand projections.

1) Water Use Estimates, Base Year 2015

The District collects, and audits public supply utility water use annually. The majority of compliance submissions are from utility systems that have 0.1 mgd and above annual average daily rate (ADR). Systems below the 0.1 mgd threshold are included if included in regulatory audits, if water use may meet the threshold during the future planning horizon, or if multiple small systems within a county collectively meet the 0.1 mgd threshold. Monthly Operating Reports (MORs) from DEP provide supplemental data.

Water withdrawn is not always equivalent to water distributed or consumed. Water may be imported and/or exported to and from other utilities or service areas. Public supply often includes not only residential uses but also commercial, institutional, industrial, recreation, fire protection and other uses or services. Large industrial or other water users, if separately reported, are removed and added to the appropriate water use category. Following adjustments noted above, total average daily gross water use or average daily rate (ADR) for each utility is determined according to the following formula:

$$\text{Gross Utility Water Use (mgd)} = \text{Withdrawals} + \text{Imports} - \text{Exports}$$

Water leaks and other unaccounted water losses are a part of total water withdrawals. Per capita water use metrics are determined by dividing gross and residential water use estimates by associated populations served. The per capita water use rates formula is:

$$\text{Gross or Residential per capita water use (gallons per day)} = \frac{\text{Gross or Residential Water Use}}{\text{Utility Population Served}}$$

Utility populations served include seasonal resident adjustments. The per capita rates are used for planning purposes to project future demand.

2) Population Estimates and Projections

Adjusting BEBR data with seasonal population estimates is previously described above. This section describes the methodology for considering seasonally-adjusted population estimates in conjunction with population data provided by utilities.

2015 Utility Population Served Estimates

District Customer Use Survey (CUS) reports provide estimates of populations served, number of dwelling units, and number of meter or service connections, in addition to residential data disaggregated from commercial and other water uses. Basic Facility Reports (BFRs) submitted to DEP provide similar and supplemental data. Persons per household (PPH) is calculated from BEBR and utility-provided data. Seasonal population estimates are reviewed and considered in conjunction with other data sets. This WSA applied review and consideration of all available PS utility population data. Table A1.2 provides a summary of data along with strengths and weaknesses of each source.

Data reported by utilities was generally the default selection for 2015 estimates of populations served if reported data was within reason considering estimated seasonal populations where applicable, and after checking PPH metrics and other available estimate data. In the absence of clear and definitive population values, estimates used are based on moderate or middle estimated values.

Table A1.2. Public Supply Utility Population Data

Source of Population Estimate Data	Strengths and Weaknesses
District Customer Use Survey (CUS) Reports	• Both CUS and BFR data reported by PS utilities but not available from all permittees. • CUS and BFR population estimates sometimes based on dated or inappropriate metrics, i.e. 3.5 PPH. • Data may be different in CUS versus BFR reports. • Water use data includes seasonal populations, by default, albeit not distinctly identified or disaggregated.
DEP Basic Facility Reports (BFR)	
County average (BEBR) Persons Per Household (PPH) multiplied times: *a. Number of dwelling units, and/or;* *b. Number of meter or service connections*	• County-wide average metric and estimates only - no accounting for local utility or community variations, with or without seasonal adjustments. • An average 'rule-of-thumb' calculation.
Seasonal population estimates	• Seasonal populations estimated per utility, DSS, and county averages; and weighted averages. • Not reconciled with BEBR, reliance on available service area maps, and DSS wells not incorporated.
Misc. other references, e.g., on-line statistics or local comprehensive plans	• May provide additional or supplemental information, but is often out of date.

2020-2040 Population Projections

Population projections used for determining public water supply needs shall consider the BEBR medium population projections and population projection data and analysis submitted by local governments. The methodology to project future populations is similar to that used in the 2013 WSA, with two exceptions. First, because seasonal adjustments are included in 2015 estimates, future population projections also apply seasonal population adjustments. Secondly, this WSA considered a variety of growth factors and population trends to estimate and select BEBR county growth rates as a proxy for growth of populations served. Population projection methodology in brief:

- Review and analyze geospatial information and determine whether:
  - *PS utility service area more or less coincides with a BEBR incorporated area,*
  - *PS utility service area is rural or otherwise unrelated to BEBR population estimates;*
- Review and consider additional available data and information;
- Select set of BEBR growth rates that best represents a proxy for probable growth;
- Multiply 2015 population estimates by selected growth rates.

Projection methodologies are described in more detail below.

<u>Geospatial Analysis</u>: Review of geospatial information to ascertain the correlation between a utility service area and whether the service area has direct or some correlation with a BEBR incorporated area or is located in an unincorporated area or otherwise unrelated to a BEBR-identified city or town.

<u>Service Area in BEBR Incorporated Area</u> **-** If a service area coincides with or has a significant correlation with a BEBR-identified incorporated area, review of associated population data includes:

- Historical populations and historical change in population trends;
- Historical 5-year growth rates, 1995-2015, and average growth rates;
- Ratio or share of incorporated area vs. total county populations.

Service Area in Unincorporated County **-** If a service area is in an unincorporated area of a county, aerial photography and land use review to discern any commercial or residential structures. The ratio or share of municipal populations to total county populations, referenced above, was also reviewed for evidence of people relocating between incorporated areas and other areas of a county.

Additional Data: The initial analyses described above were considered together with other available data and information, for example:

- Population projection data and analysis submitted by local entities;
- Historical trends in PS utility population, number of service connections, or water use data;
- Other local area future projected growth and development information.

Select Growth Rates: All of the above was considered to select one set of assumed best-fit growth rates for the 2020-2040 planning horizon for each PS utility. Selected growth rates were low, medium, or high projected rates generated from BEBR data, or interpolated intermediate low-medium or medium-high growth rates. BEBR medium was the default selection unless analyses, and/or utility-provided data, supported an alternative growth rate. If a negative growth rate appeared to be most statistically appropriate, a no growth (0.0%) scenario was used for future growth projections.

Project Future Populations: Future populations were projected from 2015 estimates multiplied by selected BEBR growth rates. As seasonal population adjustments were already factored into the 2015 baseline population estimates, future projections are also assumed to include seasonal populations. Estimates, projections, and supporting data were sent in outreach surveys to utilities for review. Over half of all utilities returned surveys with comments, which contributed to refinement of the data.

3) 2020-2040 Demand Projections

Water demand projections are the product of population projections and gross per capita water use rates estimated in base year 2015. For planning purposes, per capita rates are assumed to remain constant over the 2020-2040 planning horizon.

4) Water Production Estimates and Projections

A water use estimate is the amount of water used or in demand by populations in public supply service areas. Water production is the amount of water withdrawn or pumped from specified locations, sometimes referred to as wholesale raw water withdrawals.

In some counties demand and production estimates and projections are identical. Counties that have different demand and production data are: Okaloosa, Santa Rosa and Walton counties (Region II), Bay County (Region III), Washington and Holmes counties in Region IV, Franklin County in Region V, and Leon and Wakulla counties in Region VII.

Base year 2015 water production estimates for each utility were estimated from reported pumpage compliance submissions and regulatory audits. Utility production future projections were estimated from base year 2015 reported pumpage and relevant population growth rates. For wholesale production wellfields and for utilities engaged in water transfers (imports and/or exports), growth rates were approximated across multiple service areas, which at times cross county borders. Also, some utilities have planned changes in water withdrawals, for example, periodic reductions in coastal withdrawals and corresponding increases in inland wellfield pumpage over time. As required, production projections were refined according to varying growth rates, water transfers, and changing permit conditions.

Water use estimates and future demand projections were also forwarded to public supply utilities and to other affected and interested parties for review and comment. Responses were received from over half of all parties contacted and, following review and analysis, estimates and projections were modified according to outreach responses where appropriate.

Drought Year Projections

The 1-in-10 year drought projections indicate the estimated increase in water used during a drought year primarily due to short-term increases in irrigation in public supply service areas. Public supply pumpage data from 2011, a dry year, was compared to the average year 2015. An increase in water usage during 2011 generated the drought event multiplier of 1.07, or a seven percent increase over a normal year.

Sources of Uncertainty in Demand Projections

Population estimates and projections used in public supply water use estimates and demand projections are based on best available data, including best estimates of seasonal population adjustments. Future population estimates may differ numerically or spatially from what is projected.

2. Domestic Self Supply

Data and methodology for Domestic Self Supply (DSS) are similar to those used for the 2013 WSA, with the exception of incorporating seasonal populations. In brief:

1) Base year 2015 populations and future population projections are derived by subtracting Public Supply utility populations from county totals;
2) Identify average per capita DSS water use rate from latest available USGS report;
3) Per capita water use rate x populations = 2015 estimates and water demand (2020-2040).

Methodology includes drought year projections and sources of uncertainty in demand projections.

1) Population Estimates and Projections

Domestic self-supply is the population not served by public supply, which includes DSS and small public water systems. DSS populations in each county were estimated by subtracting public supply populations served from the total estimated county population for 2015 estimates and for the 2020-2040 planning horizon. Since DSS is calculated from county and public supply utility population data, all DSS population estimates include the same seasonal population adjustments previously noted.

2) Per Capita Water Use Rate

County-wide average domestic per capita use rates are estimated by USGS, which exclude commercial and industrial usage to derive residential usage. The districtwide average DSS per capita rate in 2010 was about 89 gpd (USGS, 2014). For planning purposes, it was assumed that per capita use rates will remain constant over the future 2020-2040 planning horizon.

3) Water Use Estimates and Projections

Water use estimates and projections are calculated by multiplying the DSS population estimates aggregated at the county level by the average per capita water use rate.

Drought Year Projections

The same factors that increase public supply demand in a 1-in-10 year drought event are presumed to also affect domestic self-supply. Therefore, the drought year projections for DSS use the same 1.07 multiplier as that used in public supply drought year projections.

Sources of Uncertainty in Demand Projections

DSS estimates and projections are dependent on the accuracy of aggregate public supply utility and total county population estimates. As noted in previous sections, all population estimates include seasonal population adjustments. Future population estimate methodologies, including seasonal residents, may be further refined. Population estimates may also differ spatially.

Public supply service areas often contain pockets of domestic self-supply wells, which may lend uncertainty to both DSS and public supply service area population estimates. Public supply utilities may expand service areas over time, for example into franchise areas, and provide public water connections that make DSS wells suitable for abandonment.

3. Agriculture

Per Florida Statutes[3], agricultural demand projections used for determining the needs of agricultural self-suppliers must be based upon the best available data. Districts shall consider the future water supply demands provided by the Florida Department of Agriculture and Consumer Services (DACS), and data and analysis submitted by local governments.

The DACS Florida Statewide Agricultural Irrigation Demand (FSAID) initiative began in 2013-2014 to assist in meeting the agricultural water demand objectives set forth in Florida Statutes. The FSAID data, methodologies, water use estimates and water demand projections have been updated and refined each year. This WSA incorporates the fourth iteration of FSAID (DACS 2017) for the 2015 estimates and demand projections 2020-2040. Data and methodologies in brief are noted below:

1) Geospatial datasets developed for:
    - Total Agricultural Lands Geodatabase (ALG),
    - Irrigated Lands Geodatabase (ILG);
2) Share of irrigated versus total permitted agricultural land calculated.
3) ILG climate conditions (rainfall, evapotranspiration, soil assignments) incorporated.
4) Review and analysis of district water use metered data and permit information (crop type, irrigation system, acreage).
5) Irrigation application rates estimated for different crop types.
6) With the above inputs, econometric model used to estimate:
    - 2015 crop irrigation water use,
    - Future water demand projections (2020-2040);
7) Additional estimate and projection factors incorporated:
    - Non-crop water use (livestock, aquaculture),
    - Frost-freeze protection.

The econometric model incorporates agronomic variables (crop choice, soil type, location, climate), engineering or physical factors (irrigation equipment, plot size), economic or behavioral factors (crop

[3] Section 373.709(2)(a)1.b., F.S., Regional water supply planning.

prices, share of irrigated land), and actual metered data or reported pumpage. Projected water use is estimated by simulating future conditions including price forecasts and future land area estimates.

Drought Year Projections

Dry year estimates were calculated for each district with 1-in-10 ratios by crop. The dry to average year ratio in northwest Florida ranges from a low of 1.17 for greenhouse/nursery crops to a high of 1.72 for hay. The overall statewide average dry to average year ratio is 1.34.

Sources of Uncertainty in Demand Projections

The fourth edition of FSAID represents the best available data for this WSA. FSAID IV is available at:

https://www.freshfromflorida.com/Business-Services/Water/Agricultural-Water-Supply-Planning

Conservation potential has been estimated in the FSAID project, but demand projections have not been modified based upon this analysis.

4. Recreational Irrigation

The three primary types of reported recreational water use in the District are golf course irrigation, non-residential landscape irrigation, and water-based recreation. Additional recreational water uses includes aesthetic (both ponds and irrigation), residential irrigation, and miscellaneous outdoor uses. Data and methodology for Recreational Irrigation are similar to the previous WSA 2013, noted below.

1) Base year 2015 water use estimated from reported and audited pumpage, and additional base year estimates added from:
   - Individual water use permits (IWUPs) that have no water use reporting requirements,
   - Water users with a well construction permit and a general water use permit (GWUP) issued by rule;
2) Future water demand = base year water use x BEBR Medium population growth rates.

The District's Water Resource Caution Areas, Areas of Resource Concern, and more recent CUPcon revisions have resulted in recreational IWUPs with smaller permitting thresholds. In 2015 about 65 percent of all recreational IWUPs had a permitted allocation of less than 0.1 mgd. For IWUP permittees with reporting requirements, about 30 percent had a permitted allocation of less than 0.1 mgd. In addition to CUPcon changes, some differences in methodology from the 2013 WSA are:

<u>IWUPs with No Reporting Requirements</u>: This WSA analyzed historic data of IWUPs with reporting requirements to determine that water use averaged a 60 percent share of permitted allocation. This allocation was assumed for IWUPs with no reporting requirements. The previous WSA assumed 100 percent of permitted water allocation was used.

<u>GWUPs with Well Construction Permit</u>: This WSA simplified the methodology into golf courses and non-golf, i.e. residential and other small-scale recreational water uses. The previous WSA had five separate methods for five different sub-categories.

Methodology includes drought year projections and sources of uncertainty in demand projections.

1) Water Use Estimates, Base Year 2015

Base year 2015 water use estimates from reported pumpage are added to additional estimating methods, further described below.

IWUPs with No Reporting Requirements

Historic data 2010-2015 of reported IWUP water use as a share of permitted allocation was reviewed and analyzed. Permittees without enough historic data and other outliers were removed. An overall District-wide average share of recreational water use to permitted allocations of 60 percent was used as a proxy to estimate water use. This water use was estimated in aggregate at the county level.

GWUPs with Well Construction Permit

Nearly all District GWUPs with well construction permits are small wells (primarily 2” to 4”, but up to 6” diameter) for residential outdoor irrigation. Non-residential GWUP wells include a small number used for golf course, aesthetic, or water-based recreation purposes. Common examples include wells used for supplementation of rural ponds or landscape fountains. All wells have a GWUP issued by rule and are exempt from consumptive water use permitting. This GWUP water use was also estimated in aggregate at the county level. Estimating methods are further noted below.

Golf Course Irrigation. In 2015 there were about twenty golf courses in the District without an IWUP. Some known to use reclaimed water were omitted from estimating analyses. The number of golf course holes multiplied by a golf course industry standard of 5.6 average irrigated acres per hole determined an estimated irrigated acreage, which was then multiplied by the Agricultural Field Scale Irrigation Requirement Simulation (AFSIRS) average districtwide irrigation rate for turf grass of 25 inches per year:

Estimated Total Irrigation = Irrigated Acreage x 25 in/year

Estimated total irrigation was then converted to an average annual daily rate (ADR) of water use.

Residential and Other Small-Scale Recreational Water Use. Of the more than fifty thousand non-golf GWUP wells in the District in 2015, 70 percent were in Region II (Okaloosa, Santa Rosa, and Walton counties), and about 97 percent in Regions I, II, and III. Work completed on the North Florida Southeast Georgia (NFSEG) groundwater model identified a districtwide weighted average outdoor water use for residential parcels of 76 gallons per day (gpd), which was then multiplied by the number of wells:

Estimated Water Use (ADR) = No. of Wells x 76 gpd

General water use permits categorized as both non-golf and non-residential are few in number and primarily with small well sizes. Geo-spatial review identified these wells as residential in nature or with similar small-scale water use operations. These wells were incorporated into the well count noted above.

2) 2020-2040 Demand Projections

Baseline (2015) water use was multiplied by the BEBR medium population projection growth rate to generate future water demand by county and by water supply planning region.

Drought Year Projections

A dry to average year multiplier for sod or perennial grass of 1.34 was used as to approximate 1-in-10 year drought conditions. This multiplier was developed through AFSIRS simulations in the FSAID project.

Sources of Uncertainty in Demand Projections

Estimates. Demand projections are dependent upon baseline water use estimates. There are over fifty-thousand GWUP recreational water users districtwide that have unknown water consumption, where specific locations of many are not known, and that have other data and estimating method uncertainties. In addition, actual water use may vary from an assumed percent share of permitted allocation. Further, recreational water use is in many cases a complex synthesis of groundwater and surface water co-mingled with stormwater run-off and sometimes also merged with reuse.

Projections. Reductions in water demand may be realized over time due to increasing use of improved technology, rainwater harvesting, best management practices (BMPs), and reuse of reclaimed water. In addition, some data indicates that recreational water use may not grow at the same pace as general population growth rates. At the same time, higher golf course water demand may result from the construction of newer courses with increasing complexity.

5. Industrial/Commercial/Institutional

Data and methodology for Industrial/Commercial/Institutional (ICI) self-supply are similar to those used in the 2013 WSA, which in brief are:

1) Base year (2015) water use reported and estimated;
2) Water demand projections requested from permittees, and from review of water use data.

Methodology includes sources of uncertainty in demand projections.

1) Water Use Estimates, Base Year 2015

ICI self-supplied water users include manufacturing plants, chemical processing plants, water bottling plants, office buildings, hospitals and health care facilities, correctional facilities, military bases, schools and universities, and other miscellaneous ICI uses. The mgd thresholds for ICI water users vary among regions and counties and range from a permitted annual Average Daily Rate (ADR) of less than 0.001 mgd ADR to more than 38 mgd. All reporting permittees are included in this WSA.

In some situations, ICI water withdrawn for heating and cooling systems is returned to the source. This recirculated water is not, for planning purposes, considered consumptive use. Also, ICI can include multiple mixed water uses: for example, public supply at a military base, agricultural irrigation at a correctional facility, landscape irrigation at a manufacturing facility, or irrigation of a corporate headquarters or military installation golf course. Generally, these incidental water uses stay in the ICI water use category. Occasionally, a significant secondary use may be moved to another water use category if clearly identified in the available data.

2) 2020-2040 Demand Projections

Demand projections for the 2020-2040 planning horizon were requested directly from permittees. Over 40 percent of ICI permittees responded to an outreach survey request. Projections provided were generally incorporated unless a projection exceeded the permitted allocation or if there were other anomalies in water use data provided. Historical water use, water use trends, and share of water use to the permitted allocation were also reviewed and considered to determine future demands.

Drought Year Projections

Drought-year water demand projections for ICI water users are not anticipated to differ from water demands during an average rainfall year.

Sources of Uncertainty in Demand Projections

Demand projections were primarily provided by permittees. Industrial and commercial enterprises are subject to market and economic variables while fluctuations in populations or governing policies may affect institutional facilities. Market forces can affect day-to-day industrial production and commercial operations or lead to facility expansions or closures.

6. Thermoelectric Power Generation

Data and methodology for thermoelectric power generation self-supply are similar to those used in the 2013 WSA, which in brief are:

1) Base year (2015) net water use reported and estimated;
2) Water demand projections requested from permittees and from review of Ten-Year Site Plans.

Methodology includes sources of uncertainty in demand projections.

1) Water Use Estimates, Base Year 2015

Thermoelectric power generating facilities in the District by owner are:

Gulf Power: Lansing Smith Plant, Bay County; Crist Plant, Escambia County; and Scholz Plant, Jackson County.

City of Tallahassee: Arvah B. Hopkins Plant, Leon County; Sam O. Purdom Plant, Wakulla County.

Others: Bay County Board of County Commissioners Waste to Energy Facility, Bay County; and Telogia Power, Liberty County.

Water use for thermoelectric power generation reflects the net amount of water used annually. Water withdrawn from fresh surface water or brackish water sources is typically used for recirculation and cooling, and then returned to its source, and is not, for planning purposes, considered consumptive use. Net water use for thermoelectric power generation does or may include water lost to evaporation, blowdown, drift, and leakages.[4] Other water use is potable or other on-site uses.

2) 2020-2040 Demand Projections

Demand projections for the 2020-2040 planning horizon were requested directly from permittees and nearly all responded to an outreach survey request. Some additional information was available in electric utility Ten-Year Site Plans submitted to the Florida Public Service Commission and from historical water use. Demand projections in five-year increments 2020-2040 are estimated net amount of water demand, not including recirculated water returned to the source.

Drought Year Projections

Drought-year water demand projections for power water users are not anticipated to differ from water demands during an average rainfall year.

[4] USGS Thermoelectric Power Water Use, http://water.usgs.gov/watuse/wupt.html.

Sources of Uncertainty in Demand Projections

Demand projections were primarily provided by permittees. In making demand projections, electric utilities may consider national and local economic outlooks, projected economic growth, interest rates and inflation, population and labor force projections, weather and demographics, fuel sources and pricing, and energy and seasonal peak demand forecasts.

ALTERNATIVE WATER SUPPLY AND CONSERVATION

INTRODUCTION

If an area requires a regional water supply plan, alternative sources of water and conservation shall be fully evaluated as part of water resource and water supply development plans to meet regional demands (per section 62-40.531, F.A.C.), as noted below.

> **62-40.531 Regional Water Supply Plans.**
>
> *(2) Each plan shall fully evaluate water resource and water supply development options, including the potential for water conservation, and alternative sources such as desalination, aquifer storage and recovery, use of surface water reservoirs, and reuse of reclaimed water, to meet the regional demands.*
>
> *(3) Conservation and reuse shall be evaluated to the same degree as other options.*

Water conservation, also known as demand management, promotes water use efficiencies, which increases the available supply of water from existing sources. Water conservation is immediate, low cost, and more energy efficient than developing new sources of water. While not an alternative water source per se, effective water conservation makes more efficient use of existing water supplies and can offset or delay the need to develop new water supply resources.

Reclaimed water is defined in Chapter 373, F.S., as *"… water that has received at least secondary treatment and basic disinfection and is reused after flowing out of a domestic wastewater treatment facility."* Reuse of reclaimed water can be generally divided into that which replaces potable quality water and other beneficial direct or indirect reuse water flows. For the purposes of alternative water supply planning, reclaimed water that offsets or replaces water demands that would otherwise be needed from potable supplies is of greatest interest. Public access reclaimed water may be used in golf course or residential irrigation, public access areas (e.g. parks and schools), irrigation of some edible and other crops, and industrial uses such as toilet flushing or fire protection. Other reuse flows include ground water recharge through rapid infiltration basins (RIBs), absorption fields, surface water augmentation, wetland recharge, and underground injection wells.

Desalination and demineralization of brackish water are not common in northwest Florida. The District's major surface water source is Deer Point Lake Reservoir in Bay County. The District has one aquifer storage and recovery (ASR) source in Okaloosa County.

REGULATORY FRAMEWORK

In addition to incorporating alternative water in water supply planning, alternative water sources and conservation are further defined and governed throughout statute and rule. As noted in Chapter 62-40.412, F.A.C., *"The overall water conservation goal of the state shall be to prevent and reduce wasteful,* *uneconomical, impractical, or unreasonable use of water resources. Conservation of water shall be required unless not economically, environmentally, or technically feasible."*

The District includes alternative water, water conservation and efficiency program conditions in many consumptive water use permits. Conditions for General Water Use Permits (GWUPs) are in the Water Use Permit Applicant's Handbook. This Handbook also assists IWUP applicants in the permitting process by establishing a framework for meeting the conditions for permit issuance in section 40A-2.301, F.A.C.

CONSERVATION POTENTIAL

Water conservation can be achieved through regulatory, economic, and incentive-based programs; and through public outreach, education, and technical assistance. Specific permit conditions that address water conservation are in many IWUPs in the public supply, agriculture, recreation, ICI, and thermoelectric power water use categories. These include conservation of groundwater withdrawals and surface water intakes in applicable water use permits, and in diversion and impoundment permits that may have, for example, recreation or agriculture as a secondary water use. Specific conditions vary but generally request permittees to, "… *encourage and provide for the efficient and non-wasteful use of water, and shall implement water conservation measures, including a proactive leak detection program, designed to enhance water use efficiency and reduce water demand and water losses."*

The quantification of potential future water savings from conservation initiatives is uncertain due to unknown future participation in incentive and voluntary programs. Conservation estimates and ongoing initiatives are further noted below.

Public Supply and DSS: Permit conditions for a 'Water Conservation and Efficiency Program' typically include requirements for public education and information campaigns, indoor and outdoor water use conservation programs, water loss reduction, and incentivizing or inclining block rate structures. Conservation goals include water system losses less than 10 percent, and maintaining an average residential per capita daily water use of 110 gallons or less.

An evaluation study of water conservation potential was completed with the University of Florida Conserve Florida Water Clearinghouse EZ Guide Water Conservation Tool for regions II and III. This EZ Guide Tool is a web-based model designed to evaluate public supply water demand and estimate conservation potential for public supply utilities. This study evaluated water conservation potential at 5, 10, and 15 percent water saving targets within and outside of Water Resource Caution Areas (WRCAs), and the cost effectiveness of various conservation measures. Conservation potential would be realized by retrofitting to more efficient water plumbing fixtures and through more efficient use of outdoor irrigation and water flow processes in large industrial facilities. For planning purposes, water conservation potential was presumed to hold constant from 2035-2040.

For Region I and regions IV-VII, an analysis was conducted comparing the ratio of gross to residential per capita water use rates, particularly for those exceeding the conservation goals noted above. Conservation potential for these regions was not estimated due to lack of data that would provide enough detail on use types while also accounting for individual utility differences (e.g. seasonal residents, very small systems, etc.). Conservation potential from DSS and small public water systems was not estimated.

Agriculture and Recreation: Conservation potential was not estimated. Agricultural water conservation is possible through irrigation efficiency improvements and through changes in agricultural practices. An example is the District's Jackson Blue Spring Agricultural Best Management Practice (BMP) Cost-Share Program, which contributes funding for producers to retrofit irrigation equipment with water-saving and nutrient reducing technologies that can reduce energy and water overuse while also reducing nutrient application. Recreational conservation potential would be similar to conservation potential in an agricultural sod crop or may include using industry-specific best management practices such as mowing heights, aeration, or plant types.

ICI and Power: Conservation potential was not estimated. Many power generation and large industrial facilities are advancing water conservation and efficiency programs. Savings from conservation programs projected by permittees have been incorporated into future demand projections.

REUSE POTENTIAL

For this WSA, reclaimed water estimates and projections are based on potable offset reuse flows, which include public access irrigation, irrigation of edible crops, toilet flushing, fire protection, and industrial uses. Not included in potable offset flows are agriculture irrigation of other crops (sprayfields), absorption fields, rapid infiltration basins (RIBs), wetlands, and industrial reuse at the treatment plant.

Potable quality water offset is defined in section 62-610.200, F.A.C. as, *"… the amount of potable quality water (Class F-I, G-I, or G-II groundwater or water meeting drinking water standards) saved through the use of reclaimed water expressed as a percentage of the total reclaimed water used. The potable quality water offset is calculated by dividing the amount of potable water saved by the amount of reclaimed water used and multiplying the quotient by 100."*

1) Water Use Estimates, Base Year 2015

The estimated amount of reclaimed water used in 2015 is primarily from FDEP's 2015 Reuse Inventory (FDEP 2016). Operators of domestic wastewater facilities with a permitted capacity of 0.1 mgd or greater that produce reclaimed water are required to submit an annual report to FDEP. Smaller facilities were included in estimates where data and information were available. Some wastewater treatment facilities were inactive in 2015, and in these cases redirected flows were included in the new facility locations for both estimates and projections, for example:

- Shores Wastewater Treatment Facility (WWTF) has closed, with wastewater going to Panama City Beach WWTF; and
- Eglin Air Force Base (AFB) Auxiliary Field #3, Auxiliary Field #6, Main Base, and Plew Heights WWTF's have closed with flows now going to Okaloosa County's Arbennie Pritchett Water Reclamation Facility.

2) Future Demand Projections, 2020-2040

Future wastewater flows were estimated by multiplying 2015 wastewater flows by the BEBR medium growth rates to represent growing populations and increasing public supply water use. The 2015 potable offset reuse flow was subtracted from future wastewater flows to determine future estimated availability.

Future potable offset reuse flows presented assume that WWTFs have treatment and disinfection levels suitable for the reuse end uses and that transmission infrastructure is available to reuse customers. Many other factors such as storage capacity, water quality treatment standards, distribution systems, demand locations, and costs were not considered as part of this WSA.

Regional Resource Assessments

The approach and methods to evaluate and assess the adequacy of existing and reasonably anticipated sources of water to meet future needs varies by region and type of water resources.

Groundwater: For groundwater resources, the assessment criteria generally included the evaluation of long-term changes to the potentiometric surface and impacts to groundwater quality. Where appropriate, the potential for groundwater pumpage to reduce groundwater discharge to surface water features (springs, rivers, bays) was evaluated qualitatively by comparing the relative magnitudes of withdrawals to surface water flows. To further assess the magnitude of groundwater withdrawals, regional scale groundwater budgets were re-evaluated. The water budgets were based on output from calibrated steady-state groundwater flow models and provide an approximation of average groundwater conditions. Although steady-state models do not account for seasonal or annual variation in flow, they do provide a means to estimate the relative magnitude of the various inflows to, and outflows from, an aquifer.

Surface Water: For surface water resources, the assessment criteria involved evaluating the sustainability of surface water resources and associated natural systems. The assessments were typically made by comparing the relative magnitudes of withdrawals and surface water flows.

Sources of Uncertainty: Resources assessments are based on best available data and results are subject to the uncertainty associated with those data. Data are collected by the District but are also obtained from other sources, such as other governmental agencies, water use permittees, or published literature. The uncertainty associated with these data varies depending on the qualifications and training of the source, the collection methods, and management of the data. There is also uncertainty associated with modeling results used for water budget evaluations and the order-of-magnitude comparison with estimated water use. Regional groundwater models are being developed as part of MFLs technical assessments, which should improve predictions of future water use impacts on natural systems.

Determining the Need for a Regional Water Supply Plan

Water demand projections and water resource evaluations are compared to determine the adequacy of water resources and conservation efforts to meet existing and projected reasonable-beneficial uses and to sustain water resources and related natural systems over the twenty-year planning horizon. Initiating or updating a regional water supply plan is recommended to the District's governing board if one or both of the following conditions occur:

- If projected future water demands exceed or approach the capacity of available water resources, and/or;
- If projected future water withdrawals would significantly harm the water resources, related natural systems, or ecology of the area.

The methodologies used to determine the need for regional water supply plans, and for recovery and prevention strategies or regulatory reservations, vary according to regional characteristics and type of water resource. Specific methods and criteria are in each regional resource assessment section but may include evaluation of: spring and surface water flows and water levels, changes or drawdown of an aquifer's potentiometric surface, or saltwater intrusion.

APPENDIX 2. DISTRICTWIDE SUMMARY ESTIMATES AND FUTURE DEMAND PROJECTIONS

Appendix 2 summarizes the Northwest Florida Water Management District (NWFWMD or District) population estimates and future projections, estimated water use, water use estimates and projections by source, future demand projections, and alternative reuse and conservation potential.

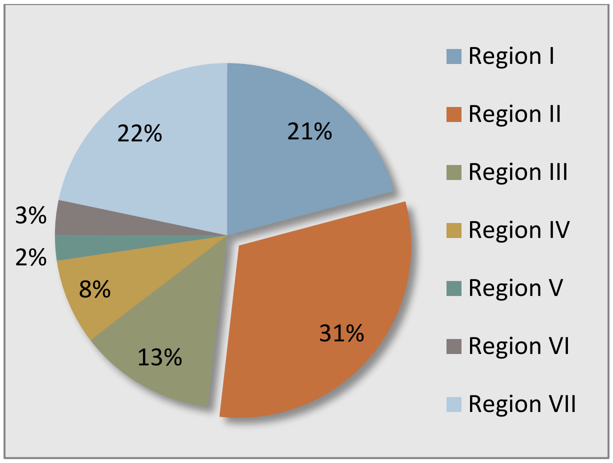

Figure A2.1. Population 2015 by Region

POPULATION: In 2015, the estimated seasonally-adjusted District total population was 1,517,943, about seven percent higher than the BEBR 2015 population estimate. District counties with the highest seasonal rates are estimated to be in regions II, III and V. About 84 percent of the District population is estimated to be served by public sector utilities. Thirty-one percent of all District population in 2015 is estimated to have resided in Region II (Figure A2.1). In addition, close to half (48%) of all districtwide population increases over the planning period are projected to be in Region II. Additional population data is at the end of Appendix 2 in Table A2.2.

In 2015, approximately 65 percent of District populations were in regions I, II and III; 22 percent in Region VII; and the remaining 13 percent in regions IV, V and VI. This spatial distribution of populations is projected to be consistent over time and similar in 2040.

ESTIMATED 2015 WATER USE: Estimated NWFWMD 2015 water use totaled close to 324 mgd. Public supply is close to half, and collectively public supply and domestic self-supply (DSS) comprise 55 percent of all District water use, followed by industrial/commercial/institutional (ICI) at 18 percent (Figure A2.2).

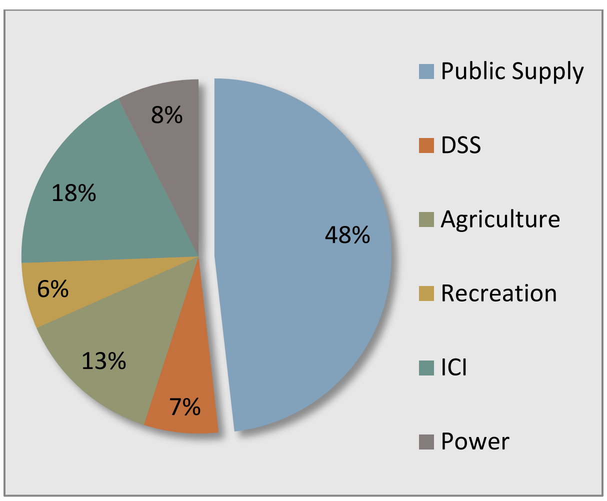

Figure A2.2. 2015 Water Use by Category

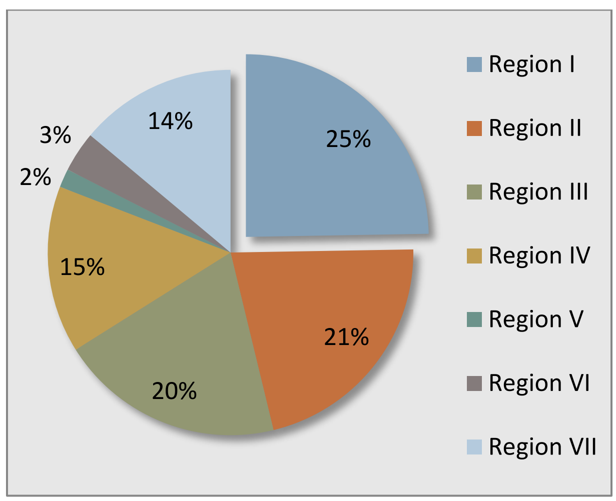

Figure A2.3. 2015 Water Use by Region

Jackson County and Region IV continue to be the dominant agricultural water user, while small-scale recreational landscape irrigation uses are focused in Region II (Table A2.3). The majority of power generation and ICI self-supply water use is in Escambia County (Region I) and Bay County (Region III). Escambia County is estimated to have used one-fourth of all water in 2015 (Figure A2.3).

ESTIMATED WATER USE BY SOURCE: Nearly three-fourths of all District water is provided by groundwater aquifer systems (Figure A2.4). Major aquifer systems are the Floridan and the sand-and-gravel. Ninety percent of sand-and-gravel water use is in Escambia and northwestern parts of Santa Rosa counties. Miscellaneous aquifers supplying just one percent of all water are the intermediate, Claiborne, and surficial aquifers. Three-fourths of all surface water use districtwide is in Bay County, primarily supplied by the Deer Point Lake Reservoir. See Appendix 3 for more information on estimates and projections by source.

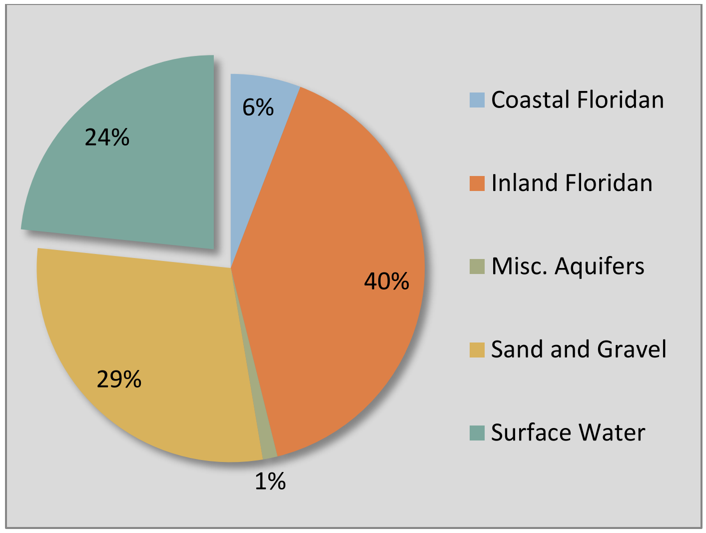

Figure A2.4. 2015 Water Withdrawals by Source

FUTURE DEMAND PROJECTIONS 2020-2040: The two fastest growing counties in the District - Walton and Santa Rosa - are in Region II where there is a projected increase of about 25 mgd or 36 percent in water use by year 2040. Steady increases in water demand are also estimated in regions I, IV and VII. Franklin and Gulf counties in Region V have seasonal populations but overall water use estimates are not expected to change significantly over the planning horizon (Table A2.4). Drought event future demand projections reach about 450 mgd districtwide by year 2040. Region IV has the highest estimated percentage increase in drought conditions due to significance of the agricultural sector (Table A2.5).

ALTERNATIVE WATER SUPPLY AND CONSERVATION: Conservation potential in the public supply sector is up to 14 mgd in Region II and 6 mgd in Region III or a total of up to 20 mgd by 2035-2040 if all cost-effective conservation measures are implemented. The 2015 reuse flow totaled about 24 mgd and the future reuse flows is estimated to be close to 93 mgd districtwide by year 2040, as noted in Table A2.1, below. There are several ongoing projects to expand potable offset reuse in various stages of planning and implementation. Across the District, there are significant opportunities to increase production of potable offset reuse through the planning horizon.

Table A2.1. Reuse Flow 2015 and Future Potential Reuse Availability 2020-2040 (mgd)

REGION	Potable Offset Reuse Flow 2015	Future Beneficial Reuse Estimated Availability					2040 Estimated Availability	
		2020	2025	2030	2035	2040	Mgd	Capacity
Region I	10.62	11.46	11.95	12.35	12.61	12.83	23.45	69.3%
Region II	9.57	21.43	23.50	25.27	26.94	28.24	37.82	71%
Region III	2.58	13.72	14.50	15.17	15.78	16.40	18.98	54%
Region IV	0.34	4.96	5.07	5.15	5.21	5.27	5.61	46.4%
Region V	0.36	1.64	1.66	1.68	1.71	1.72	2.08	32.6%
Region VI	0.00	2.05	2.08	2.11	2.14	2.16	2.16	50%
Region VII	0.68	22.41	23.52	24.43	25.23	26.00	26.68	88.7%
TOTALS	**24.15**	**77.67**	**82.28**	**86.16**	**89.62**	**92.62**	**116.78**	**53%**

Tables A2.2 through A2.5 are attached.

Table A2.2 NWFWMD Population 2015 Estimates and Future Population Projections 2020-2040

Planning Region	County	BEBR 2015 Population Estimates	TOTAL 2015 Population(1) Estimates	Future Population Projections(1)					2015-2040 Change	
				2020	2025	2030	2035	2040	Population(1)	%
I	Escambia	306,944	316,766	324,254	331,375	337,258	341,076	344,275	27,509	8.7%
	Region I Total	**306,944**	**316,766**	**324,254**	**331,375**	**337,258**	**341,076**	**344,275**	**27,509**	**8.7%**
II	Okaloosa	191,898	213,007	223,332	231,657	237,873	243,312	248,085	35,078	16.5%
	Santa Rosa	162,925	166,184	182,274	196,758	209,202	220,422	231,132	64,948	39.1%
	Walton	60,687	90,424	103,257	115,028	125,756	135,739	144,083	53,659	59.3%
	Region II Total	**415,510**	**469,615**	**508,863**	**543,443**	**572,831**	**599,473**	**623,300**	**153,685**	**32.7%**
III	Bay	173,310	194,107	205,072	214,928	223,328	230,944	238,784	44,677	23.0%
	Region III Total	**173,310**	**194,107**	**205,072**	**214,928**	**223,328**	**230,944**	**238,784**	**44,677**	**23.0%**
IV	Calhoun	14,549	14,985	15,450	15,759	16,068	16,377	16,583	1,598	10.7%
	Holmes	19,902	20,101	20,503	20,705	20,907	21,008	21,109	1,008	5.0%
	Jackson	50,458	51,972	52,633	53,251	53,663	53,869	54,281	2,309	4.4%
	Liberty	8,698	9,481	10,028	10,573	11,118	11,554	11,990	2,509	26.5%
	Washington	24,975	25,724	26,677	27,604	28,222	28,737	29,149	3,425	13.3%
	Region IV Total	**118,582**	**122,263**	**125,291**	**127,892**	**129,978**	**131,545**	**133,112**	**10,849**	**8.9%**
V	Franklin	11,840	16,458	16,680	16,819	16,958	17,097	17,097	639	3.9%
	Gulf	16,346	19,942	20,374	20,740	20,984	21,228	21,472	1,530	7.7%
	Region V Total	**28,186**	**36,400**	**37,054**	**37,559**	**37,942**	**38,325**	**38,569**	**2,169**	**6.0%**
VI	Gadsden	48,315	49,475	50,381	51,200	51,917	52,634	53,146	3,671	7.4%
	Region VI Total	**48,315**	**49,475**	**50,381**	**51,200**	**51,917**	**52,634**	**53,146**	**3,671**	**7.4%**
VII	Jefferson(NWF Only)	10,246	10,605	10,810	11,029	11,102	11,248	11,321	716	6.8%
	Leon	284,443	285,865	303,008	318,083	330,545	341,399	351,951	66,086	23.1%
	Wakulla	31,283	32,847	35,175	37,380	39,270	41,055	42,735	9,888	30.1%
	Region VII Total	**325,972**	**329,317**	**348,993**	**366,492**	**380,917**	**393,702**	**406,007**	**76,690**	**23.3%**
	TOTALS	**1,416,819**	**1,517,943**	**1,599,908**	**1,672,889**	**1,734,170**	**1,787,698**	**1,837,193**	**319,250**	**21.0%**

(1) Total estimated populations by county and region, including seasonal adjustments.

Table A2.3 NWFWMD 2015 Estimated Water Use By Category (mgd)

Planning Region	County / Region	1. Public Supply	2. Domestic Self-Supply	3. Agriculture (FSAID)	4. Recreation	5. ICI	6. Power Generation	TOTAL 2015 WATER USE (mgd)
I	Escambia	37.516	1.069	3.348	2.230	25.493	10.590	80.246
	Region I Total	**37.516**	**1.069**	**3.348**	**2.230**	**25.493**	**10.590**	**80.246**
II	Okaloosa	21.810	2.131	0.393	4.366	1.985	-	30.685
	Santa Rosa	14.957	0.257	1.801	1.988	2.690	-	21.693
	Walton	10.712	1.568	0.604	4.439	0.033	-	17.356
	Region II Total	**47.480**	**3.956**	**2.798**	**10.793**	**4.708**	**-**	**69.734**
III	Bay	26.600	1.579	0.880	2.361	23.547	9.472	64.439
	Region III Total	**26.600**	**1.579**	**0.880**	**2.361**	**23.547**	**9.472**	**64.439**
IV	Calhoun	0.404	0.927	3.008	0.005	0.175	-	4.519
	Holmes	1.007	1.295	1.159	0.219	0.006	-	3.686
	Jackson	2.142	3.151	24.227	0.386	1.430	1.834	33.170
	Liberty	0.456	0.488	0.072	0.002	0.377	0.487	1.883
	Washington	0.926	1.674	0.717	0.302	0.456	-	4.076
	Region IV Total	**4.936**	**7.536**	**29.183**	**0.914**	**2.443**	**2.322**	**47.333**
V	Franklin	1.949	0.165	0.006	0.214	0.001	-	2.335
	Gulf	1.966	0.265	0.241	0.093	0.426	-	2.991
	Region V Total	**3.915**	**0.430**	**0.247**	**0.307**	**0.427**	**-**	**5.326**
VI	Gadsden	4.069	1.521	5.370	0.141	0.560	-	11.661
	Region VI Total	**4.069**	**1.521**	**5.370**	**0.141**	**0.560**	**-**	**11.661**
VII	Jefferson (NWF Only)	0.626	0.459	0.774	0.553	-	-	2.411
	Leon	28.725	4.618	0.446	2.091	0.096	1.950	37.925
	Wakulla	2.306	0.854	0.194	0.205	1.105	0.002	4.666
	Region VII Total	**31.657**	**5.931**	**1.413**	**2.848**	**1.201**	**1.952**	**45.002**
	TOTALS	**156.173**	**22.022**	**43.240**	**19.595**	**58.379**	**24.335**	**323.742**
	Percent of water use:	**48.2%**	**6.8%**	**13.4%**	**6.1%**	**18.0%**	**7.5%**	**100.0%**

Table A2.4 NWFWMD Projected Water Demand 2020-2040 (mgd) - Average/Normal Years

Planning Region	County	TOTAL 2015 WATER USE (mgd)	Future Demand Projections - Average/Normal Years 2020	2025	2030	2035	2040	2015-2040 Change mgd	%
I	Escambia	80.246	93.542	98.568	100.547	101.892	103.077	22.831	28.5%
	Region I Total	**80.246**	**93.542**	**98.568**	**100.547**	**101.892**	**103.077**	**22.831**	**28.5%**
II	Okaloosa	30.685	32.090	33.378	34.392	35.141	35.763	5.077	16.5%
	Santa Rosa	21.693	24.947	26.764	28.411	29.839	31.229	9.536	44.0%
	Walton	17.356	19.842	22.110	24.221	26.206	27.887	10.531	60.7%
	Region II Total	**69.734**	**76.879**	**82.251**	**87.025**	**91.185**	**94.879**	**25.144**	**36.1%**
III	Bay	64.439	62.636	65.901	69.231	71.052	72.934	8.495	13.2%
	Region III Total	**64.439**	**62.636**	**65.901**	**69.231**	**71.052**	**72.934**	**8.495**	**13.2%**
IV	Calhoun	4.519	4.792	5.137	5.524	6.134	6.434	1.915	42.4%
	Holmes	3.686	3.792	3.903	4.003	4.105	4.216	0.530	14.4%
	Jackson	33.170	34.282	36.150	37.305	38.546	39.964	6.794	20.5%
	Liberty	1.883	2.028	2.179	2.278	2.361	2.450	0.567	30.1%
	Washington	4.076	4.296	4.614	4.838	5.074	5.293	1.218	29.9%
	Region IV Total	**47.333**	**49.190**	**51.984**	**53.948**	**56.221**	**58.357**	**11.025**	**23.3%**
V	Franklin	2.335	2.367	2.396	2.423	2.444	2.446	0.111	4.7%
	Gulf	2.991	3.110	3.165	3.121	3.244	3.275	0.133	4.4%
	Region V Total	**5.326**	**5.477**	**5.561**	**5.544**	**5.688**	**5.721**	**0.395**	**7.4%**
VI	Gadsden	11.661	11.789	12.180	12.534	12.907	13.182	1.521	13.0%
	Region VI Total	**11.661**	**11.789**	**12.180**	**12.534**	**12.907**	**13.182**	**1.521**	**13.0%**
VII	Jefferson (NWF District Only)	2.411	2.377	2.344	2.354	2.375	2.367	-0.044	-1.8%
	Leon	37.925	43.236	44.860	46.611	48.186	49.734	11.809	31.1%
	Wakulla	4.666	4.965	5.257	5.626	5.841	6.117	1.452	31.1%
	Region VII Total	**45.002**	**50.578**	**52.460**	**54.591**	**56.402**	**58.219**	**13.216**	**29.4%**
	TOTALS	**323.742**	**350.091**	**369.363**	**383.419**	**395.769**	**406.369**	**82.627**	**25.5%**

Table A2.5 NWFWMD Future Projected Water Demand 2020-2040 (mgd) - Dry Years

Planning Region	County / Region	TOTAL 2015 WATER USE (mgd)	Future Demand Projections - Dry Years 2020	2025	2030	2035	2040	2015-2040 Change mgd	%
I	Escambia	80.247	98.163	103.555	105.899	107.554	109.045	28.798	35.9%
	Region I Total	**80.247**	**98.163**	**103.555**	**105.899**	**107.554**	**109.045**	**28.798**	**35.9%**
II	Okaloosa	30.685	35.511	36.925	38.027	38.844	39.512	8.827	28.8%
	Santa Rosa	21.693	27.272	29.361	31.267	32.933	34.559	12.865	59.3%
	Walton	17.356	22.641	25.230	27.644	29.911	31.821	14.465	83.3%
	Region II Total	**69.734**	**85.423**	**91.516**	**96.938**	**101.688**	**105.892**	**36.157**	**51.8%**
III	Bay	64.439	65.870	69.286	72.748	74.695	76.704	12.265	19.0%
	Region III Total	**64.439**	**65.870**	**69.286**	**72.748**	**74.695**	**76.704**	**12.265**	**19.0%**
IV	Calhoun	4.519	5.972	6.456	7.007	7.818	8.240	3.721	82.3%
	Holmes	3.686	4.284	4.440	4.569	4.714	4.867	1.181	32.0%
	Jackson	33.170	44.138	46.735	48.374	50.147	52.099	18.930	57.1%
	Liberty	1.883	2.125	2.291	2.398	2.491	2.595	0.712	37.8%
	Washington	4.075	4.867	5.289	5.569	5.860	6.163	2.087	51.2%
	Region IV Total	**47.332**	**61.385**	**65.210**	**67.917**	**71.031**	**73.964**	**26.631**	**56.3%**
V	Franklin	2.335	2.613	2.622	2.651	2.675	2.677	0.342	14.7%
	Gulf	2.991	3.243	3.297	3.348	3.381	3.415	0.424	14.2%
	Region V Total	**5.326**	**5.856**	**5.919**	**5.999**	**6.056**	**6.092**	**0.766**	**14.4%**
VI	Gadsden	11.661	13.803	14.284	14.719	15.182	15.539	3.879	33.3%
	Region VI Total	**11.661**	**13.803**	**14.284**	**14.719**	**15.182**	**15.539**	**3.879**	**33.3%**
VII	Jefferson (NWF District Only)	2.411	2.845	2.808	2.820	2.845	2.837	0.426	17.7%
	Leon	37.926	46.612	48.400	50.322	52.030	53.729	15.803	41.7%
	Wakulla	4.666	5.342	5.667	6.076	6.320	6.634	1.969	42.2%
	Region VII Total	**45.002**	**54.799**	**56.875**	**59.218**	**61.195**	**63.200**	**18.198**	**40.4%**
	TOTALS	**323.742**	**385.299**	**406.646**	**423.439**	**437.402**	**450.436**	**126.694**	**39.1%**

Appendix 3, Table 3.1. NWFWMD 2015 Water Withdrawals by Source (mgd)

Planning Region	County / Region	Groundwater Aquifer Systems						TOTAL Groundwater	TOTAL Surface Water	TOTAL ESTIMATED WATER USE (mgd)
		a. Coastal Floridan	b. Inland Floridan	c. Inter-mediate	d. Claiborne	e. Sand and Gravel	f. Surficial			
I	Escambia	-	-	-	-	70.692	-	70.692	9.554	80.246
	Region Totals	**-**	**-**	**-**	**-**	**70.692**	**-**	**70.692**	**9.554**	**80.246**
II	Okaloosa	13.006	11.203	-	-	2.690	-	26.899	1.336	28.235
	Santa Rosa	1.398	0.461	-	-	19.706	-	21.565	0.128	21.693
	Walton	1.572	13.758	0.182	-	1.502	0.453	17.467	2.339	19.806
	Region Totals	**15.976**	**25.422**	**0.182**	**-**	**23.898**	**0.453**	**65.931**	**3.803**	**69.734**
III	Bay	0.544	5.179	0.268	-	0.015	1.539	7.546	56.892	64.439
	Region Totals	**0.544**	**5.179**	**0.268**	**-**	**0.015**	**1.539**	**7.546**	**56.892**	**64.439**
IV	Calhoun	-	4.072	0.371	-	-	-	4.443	0.076	4.519
	Holmes	-	3.339	-	0.320	-	-	3.659	-	3.659
	Jackson	-	31.315	-	0.250	-	-	31.565	1.605	33.170
	Liberty	-	1.605	0.195	-	-	0.056	1.857	0.026	1.882
	Washington	-	4.102	-	-	-	-	4.102	-	4.102
	Region Totals	**-**	**44.434**	**0.566**	**0.570**	**-**	**0.056**	**45.625**	**1.707**	**47.333**
V	Franklin	1.950	0.089	0.083	-	-	-	2.121	0.214	2.335
	Gulf	0.398	0.928	0.183	-	-	0.047	1.555	1.436	2.991
	Region Totals	**2.348**	**1.016**	**0.265**	**-**	**-**	**0.047**	**3.676**	**1.650**	**5.326**
VI	Gadsden	-	8.999	-	-	-	-	8.999	2.662	11.661
	Region Totals	**-**	**8.999**	**-**	**-**	**-**	**-**	**8.999**	**2.662**	**11.661**
VII	Jefferson (NWF Only)	-	2.412	-	-	-	-	2.412	-	2.412
	Leon	-	38.395	-	-	-	-	38.395	-	38.395
	Wakulla	-	4.193	-	-	-	-	4.193	0.002	4.195
	Region Totals	**-**	**45.000**	**-**	**-**	**-**	**-**	**45.000**	**0.002**	**45.002**
DISTRICT TOTALS		**18.868**	**130.050**	**1.282**	**0.570**	**94.606**	**2.095**	**247.470**	**76.271**	**323.742**
							Percentage of Water Source:	**76.4%**	**23.6%**	**100.0%**

Appendix 3, Table 3.2. NWFWMD 2015 Water Withdrawals and 2040 Production Projections by Source (mgd)

Planning Region	County / Region	2015 Estimated Water Use (mgd)			Average / Normal Year 2040 Projected Water Use[1] (mgd)			Dry / Drought Year 2040 Projected Water Use[1] (mgd)		
		Ground Water	Surface Water	TOTAL WITHDRAWALS	GW	SW	Totals	GW	SW	Totals
I	Escambia	70.692	9.554	80.246	89.165	13.912	103.077	94.438	14.607	109.045
	Region Totals	**70.692**	**9.554**	**80.246**	**89.165**	**13.912**	**103.077**	**94.438**	**14.607**	**109.045**
II	Okaloosa	26.899	1.336	28.235	30.579	1.454	32.033	32.212	1.744	33.956
	Santa Rosa	21.565	0.128	21.693	31.034	0.196	31.230	34.327	0.232	34.559
	Walton	17.467	2.339	19.806	26.862	3.477	30.338	30.026	4.418	34.444
	Region Totals	**65.931**	**3.803**	**69.734**	**65.931**	**3.803**	**93.602**	**65.931**	**3.803**	**102.959**
III	Bay	7.546	56.892	64.439	8.243	64.691	72.934	8.611	68.093	76.704
	Region Totals	**7.546**	**56.892**	**64.439**	**8.243**	**64.691**	**72.934**	**8.611**	**68.093**	**76.704**
IV	Calhoun	4.443	0.076	4.519	6.322	0.112	6.434	8.095	0.145	8.240
	Holmes	3.659	-	3.659	4.189	-	4.189	4.838	-	4.838
	Jackson	31.565	1.605	33.170	38.015	1.949	39.964	49.531	2.568	52.099
	Liberty	1.857	0.026	1.882	2.415	0.035	2.450	2.558	0.037	2.595
	Washington	4.102	-	4.102	5.320	-	5.320	6.192	-	6.192
	Region Totals	**45.625**	**1.707**	**47.333**	**56.262**	**2.096**	**58.358**	**71.214**	**2.750**	**73.964**
V	Franklin	2.121	0.214	2.335	2.231	0.215	2.446	2.415	0.262	2.677
	Gulf	1.555	1.436	2.991	1.667	1.607	3.275	1.768	1.647	3.415
	Region Totals	**3.676**	**1.650**	**5.326**	**3.899**	**1.822**	**5.721**	**4.183**	**1.909**	**6.092**
VI	Gadsden	8.999	2.662	11.661	10.180	3.001	13.182	11.825	3.714	15.539
	Region Totals	**8.999**	**2.662**	**11.661**	**10.180**	**3.001**	**13.182**	**11.825**	**3.714**	**15.539**
VII	Jefferson (NWF Only)	2.412	-	2.412	2.367	-	2.367	2.837	-	2.837
	Leon	38.395	-	38.395	50.342	-	50.342	54.379	-	54.379
	Wakulla	4.193	0.002	4.195	5.506	0.003	5.509	5.980	0.003	5.983
	Region Totals	**45.000**	**0.002**	**45.002**	**58.215**	**0.003**	**58.218**	**63.196**	**0.003**	**63.199**
	DISTRICT TOTALS	**247.470**	**76.271**	**323.742**	**291.895**	**89.328**	**405.091**	**319.398**	**94.879**	**447.502**

(1) Production projections vary marginally (<1%) from demand projections.

Percentage of Water Source:	**72.1%**	**22.1%**		**71.4%**	**21.2%**

APPENDIX 4. PUBLIC SUPPLY UTILITY DATA

Contents

Appendix 4a. 2015 Public Supply Water Demand, Populations Served, and Per Capita Water Use

		Reported Water Demand (mgd)				Populations and Per Capita Water Use (gpd)		
Planning Region	County / Region	Reported Pumpage	Imports	Exports	Water Demand	Public Supply Total Adjusted(1) 2015 Population Served	Average GROSS Per Capita Water Use	Average RESIDENTIAL Per Capita Water Use
I	Escambia	37.516	-	-	37.516	304,750	123.11	76.47
	Totals/Average Per Capita	**37.516**	**0.000**	**0.000**	**37.516**	**304,750**	**123.11**	**76.47**
II	Okaloosa	19.360	4.204	1.754	21.810	189,067	115.36	89.23
	Santa Rosa	14.957	3.853	3.853	14.957	163,293	91.60	64.97
	Walton	13.162	2.968	5.418	10.712	72,808	147.13	96.30
	Totals/Average Per Capita	**47.480**	**11.025**	**11.025**	**47.480**	**425,168**	**111.67**	**83.00**
III	Bay	26.600	23.099	23.099	26.600	176,364	150.82	76.33
	Totals/Average Per Capita	**26.600**	**23.099**	**23.099**	**26.600**	**176,364**	**150.82**	**76.33**
IV	Calhoun	0.404	-	-	0.404	4,568	88.40	55.21
	Holmes	0.981	0.027	-	1.007	5,547	181.56	59.57
	Jackson	2.142	-	-	2.142	16,563	129.32	51.98
	Liberty	0.456	-	-	0.456	4,003	113.95	114.79
	Washington	0.953	-	0.027	0.926	6,910	134.07	68.91
	Totals/Average Per Capita	**4.935**	**0.027**	**0.027**	**4.935**	**37,591**	**131.29**	**68.96**
V	Franklin	1.949	0.077	0.077	1.949	14,637	133.18	100.37
	Gulf	1.966	-	-	1.966	16,313	120.52	53.96
	Totals/Average Per Capita	**3.915**	**0.077**	**0.077**	**3.915**	**30,950**	**126.51**	**83.15**
VI	Gadsden	4.069	-	-	4.069	32,390	125.63	68.71
	Totals/Average Per Capita	**4.069**	**0.000**	**0.000**	**4.069**	**32,390**	**125.63**	**68.71**
VII	Jefferson (NWF District Only)	0.626	-	-	0.626	5,445	114.98	78.88
	Leon	29.196	-	0.472	28.725	233,981	122.77	65.26
	Wakulla	1.835	0.472	-	2.306	23,256	99.17	75.65
	Totals/Average Per Capita	**31.657**	**0.472**	**0.472**	**31.657**	**262,682**	**120.51**	**66.62**
	DISTRICT TOTALS/AVERAGE	**156.172**	**34.700**	**34.700**	**156.172**	**1,269,895**	**122.98**	**73.41**

(1) Populations served include seasonal resident adjustments.

(2) Million gallons per day (mgd) or gallons per day (gpd).

Appendix 4b. Public Supply Utility Data - Estimates and Projections, Demand and Production

REGION I

ESCAMBIA COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR, gpd)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Bratt-Davisville Water System, Inc.	182,074	1,970	92	182,908	184,282	185,518	185,607	185,607
Central Water Works, Inc.	264,360	2,448	108	265,571	267,565	269,361	269,490	269,490
Century, Town of	557,713	3,056	182	557,713	557,713	557,713	557,713	557,713
Cottage Hill Water Works, Inc.	427,232	3,020	141	429,189	432,412	435,314	435,523	435,523
Emerald Coast Utilities Authority (ECUA)	31,965,781	249,872	128	32,721,436	33,440,016	34,033,626	34,418,951	34,741,792
Farm Hill Utilties, Inc.	556,310	4,174	133	580,245	599,694	617,599	632,313	645,759
Gonzalez Utilities Association, Inc.	490,758	4,543	108	502,359	513,391	522,505	528,421	533,377
Molino Utilities, Inc	681,329	6,285	108	697,435	712,751	725,404	733,617	740,498
People's Water Service Company	2,199,044	27,737	79	2,293,656	2,370,538	2,441,312	2,499,476	2,552,630
Walnut Hill Water Works	191,740	1,645	117	192,618	194,065	195,367	195,461	195,461
REGION I TOTALS (gpd)	**37,516,341**	**304,750**		**38,423,130**	**39,272,427**	**39,983,719**	**40,456,571**	**40,857,849**
REGION I mgd	**37.516**			**38.423**	**39.272**	**39.984**	**40.457**	**40.858**

REGION II

OKALOOSA COUNTY	2015 Baseline Estimates			Gross Water DEMAND Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR, gpd)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Auburn Water System	1,695,214	15,411	110	1,817,582	1,911,093	1,990,885	2,065,772	2,136,187
Baker Water System	203,877	2,293	89	213,760	221,728	227,677	232,883	237,452
Blackman Community Water System	29,641	557	53	29,937	30,237	30,539	30,845	31,153
Crestview, City of	2,414,112	23,488	103	2,588,373	2,721,540	2,835,170	2,941,815	3,042,090
Destin Water Users	3,941,006	22,527	175	4,030,383	4,109,716	4,163,781	4,200,518	4,222,986
Fort Walton Beach, City of	2,486,537	21,008	118	2,607,069	2,704,251	2,776,813	2,840,305	2,896,023
Holt Water Works, Inc.	144,918	2,077	70	151,943	157,607	161,836	165,536	168,783
Laurel Hill, City of	112,051	1,397	80	112,051	112,051	112,051	112,051	112,051
Mary Esther, Town of	430,581	3,950	109	430,581	430,581	430,581	430,581	430,581
Milligan Water System	146,370	1,600	91	146,370	146,676	146,676	146,676	146,676
Niceville, City of	2,318,542	19,344	120	2,469,803	2,628,017	2,786,230	2,944,443	3,102,656
Okaloosa Co. Water & Sewer, Bluewater	1,148,151	11,613	99	1,203,806	1,248,680	1,282,185	1,311,502	1,337,230
Okaloosa Co. Water & Sewer, Main (Garniers)	4,360,246	41,903	104	4,459,131	4,546,903	4,606,720	4,647,365	4,672,223
Okaloosa Co. Water & Sewer, Mid-County	1,474,566	13,892	106	1,546,044	1,603,674	1,669,236	1,741,202	1,813,062
So. Walton Utility Co. (Okaloosa portion)	*457,477*	*3,567*	*128*	*479,653*	*497,532*	*510,882*	*522,564*	*532,815*
Valparaiso, City of	447,001	4,441	101	457,138	466,137	472,269	476,436	478,984
Okaloosa County TOTALS (gpd)	**21,810,290**	**189,067**		**22,743,622**	**23,536,421**	**24,203,532**	**24,810,495**	**25,360,951**

Okaloosa County PRODUCTION	Estimates	Water PRODUCTION Pumpage (ADR, gpd)				
Public Supply Utility or Service Area	**Production (ADR, gpd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Auburn Water System	1,695,214	1,817,582	1,911,093	1,990,885	2,065,772	2,136,187
Baker Water System	203,877	213,760	221,728	227,677	232,883	237,452
Blackman Community Water System	29,641	29,937	30,237	30,539	30,845	31,153
Crestview, City of	2,414,112	2,588,373	2,721,540	2,835,170	2,941,815	3,042,090
Destin Water Users	1,941,773	1,770,000	1,770,000	1,770,000	1,770,000	1,770,000
Fort Walton Beach, City of	2,486,537	2,607,069	2,704,251	2,776,813	2,840,305	2,896,023
Holt Water Works, Inc.	144,918	151,943	157,607	161,836	165,536	168,783
Laurel Hill, City of	112,051	112,051	112,051	112,051	112,051	112,051
Mary Esther, Town of	430,581	430,581	430,581	430,581	430,581	430,581
Milligan Water System	146,370	146,370	146,676	146,676	146,676	146,676
Niceville, City of	2,318,542	2,469,803	2,628,017	2,786,230	2,944,443	3,102,656
Okaloosa Co. Water & Sewer, Bluewater	1,148,151	1,203,806	1,248,680	1,282,185	1,311,502	1,337,230
Okaloosa Co. Water & Sewer, Main (Garniers)	3,749,718	3,834,757	3,910,239	3,961,680	3,996,634	4,018,011
Okaloosa Co. Water & Sewer, Mid-County	2,091,885	2,193,286	2,275,044	2,336,090	2,389,505	2,436,379
So. Walton Utility Co. (Okaloosa portion)	-	-	-	-	-	-
Valparaiso, City of	447,001	457,138	466,137	472,269	476,436	478,984
Okaloosa County TOTALS (gpd)	**19,360,371**	**20,026,456**	**20,733,879**	**21,320,682**	**21,854,984**	**22,344,256**

Appendix 4b. Public Supply Utility Data - Estimates and Projections, Demand and Production

SANTA ROSA COUNTY	2015 Baseline Estimates			Gross Water DEMAND Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR, gpd)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Bagdad-Garcon Point Water System	492,923	5,756	86	523,556	552,958	577,800	598,340	616,520
Berrydale Water System†	256,742	2,276	113	263,794	272,461	279,710	284,595	288,062
Chumuckla Water System	324,696	3,842	85	365,202	399,839	432,043	462,787	493,437
East Milton Water System	1,486,145	10,654	139	1,671,543	1,830,077	1,977,478	2,118,193	2,258,477
Fairpoint Regional Utility System (FRUS)	-	-	-	-	-	-	-	-
Gulf Breeze Water Department	725,694	5,771	126	732,951	740,280	801,017	817,365	833,712
Holley-Navarre Water System, Inc.	2,574,002	36,309	71	2,895,110	3,169,692	3,424,990	3,668,708	3,911,681
Jay, City of	127,145	1,355	94	130,637	134,929	138,519	140,938	142,655
Midway Water System	1,360,173	15,818	86	1,397,532	1,443,449	1,481,852	1,507,732	1,526,099
Milton, City of	1,710,236	17,104	100	1,816,519	1,918,533	2,004,723	2,075,988	2,139,067
Moore Creek-Mt. Carmel Utilities, Inc.	259,838	3,081	84	266,975	275,746	283,083	288,027	291,535
Pace Water System, Inc.	3,829,685	36,474	105	4,307,441	4,715,972	5,095,813	5,458,424	5,819,928
Point Baker Water System	804,197	9,105	88	904,521	990,309	1,070,072	1,146,217	1,222,129
Santa Rosa BOCC, Navarre Beach	291,831	3,982	73	299,847	309,698	415,540	477,908	540,202
South Santa Rosa Utilities	713,567	11,768	61	733,166	757,255	777,402	790,979	800,614
Santa Rosa County TOTALS (gpd)	**14,956,874**	**163,293**		**16,308,793**	**17,511,199**	**18,760,042**	**19,836,201**	**20,884,118**

Santa Rosa County PRODUCTION	Estimates	Water PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Production (ADR, gpd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Bagdad-Garcon Point Water System	492,923	523,556	552,958	577,800	598,340	616,520
Berrydale Water System†	256,742	263,794	272,461	279,710	284,595	288,062
Chumuckla Water System	324,696	365,202	399,839	432,043	462,787	493,437
East Milton Water System	1,486,145	1,671,543	1,830,077	1,977,478	2,118,193	2,258,477
Fairpoint Regional Utility System (FRUS)	***3,823,304***	***4,095,240***	***4,397,391***	***4,859,648***	***5,209,293***	***5,550,218***
Gulf Breeze Water Department	-	-	-	-	-	-
Holley-Navarre Water System, Inc.	1,122,123	1,262,109	1,300,000	1,300,000	1,300,000	1,300,000
Jay, City of	127,145	130,637	134,929	138,519	140,938	142,655
Midway Water System	643,580	661,257	682,983	701,154	713,399	722,089
Milton, City of	1,710,236	1,816,519	1,918,533	2,004,723	2,075,988	2,139,067
Moore Creek-Mt. Carmel Utilities, Inc.	259,838	266,975	275,746	283,083	288,027	291,535
Pace Water System, Inc.	3,829,685	4,307,441	4,715,972	5,095,813	5,458,424	5,819,928
Point Baker Water System	804,197	904,521	990,309	1,070,072	1,146,217	1,222,129
Santa Rosa BOCC, Navarre Beach	**76,260**	40,000	40,000	40,000	40,000	40,000
South Santa Rosa Utilities	-	-	-	-	-	-
Santa Rosa County TOTALS (gpd)	**14,956,874**	**16,308,793**	**17,511,199**	**18,760,042**	**19,836,201**	**20,884,118**

WALTON COUNTY	2015 Baseline Estimates			Gross Water DEMAND Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Argyle Water System	64,452	774	83	65,419	66,400	67,396	68,407	69,433
DeFuniak Springs, City of	1,365,957	9,525	143	1,440,527	1,521,556	1,595,834	1,652,104	1,681,365
FCSC of Walton Co. / Regional Utilities	***4,006,249***	***32,628***	***123***	***4,703,565***	***5,318,646***	***5,921,242***	***6,510,795***	***7,046,831***
Freeport, City of	1,519,201	7,604	200	1,734,776	1,932,540	2,112,846	2,280,606	2,420,863
Freeport, North Bay Water System	131,213	2,130	62	138,376	146,160	153,295	158,700	161,511
Inlet Beach	127,950	1,603	80	150,221	169,865	189,110	207,939	225,059
Mossy Head Water Works	261,496	3,162	83	275,771	291,284	305,503	316,275	321,877
Paxton, City of	194,468	1,457	134	194,468	194,468	194,468	194,468	194,468
So. Walton Utility Co., Rockhill Well Field	***(3,115)***	-	-	-	-	-	-	-
SWUC, Coastal Well Field (Walton portion)	*3,044,512*	13,926	*219*	*3,574,431*	*4,041,856*	*4,499,793*	*4,947,819*	*5,355,174*
Walton County TOTALS (gpd)	**10,712,383**	**72,808**		**12,277,553**	**13,682,774**	**15,039,487**	**16,337,114**	**17,476,580**
REGION II TOTALS (gpd)	**47,479,547**	**425,168**		**51,329,968**	**54,730,395**	**58,003,060**	**60,983,809**	**63,721,650**
REGION II mgd	**47.480**			**51.330**	**54.730**	**58.003**	**60.984**	**63.722**

Appendix 4b. Public Supply Utility Data - Estimates and Projections, Demand and Production

Walton County PRODUCTION	Estimate	Water PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Production (ADR, gpd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Argyle Water System	64,452	65,419	66,400	67,396	68,407	69,433
DeFuniak Springs, City of	1,365,957	1,440,527	1,521,556	1,595,834	1,652,104	1,681,365
FCSC of Walton Co. / Regional Utilities	***3,240,429***	***4,703,565***	***5,318,646***	***5,921,242***	***6,510,795***	***7,046,831***
Freeport, City of	2,306,961	1,734,776	1,932,540	2,112,846	2,280,606	2,420,863
Freeport, North Bay Water System	131,213	138,376	146,160	153,295	158,700	161,511
Inlet Beach	114,449	150,221	169,865	189,110	207,939	225,059
Mossy Head Water Works, Inc.†	261,496	275,771	291,284	305,503	316,275	321,877
Paxton, City of	194,468	194,468	194,468	194,468	194,468	194,468
So. Walton Utility Co., Rockhill Well Field	***4,156,118***	***5,184,466***	***5,749,103***	***6,274,457***	***6,770,901***	***7,210,974***
SWUC, Coastal Well Field (Walton portion)	*1,326,759*	*1,130,000*	*1,130,000*	*1,130,000*	*1,130,000*	*1,130,000*
Walton County TOTALS (gpd)	**13,162,302**	**15,017,588**	**16,520,022**	**17,944,150**	**19,290,196**	**20,462,381**
REGION II TOTALS (gpd)	**47,479,547**	**51,352,837**	**54,765,100**	**58,024,875**	**60,981,381**	**63,690,755**
REGION II mgd	**47.480**	**51.353**	**54.765**	**58.025**	**60.981**	**63.691**

REGION III

BAY COUNTY	2015 Baseline Estimates			Gross Water DEMAND Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Bay County BOCC (includes Sandy Creek)	2,876,661	12,225	235	3,039,159	3,185,224	3,309,712	3,422,581	3,538,769
BOCC Cedar Grove	*435,980*	*2,946*	148	446,898	458,416	467,904	475,207	482,310
BOCC GCEC (North Bay, Lake Merial)	*623,430*	*8,500*	73	676,633	719,523	759,491	797,950	838,115
Callaway	1,449,519	14,800	98	1,485,818	1,524,111	1,555,659	1,579,939	1,603,554
Lynn Haven, City of	2,111,094	20,740	102	2,291,251	2,436,490	2,571,830	2,702,063	2,838,072
Mexico Beach	354,035	2,488	142	374,034	392,010	407,331	421,222	435,522
Panama City	5,302,712	37,640	141	5,435,502	5,575,589	5,690,998	5,779,821	5,866,213
Panama City Beach	12,206,968	63,693	192	13,248,691	14,088,505	14,871,082	15,624,127	16,410,570
Parker	363,291	4,317	84	**372,363**	**373,626**	**374,047**	**374,467**	**374,467**
Springfield	856,387	9,015	95	856,387	859,371	861,360	861,360	861,360
Region III TOTALS (gpd)	**26,580,077**	**176,364**		**28,226,735**	**29,612,866**	**30,869,413**	**32,038,738**	**33,248,953**
REGION III mgd	**26.580**			**28.227**	**29.613**	**30.869**	**32.039**	**33.249**

Bay County PRODUCTION	Estimates	Water PRODUCTION Projections (ADR, gpd)				
Moore Creek-Mt. Carmel Utilities, Inc.	**Production (ADR, gpd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Bay County BOCC (includes Sandy Creek)	***24,966,658***	***26,468,965***	***27,745,189***	***28,870,710***	***29,957,968***	***31,077,670***
BOCC Cedar Grove		-	-	-	-	-
BOCC GCEC (North Bay, Lake Merial)		-	-	-	-	-
Callaway		-	-	-	-	-
Lynn Haven, City of	1,613,419	1,757,770	1,867,677	1,998,703	2,080,770	2,171,283
Mexico Beach		-	-	-	-	-
Panama City		-	-	-	-	-
Panama City Beach		-	-	-	-	-
Parker		-	-	-	-	-
Springfield		-	-	-	-	-
Region III TOTALS (gpd)	**26,580,077**	**28,226,735**	**29,612,866**	**30,869,413**	**32,038,738**	**33,248,953**
REGION III mgd	**26.580**	**28.227**	**29.613**	**30.869**	**32.039**	**33.249**

Appendix 4b. Public Supply Utility Data - Estimates and Projections, Demand and Production

REGION IV

CALHOUN COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR, gpd)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Altha	78,578	668	118	78,583	78,812	79,018	79,018	79,018
Blountstown	325,241	3,900	83	325,263	326,209	327,060	327,060	327,060
Calhoun County TOTALS (gpd)	**403,819**	**4,568**		**403,847**	**405,021**	**406,078**	**406,078**	**406,078**

HOLMES COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Bonifay, City of	748,700	3,673	204	748,700	748,700	748,700	748,700	748,700
Caryville, Town of (Holmes portion)	*26,577*	*147*	181	26,577	26,577	26,577	26,577	26,577
Esto Water Works	38,087	360	106	38,087	38,849	38,849	38,849	38,849
Joyce E. Snare Waterworks	23,323	319	73	23,323	23,323	23,323	23,323	23,323
Noma, Town of	58,067	216	269	58,067	58,067	58,067	58,067	58,067
Ponce de Leon, Town of	72,956	534	137	72,956	72,956	72,956	72,956	72,956
Westville, Town of	39,401	298	132	39,401	39,401	39,401	39,401	39,401
Holmes County TOTALS (gpd)	**1,007,111**	**5,547**		**1,007,111**	**1,007,873**	**1,007,873**	**1,007,873**	**1,007,873**

JACKSON COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR, gpd)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Alford, Town of	50,771	500	102	50,771	50,771	50,771	50,771	50,771
Campbellton, Town of	25,683	267	96	25,683	25,683	25,683	25,683	25,683
Cottondale	145,767	1,223	119	147,225	148,697	150,184	151,686	153,203
Graceville	649,850	2,830	230	649,850	649,850	649,850	649,850	649,850
Grand Ridge	90,705	892	102	90,705	90,705	90,705	90,705	90,705
Greenwood	61,293	693	88	61,293	61,293	61,293	61,293	61,293
Jackson County Utilities, Plant 1	218,195	475	459	220,971	223,566	225,295	226,160	227,890
Jacob, City of	20,688	202	102	20,688	20,688	20,688	20,688	20,688
Malone	56,873	875	65	57,597	58,273	58,724	58,949	59,400
Marianna	894,334	6,500	138	927,868	952,358	972,256	990,130	1,010,529
Sneads	249,888	2,106	119	253,067	256,039	258,020	259,010	260,991
Jackson County TOTALS (gpd)	**2,464,047**	**16,563**		**2,505,718**	**2,537,922**	**2,563,469**	**2,584,925**	**2,611,003**

LIBERTY COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR, gpd)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Bristol, City of	202,356	1,724	117	207,055	212,682	218,163	222,441	225,345
Liberty Co. BOCC, Estiffanulga Water System	25,141	281	89	25,725	26,424	27,105	27,636	27,997
Liberty Co. BOCC, Hosford-Telogia	117,767	1,290	91	117,767	117,767	117,767	117,767	117,767
Liberty Co. BOCC, Lake Mystic Water System	36,627	314	117	40,004	42,928	45,840	48,517	51,179
Liberty Co. BOCC, Rock Bluff Water System	51,989	166	313	53,196	54,642	56,050	57,149	57,895
Sumatra Water System	13,829	163	85	13,829	13,829	13,829	13,829	13,829
Talquin Electric Coop, Sweetwater System	8,446	65	130	8,642	8,877	9,106	9,284	9,406
Liberty County TOTALS (gpd)	**456,155**	**4,003**		**466,219**	**477,149**	**487,860**	**496,624**	**503,418**

WASHINGTON COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Water Supply Utility or Service Area	**Gross Water Use (ADR)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Sunny Hills Utilities (formerly Aqua Utilities)	171,258	1,403	122	172,458	174,748	175,982	176,121	176,121
Caryville, Town of (Washington portion)	*68,341*	*378*	*181*	*68,820*	*69,733*	*70,226*	*70,281*	*70,281*
Chipley, City of	577,370	3,829	151	581,416	589,135	593,295	593,764	593,764
Vernon, City of	69,868	750	93	69,868	69,868	69,868	69,868	69,868
Wausau, Town of	39,605	550	72	39,883	40,412	40,697	40,730	40,730
Washington County TOTALS (gpd)	**926,442**	**6,910**		**932,444**	**943,896**	**950,068**	**950,764**	**950,764**
REGION IV TOTALS (gpd)	**5,257,574**	**37,591**		**5,315,339**	**5,371,861**	**5,415,348**	**5,446,265**	**5,479,136**
REGION IV mgd	**5.258**			**5.315**	**5.372**	**5.415**	**5.446**	**5.479**

Appendix 4b. Public Supply Utility Data - Estimates and Projections, Demand and Production

REGION V

FRANKLIN COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	Gross Water Use (ADR)	Populations Served	Gross Per Capita (gpcd)	2020	2025	2030	2035	2040
Alligator Point Water Resources District	85,602	1,423	60	86,759	87,482	88,205	88,928	88,928
Apalachicola, City of	538,405	3,828	141	545,673	550,203	554,769	559,318	559,318
Carrabelle, City of	392,558	2,500	157	397,863	401,178	404,494	407,809	407,809
Carrabelle, City of (Lanark Village)	77,286	1,625	48	78,330	78,983	79,636	80,289	80,289
Eastpoint Water and Sewer District	326,511	2,452	133	330,923	333,681	336,439	339,196	339,196
St. James Island Utility Company	11,585	25	463	12,084	12,420	12,705	12,987	13,214
Water Management Services, Inc.	517,375	2,754	188	524,367	528,736	533,106	537,476	537,476
Franklin County TOTALS (gpd)	**1,949,322**	**14,607**		**1,975,999**	**1,992,683**	**2,009,353**	**2,026,003**	**2,026,230**

GULF COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	Gross Water Use (ADR, gpd)	Populations Served	Gross Per Capita (gpcd)	2020	2025	2030	2035	2040
Lighthouse Utilities Company, Inc.	388,170	4,210	92	408,432	422,483	434,059	445,518	457,992
Port St. Joe	1,447,396	10,801	134	1,478,742	1,505,306	1,523,015	1,540,725	1,558,434
Wewahitchka	130,422	1,949	67	133,247	135,640	137,236	138,832	140,427
Gulf County TOTALS (gpd)	**1,965,988**	**16,960**		**2,020,421**	**2,063,429**	**2,094,310**	**2,125,074**	**2,156,854**
REGION V TOTALS (gpd)	**3,915,310**	**31,567**		**3,996,420**	**4,056,112**	**4,103,663**	**4,151,077**	**4,183,084**
REGION V mgd	**3.915**			**3.996**	**4.056**	**4.104**	**4.151**	**4.183**

REGION VI

GADSDEN COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	Gross Water Use (ADR, gpd)	Populations Served	Gross Per Capita (gpcd)	2020	2025	2030	2035	2040
Chattahoochee	399,206	3,885	103	401,202	403,208	405,224	407,250	409,286
Greensboro	53,595	618	87	53,863	54,132	54,403	54,675	54,948
Gretna	456,589	1,566	292	475,820	490,314	504,682	518,494	530,765
Havana	433,534	3,977	109	437,869	442,248	451,093	455,604	460,160
Quincy, City of	1,208,684	8,834	137	1,230,824	1,297,961	1,335,997	1,372,558	1,405,043
Rosedale Water Association	-	426		-	-	-	-	-
Talquin Electric Coop, Gadsden Co. Regional	1,492,007	12,875	116	1,519,337	1,602,210	1,649,163	1,694,294	1,734,393
Talquin Electric Coop, Hammock Creek	5,930	40	148	6,039	6,137	6,223	6,309	6,370
Talquin Electric Coop, Jamieson	11,894	71	168	12,112	12,309	12,481	12,653	12,777
Talquin Electric Coop, St. James	7,844	98	80	7,988	8,118	8,231	8,345	8,426
Gadsden County and Region VI TOTALS (gpd)	**4,069,283**	**32,390**		**4,145,053**	**4,316,636**	**4,427,497**	**4,530,181**	**4,622,168**
mgd	**4.069**			**4.145**	**4.317**	**4.427**	**4.530**	**4.622**

Appendix 4b. Public Supply Utility Data - Estimates and Projections, Demand and Production

REGION VII

JEFFERSON COUNTY	2015 Baseline Estimates			DEMAND and PRODUCTION Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Jefferson Communities Water System	254,225	1,521	167	259,145	264,398	266,149	269,651	271,402
Monticello, City of	371,814	3,924	95	379,010	386,693	389,254	394,375	396,936
Jefferson County TOTALS (gpd)	**626,039**	**5,445**		**638,155**	**651,091**	**655,403**	**664,026**	**668,338**

LEON COUNTY	2015 Baseline Estimates			Gross Water DEMAND Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Seminole Waterworks (all service areas)	125,964	1,721	73	126,831	128,248	129,399	129,753	129,798
Tallahassee, City of (Leon portion)	***25,159,153***	***200,726***	***125***	***27,256,051***	***27,567,677***	***29,047,792***	***30,423,922***	***31,800,817***
Talquin Electric Coop (all service areas)	3,226,942	30,157	107	3,429,375	3,604,885	3,752,993	3,883,588	4,011,258
Small Public Systems (all service areas)	212,650	1,377	154	216,334	219,247	220,956	223,379	225,175
Leon County TOTALS (gpd)	**28,724,709**	**233,981**		**31,028,591**	**31,520,057**	**33,151,140**	**34,660,643**	**36,167,047**

Leon County PRODUCTION	Estimates	Water PRODUCTION Pumpage (ADR, gpd)				
Public Supply Utility or Service Area	**Production (ADR, gpd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Seminole Waterworks (all service areas)	125,964	126,831	128,248	129,399	129,753	129,798
Tallahassee, City of (Leon portion)	***25,630,710***	***27,765,915***	***28,088,473***	***29,597,530***	***31,002,991***	***32,408,455***
Talquin Electric Coop (all service areas)	3,226,942	3,429,375	3,604,885	3,752,993	3,883,588	4,011,258
Small Public Systems (all service areas)	212,650	216,334	219,247	220,956	223,379	225,175
Leon County TOTALS (gpd)	**29,196,266**	**31,538,455**	**32,040,853**	**33,700,878**	**35,239,711**	**36,774,685**

WAKULLA COUNTY	2015 Baseline Estimates			Gross Water DEMAND Projections (ADR, gpd)				
Public Supply Utility or Service Area	**Gross Water Use (ADR)**	**Populations Served**	**Gross Per Capita (gpcd)**	**2020**	**2025**	**2030**	**2035**	**2040**
Panacea Area Water System, Inc.	199,737	2,470	81	207,507	215,658	222,458	228,544	233,919
Sopchoppy, Town of	847,502	9,125	93	907,564	964,456	1,013,220	1,059,276	1,102,622
St. Marks, City of, Water Sys.	87,096	643	135	87,096	87,096	87,096	87,096	87,096
Tallahassee, City of (Wakulla portion)	*384,461*	*3,057*	126	422,768	433,700	462,642	491,972	520,541
Talquin Electric Coop/Wakulla Regional	757,483	7,615	99	832,958	898,000	957,925	1,018,654	1,077,809
Wakulla County, River Sink Subdivision	30,019	346	87	30,019	30,019	30,019	30,019	30,019
Wakulla County TOTALS (gpd)	**2,306,298**	**23,256**		**2,487,912**	**2,628,929**	**2,773,359**	**2,915,561**	**3,052,006**

Wakulla County PRODUCTION	Estimates		Water PRODUCTION Pumpage (ADR, gpd)				
Public Supply Utility or Service Area	**Production (ADR, gpd)**		**2020**	**2025**	**2030**	**2035**	**2040**
Panacea Area Water System, Inc.	199,737		207,507	215,658	222,458	228,544	233,919
Sopchoppy, Town of	847,502		907,564	964,456	1,013,220	1,059,276	1,102,622
St. Marks, City of, Water Sys.	-		-	-	-	-	-
Tallahassee, City of (Wakulla portion)	-		-	-	-	-	-
Talquin Electric Coop/Wakulla Regional	757,483		832,958	898,000	957,925	1,018,654	1,077,809
Wakulla County, River Sink Subdivision	30,019		30,019	30,019	30,019	30,019	30,019
Wakulla County TOTALS (gpd)	**1,834,741**		**1,978,048**	**2,108,133**	**2,223,622**	**2,336,493**	**2,444,368**
REGION VII TOTALS (gpd)	**31,657,046**	**262,682**	**34,154,658**	**34,800,077**	**36,579,902**	**38,240,230**	**39,887,391**
REVION VII mgd	**31.657**		**34.155**	**34.800**	**36.580**	**38.240**	**39.887**

Appendix 4c. Public Supply Utilities - Estimated Growth Rates

REGION and County Public Water Supply Utility or Water System	BEBR Growth Projection Rate	Growth Characteristics of Population, Water Use, Meter Connection (MC), City/County Share
REGION I: ESCAMBIA COUNTY		
ESCAMBIA grew rapidly 1950-2005 but 2005-10 saw a decline and recent growth was just over 3% 2010-15; with Walton, Santa Rosa and many others expected to grow much faster. Leon is expected to surpass Escambia to be the largest county around 2030. Escambia had the highest population density in the District and was ranked 15th in the state in 2015. Escambia is estimated to have a seasonal population rate of 3.2%.		
Bratt-Davisville Water System	**Low-Medium**	Utility water use and number of MCs has been in general decline since 2000-05.
Central Water Works	**Low-Medium**	Utility water use in decline since high in 2010.
Century, Town of	**Low**	Town population and MCs in decline.
Cottage Hill Water Works	**Low-Medium**	Utility water use in decline since 2005 while MCs increased from 2010-2015.
Emerald Coast Utilities Authority	**Medium**	Utility in general concurrence with medium projections. Seasonal populations on Pensacola Beach and Perdido Key barrier islands.
Farm Hill Utilties	**Medium-High**	Rapid growth until 2010 then remained constant; number of MCs up 6.6% from 2010-15.
Gonzalez Utilities Association	**Medium**	Utility water use declined since 2010 while number of MCs increased 2.2% from 2010-15.
Molino Utilities	**Medium**	Utility water use declined since 2010 while number of MCs increased 2.7% from 2010-15.
People's Water Service Company of Florida	**Medium-High**	Utility water use declined since 2005 while number of MCs increased 5.8% from 2010-15.
Walnut Hill Water Works	**Low-Medium**	Utility water use steady; number of MCs dropped -1.3% from 2010-15.
REGION II: SANTA ROSA, OKALOOKA AND WALTON COUNTIES		
SANTA ROSA has been on a steady growth trajectory, grew by 7.63% 2010-15, and growth is projected to continue through 2045 at an average growth rate of over 6% - second in the District only to Walton County. In 2015 three-fourths of Santa Rosa's growth was attributed to net migration versus natural occurances, and population density was about one-third of Escambia's. Santa Rosa is estimated to have a seasonal population rate of 2%.		
Bagdad-Garcon Point Water System	**Low-Medium**	Utility water use increased 1990-2005 and then steady. No change in MCs 2010-15.
Berrydale Water System	**Low**	Utility water use increasing trend 1990-2015, and increase of 0.2% in MCs from 2010-15.
Chumuckla Water System	**Medium-High**	Utility water use declined since 2010 while number of MCs increased 13% from 2010-15.
East Milton Water System	**Medium-High**	Utility water use tripled from 1990-2005, tapered off, but rose again 2010-15.
Fairpoint Regional Utility System (FRUS)	**NA**	*WHOLESALE PRODUCTION - Gulf Breeze, So. Santa Rosa, Holley-Navarre, Midway, Navarre Beach.*
Gulf Breeze Water Department	**Very Low (1%)**	Utility water use increased 6% but number of MCs declined -2.6% from 2010 to 2015.
Holley-Navarre Water System	**Medium-High**	Utility water use has steadily increased since 1990 and increased to almost triple the 1990 rate in 2015; number of MCs increased 12.3% from 2010-15.
Jay, Town of	**Low**	Utility water use in decline through 2015. Number of meter connections up 1.9% 2010-15.
Midway Water System	**Low**	Utility water use has been declining since 2000. No change in number of MCs from 2010-15.
Milton, City of	**Low-Medium**	Milton in double-digit growth overall 2000-15, slowing to 6.8% in the 2010-15 period. City-county ratio and utility water use in decline. Number of MCs declined -21% from 2010-15.
Moore Creek-Mt. Carmel Utilities	**Low**	Utility water use has been in decline since 2005, with 2015 water use less than 1990.
Pace Water System	**Medium-High**	Utility water use grew 81% from 1990-2005, tapered off, then rose again in 2015 to 2005 level.
Point Baker Water System	**Medium-High**	Utility overall water use increasing 22% since 1995. Number of MCs up 8.4% from 2010-15.
Navarre Beach Water System, SRBOCC	**Low**	Utility water use in 2015 nearly identical to 1990, with much lower water use inbetween.
South Santa Rosa Utilities	**Low**	Number of MCs up 1% from 2010-15.
OKALOOSA grew rapidly from 1950-2005, experienced a dip, and since then has continued to grow albeit at a slower rate which was just over 6% from 2010-15. Population density of Okaloosa was greater than Santa Rosa but less than half that of Escambia in 2015. The City of Crestview has been one of the most rapidly growing urban areas in the District. Okaloosa is estimated to have a seasonal population rate of 11%.		
Auburn Water System	**Medium-High**	Increasing trends in utility water use and number of MCs.
Baker Water System	**Medium**	Utility water use on steady growth trajectory 1990-2010 then declined 18.5% from 2010-15.
Blackman Community Water System	**Very Low (1%)**	Utility water use increasing 2012-14 then dropped in 2015 to near 2012 levels.
Crestview, City of	**Medium-High**	Utility water use increased 1990-2010 and number of MCs increased 24.5% from 2010-15. City has had double-digit growth and increasing city-county share since 1990.
Destin Water Users	**Medium-High**	Utility water use increased 1990-2015, with 2015 water use almost 40% higher than 1995. Destin growing 2.7% from 2005-15 with city-county share increasing 1990-2000.
Fort Walton Beach, City of	**Medium**	Number of MCs increased 4.6% from 2010-15. City population increased 7% 2010-15 and city-county shrare increased 2010-15.
Holt Water Works	**Medium**	Utility water use grew steadily 1995-2010 but since tapered off from 2010-15.
Laurel Hill, City of	**Low (zero-no growth)**	Utility water use decreased -29% in 2015. Number of MCs dropped -2% from 2010-15.
Mary Esther, Town of	**Low(1)**	Utility water use and town-county share in decline since 1995.
Milligan Water System	**Low(1)**	Utility water use more or less steady 1995-2015, with number of MCs up +/-0.5% from 2010-15.
Niceville, City of	**Medium-High**	Growth rate of 8% 2010-15. City-county share increasing since 2000. Number of MCs up 8% from 2010-15.
Okaloosa Co. Water & Sewer, Bluewater	**Medium**	Utility water use rose 1995-2010 then declined 18.5% from 2010-15. Number of MCs appears to have increased over 5% from 2010-14.
Okaloosa Co. Water & Sewer, Main (Garniers)	**Low-Medium**	Utility water use increased 1990-2000, then declined, MCs increased over 18% from 2010-15.
Okaloosa Co. Water & Sewer, Mid-County	**Medium**	Utility water use on rapid growth trajectory, more than doubling from 1995-2005, almost tripling 1995-2010. Number of MCs increased 12.1% from 2010-15.
SWUC (Okaloosa County portion)	**Medium**	Number of MCs fluctuated from 2012-14, then declined -32% from 2014-15.
Valparaiso, City of	**Low-Medium**	Utility water use steadily declining since 2000, while number of MCs up 1.3% from 2010-15. City-county share has steadily declined 1995-2015.

(1): Negative rates adjusted to zero.

MC = Meter Connection

Appendix 4c. Public Supply Utilities - Estimated Growth Rates

REGION and County Public Water Supply Utility or Water System	BEBR Growth Projection Rate	Growth Characteristics of Population, Water Use, Meter Connection (MC), City/County Share
WALTON is expected to be the fastest growing county in the District through 2045. The growth rate 2010-15 was 10.25% and projected 5-year rates 2010-2045 are an average of 9.26%. In 2015 population density was about one-fourth that of Okaloosa and one-eighth Escambia's, and only about 12% of population increases were due to natural occurrences. Walton is estimated to have a seasonal population rate of 49%.		
Argyle Water System	**Very Low (1.5%)**	Utility water use in steady decline 2000-15.
DeFuniak Springs, City of	**Low-Medium**	Utility water use has held more or less steady 2000-15.
FCSC of Walton Co. / Regional Utilities	**Medium-High**	Utility water use nearly doubled 1995-2000, more than tripled 1995-2005, and in 2015 was 5.5 times higher than 1995. Number of MCs apparently increased 113.6% from 2010-15.
Freeport, City of	**Medium**	Production projections "Low" and demand projections "Medium-High" averaged to "Medium." City population and city-county share increased 2005-15. Assumed cessation of water sales.
Freeport, North Bay Water System	**Medium**	Utility water use increased nearly 5% and number of MCs increased 23.3% from 2010-15.
Inlet Beach	**Medium-High**	Utility water use increased 62% and number of MCs increased 58% from 2010-15.
Mossy Head Water Works	**Low**	Utility water use declined -5.5% with slight increase in MCs since 2010.
Paxton, City of	**Zero-no growth**	Utility water use of 2015 nearly identical to 1990. City-county share in decline 1990-2015.
SWUC, Rockhill Inland Well Field	**NA**	*Regional wholesale inland well field serving coastal communities.*
South Walton Utility Company (SWUC), Coastal Well Field (Walton County portion)	**Medium-High**	Utility water use increased 13% and number of MCs up 35% from 2010-15.
REGION III: BAY COUNTY		
BAY. With multiple urbanized areas, Bay County has grown at an overall steady rate since 1950. The increase in population 2010-15 was 2.64% but higher rates are expected from 2015-25. In 2015 61% of population increases were from natural occurrences. Also in 2015 Bay had the third highest population density, but still less than half that of Escambia. Bay is estimated to have a seasonal population rate of 12%.		
Bay County Board of County Commissioners	**Medium**	Service area water use increased 5.5% from 2010-15. No change in MCs 2010-15.
Cedar Grove	**Low-Medium**	*Service area water use declined 10% from 2010-15.*
GCEC (North Bay, Lake Merial)	**Medium-High**	*Service area water use increased 17% from 2010-15.*
Callaway	**Low-Medium**	Water use declined 10% while number of MCs increased 25.1% from 2010-15; likely due to addition of Sandy Creek Utility service area in 2012. City-county share declining since 1995.
Lynn Haven, City of	**Medium-High**	Utility water use increased 75% from 1990-2010; number of MCs up 36% from 2010-15. City population and city-county share increased 1990-2015.
Mexico Beach	**Medium**	Service area water use increased 33% but no change in number of MCs from 2010-15.
Panama City	**Low-Medium**	Water use declined 18%, and no change in number of MCs from 2010-15.
Panama City Beach	**Medium-High**	Utility water use increased 1990-2005. Service area water use declined -3.5% and number of MCs down -2.3% from 2010-15. High city growth and increase in city-county share.
Parker	**Zero-no growth**	Service area water use declined 24% and number of MCs declined 18.6% from 2010-15.
Springfield	**Low(1)**	Service area water use declined 15% and no change in number of MCs from 2010-15.
REGION IV: WASHINGTON, HOLMES, JACKSON, CALHOUN AND LIBERTY COUNTIES		
WASHINGTON. The population of Washington increased by only 0.32% from 2010-15 but higher rates are expected over the planning horizon. All of the population change from 2010-15 is attributed to net migration. All municipal city-county shares have been in decline from 1990-2015. Washington is estimated to have a seasonal population rate of 3%.		
Sunny Hills Utilities	**Low-Medium(1)**	Utility water use 2015 declined to near 2000-05 levels.
Caryville, Town of (Washington portion)	**Low-Medium(1)**	Utility water use generally declined 1990-2010, then increased 28% from 2010-15.
Chipley, City of	**Low-Medium(1)**	City-county share has been in steady decline 1990-2015.
Vernon, City of	**Zero-no growth**	Town-county share fell from 4.6% in 1990 to 2.76% in 2015. MCs down 11.1% from 2010-15.
Wausau, Town of	**Low-Medium(1)**	Utility water use declined 24% from 2010-15.
HOLMES. In 2015 80% of the Holmes County population resided in unincorporated areas. Holmes lost population 2010-15 and has the lowest projected growth rates District-wide through 2045. Holmes Low and Low-Medium growth rate scenarios are all negative. Holmes is estimated to have a seasonal population rate of 1%.		
Bonifay, City of	**Zero-no growth**	Utility water use declined since 2000. City-county share in steady decline 1995-2015.
Caryville, Town of (Holmes County portion)	**Zero-no growth**	Utility water use generally declined 1990-2010, then increased 28% from 2010-15.
Esto Water Works	**Medium**	Water use reached a peak in 2000, declined 46% by 2010, and increased to near 2005 levels in 2015, and number of MCs increased 7.3% from 2010-15.
Joyce E. Snare Waterworks	**Zero-no growth**	Utility water use high in 2000 and declined through 2015. No change in number of MCs from 2010-15.
Noma, Town of	**Zero-no growth**	Utility water use has fluctuated and reached a high in 2010, and declined 15% 2010-15.
Ponce de Leon, Town of	**Zero-no growth**	Utility water use reached a high in 2010 then declined 26% in 2015.
Westville, Town of	**Zero-no growth**	Utility water use reached peak in 2010 then declined 24% by 2015.
JACKSON grew by 1.43% from 2010-15 and projected growth rates 2015-45 are more modest. At 55 people per square mile in 2015, population density was in line with Walton's (58) and Wakulla's (52), but less than one-fourth that of Bay County. Jackson is estimated to have a seasonal population rate of 3%.		
Alford, Town of	**Zero-no growth**	No change in number of MCs 2010-15. Small town averaging 490 residents from 1990-2015.
Campbellton, Town of	**Zero-no growth**	No change in number of MCs from 2010-15. Very small town averaging 222 residents from 1990-2015.
Cottondale	**Very Low (1%)**	Utility water use fairly constant 1990-2015. Number of MCs up slightly 0.6% from 2010-15.
Graceville	**Zero-no growth**	Number of MCs down -3.4% from 2010-15. Population and city-county share in decline.
Grand Ridge	**Zero-no growth**	Utility water use increased 1990-2000, then declined. Number of MCs down 0.7% 2010-15.
Greenwood	**Zero-no growth**	Town population declined in 2015 and town-county share in decline since 2000.
Jackson County Utilities, Plant 1	**Medium**	Allocations increased from 200,000 ADR in 2005 to 303,000 ADR in 2015.
Jacob, City of	**Zero-no growth**	Very small town saw peak population of 308 in 1995, in steady decline since.
Malone	**Medium**	Town growth 1990-95 and then fluctuating. Share analysis about 4.5% of county since 1995.
Marianna	**Medium-High**	City population increased 27% from 2010-15. No change in number of MCs from 2010-15.
Sneads	**Medium**	Utility water use has been fairly constant 1990-2015.

(1): Negative rates adjusted to zero.

MC = Meter Connection

Appendix 4c. Public Supply Utilities - Estimated Growth Rates

REGION and County Public Water Supply Utility or Water System	BEBR Growth Projection Rate	Growth Characteristics of Population, Water Use, Meter Connection (MC), City/County Share
CALHOUN lost population in the 2010-15 period and has a modest 5-year average growth rate of 1.57% through 2045. At 26 people per square mile, the population density is low and Calhoun was ranked 60th in the state in 2015. Calhoun is estimated to have a seasonal population rate of 3%.		
Altha	**Low-Medium(1)**	Utility water use in peak in 2000 and since declined. Town-county share same 2000 and 2015.
Blountstown	**Low-Medium(1)**	Utility water declined since 2000 but number of MCs up 2.5% from 2010-15.
LIBERTY. In 2015 89% of the Liberty County population resided in unincorporated areas, and Liberty also in 2015 had, at 10 persons per square mile, the lowest population density in not only the District but also the entire State of Florida. A large part of the county is in the Apalachicola National Forest. Liberty grew at nearly 4% from 2010-15 and 5-year growth rates are expected to average 4.52% from 2010-45. Liberty is estimated to have a seasonal population rate of 9%.		
Bristol, City of	**Low-Medium**	Utility water use fluctuating 2005-2015. City-county share decreasing since 1995.
Liberty Co. BOCC, Hosford-Telogia	**Low-Medium**	Utility water use increasing 1990 - and leveled off in 2015. Number of MCs dropped 2010-15.
Liberty Co. BOCC, Lake Mystic	**Zero-no growth**	Utility water use declined -18% and number of MCs dropped -64% from 2010-15.
Liberty Co. BOCC, Rock Bluff	**Medium-High**	Water use has grown over 5.5 times from 2005-2015.
Liberty Co. BOCC, Estiffanulga	**Low-Medium**	Utility water use decline -5% from 2010-15. No change in number of MCs from 2010-15.
Sumatra Water System	**Zero-no growth**	Utility water use declined 20% from 2010-15. Number of MCs apparently dropped -40% from 2010-15.
Talquin (TEC), Sweetwater	**Low-Medium**	Utility water use declined -13% from 2010-15. No change in number of MCs from 2010-15.
REGION V: GULF AND FRANKLIN COUNTIES		
GULF. In 2015 65% of the Gulf County population resided in unincorporated areas. The county grew 3.04% from 2010-15. The population density has increased from 26 persons per square mile in 2000, to 28 in 2010, and 29 in 2015. Gulf Low and Low-Medium growth rate projections are all negative. Gulf is estimated to have a seasonal population rate of 22%.		
Lighthouse Utilities Company	**Medium-High**	Utility water use has steadily increased 1990-2015, with 2015 water use almost twice 2000 and five times amount used in 1990. Number of MCs up 24% from 2010-15.
Port St. Joe	**Medium**	Utility water use rose significantly in 2005, dropped by almost half in 2010, and rose again in 2015 to approximately same as 2005. Number of MCs up by 6%.
Wewahitchka	**Zero-no growth**	Utility water use peaked in 2000 and has since declined.
FRANKLIN County grew by 2.52% from 2010-15. Population is concentrated in coastal communities. All of the population change from 2010-15 is attributed to net migration. Franklin is estimated to have a seasonal population rate of 39%.		
Alligator Point Water Resources District	**Medium**	Utility water use grew steadily 1990-2000, then declined, and has held steady from 2010-15. Number of MCs up 2.7% from 2010-15.
Apalachicola, City of	**Zero-no growth**	Utility water use reached a peak in 2005, declined -29% in 2010, and then increased 5% in 2015. No change in number of MCs from 2010-15.
Carrabelle, City of	**Medium**	Utility water use increased 1995-2010, then declined. No change in number of MCs 2010-15.
Carrabelle, City of (Lanark Village)	**Medium**	Utility water dropped to 2000 levels in 2015. No change in number of MCs 2010-15.
Eastpoint Water and Sewer District	**Medium-High**	Utility water use has been increasing since 1990, with a 26% increase from 2010-15. Number of MCs up 8.1% from 2010-15.
St. James Island Utility Company	**Medium**	Water use down 2010-15. Number of MCs up 33.3% from 2010-15.
Water Management Services	**Medium**	The period 1990-2005 increased in reported water use, declined -20% in 2010, increased again in 2015. Number of MCs up by 3.9% from 2010-15.
REGION VI: GADSDEN COUNTY		
GADSDEN grew by over 4% from 2010-15 but projected future 5-year growth rates are more modest, averaging 1.71% from 2015-45. At 94 people per square mile in 2015, Gadsden was ranked No. 39 in the state for population density, but was still less than half the density of Santa Rosa and one-fifth that of Escambia. Gadsden is estimated to have a seasonal population rate of 2.4%.		
Chattahoochee	**Less than medium (0.5%)**	Utility water use increased about 5% from 2010-15. Number of MCs up 1.7% from 2010-15. City-county share and city population have been steadily declining since 1990.
Greensboro	**Less than medium (0.5%)**	Water use in 2015 -35% lower than peak in 1995. Number of MCs down -7.7% 2010-15.
Gretna	**Medium High**	Utility water use consistent 1990-2005 then jumped about 59% 2005-10, and increased again 13% from 2010-15. Number of MCs up 5.3%.
Havana	**No growth scenario**	Utility water use low in 2005, increased in 2010 and declined to lower than 2005 levels in 2015. Number of MCs down -4.5% from 2010-15.
Quincy, City of	**Medium**	Utility water use peak in 2000 but since then decline. Number of MCs up 11.3% 2010-15.
Rosedale Water Association	**Zero-no growth**	No change in number of MCs from 2010-15.
Talquin (TEC), Gadsden County Regional	**Medium**	No change in number of MCs from 2010-15.
Talquin (TEC) Hammock Creek, Jamieson, and St. James	**Medium**	Similar to TEC County Regional.
REGION VII: LEON, WAKULLA AND JEFFERSON COUNTIES		
LEON has grown rapidly since 1950, experienced a slowing trend 2005-10, and grew at 3.25% from 2010-15. Leon is expected to surpass Escambia and become the most populous county in the District around 2030. In 2015 Leon had the second-highest (after Escambia) population density and was ranked No. 17 in the state. About three-fourths of the population increases in 2015 were by natural occurrences. Leon is estimated to have a seasonal population rate of 0.5%.		
Seminole Waterworks., Brewster Estates	**Low**	Utility water use fluctuated 1990-2005, then in decline. No change in number of MCs 2010-15.
Seminole Waterworks, Bucklake Estates	**Low**	Utility water use peak in 2000, then decline. No change in number of MCs 2010-15.
Seminole Waterworks, Meadow Hills	**Low**	Peak utility water use in 1995, declined to low in 2010, and had a slight increase of 5.9% from 2010-2015. Number of MCs declined -1.8% from 2010-15.
Seminole Waterworks, North Lake Meadows	**Low**	Utility water use peak in 2000, then decline. No change in number of MCs 2010-15.
Seminole Waterworks, Plantation Estates	**Low**	Utility water use rose rapidly from 1990 to a peak in 2005, then steadily declined with 2015 reported use less than 1990. Apparently no change in number of MCs from 2010-15.
Seminole Waterworks, Sedgefield	**Low**	Utility water use peak in 2000, then decline. No change in number of MCs 2010-15.

(1): Negative rates adjusted to zero.

MC = Meter Connection

Appendix 4c. Public Supply Utilities - Estimated Growth Rates

REGION and County Public Water Supply Utility or Water System	BEBR Growth Projection Rate	Growth Characteristics of Population, Water Use, Meter Connection (MC), City/County Share
Tallahassee, City of (Leon County portion)	**Medium-High**	Utility water use reached a high in 2000. Number of MCs up 9% from 2010-15. Poplation and city-county share steadily increasing.
Talquin (TEC), Annawood	**Low**	2015 water use 10% lower than 2010. No change in number of MCs from 2010-15.
Talquin (TEC), Bradfordville Regional	**Medium**	Utility water use grew from 1990-2005 and since in decline. Number of MCs up 2010-15.
Talquin (TEC), Lake Jackson Regional	**Medium**	Utility water use declined 1990-2000, then steady through 2015. MCs up 5.9% from 2012-15.
Talquin (TEC), Leon County East Regional	**Medium-High**	Utility water use has been on increasing trajectory since 1990, with 2015 reported use higher than the previous peak in 2000. Number of MCs up 9.7% from 2012-15.
Talquin (TEC), Leon County South Regional	**Low-Medium**	Utility water use high in 2005 and then decline. Number of MCs up 2.8% 2012-15.
Talquin (TEC), Leon County West Regional	**Medium-High**	Utility water use increased 19% from 2010-15. Number of MCs up 11.6% from 2012-15.
Talquin (TEC), Meadows at Woodrun	**Medium**	Utility water use increased over 53% from 2005-15. Number of MCs up 1.4% from 2012-15.
Talquin (TEC), Meridian Hills	**Low**	Water use declined 2010-15. No change in number of MCs from 2010-15.
Talquin (TEC), Stonegate	**Low**	2015 water use -12% lower than 2010. No change in number of MCs from 2010-15.
WAKULLA is projected to be the District's third fastest growing county over the planning horizon after Walton and Santa Rosa counties. Wakulla experienced more rapid population growth from 1995-2010, which then slowed from 2010-2015. The five-year growth from 2015-2020 is expected to be over 7 percent. A large part of the county is in the Apalachicola National Forest. Wakulla is estimated to have a seasonal population rate of 5%.		
Panacea Area Water System	**Low-Medium**	Utility water use peaked in 2005 then declined -28% from 2005-15.
Sopchoppy, Town of	**Medium**	Utility water use increased steadily from 1990-2010. Number of MCs up 8% from 2010-15.
St. Marks, City of, Water System	**Zero-no growth**	Utility water use declined -14% from 2010-15.
Tallahassee, City of (Wakulla County portion)	**Medium-High**	Highest water use in 2011, and since fluctuating. Number of MCs up 17.9% from 2010-15.
Talquin (TEC), Wakulla Regional	**Medium-High**	Utility water use more than tripled from 1990-2000, and quadrupled from 1990-2010; then declined -12% from 2010-15. Number of MCs up from 2012-15.
Wakulla County, River Sink Subdivision	**Zero-no growth**	Utility water use declined -41% and number of MCs declined -4.2% from 2010-15.
JEFFERSON lost population from 2010-15, and after Holmes, is projected to be the second-slowest growing county in the District from 2015-40. Jefferson Low and Low-Medium growth rate scenarios are all negative. Jefferson is estimated to have a seasonal population rate of 3.5%.		
Jefferson Communities Water System	**Medium**	Utility water use nearly tripled from 2005-15. Number of MCs dropped -38% from 2010-2014 but then rose 23% from 2014-15.
Monticello, City of	**Medium**	Utility water use in decline. Number of MCs up 11.5% from 2010-15.

(1): Negative rates adjusted to zero.

MC = Meter Connection

Appendix 4d. Projected Five-Year Growth Rates by County

	2015-20	2020-25	2025-30	2030-35	2035-40
BAY					
Low	-0.64%	0.35%	0.23%	-0.29%	-0.41%
Low-Medium	*2.50%*	*2.58%*	*2.07%*	*1.56%*	*1.49%*
Medium	5.65%	4.81%	3.91%	3.41%	3.39%
Medium-High	*8.53%*	*6.34%*	*5.55%*	*5.06%*	*5.03%*
High	11.42%	7.87%	7.20%	6.72%	6.67%
CALHOUN					
Low	-3.09%	-1.42%	-1.44%	-2.19%	-2.24%
Low-Medium	*0.01%*	*0.29%*	*0.26%*	*-0.13%*	*-0.49%*
Medium	3.10%	2.00%	1.96%	1.92%	1.26%
Medium-High	*5.85%*	*3.85%*	*3.68%*	*3.52%*	*2.79%*
High	8.60%	5.70%	5.39%	5.11%	4.32%
ESCAMBIA					
Low	-1.45%	-0.69%	-0.43%	-1.04%	-1.32%
Low-Medium	*0.46%*	*0.75%*	*0.67%*	*0.05%*	*-0.19%*
Medium	2.36%	2.20%	1.78%	1.13%	0.94%
Medium-High	*4.30%*	*3.35%*	*2.99%*	*2.38%*	*2.13%*
High	6.24%	4.51%	4.20%	3.63%	3.32%
FRANKLIN					
Low	-4.56%	-2.65%	-2.73%	-2.80%	-2.88%
Low-Medium	*-1.60%*	*-0.91%*	*-0.95%*	*-0.99%*	*-1.44%*
Medium	1.35%	0.83%	0.83%	0.82%	0.00%
Medium-High	*4.31%*	*2.78%*	*2.29%*	*2.22%*	*1.75%*
High	7.26%	4.72%	3.76%	3.62%	3.50%
GADSDEN					
Low	-2.93%	-1.71%	-1.52%	-1.32%	-2.01%
Low-Medium	*-0.55%*	*-0.04%*	*-0.06%*	*0.03%*	*-0.52%*
Medium	1.83%	1.63%	1.40%	1.38%	0.97%
Medium-High	*4.21%*	*3.05%*	*2.93%*	*2.74%*	*2.37%*
High	6.59%	4.47%	4.46%	4.09%	3.76%
GULF					
Low	-3.34%	-2.53%	-1.95%	-2.65%	-2.72%
Low-Medium	*-0.59%*	*-0.37%*	*-0.39%*	*-0.74%*	*-0.79%*
Medium	2.17%	1.80%	1.18%	1.16%	1.15%
Medium-High	*5.22%*	*3.44%*	*2.74%*	*2.64%*	*2.80%*
High	8.28%	5.08%	4.30%	4.12%	4.46%
HOLMES					
Low	-4.03%	-2.62%	-2.69%	-2.76%	-3.41%
Low-Medium	*-1.01%*	*-0.82%*	*-0.86%*	*-1.14%*	*-1.46%*
Medium	2.00%	0.99%	0.98%	0.48%	0.48%
Medium-High	*4.76%*	*2.83%*	*2.50%*	*2.17%*	*1.89%*
High	7.53%	4.67%	4.02%	3.86%	3.31%
JACKSON					
Low	-3.29%	-2.25%	-2.10%	-2.36%	-2.41%
Low-Medium	*-1.01%*	*-0.54%*	*-0.66%*	*-0.99%*	*-0.82%*
Medium	1.27%	1.17%	0.77%	0.38%	0.76%
Medium-High	*3.75%*	*2.64%*	*2.09%*	*1.84%*	*2.06%*
High	6.23%	4.10%	3.41%	3.29%	3.36%

Source: **Projections of Florida Population by County, 2020-2045, with Estimates for 2015**
BEBR Florida Population Studies, Volume 49, Bulletin 174, January 2016

Notes: Negative growth rates (shown in gray) were not used; for utilities with declining or no growth, 2015 values were held constant through the planning period.
Projected growth rates "Low-Medium" and "Medium-High" interpolated by District staff.

	2015-20	2020-25	2025-30	2030-35	2035-40
JEFFERSON (NOTE: growth rates based on total county population, not disaggregated by WMD)					
Low	-3.57%	-2.14%	-2.19%	-2.99%	-3.08%
Low-Medium	*-0.82%*	*-0.06%*	*-0.76%*	*-0.83%*	*-1.21%*
Medium	1.94%	2.03%	0.66%	1.32%	0.65%
Medium-High	*5.03%*	*3.56%*	*2.45%*	*2.69%*	*2.28%*
High	8.13%	5.10%	4.24%	4.07%	3.91%
LEON					
Low	0.69%	1.12%	0.90%	0.27%	0.03%
Low-Medium	*3.34%*	*3.05%*	*2.41%*	*1.78%*	*1.56%*
Medium	6.00%	4.98%	3.92%	3.28%	3.09%
Medium-High	*8.33%*	*6.28%*	*5.37%*	*4.74%*	*4.53%*
High	10.67%	7.59%	6.82%	6.19%	5.96%
LIBERTY					
Low	-1.13%	0.00%	0.00%	0.00%	-1.16%
Low-Medium	*2.32%*	*2.72%*	*2.58%*	*1.96%*	*1.31%*
Medium	5.77%	5.43%	5.15%	3.92%	3.77%
Medium-High	*9.22%*	*7.31%*	*6.78%*	*5.84%*	*5.49%*
High	12.67%	9.18%	8.41%	7.76%	7.20%
OKALOOSA					
Low	-0.31%	0.21%	-0.05%	-0.52%	-0.89%
Low-Medium	*2.27%*	*1.97%*	*1.32%*	*0.88%*	*0.53%*
Medium	4.85%	3.73%	2.68%	2.29%	1.96%
Medium-High	*7.22%*	*5.14%*	*4.18%*	*3.76%*	*3.41%*
High	9.59%	6.56%	5.67%	5.24%	4.86%
SANTA ROSA					
Low	2.75%	3.29%	2.66%	1.75%	1.22%
Low-Medium	*6.21%*	*5.62%*	*4.49%*	*3.55%*	*3.04%*
Medium	9.68%	7.95%	6.32%	5.36%	4.86%
Medium-High	*12.48%*	*9.48%*	*8.05%*	*7.12%*	*6.62%*
High	15.27%	11.02%	9.78%	8.87%	8.39%
WAKULLA					
Low	0.69%	1.59%	1.25%	0.93%	0.61%
Low-Medium	*3.89%*	*3.93%*	*3.15%*	*2.74%*	*2.35%*
Medium	7.09%	6.27%	5.06%	4.55%	4.09%
Medium-High	*9.96%*	*7.81%*	*6.67%*	*6.34%*	*5.81%*
High	12.84%	9.35%	8.29%	8.13%	7.52%
WALTON					
Low	5.46%	5.63%	4.88%	3.53%	1.77%
Low-Medium	*9.83%*	*8.51%*	*7.10%*	*5.73%*	*3.96%*
Medium	14.19%	11.40%	9.33%	7.94%	6.15%
Medium-High	*17.41%*	*13.08%*	*11.33%*	*9.96%*	*8.23%*
High	20.62%	14.75%	13.33%	11.97%	10.32%
WASHINGTON					
Low	-2.30%	-0.82%	-0.83%	-1.67%	-2.12%
Low-Medium	*0.70%*	*1.33%*	*0.71%*	*0.08%*	*-0.34%*
Medium	3.70%	3.47%	2.24%	1.82%	1.43%
Medium-High	*6.71%*	*5.02%*	*4.03%*	*3.34%*	*3.03%*
High	9.71%	6.57%	5.82%	4.85%	4.63%

Source: **Projections of Florida Population by County, 2020-2045, with Estimates for 2015**
BEBR Florida Population Studies, Volume 49, Bulletin 174, January 2016

Notes: Negative growth rates (shown in gray) were not used; for utilities with declining or no growth, 2015 values were held constant through the planning period.
Projected growth rates "Low-Medium" and "Medium-High" interpolated by District staff.

Appendix 5. Thermoelectric Power Generation Facilities - Estimates and Projections

Planning Region	County, Facility and Region	Total 2015 Groundwater	Total 2015 Surface Water	TOTAL 2015 WATER USE ESTIMATE	Projected Future Water Demand (mgd) 2020	2025	2030	2035	2040
I	Escambia - Gulf Power, Crist Generating Plant	2.017	8.573	10.590	10.590	10.590	10.590	10.590	10.590
	Escambia - (Potential New Northern Facility)	NA	NA	NA	1.500	1.500	1.500	1.500	1.500
	Region I Total	**2.017**	**8.573**	**10.590**	**12.090**	**12.090**	**12.090**	**12.090**	**12.090**
II	Okaloosa - NA	-	-	-	-	-	-	-	-
	Santa Rosa - NA	-	-	-	-	-	-	-	-
	Walton - NA	-	-	-	-	-	-	-	-
	Region II Total	**-**	**-**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
	Bay County BOCC Waste to Energy Facility	0.066	-	0.066	0.100	0.100	0.125	0.125	0.150
	Bay - Gulf Power, Lansing Smith Plant	0.898	8.508	9.406	5.715	6.888	8.265	8.265	8.265
	Region III Total	**0.964**	**8.508**	**9.472**	**5.815**	**6.988**	**8.390**	**8.390**	**8.415**
IV	Calhoun - NA	-	-	-	-	-	-	-	-
	Holmes - NA	-	-	-	-	-	-	-	-
	Jackson - Gulf Power, Scholz Plant	0.229	1.605	1.834	1.834	1.834	1.834	1.834	1.834
	Liberty - Telogia Power	0.487	-	0.487	0.486	0.486	0.486	0.486	0.486
	Washington - NA	-	-	-	-	-	-	-	-
	Region IV Total	**0.717**	**1.605**	**2.322**	**2.320**	**2.320**	**2.320**	**2.320**	**2.320**
V	Franklin - NA	-	-	-	-	-	-	-	-
	Gulf - NA	-	-	-	-	-	-	-	-
	Region V Total	**-**	**-**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
VI	Gadsden - NA	-	-	-					
	Region VI Total	**-**	**-**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
VII	Jefferson (NWF District only) - NA	-	-	-	-	-	-	-	-
	Leon - Arvah B. Hopkins Generating Station	1.950	-	1.950	4.930	4.930	4.930	4.930	4.930
	Wakulla - Sam O. Purdom Plant	-	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	Region VII Total	**1.950**	**0.002**	**1.952**	**4.932**	**4.932**	**4.932**	**4.932**	**4.932**
	TOTALS	**5.648**	**18.688**	**24.335**	**25.157**	**26.330**	**27.732**	**27.732**	**27.757**

NOTES: Arvah B. Hopkins plant in Leon County is projecting higher water use 2020-2040. Reductions from 2015 - 2020 in Bay County are due to the Lansing Smith facility ceasing coal operations in 2016, and reducing associated surface water withdrawals by approximately 80%; also reclaimed water may be available by 2019. Gulf Power's Crist and Lansing Smith plants, and Hopkins, reduced water use from 2010-2015 by 33%, 29% and 41% respectively.

APPENDIX 6. ESTIMATES AND PROJECTIONS BY COUNTY

Region I - Escambia County

See Region I Resource Assessment

Region II - Okaloosa, Santa Rosa and Walton Counties

OKALOOSA	Estimates	Future Demand Projections					2015-2040 Change	
Use Category	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	21.810	22.939	23.870	24.668	25.412	26.104	4.294	19.7%
DSS	2.131	2.214	2.262	2.223	2.157	2.072	-0.059	-2.8%
Agriculture	0.393	0.375	0.362	0.335	0.294	0.211	-0.182	-46.2%
Recreational	4.366	4.578	4.749	4.876	4.987	5.085	0.719	16.5%
ICI	1.985	1.985	2.136	2.290	2.290	2.290	0.305	15.4%
Power	-						n/a	n/a
	30.685	**32.090**	**33.378**	**34.392**	**35.141**	**35.763**	**5.077**	**16.5%**

SANTA ROSA	Estimates	Future Demand Projections					2015-2040 Change	
Use Category	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	14.957	16.309	17.511	18.760	19.836	20.884	5.927	39.6%
DSS	0.257	0.394	0.526	0.423	0.379	0.319	0.062	24.1%
Agriculture	1.801	2.007	2.244	2.520	2.781	3.056	1.255	69.7%
Recreational	1.988	2.181	2.354	2.503	2.637	2.765	0.777	39.1%
ICI	2.690	4.056	4.129	4.206	4.206	4.206	1.515	56.3%
Power	-						n/a	n/a
	21.693	**24.947**	**26.764**	**28.411**	**29.839**	**31.229**	**9.536**	**44.0%**

WALTON	Estimates	Future Demand Projections					2015-2040 Change	
Use Category	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	10.712	12.398	13.894	15.349	16.755	18.011	7.299	68.1%
DSS	1.568	1.720	1.884	1.981	2.044	2.053	0.485	30.9%
Agriculture	0.604	0.622	0.635	0.668	0.694	0.700	0.096	15.9%
Recreational	4.439	5.069	5.647	6.173	6.663	7.073	2.634	59.3%
ICI	0.033	0.033	0.050	0.050	0.050	0.050	0.017	52.6%
Power	-						n/a	n/a
	17.356	**19.842**	**22.110**	**24.221**	**26.206**	**27.887**	**10.531**	**60.7%**

Region III - Bay County

See Region III Resource Assessment

Region IV - Calhoun, Holmes, Jackson, Liberty and Washington Counties

CALHOUN	**Estimates**	**Future Demand Projections - Average/Normal**					**2015-2040 Change**	
Use Category	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**mgd**	**%**
Public Supply	0.404	0.404	0.405	0.406	0.406	0.406	0.002	0.5%
DSS	0.927	0.968	0.995	1.021	1.049	1.067	0.140	15.0%
Agriculture	3.008	3.239	3.552	3.902	4.474	4.756	1.748	58.1%
Recreational	0.005	0.005	0.005	0.005	0.005	0.005	0.001	10.7%
ICI	0.175	0.175	0.180	0.190	0.200	0.200	0.025	14.2%
Power	-						n/a	n/a
	4.519	**4.792**	**5.137**	**5.524**	**6.134**	**6.434**	**1.915**	**42.4%**

HOLMES	**Estimates**	**Future Demand Projections - Average/Normal**					**2015-2040 Change**	
Use Category	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**mgd**	**%**
Public Supply	1.007	1.007	1.008	1.008	1.008	1.008	0.001	0.1%
DSS	1.295	1.331	1.348	1.366	1.375	1.384	0.089	6.9%
Agriculture	1.159	1.225	1.314	1.393	1.484	1.583	0.424	36.6%
Recreational	0.219	0.224	0.226	0.228	0.229	0.230	0.011	5.0%
ICI	0.006	0.006	0.007	0.008	0.009	0.010	0.004	78.6%
Power	-						n/a	n/a
	3.686	**3.792**	**3.903**	**4.003**	**4.105**	**4.216**	**0.530**	**14.4%**

JACKSON	**Estimates**	**Future Demand Projections - Average/Normal**					**2015-2040 Change**	
Use Category	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**mgd**	**%**
Public Supply	2.142	2.184	2.216	2.241	2.263	2.289	0.147	6.0%
DSS	3.151	3.184	3.218	3.238	3.243	3.263	0.112	3.6%
Agriculture	24.227	25.231	26.905	27.935	29.137	30.495	6.268	25.9%
Recreational	0.386	0.391	0.395	0.398	0.400	0.403	0.017	4.4%
ICI	1.430	1.458	1.582	1.658	1.669	1.680	0.250	17.5%
Power	1.834	1.834	1.834	1.834	1.834	1.834	0.000	0.0%
	33.170	**34.282**	**36.150**	**37.305**	**38.546**	**39.964**	**6.794**	**20.5%**

LIBERTY	**Estimates**	**Future Demand Projections - Average/Normal**					**2015-2040 Change**	
Use Category	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**mgd**	**%**
Public Supply	0.456	0.466	0.477	0.488	0.497	0.503	0.047	10.3%
DSS	0.488	0.529	0.570	0.611	0.643	0.677	0.189	38.6%
Agriculture	0.072	0.111	0.124	0.139	0.154	0.175	0.103	143.2%
Recreational	0.002	0.002	0.002	0.002	0.002	0.002	0.000	26.5%
ICI	0.377	0.434	0.520	0.552	0.579	0.607	0.230	61.0%
Power	0.487	0.486	0.486	0.486	0.486	0.486	-0.001	-0.3%
	1.883	**2.028**	**2.179**	**2.278**	**2.361**	**2.450**	**0.567**	**30.1%**

Region IV – (continued)

WASHINGTON Use Category	Estimates 2015	Future Demand Projections - Average/Normal 2020	2025	2030	2035	2040	2015-2040 Change mgd	%
Public Supply	0.926	0.932	0.944	0.950	0.951	0.951	0.025	2.7%
DSS	1.674	1.755	1.831	1.882	1.927	1.964	0.290	17.3%
Agriculture	0.717	0.831	1.015	1.137	1.294	1.444	0.727	101.4%
Recreational	0.302	0.314	0.324	0.332	0.338	0.343	0.040	13.3%
ICI	0.456	0.465	0.500	0.537	0.564	0.592	0.136	29.9%
Power	-						n/a	n/a
	4.076	**4.296**	**4.614**	**4.838**	**5.074**	**5.293**	**1.218**	**29.9%**

Region V - Franklin and Gulf Counties

FRANKLIN Use Category	Estimates 2015	Future Demand Projections 2020	2025	2030	2035	2040	2015-2040 Change mgd	%
Public Supply	1.949	1.986	2.009	2.031	2.053	2.059	0.110	5.6%
DSS	0.165	0.158	0.157	0.155	0.153	0.149	-0.016	-9.9%
Agriculture	0.006	0.006	0.006	0.006	0.006	0.006	0.000	-2.9%
Recreational	0.214	0.217	0.219	0.221	0.222	0.222	0.008	3.9%
ICI	0.001	0.001	0.005	0.010	0.010	0.010	0.009	1146.9%
Power	-						n/a	n/a
	2.335	**2.367**	**2.396**	**2.423**	**2.444**	**2.446**	**0.111**	**4.7%**

GULF Use Category	Estimates 2015	Future Demand Projections 2020	2025	2030	2035	2040	2015-2040 Change mgd	%
Public Supply	1.966	2.032	2.083	2.121	2.159	2.200	0.234	11.9%
DSS	0.265	0.307	0.299	0.289	0.280	0.268	0.003	1.0%
Agriculture	0.241	0.241	0.241	0.241	0.241	0.242	0.001	0.4%
Recreational	0.093	0.095	0.097	0.098	0.099	0.101	0.007	7.7%
ICI	0.426	0.434	0.445	0.463	0.464	0.465	0.039	9.2%
Power	-						n/a	n/a
	2.991	**3.110**	**3.165**	**3.213**	**3.244**	**3.275**	**0.284**	**9.5%**

Region VI - Gadsden County

See Region VI Resource Assessment

Region VII - Jefferson, Leon and Wakulla Counties

JEFFERSON*	Estimates	Future Demand Projections					2015-2040 Change	
Use Category	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	0.626	0.638	0.651	0.655	0.664	0.668	0.042	6.7%
DSS	0.459	0.468	0.478	0.481	0.487	0.490	0.031	6.8%
Agriculture	0.774	0.708	0.640	0.640	0.638	0.619	-0.154	-19.9%
Recreational	0.553	0.563	0.575	0.578	0.586	0.590	0.037	6.7%
ICI	-	0.000	0.000	0.000	0.000	0.000	n/a	n/a
Power	-	0.000	0.000	0.000	0.000	0.000	n/a	n/a
	2.411	**2.377**	**2.344**	**2.354**	**2.375**	**2.367**	**-0.044**	**-1.8%**

*NWFWMD portion of county only.

LEON	Estimates	Future Demand Projections					2015-2040 Change	
Use Category	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	28.725	31.029	31.520	33.151	34.661	36.167	7.442	25.9%
DSS	4.618	4.487	5.459	5.393	5.273	5.129	0.511	11.1%
Agriculture	0.446	0.478	0.520	0.560	0.610	0.697	0.251	56.3%
Recreational	2.091	2.216	2.326	2.417	2.497	2.574	0.483	23.1%
ICI	0.096	0.096	0.105	0.160	0.215	0.237	0.141	147.0%
Power	1.950	4.930	4.930	4.930	4.930	4.930	2.980	152.8%
	37.925	**43.236**	**44.860**	**46.611**	**48.186**	**49.734**	**11.809**	**31.1%**

WAKULLA	Estimates	Future Demand Projections					2015-2040 Change	
Use Category	2015	2020	2025	2030	2035	2040	mgd	%
Public Supply	2.306	2.488	2.629	2.773	2.916	3.052	0.746	32.4%
DSS	0.854	0.900	0.967	1.007	1.040	1.069	0.215	25.2%
Agriculture	0.194	0.206	0.226	0.277	0.305	0.356	0.162	83.5%
Recreational	0.205	0.219	0.233	0.244	0.256	0.266	0.062	30.1%
ICI	1.105	1.150	1.200	1.322	1.322	1.372	0.267	24.2%
Power	0.002	0.002	0.002	0.002	0.002	0.002	0.000	0.0%
	4.666	**4.965**	**5.257**	**5.626**	**5.841**	**6.117**	**1.452**	**31.1%**

Appendix 7. Potable Offset Wastewater Treatment Facilities Estimates and Projections

Region - County - Facility	Potable Offset Flow (mgd)					
Region I	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Escambia County						
Bayou Marcus WRF	0.000	6.03	6.16	6.27	6.34	6.40
Bratt Elementary School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Central Water Reclamation Facility	10.530	4.16	4.49	4.75	4.93	5.07
Century, Town of - WWTF	0.000	0.45	0.46	0.47	0.47	0.48
Ernest Ward Middle School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Molino Park Elementary School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Northview High School WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Pensacola Beach WWTP	0.090	0.81	0.83	0.85	0.86	0.87
Region I Total	**10.620**	**11.46**	**11.95**	**12.35**	**12.61**	**12.83**

Region - County - Facility	2015	2020	2025	2030	2035	2040
Region II	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Okaloosa County						
Arbennie Pritchett Water Reclamation Facility	0.895	6.16	6.42	6.62	6.79	6.94
Baker High School WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Bob Sikes WRF	0.000	0.10	0.10	0.10	0.11	0.11
Crestview, City of - WWTF	0.000	1.55	1.61	1.65	1.69	1.72
Eglin AFB - Aux Field #6 STP	0.000	0.00	0.00	0.00	0.00	0.00
Eglin AFB - Auxiliary Field 3 WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Eglin AFB - Main Base WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Eglin AFB - Plew Heights WWTP	0.000	0.00	0.00	0.00	0.00	0.00
FDOT Okaloosa I-10 Rest Area WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Fort Walton Beach General Reuse Service Area	0.336	-0.34	-0.34	-0.34	-0.34	-0.34
George F French Water Reclamation Facility	2.059	1.01	1.13	1.21	1.29	1.35
Hurlburt Field AWTP	0.093	0.52	0.55	0.56	0.58	0.59
Mary Esther WWTP	0.000	0.42	0.44	0.45	0.46	0.47
Niceville-Valparaiso Regional WWTF	0.594	1.93	2.03	2.10	2.16	2.21
Okaloosa Correctional Institution WWTF	0.000	0.18	0.18	0.19	0.19	0.20
Russell F W Stephenson WWTF	0.000	0.41	0.42	0.43	0.44	0.45
Okaloosa County Total	**3.977**	11.95	12.55	12.99	13.38	13.72
Santa Rosa County						
Berrydale Forestry Camp WWTF	0.000	0.02	0.02	0.03	0.03	0.03
Holley Wastewater Reclamation Facility	0.000	0.08	0.09	0.10	0.10	0.11
Holley-Navarre Wastewater Treatment Facility	1.107	0.11	0.20	0.29	0.36	0.43
Jay, Town of - WWTP	0.000	0.06	0.07	0.07	0.08	0.08
Milton WWTF	0.000	1.78	1.92	2.04	2.15	2.25
Navarre Beach WWTP	0.000	0.31	0.34	0.36	0.38	0.40
Pace Water System, Inc WWTP	0.875	0.76	0.89	1.00	1.10	1.20
South Santa Rosa Utilities System WWTF	1.101	0.54	0.67	0.78	0.90	0.90
Sundial Utilities WWTP	0.000	0.08	0.09	0.10	0.10	0.11
Santa Rosa County Total	**3.083**	3.75	4.30	4.76	5.20	5.51
Walton County						
Defuniak Springs, City of - WWTP	0.000	0.70	0.79	0.86	0.93	0.98
Eglin AFB - Test Site C-6 WWTP	0.000	0.00	0.01	0.01	0.01	0.01
Freeport, City of - WWTP	0.000	0.28	0.31	0.34	0.37	0.39
Green Acres Road WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Paxton, City of - WWTP	0.000	0.03	0.03	0.03	0.03	0.04
Point Washington WWTP	0.000	0.94	1.05	1.14	1.23	1.31
Sandestin WWTP	0.397	3.18	3.59	3.96	4.31	4.60
Seacrest WWTF	0.723	0.22	0.32	0.42	0.51	0.59
South Walton Utility Company WWTP	1.389	0.23	0.41	0.58	0.73	0.87
Walton Correctional Institution WWTP	0.000	0.13	0.15	0.16	0.23	0.23
Walton County Total	2.509	5.72	6.66	7.51	8.36	9.02
Region II Total	**9.569**	**21.43**	**23.50**	**25.27**	**26.94**	**28.24**

Region - County - Facility	Potable Offset Flow (mgd)					
Region III	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Bay County						
Lynn Haven, City of - WWTF	0.501	0.98	1.05	1.12	1.17	1.23
Military Point Regional AWT Facility	0.000	4.01	4.20	4.37	4.52	4.67
Millville WWTF	0.000	2.01	2.10	2.19	2.26	2.34
North Bay WWTF	0.000	0.02	0.02	0.02	0.02	0.02
Panama City Beach WWTP #1	2.080	4.25	4.55	4.81	5.05	5.29
RiverCamps On Crooked Creek WWTP	0.000	0.02	0.02	0.02	0.02	0.02
Shores WWTF	0.000	0.00	0.00	0.00	0.00	0.00
St Andrews WWTF	0.000	2.43	2.55	2.65	2.74	2.83
Region III Total	**2.581**	**13.72**	**14.50**	**15.17**	**15.78**	**16.40**

Region IV	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Calhoun County						
Blountstown WWTP	0.000	0.51	0.52	0.54	0.55	0.55
Calhoun County Total	0.000	0.51	0.52	0.54	0.55	0.55
Holmes County						
Bethlehem K - 12 School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Bonifay, City of - WWTF	0.000	0.64	0.64	0.65	0.65	0.66
Noma WWTP	0.000	0.03	0.03	0.03	0.03	0.03
Ponce De Leon WWTP	0.000	0.03	0.04	0.04	0.04	0.04
Holmes County Total	0.000	0.71	0.71	0.72	0.72	0.73
Jackson County						
Cottondale, City of - WWTF	0.000	0.08	0.09	0.09	0.09	0.09
FDOT HWY 231 Welcome Center WWTF	0.000	0.01	0.01	0.01	0.01	0.01
FDOT Jackson County I-10 Rest Area WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Graceville, City of - Advanced WWTF	0.000	0.75	0.76	0.76	0.77	0.77
Jackson Correctional Institution WWTP	0.000	0.21	0.21	0.21	0.21	0.21
Marianna Community Correctional WWTF	0.000	0.00	0.00	0.00	0.00	0.00
Marianna, City of - WWTP	0.000	1.09	1.10	1.11	1.11	1.12
Sneads, Town of - WWTF	0.000	0.42	0.43	0.43	0.43	0.43
Town of Grand Ridge WWTF	0.000	0.06	0.06	0.06	0.06	0.06
Jackson County Total	0.000	2.63	2.66	2.68	2.69	2.71
Liberty County						
Bristol WWTF	0.000	0.13	0.14	0.15	0.15	0.16
Liberty Correctional Institution WWTP	0.000	0.18	0.19	0.20	0.20	0.21
Liberty County Total	0.000	0.31	0.33	0.34	0.36	0.37
Washington County						
Chipley WWTP	0.342	0.34	0.36	0.38	0.39	0.40
Ebro Greyhound Park WWTF	0.000	0.02	0.02	0.02	0.02	0.02
Northwest Florida Reception Center WWTF	0.000	0.35	0.36	0.37	0.37	0.38
Sunny Hills WWTP	0.000	0.02	0.02	0.02	0.02	0.02
Vernon, City of - WWTF	0.000	0.09	0.09	0.09	0.10	0.10
Washington County Total	0.342	0.81	0.85	0.87	0.90	0.91
Region IV Total	**0.342**	**4.96**	**5.07**	**5.15**	**5.21**	**5.27**

Region V	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Franklin County						
Apalachicola WWTF	0.075	0.23	0.23	0.23	0.24	0.24
Buccaneer Inn WWTF	0.000	0.01	0.01	0.01	0.01	0.01
Eastpoint WWTP	0.000	0.11	0.11	0.11	0.11	0.11
Kenneth B Cope AWT Facility	0.284	0.10	0.11	0.11	0.11	0.11
Sunset Beach / 300 Ocean Co-Operative WWTF	0.000	0.01	0.01	0.01	0.01	0.01
Villas of St George WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Franklin County Total	**0.359**	0.46	0.47	0.48	0.48	0.48

Region - County - Facility	Potable Offset Flow (mgd)					
Region V (continued)	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Gulf County						
Beaches Sewer System WWTP	0.000	0.04	0.04	0.04	0.04	0.04
Gulf Correctional Institution WWTP	0.000	0.29	0.30	0.30	0.31	0.31
Gulf Forestry Work Camp WWTP	0.000	0.04	0.04	0.04	0.04	0.04
Port St Joe WWTF, City of	0.000	0.66	0.68	0.68	0.69	0.70
Wewahitchka WWTP	0.000	0.14	0.14	0.15	0.15	0.15
Gulf County Total	**0.000**	1.17	1.19	1.21	1.22	1.24
Region V Total	**0.359**	**1.64**	**1.66**	**1.68**	**1.71**	**1.72**
Region VI	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Gadsden County						
Chattahoochee, City of - WWTP	0.000	0.21	0.21	0.22	0.22	0.22
FDOT Gadsden County I-10 Rest Area WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Florida State Hospital WWTP	0.000	0.29	0.29	0.30	0.30	0.30
Gadsden East WWTF	0.000	0.15	0.15	0.15	0.16	0.16
Greensboro High School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Gretna, City of - WWTP	0.000	0.28	0.28	0.29	0.29	0.30
Havana Middle School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Havana WWTF	0.000	0.16	0.17	0.17	0.17	0.17
Quincy WWTP	0.000	0.93	0.95	0.96	0.98	0.99
Rentz MHP WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Region VI Total	**0.000**	**2.05**	**2.08**	**2.11**	**2.14**	**2.16**
Region VII	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Jefferson County						
Capital City Plaza WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Monticello, City of - WWTP	0.000	0.55	0.56	0.56	0.57	0.57
Jefferson County Total	**0.000**	0.55	0.56	0.57	0.57	0.58
Leon County						
Disc Village WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Fort Braden Elementary School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Grand Village Mobile Home Park WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Killearn Lakes WWTP	0.000	0.69	0.72	0.75	0.78	0.80
Lake Bradford Estates MHP WWTF	0.000	0.01	0.01	0.01	0.01	0.01
Lake Jackson WWTP	0.000	0.26	0.27	0.28	0.29	0.30
Meadows - At - Woodrun WWTF	0.000	0.08	0.08	0.09	0.09	0.09
Sandstone Ranch WWTF	0.000	0.04	0.04	0.04	0.04	0.04
T P Smith Water Reclamation Facility	0.641	19.72	20.74	21.57	22.30	23.01
Western Estates MHP WWTP	0.000	0.01	0.01	0.01	0.01	0.01
Woodville Elementary School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Leon County Total	**0.641**	20.82	21.89	22.77	23.54	24.29
Wakulla County						
River Plantation Estates WWTP	0.000	0.01	0.01	0.01	0.01	0.01
St Marks WWTF	0.036	0.00	0.00	0.01	0.01	0.01
Wakulla County WWTF	0.000	0.61	0.60	0.60	0.60	0.60
Wakulla Middle School WWTP	0.000	0.00	0.00	0.00	0.00	0.00
Winco Utilities, Inc WWTP	0.000	0.41	0.44	0.46	0.48	0.50
Wakulla County Total	**0.036**	1.04	1.06	1.09	1.11	1.13
Region VII Total	**0.677**	**22.41**	**23.52**	**24.43**	**25.23**	**26.00**
NWFWMD Total (mgd)	**24.184**	**77.63**	**82.24**	**86.12**	**89.57**	**92.58**