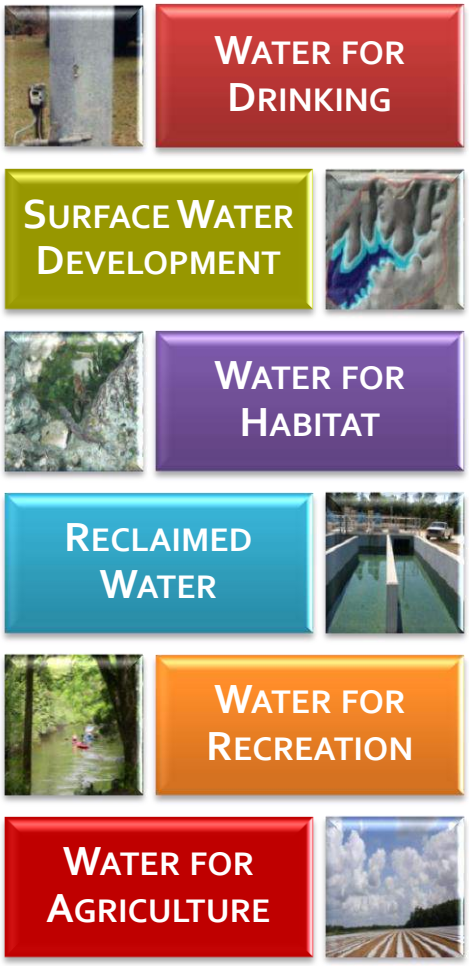
NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

2012 Regional Water Supply Plan Update for Santa Rosa, Okaloosa, and Walton Counties

Water Supply Planning Region II



Water Resource Assessment 12-01

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2012 Regional Water Supply Plan Update for Santa Rosa, Okaloosa, and Walton Counties Water Supply Planning Region II

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NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

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EXECUTIVE SUMMARY

The Northwest Florida Water Management District has been involved with Floridan Aquifer water supply issues brought on by population increases in Santa Rosa, Okaloosa, and Walton counties since the late 1970's. Declining Floridan Aquifer levels along the coast of these counties prompted concerns about the long-term sustainability of regional water supplies. Significant progress has been made in researching and understanding the region's surface water and ground water resources for sustainable development of these water supplies. This Regional Water Supply Plan (RWSP) update augments the 2000 RWSP and 2006 RWSP update and presents the District's strategy for continued implementation and progress toward meeting the region's water supply needs through the next 20 years

The 2000 RWSP was developed by the District pursuant to the requirements of Chapter 373, Florida Statutes (FS), to provide a strategy to meet the water needs of the region that includes Santa Rosa, Okaloosa, and Walton counties and to protect the region's water resources and related natural systems (**Figure 1**). The initial plan (NWFWMD, 2000) described how groundwater withdrawal in the coastal area caused a decline in Floridan Aquifer levels that threaten the potable aquifer with saltwater intrusion. The plan also provides a strategy of water resource and water supply development projects to better balance needs with sources.

The first RWSP update was published in 2006 and focused on three priorities discussed in the original RWSP. These included completing the implementation of the 2000 report tasks and ongoing work; increasing the amount of reclaimed water use for beneficial purposes; and identifying and initiating work on long-range (2025 and beyond) solutions. Thus, the plan was based on at least a 20-year planning period. The projects identified in the RWSP and updates falls into two categories defined by statute: water resource development projects which are the responsibility of the District and water supply development projects which are the responsibility of local governments, utilities, and individual users.

This updated RWSP utilizes the 2010 census population count and based on population projections by the University of Florida's Bureau of Business and Economic Research (BEBR) extends the planning horizon for at least the next 20 years. Water usage is forecast for public water supply, domestic self-supply, commercial-industrial supply, recreational and agricultural irrigation, and thermoelectric power generation water usage. Based on population growth, the amount of water usage is not expected to exceed the projections made in the previous plan, thus, the basic strategy to meet the water needs of the public and to protect the water resources and related natural systems in the region remains very similar to the previous year 2000 Plan and 2006 Plan update.

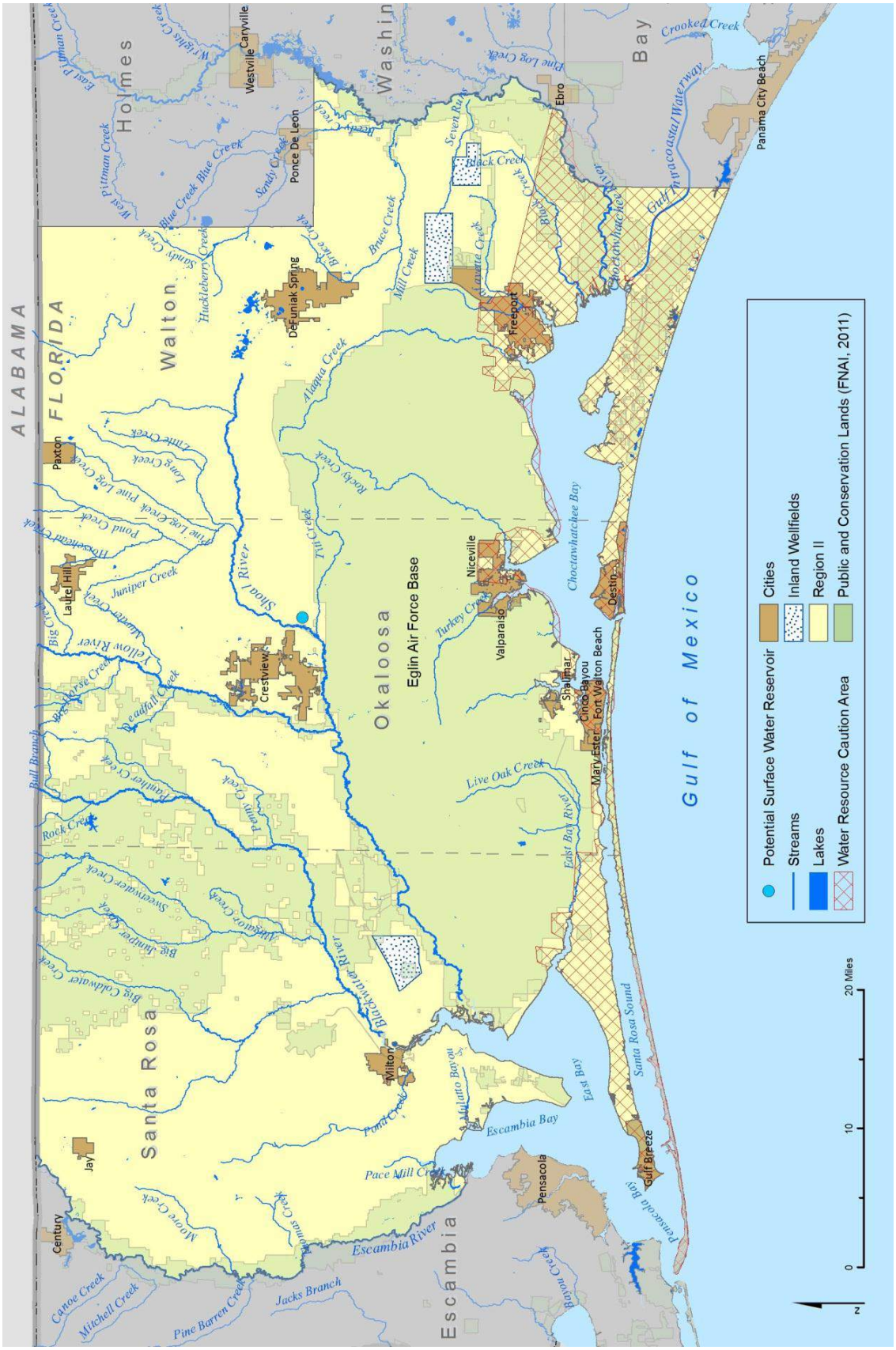


Figure 1. Region II: Santa Rosa, Okaloosa & Walton Counties, Florida

The Plan update, however, discusses major progress for plan implementation and the Water Resource Development projects that the District has performed including:

- Coastal Floridan Aquifer Sustainability Modeling,
- Inland Sand-and-Gravel Aquifer Modeling,
- Development of Feasible Surface Water Sources,
- Aquifer Storage and Recovery Feasibility Assistance,
- Water Reuse Coordination
- Water Conservation Coordination,
- Regional Water Supply Planning Strategies,
- Interconnection of Water Supply Conveyance Systems,
- Hydrologic Data Collection, Monitoring, and Analysis, and
- Abandoned Well Plugging.

Water Supply Development projects, as discussed in the RWSP, consists of economically and environmentally favorable alternative water supply options targeted to reduce the demand on coastal groundwater sources as well as those that meet the Region II future demands. These projects are developed by local governments and utility water suppliers. Developments that have or are currently being planned by local governments and utilities include:

- Inland Floridan Aquifer Alternative Water Supply,
- Inland Sand-and-Gravel Aquifer Projects Serving Coastal Areas,
- Surface Water Supply Development,
- Water Reuse, and
- Utilities Interconnection

The progress and future implementation of water resource and water supply development projects are reported through the Five-Year Water Resource Development Work Program (WRDWP) submitted annually after adoption of the District's budget. Funding plans for alternative water supply development activities are also incorporated in the WRDWP.

The District will continue to work cooperatively with local governments, water supply utilities, and major water users within Region II to identify and implement additional alternatives for water supply that are consistent with statutory guidelines, environmental and technical feasibility, cost feasibility, funding commitments, and consistency with this plan. Funding sources for water resource and water supply development plan implementation include the Water Protection and Sustainability Trust Fund (WPSTF), District general revenue funds, Florida Forever capital improvements funding, the Water Management Lands Trust Fund, legislative grants and appropriations, state and federal grant and loan programs, local government and utility revenues, and funding from other water use entities.

Public water supply demand in 2010 within Region II totaled approximately 46.1 million gallons per day (Mgal/d). According to the 2008 WSA performed by the District, demand for public supply in 2030 is projected to increase by 20.9 Mgal/d or 42 percent to a volume of 70.7 Mgal/d **(Table 1)**. An additional 59 Mgal/d (25 Mgal/d from surface water, 14 Mgal/d from the Inland Sand-and-Gravel Aquifer, and 15 Mgal/d from the Rockhill Inland Floridan Wellfield

development, and 5 Mgal/d from reuse water) has been identified to become available by 2030 under the Water Resource Development component of this plan **(Table 3)**. Based on 2010 census data and current BEBR population projections, the population in Region II is not shown to be growing at the rate previous studies and plans have projected. Therefore, the total water demand for Region II may be less than the District's current projection for the 2030 demand in Region II as stated in the 2008 District-wide water supply assessment. As scheduled, the District will perform a 5-year update of water supply demand in 2013. It is, therefore, expected that this plan's implementation will result in a total regional water supply that will be well in excess of the 2030 demand. This includes the demand of a 1-in-10 year drought event for Region II.

	Actual	2008 WSA Projections (Mgal/d)					2010 - 2030	Percentage
Okaloosa County	**2010**	**2010**	**2015**	**2020**	**2025**	**2030**	**Increase**	**Increase**
Crestview	2.63	2.82	3.12	3.42	3.72	4.03	1.21	42.9
Auburn	1.47	1.41	1.54	1.67	1.79	1.92	0.51	36.2
OCWS - Mid-County	0.94	1.19	1.52	1.85	2.18	2.51	1.32	110.9
Baker	0.25	0.26	0.29	0.32	0.35	0.38	0.12	46.2
Holt	0.15	0.15	0.17	0.19	0.21	0.23	0.08	53.3
Milligan	0.15	0.15	0.16	0.17	0.18	0.20	0.05	33.3
Laurel Hill	0.16	0.14	0.15	0.16	0.16	0.17	0.03	21.4
Inland Subtotal	**5.75**	**6.12**	**6.95**	**7.78**	**8.59**	**9.44**	**3.32**	**54.2**
Destin Water Users	3.51	3.76	4.06	4.36	4.66	4.97	1.21	32.2
OCWS - Garniers	3.74	4.97	5.10	5.24	5.37	5.50	0.53	10.7
Niceville	2.64	3.14	3.33	3.53	3.72	3.92	0.78	24.8
Ft. Walton Beach	2.51	3.24	3.39	3.53	3.68	3.82	0.58	17.9
OCWS - Bluewater	1.41	1.28	1.35	1.43	1.51	1.59	0.31	24.2
OCWS - West	0.80	0.78	0.82	0.85	0.88	0.90	0.12	15.4
Valparaiso	0.49	0.69	0.71	0.74	0.76	0.79	0.10	14.5
Mary Esther	0.46	0.62	0.65	0.67	0.70	0.72	0.10	16.1
Coastal Subtotal	**15.56**	**18.58**	**19.51**	**20.45**	**21.38**	**22.31**	**3.73**	**20.0**
Okaloosa County Total	**21.31**	**24.70**	**26.46**	**28.23**	**29.97**	**31.75**	**7.05**	**28.2**

	Actual	2008 WSA Projections (Mgal/d)					2010 - 2030	Percentage
Santa Rosa County	**2010**	**2010**	**2015**	**2020**	**2025**	**2030**	**Increase**	**Increase**
Pace	3.67	4.26	4.82	5.38	5.95	6.51	2.25	52.8
Milton	1.81	2.32	2.48	2.66	2.85	3.05	2.73	31.5
East Milton	1.29	1.47	1.73	1.98	2.23	2.49	1.02	69.4
Point Baker	0.80	0.94	1.06	1.19	1.35	1.52	0.58	61.7
Bagdad/Garcon	0.49	0.61	0.68	0.76	0.83	0.90	0.29	47.5
Chumuckla	0.35	0.33	0.36	0.40	0.43	0.46	0.13	39.4
Moore Creek/Mt. Carmel	0.28	0.41	0.45	0.50	0.54	0.59	0.18	43.9
Berrydale	0.23	0.27	0.30	0.32	0.35	0.38	0.11	40.7
Jay	0.19	0.20	0.22	0.24	0.27	0.29	0.09	45
Inland Subtotal	**9.11**	**10.81**	**12.10**	**13.43**	**14.80**	**16.19**	**5.38**	**49.8**
Midway	1.18	2.05	2.21	2.37	2.53	2.69	0.64	31.2
Holly Navarre	2.63	1.43	1.52	1.60	1.69	1.77	0.34	23.8
South Santa Rosa/Gulf Breeze	1.7	1.34	1.50	1.65	1.80	1.95	0.61	45.5
Navarre Beach	0.27	0.41	0.46	0.52	0.57	0.62	0.21	51.2
Coastal Subtotal	**5.78**	**5.23**	**5.69**	**6.14**	**6.59**	**7.03**	**1.80**	**34.4**
Santa Rosa County Total	**14.89**	**16.04**	**17.79**	**19.57**	**21.39**	**23.22**	**7.18**	**44.8**

	Actual	2008 WSA Projections (Mgal/d)					2010 - 2030	Percentage
Walton County	**2010**	**2010**	**2015**	**2020**	**2025**	**2030**	**Increase**	**Increase**
DeFuniak Springs	1.53	1.43	1.62	1.83	2.06	2.33	0.90	62.9
Mossy Head	0.28	0.25	0.30	0.35	0.40	0.45	0.20	80.0
North Bay Water Co.	0.13	0.16	0.17	0.19	0.21	0.23	0.07	43.8
Paxton	0.20	0.22	0.24	0.26	0.27	0.30	0.08	36.4
Argyle	0.07	0.10	0.12	0.13	0.15	0.16	0.06	60.0
Inland Subtotal	**2.21**	**2.16**	**2.45**	**2.76**	**3.09**	**3.47**	**1.31**	**60.6**
Fla. Comm. Service Corp.	2.84	2.80	3.47	4.14	4.82	5.49	2.69	96.1
South Walton	2.97	3.22	3.73	4.23	4.74	5.25	2.03	63.0
Freeport	1.77	0.76	0.91	1.07	1.23	1.39	0.63	82.9
Inlet Beach	0.09	0.10	0.11	0.12	0.13	0.14	0.04	40.0
Coastal Subtotal	**7.67**	**6.88**	**8.22**	**9.56**	**10.92**	**12.27**	**5.39**	**78.3**
Walton County Total	**9.88**	**9.04**	**10.67**	**12.32**	**14.01**	**15.74**	**6.70**	**74.1**
Region II Total	**46.08**	**49.78**	**54.92**	**60.12**	**65.37**	**70.71**	**20.93**	**42.0**

Table 1: Public Water Supply Demand Projections from the 2008 WSA (Mgal/d)

INTRODUCTION

The Northwest Florida Water Management District conducted a district-wide water supply assessment in 1998 that identified Region II (Santa Rosa, Okaloosa, and Walton counties), (**Figure 2**) as an area needing a RWSP as directed in section 373.036, Florida Statutes (F.S.). The plan was approved by the Governing Board in February 2001 (NWFWMD, 2000) and has since been in implementation. The District-wide Water Supply Assessment (WSA) was updated in 2003 (NWFWMD, 2003) while the RWSP was updated in 2006 (NWFWMD, 2006). These reports included more recent projections of water demand to the year 2030. This update incorporates and augments the 2000 RWSP and 2006 RWSP update.

Chapter 373.036, FS, require that a district-wide water supply assessment be developed by 1998 to examine the availability of existing and known water supply sources to meet reasonably anticipated projected future needs while sustaining existing legal water uses, the water resources and related natural systems.

Region II has experienced an increasing rate of growth since the 1980s, with a majority of the population living in the unincorporated areas of the three counties. Region II's population is projected to increase by 28.6 percent over the 2010 census population by the year 2030 to a population of approximately 500,000 residents (**Table 2**).

Purpose

The purpose of this plan update is to update the previous 2000 RWSP and 2006 RWSP update and in accordance with Section 373.709, F.S., to extend the planning horizon of the plan to at least 2035. Updating the plan is also intended to facilitate development and potential funding of alternative water supply sources in accordance with Sections 373.707 and 403.890, F.S. The plan provides a preliminary evaluation of water demand projections for the region to facilitate planning for water supplies through 2030 and beyond.

An Area of Special Concern (ASC) for water supply was previously identified along the coast in Santa Rosa, Okaloosa, and Walton counties (**Figure 2**), where historic groundwater withdrawals have caused a decline in coastal Floridan Aquifer potentiometric levels by as much as 150 feet at the City of Fort Walton Beach (Ryan et al., 1998) resulting in a serious potential for salt water intrusion within the aquifer along the coast and further inland. Water resource development strategies and projects presented in the 2000 WSP and updated 2006 RWSP and as further updated in this plan from a base year of 2010 were created to alleviate this threat and to provide sufficient water resources for the projected population demand through 2030 and beyond.

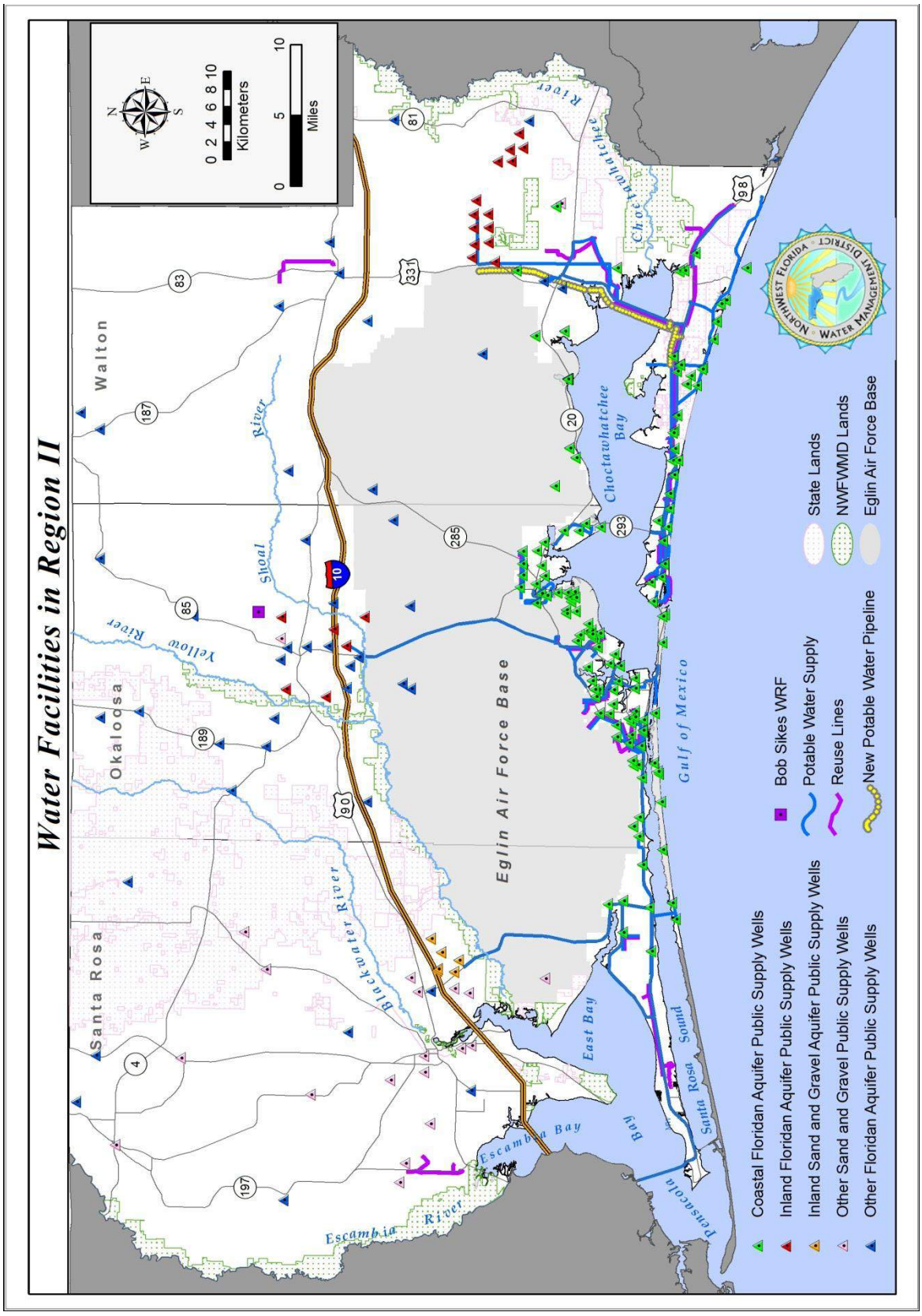


Figure 2.Water Resource Development Projects – Region II: Santa Rosa, Okaloosa & Walton Counties, Florida

Region II Water Demand & Population Projections by Category (2008 WSA Update)						
Water Use Category	**Reported**	**2008 WSA Update Projections (Mgal/d)**				
	2010	**2010**	**2015**	**2020**	**2025**	**2030**
Public supply	45.99	49.78	54.92	60.12	65.37	70.71
Domestic self-supply	2.97	2.97	3.38	3.76	4.11	4.43
Ind-Comm-Inst (I/C/I)	7.79	7.79	7.79	7.79	7.79	7.79
Recreational Irrigation	8.44	8.44	9.44	10.35	11.15	11.85
Agricultural Irrigation	5.42	5.42	5.42	5.42	5.42	5.42
Power Generation	0.00	0.00	0.00	0.00	0.00	0.00
Region II Total	**70.61**	**74.40**	**80.95**	**87.44**	**93.84**	**100.20**

Population Served	**Census**	**2011 BEBR Projections**				
	2010	**2010**	**2015**	**2020**	**2025**	**2030**
Total Region II Population	387,237	387,237	414,300	443,500	471,600	498,100
Pop. Srv. Public Supply	362,563	362,563	388,003	415,455	441,879	466,797
Pop. Srv. Domestic SS	24,674	24,674	26,297	28,045	29,721	31,303
Population Served (2008 rpt)	**Census**	**2008 WSA Update Projections**				
	2010	**2010**	**2015**	**2020**	**2025**	**2030**
Total Region II Population	387,237	388,143	431,010	465,203	500,002	530,001
Pop. Srv. Public Supply	362,563	374,474	408,146	442,567	476,240	496,081
Pop. Srv. Domestic SS	24,674	25,626	27,854	30,133	32,360	33,920

Region II Demand Projections for a 1-in-10 Year Drought Event by Category (2008 WSA Update)						
Water Use Category	**Reported**	**2008 WSA Update Projections (Mgal/d)**				
	2010	**2010**	**2015**	**2020**	**2025**	**2030**
Public supply	48.75	52.77	58.22	63.73	69.29	74.95
Domestic self-supply	3.15	3.15	3.58	3.99	4.36	4.70
Ind-Comm-Inst (I/C/I)	7.79	7.79	7.79	7.79	7.79	7.79
Recreational Irrigation	10.13	10.13	11.33	12.42	13.38	14.22
Agricultural Irrigation	5.42	5.42	5.42	5.42	5.42	5.42
Power Generation	0.00	0.00	0.00	0.00	0.00	0.00
Region II Total	**75.24**	**79.25**	**86.34**	**93.34**	**100.24**	**107.08**

Table 2. Region II Water Demand in Mgal/d & Population Projections (2010 – 2030)

An overall goal of the RWSP is to maintain groundwater withdrawals in the coastal Water Resource Caution Area (WRCA) at sustainable levels by developing alternative water supplies to meet present and future water demands in an environmentally sound and economically feasible manner. This will be accomplished by ensuring that regional water needs are met within the capability of regional resources, and by identifying alternative water supplies that can be developed by local governments, utilities, and other entities in Region II to meet future demands while sustaining water resources and related natural systems.

WATER DEMAND ESTIMATES AND PROJECTIONS

Water use estimates and projections were prepared with the 2008 WSA update (NWFWMD, 2008). One in 10 year drought-year projections are included to address the level-of-certainty planning goal outlined in Chapter 373.709(2) (a) 1, F.S.

During drought events, multiple factors come into play that can affect determinations made regarding the availability of water to meet the needs of both permitted users and the natural systems. Under drought conditions water demands will increase for certain uses such as recreational irrigation and outdoor water use (landscape irrigation). Drought conditions also can reduce the amount of water that is available for withdrawal from a given source, whether surface water or ground water, without causing harm to natural systems.

Population estimates and projections were obtained from the 2010 U.S. Census and the BEBR Florida Population Studies (BEBR, 2011). BEBR population projections are currently available for the region through 2040. The estimated amounts for Water Demand for the Region II area are based on projections developed in the 2008 WSA update and are presented in **Table 2**. Previous water supply plans projected the Region II population in 2010 to be approximately 400,100. The 2008 WSA projected the 2010 Region II population to be 388,143. The 2010 census reported the Region II population to be 387,237; 3.2 percent less than previously projected. Currently BEBR projects population for the region by 2030 to be 498,100 (522,300 by 2035).

The water demand projections show a demand increase of 29.6 Mgal/d from the reported 2010 usage to the 2030 projections. As before, public supply is the largest category with a projected total demand of 70.7 Mgal/d, or 70.6 percent of the total projected 2030 water demand of 100.2 Mgal/d **(Table 2)**.

Water use projections for a 1-in-10 year drought event are also presented in **Table 2**. During a drought, the projected water use for all categories would increase by 6 to 7 percent for the 5-year projections. By 2030, the projected increase due to a drought event is an additional 6.8 Mgal/d to approximately 107 Mgal/d. The drought related increased water use is projected to occur primarily in the public supply, domestic self-supply and recreational irrigation categories.

A major degree of uncertainty in the application of projected values is population. Other major factors which drive water demand in Region II are seasonality and climate. Because of these factors and other levels of uncertainty, it is planned to routinely re-evaluate and update demand projections through District-wide water supply assessment updates. The next water demand projection update is planned again in 2013 which would include projections out to 2035.

Projected Water Demand Estimates

Actual water demand for 2010 was determined by consumptive use data and utility reports. Projected estimates of water demand, based on population, previous user data, and assumptions and/or mathematical methods as discussed in the 2000 RWSP, were calculated for public water supply, domestic self-supply, commercial-industrial supply, recreational irrigation, agricultural irrigation and thermoelectric power generation.

Public Supply: Public supply water use in Region II totaled 46.0 Mgal/d in 2010. Within Region II there are numerous public supply utilities, many of which buy, sell, or transfer water to other utilities or municipalities. Because of issues regarding the availability and consistency of data for water transfers, it is difficult to calculate the net water use for some utilities. The largest utilities with respect to raw water withdrawals in 2010 were Okaloosa County Water and Sewer (6.9 Mgal/d), South Walton Utility Company (4.7 Mgal/d), Fairpoint Regional Utility System (4.1 Mgal/d), and Pace Water System (3.7 Mgal/d). Public supply water demands are anticipated to increase by 24.7 Mgal/d or 53.8 percent to approximately 70.7 Mgal/d by 2030 with a large portion of this increase anticipated to serve demand in the coastal region.

Domestic Self-Supply and Small Public Supply Water Systems: Domestic self-supply and small public water systems in Region II used an estimated 2.97 Mgal/d in 2010. Demands are anticipated to increase to 4.4 Mgal/d or 49.2 percent by 2030.

Commercial, Industrial and Institutional (I/C/I) Self-Supply: The I/C/I water use in Region II totaled 7.8 Mgal/d in 2010. Water users such as Taminco Methylamines, Inc., Eglin Air Force Base, Cytec, and Okaloosa Correctional Facility were the large users in this category, using the Sand-and-Gravel Aquifer and the Floridan Aquifer System as their primary water sources. The projected I/C/I water demand is not anticipated to increase for this region by 2030.

Recreational Irrigation: Recreational irrigation is the second largest water user in Region II with an estimated water use rate of 8.4 Mgal/d in 2010 or approximately 12 percent of the total water usage. Recreational water use consists primarily of golf course and landscape irrigation. Future irrigation water demands that include reclaimed water, surface water, and ground water sources are anticipated to increase to approximately 11.9 Mgal/d by 2030.

Agricultural Irrigation: Agriculture in Region II consists largely of container ornamentals, field crops, sod, and aquaculture with some hay, cotton, peanuts and fruit crops. Water use for agricultural irrigation was 5.4 Mgal/d in 2010 and is not anticipated to increase for this region by 2030.

Thermoelectric Power Generation: There are no power generation facilities in Region II and no plans for power generation facilities have been submitted for regulatory review at this time.

Water Supply Sources

As stated in the 2006 RWSP update, the coastal area in Region II has been heavily affected by ground water withdrawals that has resulted in the depression of the Floridan Aquifer potentiometric surface and has induced saltwater intrusion. As a result, surface water sources and inland Floridan Aquifer and Sand-and-Gravel Aquifer wellfields are planned and being implemented as an alternative water supplies. Studies have also been conducted to estimate a sustainable amount of withdrawal from the coastal Floridan Aquifer.

Ground Water Resources: In Region II, 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. Together, the Sand-and-Gravel Aquifer provides about 35 percent of the water used in the region and the Floridan Aquifer provides the majority of the remaining 65 percent.

Studies, as described in the 2006 RWSP update, have been conducted for the inland Sand-and-Gravel Aquifer wellfield in the region between the Blackwater and Yellow Rivers in Santa Rosa County as an alternative source of water to meet the increasing demand in Fairpoint Peninsular coastal areas as well as enabling a reduction in coastal withdrawals of the Floridan Aquifer System. The Sand-and-Gravel Aquifer provides about 85 percent of the ground water use in Santa Rosa County. In 2010, a total of approximately 4 Mgal/d was withdrawn from the inland Sand-and-Gravel Aquifer to supply the Fairpoint Peninsula coastal area. Impact to the water resources of the inland Sand-and-Gravel Aquifer is minimized due to storage in the aquifer, high recharge rates in upland areas and adequate well spacing. Drawdown impacts are generally limited to the immediate vicinity of individual pumping wells. A three dimensional transient ground water flow model has been developed for the inland Sand and Gravel Aquifer to evaluate cumulative impacts of additional pumping from this aquifer which may be sustained to supply the coastal Fairpoint Peninsular area. Initial modeling results indicate that an additional 14 Mgal/d of groundwater can be drawn from this area for a groundwater production total of approximately 18 Mgal/d.

Increased Floridan Aquifer ground water withdrawals since the early 1940's have developed a cone of depression as much as 110 feet below sea level along the coastal region, centered under coastal Okaloosa County, because of ever increasing water demands. In 1989, the coastal regions of Santa Rosa, Okaloosa, and Walton counties were designated as a WRCA (**Figure 2**). Initiatives have been in place since 2000 to reduce the pumpage in this area and to supplement the increasing water use demands with inland sources of potable ground water and surface water. These initiatives have resulted in reversing the trend of lowering the Floridan Aquifer water levels and stabilizing the aquifer as a sustainable water source. In 2010, permitted groundwater pumpage from the coastal Floridan Aquifer in Santa Rosa, Okaloosa and Walton counties totaled approximately 23.7 Mgal/d. The amount of groundwater needed to maintain projected growth in the coastal area in 2030 is 41.6 Mgal/d. This amount is not sustainable (HydroGeoLogic 2005, 2007a and 2007b). Model forecast simulations of the coastal Floridan Aquifer show that the pumpage in the coastal Floridan Aquifer must be 30 Mgal/d or less to be sustainable. Therefore, other sources of potable water outside the WRCA are needed to meet the water demands in the coastal areas.

The Lower Floridan Aquifer is non-potable and the limits of the upper Floridan Aquifer as a water supply source has been previously summarized in the RWSP (Bartel, et al., 2000). Additional water needs for the coastal area will, therefore, have to come from inland areas (inland Floridan Aquifer, inland Sand-and-Gravel Aquifer, and/or surface water sources) and be transported to the coastal area. Water use can also be reduced somewhat through additional water re-use and conservation programs.

Surface Water Resources: In Region II, surface water has not historically played a major water supply role. Surface water withdrawals totaled approximately 4.2 Mgal/d in 2005 and largely reflect water withdrawn from streams and ponds for golf course and agricultural irrigation. The RWSP has evaluated the use of surface water as an alternative to future increase in the use of the coastal and to some extent the inland Floridan Aquifer.

The source of fresh surface water currently being considered under the RWSP is the Shoal River. A District feasibility of water quality and flow analysis of surface water alternatives for rivers in Okaloosa County (PBS&J, 2006) indicated that the Shoal River had potential to meet this county's future water demands in the long term. A planning level estimate of long term need which was used for the basis of conceptual design work was approximately 25 Mgal/d of surface water.

Reclaimed Water and Conservation: The reuse of water and conservation measures could reduce future demands on ground and surface water resources in Region II. In 2005, approximately 57 percent or 27.1 Mgal/d of the wastewater generated in Region II was of reuse quality (FDEP, 2006). However, more than half of the reuse (approximately 17.5 Mgald/d) takes place in the coastal areas of Region II and was discharged to spray fields and infiltration ponds that recharge the surficial aquifer rather than being used to directly offset water withdrawals from the Floridan Aquifer source of supply. As of 2009, beneficial reuse for irrigation totaled 9.63 Mgal/d and included 19 golf courses, 1,321 residences, seven parks, three schools and one cemetery (NWFWMD, 2010).

A District-wide re-use plan is currently under development. There are several ongoing projects to develop and expand reuse systems in Region II that are discussed in the 2006 RWSP update (NWFWMD, 2006) and the Five Year Water Resource Development Work Program (NWFWMD, 2010). These systems will provide reclaimed water for irrigation at public access sites, private landscaping, golf courses, cemeteries, schools, and an industrial park. Water conservation remains a priority within the Region II area. Water conservation measures that have been implemented include public education, water-conservation rate structures, leak detection and repair, retrofitting with low flow toilets and showerheads, installation of efficient irrigation systems and the use of drought-tolerant plants in landscapes.

REGION II RESOURCE ANALYSES

Ground water, surface water, and related resources in Region II are described in detail in the 2000 RWSP and the 2006 RWSP Update. This section discusses current resource analysis programs within Region II.

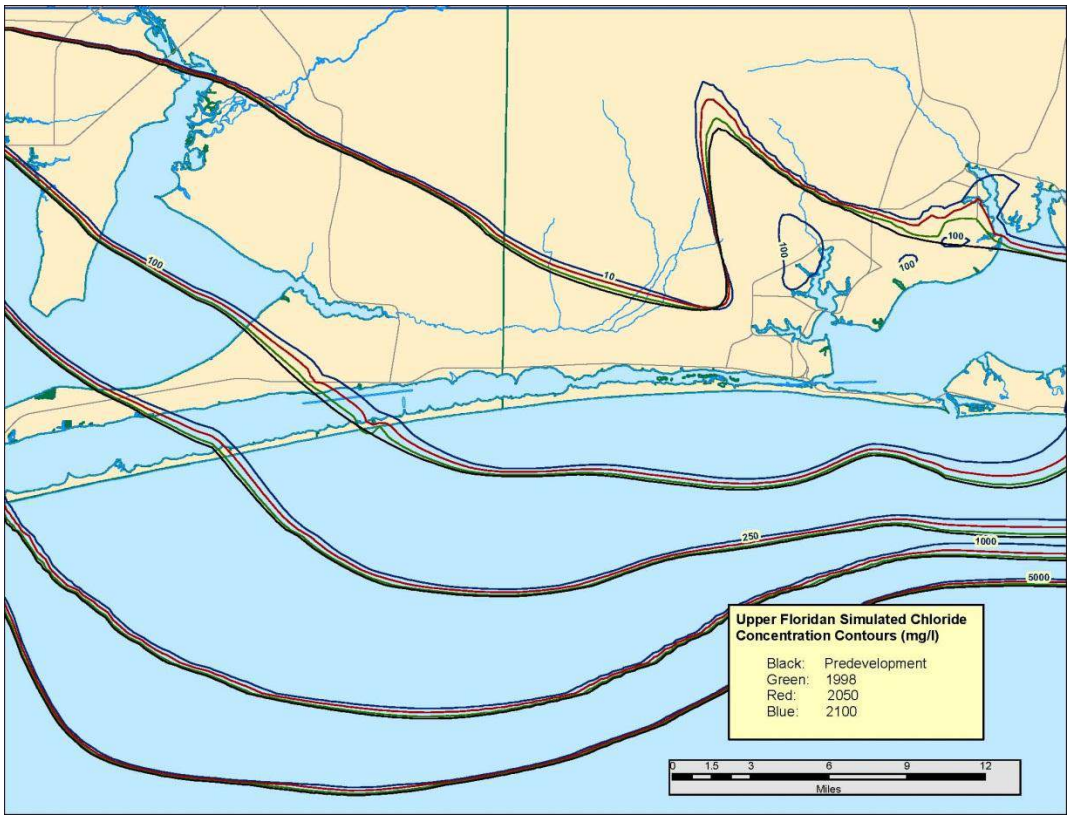
Coastal Floridan Aquifer Sustainability

Historic and existing ground water withdrawals from the coastal Floridan Aquifer have caused a significant depression in the potentiometric surface of the aquifer, including saltwater intrusion within the aquifer's potable zone. Based on sustainability model results, it appears that a moderate but reduced degree of ground water pumpage can be sustained in the coastal area for many years, well into the future.

In 1998, coastal withdrawals averaged 28 Mgal/d and accounted for 78 percent of the Floridan Aquifer pumping in the region. A regional ground water flow model was completed for the coastal Floridan Aquifer in Santa Rosa, Okaloosa, and Walton Counties. Two saltwater intrusion models were then developed based on this regional flow model, a western domain model for the western coastal portion of the region (HydroGeoLogic, Inc. 2005) and an eastern domain model for the eastern coastal area (HydroGeoLogic, Inc. 2007a). The western domain saltwater intrusion model is applicable to Ft. Walton Beach and areas to the west, including the main Eglin Air Force Base. The eastern domain model is applicable to Destin and areas to the east.

The intrusion models were then used to assess the long term threat of induced intrusion of saltwater in the Floridan Aquifer. Estimated Floridan Aquifer withdrawal rates were applied beginning in 1942 and were adjusted annually to the actual 2004 pumping rate. From 2005 through 2025 pumpage was increased annually in order to meet the projected 2025 demand. Pumping rates were then held constant through 2100 in order to estimate the long term intrusion threat (HydroGeoLogic, Inc. and Hazlett-Kincaid, Inc. 2007b; HydroGeoLogic, Inc. 2007c). Reports documenting.these results are available on the District's website. **Figure 3A & 3B** present the Upper Floridan Aquifer simulated chloride concentration contours for both the eastern and western domains in milligram per liter (mg/l) for the pre-development time period and for the years 1998, 2050, and 2100.

The projected (simulated) coastal Floridan Aquifer withdrawal rate for 2030 is 27.7 Mgal/d, or 49 percent of the expected 2030 Floridan Aquifer demand. Based on these model results, the sustainable amount of groundwater withdrawal from the coastal Floridan Aquifer in this region is approximately 30 Mgal/d. Additional future water supplies in excess of 30 Mgal/d will need to be obtained from alternative inland groundwater and surface water sources. Determination of sustainable groundwater pumpage in the coastal area will also depend upon ongoing monitoring of the aquifer for saltwater encroachment. As of 2011, monitoring data indicates conditions in the coastal area of the Floridan Aquifer have not changed since the 2006 RWSP Update. Limiting further saltwater intrusion into the Floridan Aquifer and sustaining the aquifer as a



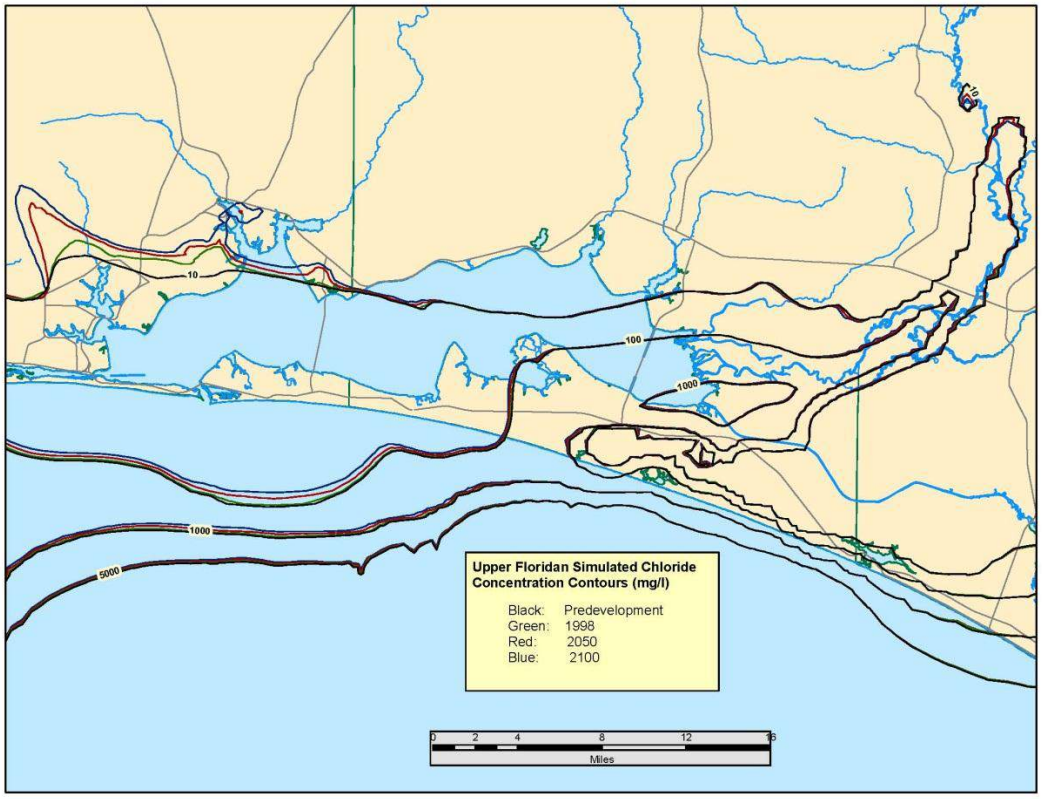


Figure 3A & 3B Coastal Upper Floridan Aquifer Simulated Chloride Concentrations

viable water supply is a primary focus of this plan. Based on the model, it is estimated that the coastal Floridan Aquifer, under current pumping conditions, is sustainable at least through 2050 and likely beyond. The District is continuing to work cooperatively with local utilities to develop additional future water supplies (ground water and surface water sources). The successes in the development of these future water sources may also help aquifer levels in the coastal area recover or remain stable.

Inland Floridan Aquifer

To reduce the amount of groundwater being removed from the coastal Floridan Aquifer, wellfields have been placed further inland (north of Freeport and Eglin Air Force Base) to reduce the drawdown and potential for saltwater intrusion in the coastal zone (**Figure 2**). As of 2009, approximately 8.0 Mgal/d of groundwater was being withdrawn for public supply from the inland Floridan Aquifer in northern Okaloosa and Walton counties. The projected 2030 inland Floridan Aquifer demand is approximately 20 Mgal/d.

Inland Sand-and-Gravel Aquifer Sustainability

The Inland Sand-and-Gravel Aquifer in Region II has a high recharge rate and is capable of providing regionally-significant quantities of water. The aquifer is located between the Yellow and Blackwater Rivers, east of Milton in Santa Rosa and Okaloosa counties (**Figure 4**). A three dimensional transient ground water flow model has been developed to assess and identify the volume of water available from the aquifer. The model results show that a ground water withdrawal of at least 18 Mgal/d appears to be sustainable within a range of expected annual precipitation amounts. In order to achieve sustainable ground water pumping in this area, proper placement of production wells and pumping management may be necessary to limit areas of excessive ground water drawdown and to assure that impacts to the water resources and ecology are negligible. Water quality protection of this aquifer has also been emphasized previously in the RWSP (NWFWMD, 2000). **Figure 4** shows the current public supply wells that are in use along with high quality upland wetlands where excessive drawdowns due to cumulative impacts of withdrawal should be avoided or minimized. The floodplains of the Yellow and Blackwater Rivers and adjacent low lands are areas where drawdown is not expected to be excessive due to riverine flux type boundaries. The current public supply wells are positioned mostly along the central upland ridge of the peninsula. This area has a high recharge rate. Because of the thickness of the sandy overburden above the aquifer along this ridge, upland wetlands are hydraulically isolated; therefore, the wetlands do not appear to be affected by the aquifer water level changes brought on by groundwater withdrawal. In these areas, water must also first travel through the wetlands before it is available for recharge to the underlying ground water table.

Figure 4 also indicates areas where further investigation may be needed to avoid minimize or protect the sensitive high quality upland wetland areas from impacts due to water well pumping. These areas are generally positioned along steep sided inland creeks and areas upland of existing floodplain areas along the Yellow River and Blackwater Rivers where groundwater is the primary source of water for the wetland inhabitants to thrive. The area

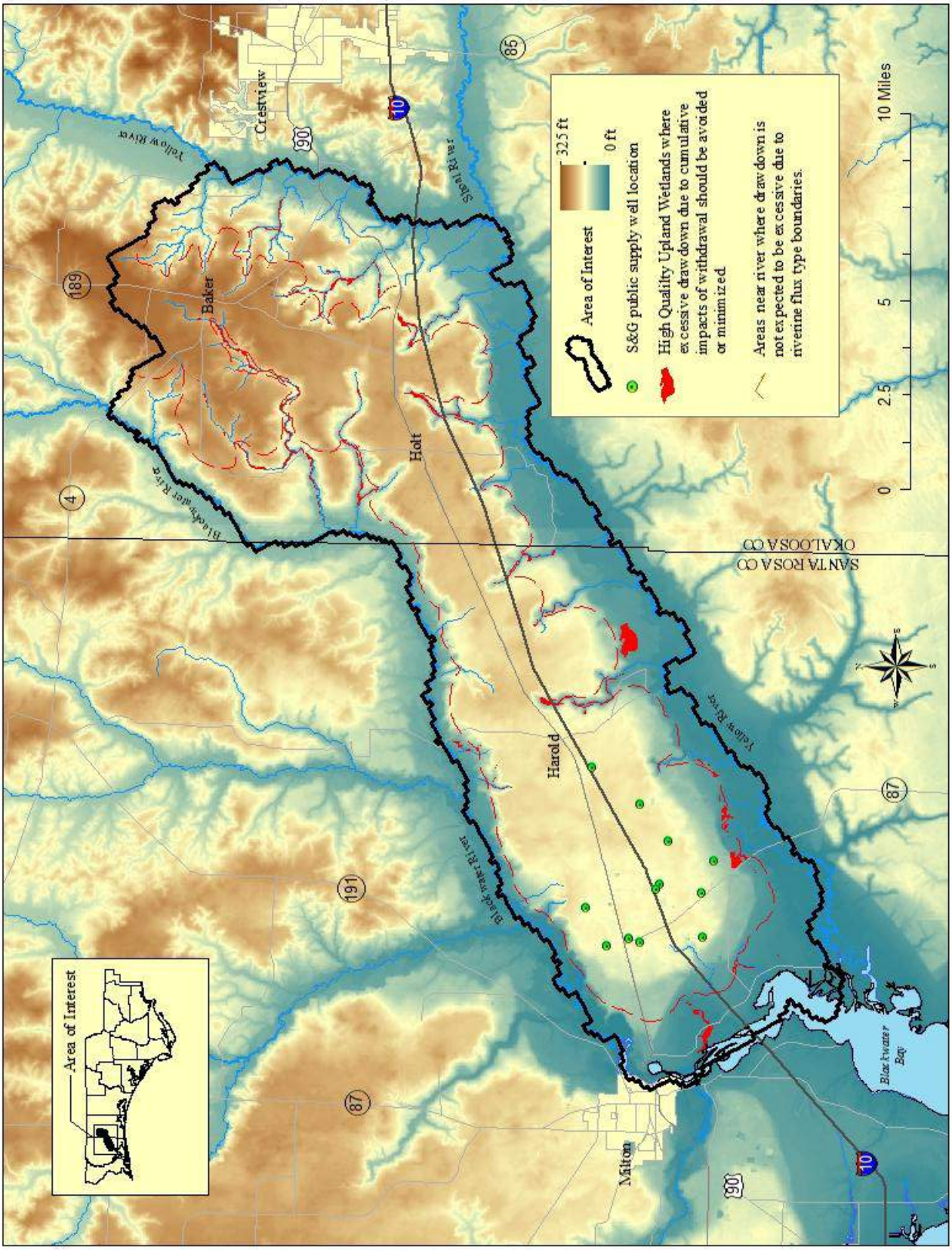


Figure 4. Inland Sand-and-Gravel Aquifer Alternative Water Supply Area

in the far southwestern portion of the peninsula should also be minimized or avoided because of the potential of saltwater intrusion into the aquifer from Blackwater Bay. These areas are currently being mapped in more detail to identify the quality of wetlands and their potential sensitivity to excessive drawdown. Ultimately, the use of this alternative water supply source and placement of wells within the Sand and Gravel aquifer would need to be determined through the District's consumptive use permitting program. The transient three-dimensional ground water flow model developed by the District will also be helpful to determine the amount of drawdown to expect in the future as a result of the cumulative effects of groundwater pumping. This model may also be a useful tool to help optimize supply well locations. The District is also nearly complete with development of backwater models of the Yellow and Blackwater Rivers which are useful for accurately delineating flood plain areas which are largely fed by these riverine sources.

Surface Water Resources

In Region II, surface water has not historically played a major water supply role, however, in order to sustain the coastal Floridan Aquifer and to meet the future water demands, new sources of surface water have to be developed prior to 2030. Surface water withdrawals in the region in 2005 totaled approximately 4.2 Mgal/d and largely reflect water withdrawn from streams and ponds for golf course and agricultural irrigation.

The District has conducted feasibility evaluations of surface water sources that include the Blackwater River, Yellow River, Shoal River, Choctawhatchee River, and Escambia River. The District and its water supply consultants prepared an analysis and report of potential surface water supply sources (PBS&J, 2006). Surface water source alternatives such as direct river withdrawal, offline surface water supply reservoirs, or river bank filtration have been considered as possible technologies to meet the demands for the 2030 planning horizon and beyond. Currently, the Shoal River, east of Crestview in Okaloosa County, is being considered. This alternative is being considered along with an offline pumped storage reservoir with a target of dependably delivering 25 Mgal/d of surface water. Water would be pumped directly from the Shoal River to a reservoir located on an upstream tributary behind an earthen dam. The District and Okaloosa County staffs have performed preliminary feasibility studies, investigated land acquisition potential, and evaluated river water withdrawal methods and offline tributary surface impoundments for this project.

Minimum Flow and Water Levels

District developed minimum flow and water levels as defined by 373.042 FS are listed at (www.nwfwmd.state.fl.us/rmd/mfl/mfl) and includes:

- The Floridan Aquifer in Coastal portions of Santa Rosa, Okaloosa, and Walton counties. Protection of this aquifer is provided through the District's consumptive use permitting process and the aforementioned sustainability modeling effort. The District also continues to monitor the aquifer to confirm expected potable water conditions in the future.
- The Inland Sand-and-Gravel Aquifer in Santa Rosa and Okaloosa Counties.: This water resource has been identified in the regional water supply plan as a likely future water supply. Monitoring and hydrologic modeling has been implemented

and is ongoing under this plan to consider the potential for harm to this resource. None has been identified.

- The Yellow River in Santa Rosa and Okaloosa Counties. An MFL for this water resource was initially scheduled due to previous threats or potential for significant harm due to construction of a dam on the main stem of the river which may have altered the natural flow regime of this river. Since this dam is no longer being planned, there is no longer any threat of altered flow regime to natural system.

- Morrison Spring in Walton County is scheduled for the listing of an MFL in 2015. The scheduling of second order magnitude springs within state owned park lands is a requirement of Chapter 373.042, FS. Monitoring and technical analyses are ongoing to determine hydrology and aquatic resource needs.

The MFL Priority List is updated annually and submitted to the FDEP for review and approval.

WATER RESOURCE DEVELOPMENT STRATEGIES

In meeting the requirements of the first regional water supply plan developed for northwest Florida in 2000 (NWFWMD, 2001) and the updated plan in 2006 (NWFWMD, 2006), the District has updated and revised water resource development components, specific alternative water supply development projects, and other elements into a program that extends the planning timeframe to 2030 and beyond. This program includes ten Region II strategies that are briefly described as follows:

Floridan Aquifer Sustainability Modeling

A model has been developed with two areas that include a western domain that covers Santa Rosa and western Okaloosa counties, and an eastern domain that covers eastern Okaloosa and Walton counties. The model has been used to evaluate long-term safe yield from the coastal Floridan Aquifer, pumpage from consumptive use permits, and future withdrawal scenarios to evaluate cumulative impacts on this source of groundwater supply.

Model simulations were run to predict the extent of saltwater intrusion through the year 2100 for both the eastern and the western model domains. The simulations incorporated historical withdrawals as well as proposed future pumping rates. Model results indicate that saltwater intrusion into potable portions of the Floridan Aquifer will continue to occur at a very slow, manageable rate into the future (HydroGeoLogic, Inc., 2007b, 2007c). **Figures 3A & 3B** illustrate the computed simulated chloride concentrations in milligrams per liter (mg/l) for several past and projected dates. The initial chloride concentration contours were based on a pre-development (pre-1942) period. The model simulated applied annual pumping from 1942 -- 2009. Coastal Floridan Aquifer withdrawals were then increased to their permitted rates. Future coastal demand above this amount was assumed to be met by alternative water supplies (including inland Floridan Aquifer wells). The simulated coastal Floridan Aquifer withdrawal was held constant at 27.7 Mgal/d from 2030 to 2100. The chloride concentration contours in the coastal area for these simulations are presented on **Figures 3A & 3B**.

Inland Sand-and-Gravel Aquifer Development and Sustainability

The "inland" Sand-and-Gravel Aquifer is located east of Milton in that portion of Santa Rosa and Okaloosa counties lying between the Blackwater and Yellow Rivers. The aquifer has a high recharge rate and is capable of providing regionally-significant quantities of water. A three dimensional transient groundwater flow model of the aquifer was developed to evaluate drawdown effects from pumping and changes in groundwater flow in addition to evaluating possible impacts on surface water and wetland areas as a resource protection criterion. The model also includes the transient response of the aquifer to drought and climatic variability.

Local utility contributions and approximately $3 million in federal grant funding have been previously applied to develop an inland wellfield for the Fairpoint Peninsula. Production wells have been developed along with a pipeline from the inland Sand-and-Gravel Aquifer wellfield to the coastal Santa Rosa County area to alleviate pumping pressures in the WRCA of the coastal Floridan Aquifer. Currently, the production wells in the inland Sand-and-Gravel Aquifer are permitted to produce approximately 8.35 Mgal/d, although in 2010 the withdrawal rate was 4.0 Mgal/d. Total production capability of the inland Sand-and-Gravel Aquifer wellfield is estimated

to be able to yield over 18 Mgal/d with restrictions, variable pumping scenarios, and proper placement of production wells.

Feasibility studies and the continued development of the inland wellfield by the cooperating utilities and the District should continue to assess optimum placement of new production wells that will avoid or minimize impacts to the natural resources. The actual location and allowable pumping rates from these wells will ultimately require permits obtained through the District's consumptive use regulatory program.

Development of Surface Water Sources

In Region II, surface water has been identified as a potential alternative water source to meet future demands beyond 2035, particularly in Okaloosa County. The District and its water supply consultants prepared an analysis and report of potential surface water supply sources (PBS&J, 2006). This study reviewed various technically and economically feasible alternatives, including direct river withdrawal and riverbank infiltration. As part of this study, the District and others conducted an evaluation of the county's Yellow River Reservoir proposal and determined that the proposal was not economically feasible and that its implementation would result in significant environmental impacts and mitigation requirements. Currently, the District and Okaloosa County staffs are investigating land acquisition potential, river water withdrawal methods and offline tributary surface impoundments for surface water supply sources along the Shoal River.

Significant funding for the next fiscal year and beyond has been allocated to assist Okaloosa County in land acquisition and project development, once a preferred alternative is selected. Currently, for the District to provide project funding, it would have to be from its general fund reserves although other sources of funding may come available to support land acquisition in the future (e.g. WPSTF, Florida Forever).

Aquifer Storage and Recovery Feasibility

Storage of potable water supplies through aquifer storage and recovery (ASR) is a component of a regional water supply management strategy. The primary advantage of ASR is large, relatively protected storage capacity requiring no significant additional land area. Large-scale District-funded ASR operations for storing freshwater supplies have not been implemented or planned in Region II due to economic feasibility, water quality, and other technical constraints. ASR implementation along with its feasibility and management may require a regional approach since water introduced into a geologic formation might not remain within a single utility's jurisdiction or service area. A cooperative approach between the utilities would, therefore, be essential. The District coordinates with water and wastewater utilities on ASR through FDEP, water reuse planning, and permitting projects.

District projects may also consider ASR as a salinity barrier to protect existing potable water supplies. However, this approach would need to be coordinated closely with ongoing efforts to sustain the Floridan Aquifer. The District may conduct preliminary ground water model analyses on the feasibility of additional ASR activities within Region II in the future if it appears there is an opportunity that would be conducive to this approach.

Water Reuse Coordination

Water reuse is required in designated WRCA and strongly encouraged in other areas as a way to offset demand for potable-quality water supplies. Wastewater treatment and disposal and reuse activities are regulated by FDEP and coordinated with the District's consumptive use permitting program. The purpose of this program is to provide funding and assistance to encourage water reuse in water supply development projects. Reclaimed or reuse water is used primarily for irrigation and can significantly reduce the overall demand for potable supplies from all sources in Region II.

The District is working on the development of a District-wide reuse plan that will identify future projects to support the RWSP implementation and to enhance the sustainability of water resources throughout northwest Florida. The reuse plan is currently scheduled to be completed in 2012.

The District staff also encourages local governments to require connection to reclaimed water system for uses not requiring potable quality water. These efforts complement measures established under the District's Regulatory program for the coastal WRCA. Under this program, new uses of the Floridan Aquifer for non-potable uses are not being permitted.

Water Conservation Coordination

The District has made a significant effort and has been successful in encouraging water conservation in Region II for some time. Current regulatory activities involving criteria stipulated in the District's Consumptive Uses of Water permitting rule, Chapter 40A-2, F.A.C. such as consumptive use permitting, public education and outreach, and local plan and project review programs have been conducted to increase water conservation in Region II. The rule requires utilities within the WRCA to submit water conservation plans, programs, and measures that are evaluated on their effectiveness to reduce water use demand and promote the efficient use of the area's water supplies. The goal of the utility conservation measures is to reduce the annual average per capita water consumption to 110 gallons per day, or lower and to reduce water leakage to 10 percent or less of the water withdrawn.

The District, in coordination with the FDEP initiated the Water Conservation Hotel and Motel Program (Water CHAMP) throughout the district with a focus on Region II. The program is a towel and linen reuse program for all hotels and motels in the area. As of September 2011, 38 hotels are participating in the District-wide program, including 16 in Region II. The District is also continuing its water resource education program and distributing brochures. Other water conservation methods encouraged by the District include the use of drought-tolerant native vegetation in landscaping, lawn irrigation timers and sensors, and the installation of high efficiency, low volume plumbing fixtures. The District staff also encourages local governments to require connection to reclaimed water systems for uses not requiring potable quality water. These efforts complement measures established under the District's regulatory program for the coastal WRCA. Under this program, new uses of the Floridan Aquifer for non-potable uses are not being permitted.

Water conservation remains a priority within Region II, both to sustain and build upon gains made in water efficiency and to ensure that future growth is established in such a way as to maximize long-term water use efficiency.

Funding for water conservation efforts is provided through the Water Management Lands Trust Fund (WMLTF), as well as local sources. As other projects are determined to be viable and cost-effective, increased funding may be made available for implementation.

Regional Water Supply Planning

Development and refinement of regional strategies, project planning and development, and RWSP updates are essential components of the Water Resource Development. Program related activities include technical support and coordination with local governments and utilities to ensure a regional focus in the planning and development of alternative water supply projects. Associated administrative activities include project and funding management, coordination with FDEP and other agencies, and progress reporting.

The District provides assistance with hydrogeology and related engineering work for development of new and alternative water sources and water distribution systems within Region II, including the inland Floridan Aquifer, the Sand-and-Gravel Aquifer, the Shoal River Reservoir, and reclaimed water. The District has also coordinated with local governments and utilities in providing water distribution systems from well fields in the northern part of the region to coastal areas within the WRCA.

District staff works with local governments and state and regional agencies to enhance coordination of land use, and water supply planning. District staff also reviews water supply facilities work plans submitted by local governments as amendments to their comprehensive plans. Of the 18 local governments in Region II, reviews have been conducted for all three counties and nine of the municipalities.

Interconnection of Water Supply Conveyance Systems

A major District priority is the coastal water systems interconnection initiative in which, through cooperation with local utilities, the goal is to explore and develop strategies for the interconnection of water supply systems that will significantly enhance the resilience of the coastal water systems by enabling transfer of water between utilities, if necessary, because of future droughts or other contingencies. The objective is to provide multi-jurisdictional and regional water conveyance systems that ensure water availability for emergency response and disaster recovery in the event of water shortages, natural disasters, environmental emergencies, or system failures. Interconnections are also consistent with development of regional sources of water. Ten utilities with a total of 14 water systems were evaluated within Santa Rosa, Okaloosa, and Walton counties for the possibility of connecting several of the utilities to ensure sufficient water supply during emergency situations.

The Santa Rosa County and Okaloosa County Interconnect addresses a critical infrastructure need for the coastal area of Region II. A water supply pipeline between the two counties will connect Fairpoint Regional Utility with Okaloosa County Water System – West (OCWS-West). The interconnect project includes approximately 10.2 miles of 24-inch and 20-inch pipeline. The

estimated cost is approximately $15.5 million and includes all design, construction and materials to complete the project.

Hydrologic Data Collection and Analysis

The District has a hydrologic data collection network of rainfall gauges, stream gauges, and monitoring wells throughout Region II. Additional monitoring is also recommended or required as part of the consumptive use permitting process. The District has enhanced its ground and surface water monitoring capabilities by continuing monitoring operations in cooperation with the U.S. Geological Survey surface water gauging network and an expanded monitoring network for the Sand-and-Gravel Aquifer and the Floridan Aquifer where new water sources have been developed or are planned. In addition, the District will continue to monitor coastal areas within the WRCA for salt water intrusion and sustainability data for the coastal Floridan Aquifer. The monitoring network will continue to be useful in ensuring that long-term water supply initiatives will be successful and sustainable and in refining groundwater models and analyses needed to make future management decisions and to further develop water management strategies.

The District anticipates that this will be an ongoing project, both up to and beyond the RWSP's 20-year planning horizon. Current funding is primarily reliant upon the WMLTF and the District's general fund.

Abandoned Well Plugging

The District resource regulatory program has an active program to plug abandoned artesian wells. The overall goal of this program is to protect available ground water resources from old, uncontrolled, or improperly constructed wells that are no longer in use. To date, the District has facilitated the plugging of over 4,000 abandoned wells within Region II. During FY 2009-2010, the District permitted the proper plugging of 201 wells in Santa Rosa, Okaloosa, and Walton counties.

The District staff also provides technical assistance and funding to utilities in the plugging of abandoned wells identified as having the potential to adversely affect ground water quality. Well abandonment is an ongoing project and is likely to continue as more wells are identified for plugging in the future. The District will continue to implement this project through regulatory programs, where feasible. The project supports District efforts to sustain coastal water supply sources.

Technical assistance may be funded using the District's General Fund or the WMLTF. Additional sources for funding abandoned well plugging include federal or state grants, individual well owners, and local governments. When possible, the District anticipates continued use of these sources to fund well plugging that is not associated with regulatory requirements.

Additional information on these strategies, including the lead agency, estimated 5-year cost, potential funding sources, quantity of water made available, and project status are presented in the NWFWMD Five-Year Water Resource Development Work Program for Fiscal Year 2011-2013 Update (NWFWMD, 2011).

WATER SUPPLY DEVELOPMENT STRATEGIES

The District in conjunction and cooperation with local governments and utilities have updated and revised specific alternative water supply development projects, and other water supply development elements into a program that extends the planning timeframe to 2035 and beyond. Water supply development projects are in the purview of local governments and water supply utilities. The District provides technical and financial assistance to feasible projects. Local entities are responsible for planning, design, securing permits, construction, operation, and maintenance of alternative water supply development projects, their facilities and water distribution systems. Water supply options and alternatives for Region II include surface water, groundwater, reclaimed water, conservation and utility interconnections. Traditional water supply sources in Region II are locally withdrawn groundwater supplies from the Floridan aquifer. This regional water supply plan includes strategies that are described below. **Figure 5** presents the Alternative Water Supply projects to replace coastal withdrawals from the Floridan Aquifer with alternative water supplies. **Table 3** presents information on the responsible agencies, and funding for water supply development projects.

Inland Floridan Aquifer Alternative Water Supply

Progress began in the early 2000's to replace coastal groundwater withdrawals from the Floridan Aquifer in south Walton County with alternative inland supply wells. The Rock Hill Wellfield, located between Freeport and DeFuniak Springs, was developed as part of the 2000 RWSP implementation and is currently producing 3.6 Mgal/d for coastal Walton County. Additional capacity, within the limits of this supply source, are planned to accommodate increased demand related to growth that is based on a build-out condition in the area.

The continuation of this welllfield will include installation of additional wells, chlorination facilities, ground storage, land acquisition, and transmission lines. Because the next series of wells may be located further to the east, the District and utilities are evaluating options for expanding the wellfield and facilities. This will serve to accommodate additional demands, reduce pumping and reliance on water supplies in the coastal area, and provide redundancy in the regional water supply and distribution system.

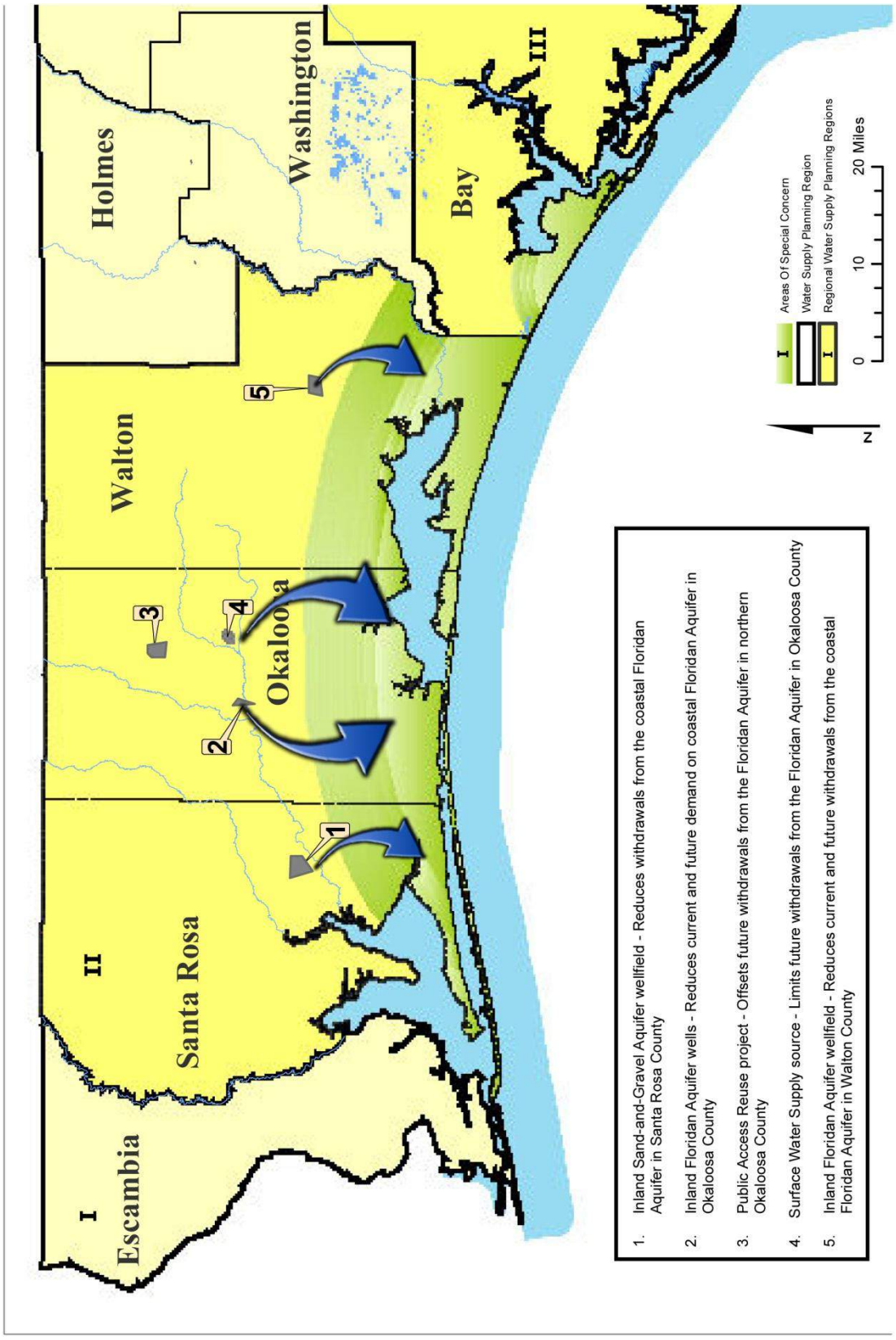


Figure 5. Alternative Water Supply Projects

Project	Responsible Entities	Purpose/Objective	Estimated Quantity (Mgal/d)	Possible Funding Agencies	Planning Level Capital Cost Estimates	Present Value Cost Per 1,000 gallons
5.1 Inland Floridan Aquifer Alternative Water Supply						
Rock Hill Wellfield and distribution system to South Walton Co.	South Walton Utility, Regional Utilities (FCSC)	Expansion of Rock Hill Wellfield w/ storage and conveyance system	15	SWUCI, FCSC, District WPSTF	$ 47,088,331	$ 0.59
5.2 Inland Sand-and-Gravel Aquifer Alternative Water Supply						
Fairpoint Peninsula additional wellfield and distribution system development	FRUS, local governments	Additional Production wells and expansion of conveyance system to coastal area	14	District WPSTF, Utilities	$ 18,800,000	$ 0.60
5.3 Surface Water Supply Development						
Shoal River Reservoir, water treatment, and distribution project	Okaloosa County, NWFWMD	Development of alternative surface water supply source, storage system, conveyance, and conjunctive use	25	District, local governments, Utilities	$ 86,159,000	$ 0.64
5.4 Water Reuse Projects						
Water Reuse Facilities	Okaloosa, Walton, Santa Rosa, Utilities	Establish Beneficial Reuse and Potable Water Offset	5	WPSTF, Local Utilities and governments	TBD	N/A
5.5 Water Supply Management Projects						
Regional Water Supply Conveyance and Interconnection Projects	Numerous Utilities	Water line extensions and Interconnect projects	N/A	WPSTF, state, federal, local utilities	$ 42,700,000	N/A

Note: Present value cost is the capital costs over a 30 year period with a 3.5% inflation rate per 1,000 gallons of water.

Table 3. Water Supply Development Projects

Inland Sand-and-Gravel Aquifer Projects Serving Coastal Areas

Production wells have been developed in the inland Sand-and-Gravel Aquifer wellfield located in between the Blackwater and Yellow Rivers. The water from these wells is stored in above ground storage and is transported via pipelines from the wellfield to the Fairpoint Peninsular coastal Santa Rosa area to alleviate pumping pressures in the WRCA of the coastal Floridan Aquifer. Areas receiving this water include Gulf Breeze, Midway, Holley-Navarre, Navarre Beach and South Santa Rosa. Currently, the production wells in the inland Sand-and-Gravel Aquifer are pumping 4 Mgal/d and are permitted to produce approximately 8.35 Mgal/d. Based on detailed computer modeling of the aquifer to compute aquifer drawdown and consideration of sensitive wetlands, the total production capability of the inland Sand-and-Gravel Aquifer wellfield is estimated to yield over 18 Mgal/d. Some constraints such as variable pumping scenarios and proper spacing or placement of production wells may be necessary. This and other constraints, if any, would need to be determined during the regulatory process for obtaining consumptive use permits from the District.

Surface Water Supply Development

Direct withdrawal of surface water from the Shoal River with an offline surface water supply reservoir is being planned as an alternative for beyond the 2030 planning horizon. Currently, a tributary of the Shoal River, east of Crestview in Okaloosa County, is being considered as an offline 1 billion gallon surface water reservoir. Water from the Shoal River would be pumped into a reservoir located behind an earthen dam that would be capable of delivering a water source of approximately 25 Mgal/d. A pumping station, water treatment plant, and water distribution system would have to be developed for this or any similar project. The District and Okaloosa County staffs are performing preliminary feasibility studies, investigating land acquisition potential, evaluating river water withdrawal methods and offline tributary surface impoundments for this project. Use of this surface water supply conjunctively with Floridan Aquifer water supplies will also be considered.

Water Reuse

Water reuse has been a legislative priority of the Water Protection and Sustainability Program in the recent past and is required in designated WRCAs of the District. In Region II, reuse is strongly encouraged to offset the demand of Floridan Aquifer potable water supplies. A regional reuse plan is currently under development by the District which may further the application of available reuse supplies for this purpose. The reuse plan is expected to be completed by September 2012. The purpose of the regional reuse program is to provide funding and assistance to encourage water reuse in water supply development projects. Golf course and landscape irrigation is the predominant use of reclaimed water which is treated to public-access standards. Nearly all golf courses in Region II use reclaimed water maximizing this demand for reuse water. Retrofitting existing residential areas for additional reuse water for landscape and yard irrigation tends to be cost-prohibitive, but as new developments are planned and as redevelopment activities occur, increased use of reclaimed water may be more economically pursued.

Of the 28 wastewater facilities permitted for 0.1 Mgal/d or more of treated wastewater for disposal in Region II, 17 are currently permitted or have future plans for public access reuse

water. As of 2009, an estimated 9.63 Mgal/d of reclaimed water was used for public access reuse in Region II (FDEP, 2010). This includes irrigation of an estimated 1,321 residences, 19 golf courses, seven parks, three schools and one cemetery. The District, in cooperation with county wastewater departments, has provided technical assistance and funding to reclaimed water project within Region II, particularly in the coastal areas. The City of Freeport constructed a wastewater reuse system that provides approximately 0.47 Mgal/d public access reuse water to irrigate a future residential subdivision and golf course. The construction to expand Okaloosa County's Bob Sikes Water Reclamation Facility has been completed and approximately 1.0 Mgal/d of reuse water is available for public access irrigation in the vicinity of Crestview.

Water Storage and Conveyance Projects

Guidance is also provided in Section 373.019, F.S., for defining alternative water supplies to include such management measures as storage and conveyance. Projects include water storage capability that ensures water supply availability consistent with permit conditions, emergency management, response, and disaster recovery. Other criteria include utility interconnections that provide for multijurisdictional, interlocal, and regional water provision and delivery systems serving the public interest (including emergency management, response, and disaster recovery).

In Region II, Water Supply Management projects include the Fairpoint Regional Utilities System (FRUS) in Santa Rosa County that interconnects the inland Sand and Gravel Aquifer wellfield with water utilities in Midway, South Santa Rosa, Gulf Breeze, Navarre Beach and Holley Navarre. The Okaloosa County Water & Sewer (OCWS) provides interconnects, water transfers and storage capacity between the Mid-County wellfield and county water providers at OCWS-Main (Garniers) and OCWS-West. The South Walton Utility Company (SWUC) and Florida Community Services of Walton County (FCSC) Regional Utilities provides interconnects, water transfers and storage capacity from the inland Rockhill and Owl's Head wellfields to the City of Freeport, Inland Beach, South Walton, and Destin.

Another alternative water supply project is the Aquifer Storage and Recovery (ASR) program. ASR provides storage of potable water supplies and is one component of a regional water supply management strategy when combined with other alternative water supplies. The primary advantage of ASR is large, relatively protected water storage capacity requiring no significant additional land area. Large-scale District-funded ASR operations for storing freshwater supplies have not been implemented in Region II due to economic feasibility, water quality, and other technical constraints. ASR implementation along with its feasibility and management requires a regional approach since water introduced into a geologic formation might not remain within a single utility's jurisdiction or service area. Therefore, a cooperative approach between many utilities in the region is essential. ASR is not considered to be a viable stand-alone water supply source, but in combination with other alternative water supply strategies might be viable. ASR, where available, could be used to store large quantities of water at low cost more effectively than above ground storage facilities.

In 2009, Destin Water Users were permitted for testing of an ASR in the lower portion of the Surficial Aquifer. The system consists of seven wells for storage of reclaimed water that will be available to offset irrigation demands. Testing indicates the ASR system will successfully provide 2.125 Mgal annual average daily flow capacity of reuse to the area.

Planned coastal water system interconnects, which will be described more specifically under the District's Interconnect Plan, are also considered part of this RWSP. One example is the planned interconnect between Santa Rosa County (Fairpoint Regional Utility) and Okaloosa County Water Systems.

SUMMARY AND RECOMMENDATIONS

The first WSA required by s. 373.036 F.S. was completed in June 1998 for the 1995-2020 planning horizon (Ryan et al. 1998). A Water Supply Projection Report updated the WSA in 2003 to extend demand projections in five-year increments through 2025 (Bonekemper 2003). The 2003 update provided water demand projections for the 2010-2025 planning horizon and reevaluated the ability of existing and reasonably anticipated future water sources and conservation to meet projected future demands, while sustaining water resources and associated natural systems. The WSA was updated again in 2008 to provide water demand projections at five-year increments for the 2010-2030 planning period.

The initial Region II RWSP plan was produced in 2000 and updated in 2006. This second update outlines a strategy which is essentially unchanged from the earlier plans. It describes the water resource and water supply development projects that have been planned in conjunction with the most recent projected water needs in the region. The updated RWSP also presents a strategy to sustain the water resources in Region II through 2035 based on the latest BEBR population projections and the 2008 WSA water demand projections.

Water Supply Development projects are currently being implemented or planned which, when fully developed will assist in sustaining the Region II water resources and provide the necessary resources to meet the water supply demands for at least the next 20 years. The major projects include:

- Inland Floridan Aquifer Alternative Water Supply;
- Inland Sand-and-Gravel Aquifer Projects Serving Coastal Areas;
- Surface Water Supply Development;
- Water Reuse Program; and
- Utilities Interconnection

These projects have been discussed in detail in the 2000 RWSP, the 2006 RWSP Update (NWFWMD, 2000, 2006) and the Five-Year Water Resource Development Work Program (NWFWMD, 2010). The District should continue to work cooperatively with local governments, water supply utilities, and major water users within Region II to identify and implement additional alternatives for water supply. The implementation of water resource and water supply development strategies and funding plans is evaluated and reported annually through the Water Resources Development Work Plan (WRDWP).

Region II's 2010 census population of 387,237 is projected to increase by 28.6 percent to a population of 498,100 by the year 2030 (522,300 by 2035). Within Region II, the reported 2010 public water supply demand was approximately 46.0 Mgal/d. The public water supply demand for 2030 was projected in the 2008 WSA update to increase by 24.7 Mgal/d to 70.7 Mgal/d. In addition, the total water demand for Region II was projected to increase by 25.8 Mgal/d from a 2010 usage of 74.4 Mgal/d to a projected 2030 volume of approximately 100.2 Mgal/d. In order to meet this demand the Water Resources Development component of this plan identified an additional 59 Mgal/d that is anticipated to become available by 2022 **(Table 3)**. Comparison of

past reported population projections in Region II with the current 2010 Census and the most recent BEBR population projections indicates that the population is not increasing at the rate previously projected, therefore, future water demand should be less than projected.

Section 373.709, FS, requires that the total capacity of the RWSP's projects must exceed the projected demands. It is expected that this updated plan's implementation will exceed the 2030 demand of 100.2 Mgal/d for Region II. The total water production capacity will also exceed the 1-in-10 year drought event for Region II of 107.1 Mgal/d.

Water demand in Region II is overwhelmingly driven by population but land use and land availability, seasonality, climate variability, are also factors. As with any planning level analysis, each of these factors has a degree of uncertainty that is difficult to quantify precisely and therefore it is planned to update the demand estimates again in 2013.

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