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Section 3

Water Quantity

This section addresses water quantity issues (availability and use), while water quality in the Suwannee basin is the subject of Section 4. Water use in the Suwannee River basin is measured by estimates of freshwater withdrawn from groundwater and surface water. Uses of water include both consumptive and nonconsumptive uses.

Groundwater is the primary water source in the Coastal Plain Province of the Suwannee River basin. Principal aquifers of the Coastal Plain include the Upper Brunswick and Lower Brunswick aquifers, the Floridan aquifer system, the Claiborne and Clayton aquifers and the Cretaceous aquifer system.

The Floridan aquifer system supplies most of the ground water used in the Suwannee basin. This system consists primarily of limestone, dolostone and calcareous sand. It is generally confined, but is semiconfined to unconfined near its northern limit. Wells in this aquifer system are generally high-yielding and are extensively used for irrigation, municipal supplies, industry and private domestic supply.

Water use in the Suwannee River basin is expected to remain stable in the near future due to average population growth rates.

In the following sections, water availability is discussed from a number of viewpoints. First, the important topic of drinking water is presented, which includes both surface and ground water supplies. Then, general surface water availability is presented, followed by ground water availability.

3.1 Drinking Water Supply

3.1.1 Drinking Water Supplies in the Suwannee River Basin

A public water system pipes water for human consumption and has at least 15 service connections or regularly serves at least 25 individuals 60 or more days out of the year. Public water system sources include surface water pumped from rivers and creeks or

ground water pumped to the surface from wells or naturally flowing from springs. Unlike other basins in Georgia, the main source of drinking water in the Suwannee basin is provided by groundwater. There are three different types of public water systems: community, non-community non-transient, and non-community transient.

Types of Public Water Systems

A community public water system serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. Examples of community water systems are municipalities, such as cities, counties, and authorities which serve residential homes and businesses located in the areas. Other types of community public water systems include rural subdivisions or mobile home parks which have a large number of homes connected to a private public water system, usually a small number of wells.

A non-community non-transient public water system serves at least 25 of the same persons over six months per year. Examples of non-community non-transient systems are schools, office buildings, and factories which are served by a well.

A non-community transient public water system does not meet the definition of a non-community non-transient system. A non-community transient public water system provides piped water for human consumption to at least 15 service connections or which regularly serves at least 25 persons at least 60 days a year. Examples of a non-community transient are highway rest stops, restaurants, motels, and golf courses.

Private domestic wells serving individual houses are not covered by the state's public water system regulations. However, the regulations for drilling domestic wells are set by the Water Well Standards Act and the local health department is responsible for insuring water quality.

3.1.2 Drinking Water Demands

Over the next few years it is estimated that there will be a modest increase in the use of groundwater from the Suwannee River basin.

3.1.3 Drinking Water Permitting

The Georgia Safe Drinking Water Act of 1997, the Rules for Safe Drinking Water (391-3-5) adopted under the act require any person who owns and/or operates a public water system to obtain a permit to operate a public water system from the Environmental Protection Division. The permitting process has three phases: Inquiry and Discovery, Technical Review, and Permitting. During these phases the owners must provide a detailed description of the project; demonstrate the reliability of the water source; render engineering plans and specifications prepared by a professional engineer demonstrating the construction integrity of wells, treatment and distribution; conduct preliminary water sample testing; and legal documentation including an application to operate a public water system. Permits contain specific conditions the owner must meet for different types of public water systems, including a list of approved water sources, filter rates, disinfection and treatment requirements, compliance with sample testing schedule, and number of allowed service connections. Permits are issued for 10 years and are renewable.

3.2 Surface Water Quantity

3.2.1 Surface Water Supply Sources

The Suwannee River basin is an 11,020 square-mile landmass that extends from Georgia into Florida with approximately 5,560 square miles of the basin within Georgia. The headwaters start in the northwest quadrant of Dooly County, then the basin extends southward through the Georgia-Florida border into Florida, and eastward to the Okefenokee Swamp. The Suwannee basin ultimately discharges to the Gulf of Mexico.

The principal surface water resources are the three major rivers which drain portions of the basin. The eastern portion of the basin contains the headwaters of the Suwannee River (average annual flow 1580 cfs). The central portion is drained by the Alapaha River (average annual flow 1045 cfs), which joins the Suwannee River about 15 miles south of the state line. The western portion of the basin comprises the Withlacoochee River watershed, (average annual flow 1580 cfs) which joins the Suwannee River about eight miles downstream from the confluence of the Suwannee and Alapaha rivers. The three major rivers thus cross the state lines separately, but they join long before the Suwannee reaches the Gulf of Mexico.

Some of the other larger tributaries across the basin include Okapilco Creek, Suwanoochee Creek, Willacoochee River and Little River.

3.2.2 Surface Water Supply Demands and Uses

Municipal and Industrial Demand

Municipal and Industrial (M&I) water demands include public supplied needs such as residential, commercial, governmental, institutional, manufacturing and other demands such as distribution system losses.

Currently, the Suwannee River basin does not have any surface water withdrawal permits. Surface water withdrawal permits are for users equal to or greater than 100,000 gallons per day. Users below this amount of surface water are not required to have a permit for their withdrawals.

Agricultural Water Demand

The demands on water resources for agricultural activities include irrigation for crops, nursery, and turf; drinking water for livestock and poultry; and, to a much lesser extent, water for aquacultural purposes. As of 1996, the EPD had issued 4,486 agricultural permits for water withdrawal permits to entities located within the Suwannee River Basin. Within Georgia, agricultural permit holders are by law (O.C.G.A. Section 12-5-31 et seq.) exempted from requirements to report their water use, which make determining exact historical, current, and future agricultural water demand rather challenging.

Irrigated Acreage

The total water demand from agriculture, including both surface water and ground water demand, may be estimated using a variety of agricultural data collected by multiple sources. NRCS has attempted to combine this information for the purpose of estimating historical, current, and future, agricultural water use in the basin. Table 3-1 shows historical irrigated acreage in the basin from 1974 to 1998.

Table 3-1. Irrigated Acres in the Suwannee River Basin, 1974-1998.

Suwannee River Basin - Irrigated Acres					
Year	Sub-Basin 3110201	Sub-Basin 3110202	Sub-Basin 3110203	Sub-Basin 3110204	Basin Total
1974	193	5,560	5,208	4,804	15,765
1978	1,148	24,911	13,041	27,629	66,730
1979	764	31,956	17,927	28,818	79,465
1980	1,254	41,710	27,185	33,821	103,970
1981	1,159	47,014	33,705	37,916	119,794
1982	1,650	51,754	35,702	38,605	127,711
1984	1,951	55,948	32,795	40,017	130,712
1986	2,069	60,778	36,480	39,370	138,697
1989	1,915	74,393	50,414	42,441	169,163
1992	2,123	78,669	58,278	43,710	182,780
1995	2,238	82,941	61,443	46,083	192,705
1998	2,325	86,151	63,821	47,867	200,163

Source: USDA-NRCS estimates are based on county level data extrapolated to the basin.

Irrigated acres in the Suwannee River Basin grew from 15,765 in 1974 to an all time maximum, for the Basin, of 200,163 in 1998. This represents an average annual growth rate of 15.45 percent during the period of record. Much of this growth occurred in the 1970's during an extensive increase in the number of irrigation systems statewide, principally cable tow and center pivot systems. Since 1982, irrigated acreage across Georgia has continued to grow, but at a much slower rate, approximately 1.6 percent annually. However, irrigated acreage expansion in the Suwannee River Basin has more than doubled this pace with an annual growth rate of 3.3 percent over the same time period. Cotton, peanuts, and corn are the primary crops under irrigation, but there is also a notable effort to irrigate vegetables in the Basin.

Water Demand

Agricultural water demand is dependent upon a number of variables that include, but are not limited to, irrigated acreage, cropping mix and patterns, soil characteristics, climatic conditions, type of animal operation, best management practices, and market conditions. Water use in the Suwannee River Basin reflects the influence of these variables (Table 3-2). A distinctly positive trend can be observed. From 1980 to 1995 there was a increase of 40 MGD from 51 MGD in 1980 to 91 MGD in 1995.

Table 3-2. Historical Agricultural Water Use in the Suwannee River Basin, 1980-1995.

Suwannee River Basin - Agricultural Water Use					
year	Sub-Basin 3110201	Sub-Basin 3110202	Sub-Basin 3110203	Sub-Basin 3110204	Basin total
1980	0.58	23.29	13.10	14.17	51.14
1985	1.25	22.41	12.18	10.27	46.11
1987	1.27	36.18	18.79	23.48	79.72
1990	0.96	25.97	31.16	18.78	76.87
1995	2.64	38.69	24.63	27.51	93.47

Source: Georgia Geological Survey

Over 98 percent of the agricultural water used in 1995 was for irrigation purposes (89.62 MGD). The remaining 2 percent (1.21 MGD) was used for animal operations. Ground water sources provided 58 percent of the water used by this industry in 1995.

Future Water Use

Agricultural producers are constantly reacting to changing climate and market conditions; thus, rendering any projections regarding future agricultural water use extremely difficult. Projecting irrigated acreage based on historical trends, and then assuming various water application rates, is likely the most stable approach to estimating future water use in this industry. Irrigation systems represent a significant investment for agricultural producers. Operational modifications, based on changing climate and market conditions, will occur on land under irrigation.

Table 3-3 shows the historical and projected acres under irrigation for the Suwannee River Basin and each sub-basin. Assuming the 1.92 percent annual growth rate, observed in the Suwannee River Basin between 1992 and 1998, continues; irrigated acreage in the Basin will reach 304,152 acres by the year 2020.

Table 3-3. Irrigated Acreage 1974-1998, Projected through 2020.

Suwannee River Basin - Irrigated Acres					
Year	Sub-Basin 3110201	Sub-Basin 3110202	Sub-Basin 3110203	Sub-Basin 3110204	Basin Total
1974	193	5,560	5,208	4,804	15,765
1978	1,148	24,911	13,041	27,629	66,730
1979	764	31,956	17,927	28,818	79,465
1980	1,254	41,710	27,185	33,821	103,970
1981	1,159	47,014	33,705	37,916	119,794
1982	1,650	51,754	35,702	38,605	127,711
1984	1,951	55,948	32,795	40,017	130,712
1986	2,069	60,778	36,480	39,370	138,697
1989	1,915	74,393	50,414	42,441	169,163
1992	2,123	78,669	58,278	43,710	182,780
1995	2,238	82,941	61,443	46,083	192,705
1998	2,325	86,151	63,821	47,867	200,163
2000	2,415	89,491	66,295	49,722	207,923
2005	2,656	98,418	72,908	54,683	228,665
2010	2,921	108,236	80,182	60,138	251,476
2015	3,212	119,034	88,180	66,137	276,563
2020	3,533	130,908	96,977	72,734	304,152

Source: USDA-NRCS estimates are based on county level data extrapolated to the basin.

Future agricultural water demand is also expected to increase significantly within the basin to 169.68 MGD by the year 2020. Undesirable climate and favorable market conditions could force producers to demand as much as 271.49 MGD on the projected 304,152 acres under irrigation by that time. Conversely, desirable climate conditions and unfavorable market conditions may result in a much lower demand, 113.12 MGD by 2020. Table 3-4 shows the likely range of agricultural water demand scenarios in the basin through the year 2020. The reader should note that significant increases in irrigated acreage will have the potential to result in a much higher demand.

Table 3-4. Projected Agricultural Water Use [MGD] through 2020.

Suwannee River Basin - Agricultural Water Use				
Year	Low Scenario	Expected Scenario	High Scenario	
2000	77.33	116.00	185.59	
2005	85.04	127.57	204.11	
2010	93.53	140.29	224.47	
2015	102.86	154.29	246.86	
2020	113.12	169.68	271.49	

Source: USDA-NRCS estimates are based on average water application rates for all commodities.

Power Generation Water Demand

There are no power generating plants located within the Suwannee basin that use the water resources of the basin.

Navigational Water Demand

There is no commercial navigation in the Suwannee basin.

Recreation

Recreation activities in the Suwannee River basin includes fishing, camping, boating, swimming, picnicking, and other activities.

Waste Assimilation Water Demand

Water quantity, wastewater treatment, and wastewater discharge permitting are addressed in Section 4. However, it should be noted that the guidelines for discharge of treated effluent into the rivers and streams of the Suwannee River basin assume that sufficient surface water flow will be available to assimilate waste and ensure that water quality criteria will be met.

Environmental Water Demands

EPD recognizes the importance of maintaining suitable aquatic habitat in Georgia's lakes and streams to support viable communities of fish and other aquatic organisms.

A significant issue that is receiving increasing attention from EPD is the minimum stream flow policy. EPD's current minimum stream flow policy is to protect the lowest seven-day average flow, which would have occurred during any ten-year period for a stream (commonly called the 7Q10). EPD is considering increasing the minimum flow requirement under recommendations of the Wildlife Resources Division.

3.2.3 Surface Water Withdrawal Permitting

The 1977 Surface Water Amendments to the Georgia Water Quality Control Act of 1964 require all non-agricultural users of more than 100,000 GPD on a monthly average (from any Georgia surface water body) to obtain a permit for this withdrawal from EPD. These users include municipalities, industries, military installations, and all other non-agricultural users. The statute stipulates that all pre-1977 users who could establish the quantity of their use prior to 1977 would be "grandfathered" for that amount of withdrawal. Table 3-5 lists the permits in effect in the Suwannee River basin.

Applicants are required to submit details relating to the source of withdrawals, demand projections, water conservation measures, low flow protection measures (for non-grandfathered withdrawals), and raw water storage capacities. EPD issued permit identifies the source of withdrawal, the monthly average and maximum 24-hour withdrawal, the standard and special conditions under which the permit is valid, and the

Table 3-5. Active Municipal and Industrial Ground Water Withdrawal Permits in the Suwannee River Basin

GEORGIA COUNTY	PERMIT NUMBER	PERMIT USER NAME	PERMITTED MONTHLY AVG W/D (MGD)	PERMITTED YEARLY AVG W/D (MGD)	PERMITTED AQUIFER
Lowndes	092-0008	Century Diversified Ind (Northlake CC) REVOKED	0.144	0.144	Floridan
Lowndes	092-0001	Packaging Corporation of America	14.600	13.700	Floridan
Tift	137-0001	Tifton, City of	11.000	8.360	Floridan
Lowndes	092-0004	Valdosta, City of	9.000	7.200	Floridan
Coffee	034-0001	Douglas, City of	6.000	5.750	Floridan
Ben Hill	009-0001	Fitzgerald Water, Light, & Bond Commission	4.500	4.000	Floridan
Cook	037-0002	Georgia Department of Transportation	3.500	3.500	Floridan
Cook	037-0001	Adel, City of	4.312	3.300	Floridan
Colquitt	035-0005	Moultrie, City of	3.700	3.200	Floridan
Turner	142-0001	Ashburn, City of	1.728	1.728	Floridan
Lowndes	092-0009	Lowndes Co - S. Lowndes Regional Utility System	1.240	1.240	Floridan
Worth	159-0001	Sylvester, City of	1.750	1.200	Floridan
Berrien	010-0002	Amoco Fabrics & Fibers Co	1.152	1.152	Floridan
Colquitt	035-0002	Premium Pork, Inc (Lykes Meat Group)	1.000	1.000	Floridan
Berrien	010-0001	Nashville, City of	1.000	1.000	Floridan
Lowndes	092-0002	Arizona Chemicals (Int paper, ex Union Camp)	0.890	0.890	Floridan
Lowndes	092-0006	Moody Air Force Base	0.860	0.860	Floridan
Clinch	032-0001	Homerville, City of	0.750	0.750	Floridan
Irwin	077-0001	Ocilla, City of	1.000	0.700	Floridan
Lanier	086-0001	Lakeland, City of	0.700	0.700	Floridan
Lowndes	092-0010	Sterling Pulp Chemicals, Inc.	0.576	0.552	Floridan
Coffee	034-0003	Nicholls, City of	0.500	0.500	Floridan
Cook	037-0003	Sparks, City of	0.413	0.407	Floridan
Lowndes	092-0003	Hahira, City of	0.600	0.400	Floridan
Cook	037-0004	Aluminum Finishing of Georgia	0.360	0.360	Floridan
Colquitt	035-0006	Norman Park, Town of	0.400	0.350	Floridan
Clinch	032-0002	Brockaway Standard	0.300	0.300	Floridan
Lowndes	092-0007	SAFT America, Inc	0.400	0.300	Floridan
Lowndes	092-0011	Lowndes Co - North Lowndes System	0.410	0.230	Floridan
Tift	137-0003	Omega, City of	0.270	0.220	Floridan
Tift	137-0002	Abraham Baldwin Agricultural College	0.250	0.180	Floridan
Turner	142-0002	Sycamore, City of	0.200	0.175	Floridan
Colquitt	035-0007	Beadles Lumber Company	0.200	0.125	Floridan
Coffee	034-0002	Broxtown, City of	0.125	0.110	Floridan
Colquitt	035-0004	Farmers Favorite Fertilizer	0.100	0.100	Floridan

expiration date of the permit. The standard conditions section of the permit generally defines the reporting requirements (usually annual submission of monthly average withdrawals); the special conditions section of the permit usually specifies measures the permittee is required to undertake so as to protect downstream users and instream uses (e.g. waste assimilation, aquatic habitat). The objective of these permits is to manage and allocate water resources in a manner that both efficiently and equitably meets the needs of all the users.

Farm Irrigation Permits

The 1988 Amendments to the Water Quality Control Act establish the permitting authority within EPD to issue farm irrigation water use permits. As with the previously mentioned surface water permitting statute, the lower threshold is 100,000 GPD; however users of less water may apply for and be granted a permit. With two exceptions, farm use is defined as irrigation of any land used for general farming, aquaculture, pasture, turf production, orchards, nurseries, watering for farm animals and poultry, and related farm activities. One relevant exception is that the processing of perishable agricultural products is not considered a farm use.

Applicants for these permits who can establish that their use existed prior to July 1, 1988, *and* when these applications are received prior to July 1, 1991, are “grandfathered” for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with an eye towards protection of grandfathered users and the integrity of the resource. Generally, agricultural users are not required to submit any water use reports.

3.2.4 Flooding and Floodplain Management

The Suwannee River basin was unaffected by the massive flooding that occurred in parts of Georgia in 1994, however, many counties within the St. Marys, Suwannee, Satilla and Ochlockonee basins were included in Federal Disaster Declaration #1209 as a result of the 1998 floods. The Floods of 1998 further substantiated the fact that flooding is the number one natural hazard in Georgia.

In March 1991, severe storms caused flooding in counties within St. Marys, Suwannee and Satilla river basins. Also the counties of Appling, Atkinson, Bacon, Berrien, Clinch, Coffee, Jeff Davis, Johnson, Lanier, Laurens, Lowndes, Pierce, Thomas and Ware were declared disaster areas.

Floodplain development is a constant concern, because development within floodplain areas can increase flood levels, thereby increasing the number of people and the amount of property at risk. The term “floodplain management” is often used as a synonym for program or agency-specific projects and regulations. It is in fact quite a broad concept. Floodplain management is a continuous process of making decisions about whether flood plains are to be used for development and how they are to be developed.

Floodplain Management Activities

To increase understanding and maintain a working knowledge of floodplain management, Georgia’s Floodplain Management Office periodically conducts training workshops throughout the State for local officials. The Floodplain Management Office held a workshop on May 13, 1999, for local officials from Glynn and Camden counties at the City of Brunswick government offices. The workshop covered the related aspects of the National Flood Insurance Program (NFIP), administration and enforcement of local flood ordinance, the effects of floodplain management on flood insurance rates and flood hazard mitigation.

The Floodplain Management Office also participates in the annual Governor’s Severe Weather conference held on Jekyll Island. The purpose of this conference is to increase awareness and preparedness regarding all types of severe weather—flooding, hurricanes, tornadoes, thunderstorms and ice storms. Flooding is the number one natural disaster in Georgia according to the Georgia Emergency Management Agency (GEMA), coordinator of the conference. The conference is an opportunity for emergency managers, public safety personnel, medical professionals, elected officials and other interested persons to gather and discuss means to better protect against loss of lives and property.

This new initiative is called “Project Impact.” Project Impact works with state and local governments across the country to build communities that are more likely to

withstand the ravages of natural disasters. The Savannah area's low elevation makes it vulnerable to tidal flooding and hurricanes. Project Impact's goal is to erase the ceaseless damage-repair-damage cycle by implementing preventive measures before disaster occurs.

3.3 Ground Water Quantity

3.3.1 Ground Water Sources

The Suwannee River basin is in the physiographic province known as the Coastal Plain province. South of the fall line is the Coastal plain area, a region underlain by alternating layers of sand, clay, and limestone which get deeper and thicker to the southeast.

The Suwannee basin includes all of Tift, Berrien, Cook, Lanier, Lowndes and Echols counties and portions of five other counties. The main groundwater source in these counties is the Floridan Aquifer system. This aquifer system delivers tremendous amounts of water quickly, leading to very heavy municipal, industrial and agricultural usage from this source.

3.3.2 Ground Water Supply Demands

Municipal and Industrial Uses

Municipal and Industrial (M&I) water demands include public supplied and private supplied residential, commercial, governmental, institutional, manufacturing and other demands such as distribution system losses.

Existing permitted municipal and industrial groundwater users are shown on Table 3-5, by county. These permits are for users equal to or greater than 100,000 gallons per day. Users below this amount of groundwater are not required to have a permit for their withdrawals.

Agricultural Water Demand

Agricultural groundwater demand in the Suwannee River basin is large. Generally, agricultural areas use the Floridan Aquifer as their source of groundwater.

3.3.3 Ground Water Supply Permitting

Nonagricultural Permits

The Georgia Ground Water Use Act of 1972 requires permits from EPD for all non-agricultural users of ground water of more than 100,000 GPD. General information required of the applicant includes location (latitude and longitude), past, present, and expected water demand, expected unreasonable adverse effects on other users, the aquifer system from which the water is to be withdrawn, and well construction data. The permits issued by EPD stipulate both the allowable monthly average and annual average withdrawal rates, standard and special conditions under which the permit is valid, and the expiration date of the permit. Ground water use reports are generally required of the applicant on a semi-annual basis. The objective here is the same as with surface water permits. A list of active Georgia municipal and industrial ground water withdrawal permits is provided in Table 3-5.

Farm Irrigation Permits

The 1988 Amendments to the Ground Water Use Act establishes the permitting authority within EPD to issue farm irrigation water use permits. As with the previously

mentioned ground water permitting statute, the lower threshold is 100,000 GPD; however users of less water may apply and be granted a permit. Agricultural withdrawal permits are too numerous to list in this document.

Applicants for these permits who could establish that their use existed prior to July 1, 1988, *and* when their applications were received prior to July 1, 1991, were “grandfathered” for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with an eye towards protection of grandfathered users and the integrity of the resource. Generally, agricultural users are not required to submit any water use reports.

Excessive Ground Water Withdrawals

Excessive ground water withdrawal can lead to lowering or drawdown of the water table. Localized groundwater drawdowns are generally discovered only after the fact of permitting has occurred and withdrawal operations begun. To avoid such a possibility, if an application for a very large use of groundwater is received, the Water Resources Management Program of the Georgia EPD can take certain steps to possibly contain drawdowns effects. Modeling the hydrogeologic impact of such a large user may be required of the potential permittee. If this computer analysis indicates no unreasonable impact on existing users, such a water use permit may be approved. Another recommended possibility is a negotiated reduction in permit amounts to a more moderate amount of withdrawal, with lessened impacts. Prior to full scale production of a well field, well pumping tests run at or near actual production rates can be required. These may give the permittee and the EPD some real idea of the amount of water that may be pumped safely, without endangering other users nor drawing down the aquifer too greatly. Permit withdrawal limits may then be set at some safer yield which is determined by these pumping tests. These tests may also indicate that proposed pumping amounts may require more wells drilled to spread out the ultimate production impact on the aquifer.

References

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