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Section 3

Water Quantity

This section addresses water quantity issues (availability and use), while water quality in the Altamaha basin is the subject of Section 4. Water use in the Altamaha River basin is measured by estimates of freshwater withdrawn from groundwater and surface water.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 Altamaha 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 groundwater used in the Altamaha 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 Altamaha River basin is expected to increase in the future due to average population growth and farming.

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 groundwater supplies. Then, general surface water availability is presented, followed by groundwater availability.

3.1 Drinking Water Supply

3.1.1 Drinking Water Supplies in the Altamaha 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 groundwater pumped to the surface from wells or naturally flowing from springs. Unlike

other basins in Georgia, the main source of drinking water in the Altamaha 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.

In the Altamaha River basin there are no community public water systems utilizing surface water and groundwater.

3.1.2 Drinking Water Demands

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

3.1.3 Drinking Water Permitting

The Rules for Safe Drinking Water (391-3-5) adopted under the Georgia Safe Drinking Water Act of 1997, 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 provide 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 Altamaha River basin encompasses 2,870 square-miles in southeast Georgia. Formed by the confluence of the Ocmulgee and Oconee Rivers near Lumber City in

Telfair County, the Altamaha River flows southeasterly 125 miles emptying into the Atlantic Ocean near Darien.

The principal surface water resources are the Altamaha River and the Ochoopee River. The lower portion of the basin contains the Altamaha River (average annual flow 14,300 cfs). The upper portion is drained by the Ochoopee River (average annual flow 1,200 cfs), which flows southeast joining the Altamaha River about 12 miles below Reidsville. Some of the other larger tributaries across the basin include Penholoway Creek, Beards Creek, Pendleton Creek, and the Little Ochoopee 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, and industrial, and other demands such as distribution system losses.

Currently, the Altamaha River basin has one surface water withdrawal permit. 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

Agricultural surface water demand in the Altamaha River Basin is considerable. Irrigated crops are grown throughout Emmanuel, Johnson, and Tattnall Counties. Other counties in the basin also contain lesser amounts of irrigated acreage.

The demands on surface 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.

Irrigated Acreage

The total water demand from agriculture, including both surface water and groundwater 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 current and future agricultural water use in the basin. Table 3-1 shows historical irrigated acreage in the basin from 1974 to 1998.

Irrigated acres in the Altamaha River basin grew from 3,756 in 1974 to a maximum for the basin of 48,551 in 1998. Assuming growth rates continue as observed in the Altamaha River basin between 1982 and 1998, there will be approximately 69,000 acres under irrigation by 2020.

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

Year	HUC 03070106	HUC 03070107	Basin Total
1974	1,906	1,850	3,756
1978	7,928	9,865	17,793
1979	9,503	14,431	23,934
1980	12,006	13,291	25,298
1981	14,283	16,273	30,556
1982	15,209	21,529	36,738
1984	16,845	23,513	40,358
1986	15,829	25,094	40,923
1989	16,822	25,442	42,264
1992	20,166	27,691	47,857
1995	22,204	26,000	48,204
1998	24,241	24,310	48,551

USDA-NRCS estimates based on county level data extrapolated to 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 Altamaha River basin reflects the influence of these variables (Table 3-2). No distinct trend can be observed; however, from 1980 to 2000 there was a increase of 12 MGD from 14.12 MGD in 1980 to 26.77 MGD in 2000.

Table 3-2. Historical Agricultural Water Use (MGD) in the Altamaha River Basin, 1980-2000

Year	HUC 03070106	HUC 03070107	Basin Total
1980	6.02	8.09	14.12
1985	6.10	9.13	15.23
1987	7.10	9.98	17.08
1990	5.49	6.39	11.89
1995	11.90	13.68	25.57
2000	11.56	15.21	26.77

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

Approximately 97.5 percent of the agricultural water used in 2000 was for irrigation purposes (26.10 MGD). The remaining 2.5 percent (.67 MGD) was used for animal operations.

Future agricultural water demand is expected to increase slightly within the basin to 36.7 MGD by the year 2020 on a projected 69,000 acres under irrigation by that time. Table 3-3 shows the projected increase in agricultural water demand 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 3-3. Projected Water Use in the Altamaha River Basin, 2005-2020

Year	Projected Water Use (MGD)
2005	29.2
2010	31.7
2015	34.2
2020	36.7

Power Generation Water Demand

There are no hydropower facilities in the Altamaha basin.

Navigational Water Demand

There is some commercial navigation in the lower portion of the Altamaha River, particularly in the intracoastal waterway.

Recreation

Recreation activities in the Altamaha River basin include 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 Altamaha 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 7-day average flow, which would have occurred during any 10-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. There is only one surface water withdrawal permit in the Altamaha River basin – a permit for the Southern Nuclear Operating Company Plant Hatch in Appling County for a withdrawal from the Altamaha River of 103.6 mgd (24-hour maximum) and 85.0 mgd (monthly average).

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

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.

In the Altamaha River basin, a total of 1,079 surface and/or groundwater permits have been issued.

3.2.4 Flooding and Floodplain Management

The Altamaha River basin was unaffected by the massive flooding that occurred in parts of Georgia in 1994, however, many counties within the Altamaha, Ocmulgee, and Oconee basins were included in Federal Disaster Declaration #1209 as a result of the 1998 floods.

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 workshops cover 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. 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.

EPD is also working with a new initiative 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. Project Impact’s goal is to erase the ceaseless damage-repair-damage cycle by implementing preventive measures before disaster occurs.

3.3 Groundwater Quantity

3.3.1 Groundwater Sources

The Altamaha River basin is in the Coastal Plain physiographic province. The Coastal plain area lies south of the fall line and is a region underlain by alternating layers of sand, clay and limestone that generally deepen and thicken to the southeast. The main groundwater source in most of the basin 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 Groundwater 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.

Municipal and Industrial groundwater users equal to or greater than 100,000 gallons per day are required to obtain permits from the Georgia EPD. Users below this amount of groundwater are not required to have a permit for their withdrawals.

Agricultural Water Demand

Agricultural surface water demand in the Altamaha River Basin is considerable. Irrigated crops are grown throughout Emmanuel, Johnson, and Tattnall Counties. Other counties in the basin also contain lesser amounts of irrigated acreage.

The demands on surface 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.

3.3.3 Groundwater Supply Permitting

Nonagricultural Permits

The Georgia Ground Water Use Act of 1972 requires permits from EPD for all non-agricultural users of groundwater 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. Groundwater use reports are generally required of the applicant on a semi-annual basis. The objective here is the same as with surface water permits.

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 groundwater permitting statute, the lower threshold is 100,000 GPD; however

users of less water may apply and be granted a permit. A total of 1,079 surface and/or groundwater agricultural withdrawal permits have been issued.

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. Presently, agricultural users are not required to submit any water use reports; however, recent legislation will institute a metering and reporting program.

Excessive Groundwater Withdrawals

Excessive groundwater 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 drawdown 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 or 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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