
In This Section

- Drinking Water Supply
- Surface Water Quantity
- Ground Water Quantity

Section 3

Water Quantity

This section addresses water quantity issues (availability and use), while water quality in the Satilla basin is the subject of Section 4. Water use in the Satilla River basin is measured by estimates of freshwater withdrawn from groundwater and surface water.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 Satilla River basin. Principal aquifers of the Coastal Plain include the Floridan aquifer system, the Upper Brunswick and Lower Brunswick aquifers, the Claiborne and Clayton aquifers and the Cretaceous system.

The Floridan aquifer system supplies most of the ground water used in the Satilla 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, industries and private domestic supply.

Water use in the Satilla River Basin is expected to increase 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 Satilla 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 water from springs.

Unlike other basins in Georgia, the main source of drinking water in the Satilla basin is provided by ground water. 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 an increase in the use of groundwater to be used for drinking water from the Satilla River basin. Areas that are expected to increase include Ware, Camden and Glynn counties

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 Satilla River basin is a 3940 square-mile landmass, which includes all of Bacon, Brantley, and Pierce counties and portions of twelve others. The basin's major surface water body, the Satilla River meanders easterly for almost 250 miles prior to discharging into the Atlantic Ocean about ten miles south of Brunswick, between Jekyll Island and Cumberland Island.

As the basin name implies, the major surface water body is the Satilla River with an average annual discharge at its mouth of approximately 2700 cfs. However, there are several tributaries with significant flows of their own. Among the major streams are the Little Satilla River, Alabaha River, Big Satilla River, Seventeen Mile Creek and Hurricane Creek.

The areas of least surface water availability are the headwaters of most of the tributaries along the northern boundary of the Satilla River basin. As the tributaries approach their lower extremities and merge with other streams, the available flow becomes much more reliable. However, the topographical characteristics of the Satilla and other Coastal Plain basin are such that they do not produce surface runoff to the extent that the basins of the Piedmont, Valley and Ridge and Blue Ridge Mountains provinces do. Relatively small streams flow rates during low-flow periods typify rivers in the Coastal Plain. Indeed, many of the smaller streams have virtually no flow during extended dry periods.

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 Satilla River basin contains only two industrial surface water withdrawal permits. These are listed in Table 3-1, sorted by county. These 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.

Table 3-1. Surface Water Withdrawals

Facility	Type	Source	Mon Avg (Mgd)	Max Day (Mgd)	County
Brunswick Pulp and Paper Co.	Industrial	Turtle River	56.0	58.0	Glynn
Georgia Power Co- Mc Manus	Industrial	Turtle Creek	155.0	155.0	Glynn

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 1829 agricultural permits for water withdrawal permits to entities located within the Satilla 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 3-2 shows historical irrigated acreage in the basin from 1974 to 1998.

Table 3-2. Irrigated Acres in the Satilla River Basin, 1974-1998.

Satilla River Basin - Irrigated Acres				
year	Sub-Basin 3070201	Sub-Basin 3070202	Sub-Basin 3070203	Basin Total
1974	3,646	1,454	171	5,271
1978	16,686	9,704	1,128	27,518
1979	23,168	10,414	890	34,472
1980	31,268	13,050	2,150	46,467
1981	26,113	16,943	2,035	45,091
1982	34,653	16,798	1,788	53,239
1984	31,761	17,010	2,275	51,047
1986	31,785	16,413	2,191	50,389
1989	26,887	27,984	2,014	56,886
1992	32,554	25,756	2,655	60,965
1995	33,143	26,222	2,703	62,069
1998	33,571	26,560	2,738	62,869

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

Irrigated acres in the Satilla River Basin grew from 5,721 in 1974 to an all time maximum, for the Basin, of 62,869 in 1998. This represents an annual growth rate of 14.96 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. Despite recent expansions in irrigated acreage, the Satilla River Basin over the same time period has experienced a slower an annual growth rate of 1.3 percent. Cotton, peanuts, and corn are the primary crops under irrigation.

Water Demand

Agricultural water demand is dependent upon a number of variable 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 Satilla River basin reflects the influence of these variables (Table 3-3). No distinct trend can be observed. From 1980 to 1995 there was an increase of 3 MGD from 21 MGD in 1980 to 24 MGD in 1995.

Over 93 percent of the agricultural water used in 1995 was for irrigation purposes (22.33 MGD). The remaining 7 percent (1.6 MGD) was used for animal operations. Ground water sources provided 58 percent of the water used by this industry in 1995.

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

Satilla River Basin - Agricultural Water Use				
year	3070201	3070202	3070203	Basin total
1980	13.94	6.64	0.82	21.40
1985	11.16	7.55	1.00	19.71
1987	10.40	10.91	1.17	22.48
1990	8.41	7.52	0.68	16.61
1995	14.95	8.11	0.86	23.92

Source: Georgia Geological Survey

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 3-4 shows the historical and projected acres under irrigation for the Satilla River Basin and each sub-basin. Assuming the 2.06 percent annual growth rate, observed in the Satilla River Basin between 1992 and 1998, continues; irrigated acreage in the Basin will reach 95,478 acres by the year 2020.

Table 3-4. Irrigated Acreage 1974-1998, Projected through 2020.

Satilla River Basin - Irrigated Acres				
year	Sub-Basin 3070201	Sub-Basin 3070202	Sub-Basin 3070203	Basin Total
1974	3,646	1,454	171	5,271
1978	16,686	9,704	1,128	27,518
1979	23,168	10,414	890	34,472
1980	31,268	13,050	2,150	46,467
1981	26,113	16,943	2,035	45,091
1982	34,653	16,798	1,788	53,239
1984	31,761	17,010	2,275	51,047
1986	31,785	16,413	2,191	50,389
1989	26,887	27,984	2,014	56,886
1992	32,554	25,756	2,655	60,965
1995	33,143	26,222	2,703	62,069
1998	33,571	26,560	2,738	62,869
2000	33,909	26,828	2,766	63,503
2005	37,549	29,707	3,063	70,319
2010	41,579	32,896	3,391	77,866
2015	46,042	36,426	3,756	86,224
2020	50,983	40,336	4,159	95,478

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

Future agricultural water demand is expected to increase significantly within the basin to 53.27 MGD by the year 2020. Undesirable climate and favorable market conditions could force producers to demand as much as 85.22 MGD on the projected 95,478 acres under irrigation by that time. Conversely, desirable climate conditions and unfavorable market conditions may result in a much lower demand, 35.51 MGD by 2020. Table 3-5 shows the likely range of 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 3-5. Projected Agricultural Water Use [MGD] through 2020.

Satilla River Basin - Agricultural Water Use			
Year	Low Scenario	Expected Scenario	High Scenario
2000	23.62	35.43	56.68
2005	26.15	39.23	62.77
2010	28.96	43.44	69.50
2015	32.07	48.10	76.96
2020	35.51	53.27	85.22

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 Satilla basin that use the water resources of the basin.

Navigational Water Demand

There is no commercial navigation in the Satilla basin.

Recreation

Recreation activities in the Satilla 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 Satilla 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 3-6 lists the permits in effect in the Satilla River basin.

Table 3-6 Active Municipal and Industrial Ground Water Withdrawal Permits in the Satilla River Basin

GEORGIA COUNTY	PERMIT NUMBER	PERMIT USER NAME	PERMITTED MONTHLY AVG W/D (MGD)	PERMITTED YEARLY AVG W/D (MGD)	PERMITTED AQUIFER
Glynn	063-0028	Glynn Brunswick Memorial Hospital	0.134	0.134	Floridan
Glynn	063-0003	Georgia-Pacific Corp (Brunswick Pulp Operation)	49.000	45.000	Floridan
Glynn	063-0008	Hercules, Incorporated	14.000	12.000	Floridan
Glynn	063-0011	Brunswick, City of - City System	6.400	5.900	Floridan
Glynn	063-0010	St. Simons Water & Sewer District	5.670	4.350	Floridan
Ware	148-0004	Waycross, City of - Ware County Industrial Park	3.400	3.000	Floridan
Ware	148-0001	Waycross, City of	3.160	2.600	Floridan
Glynn	063-0002	Jekyll Island Authority - Public Water System	2.150	1.850	Floridan
Camden	020-0007	Aventis CropScience USA LP	1.700	1.700	Floridan
Glynn	063-0009	Sea Island Services, Inc.	2.200	1.600	Floridan, Miocene
Appling	001-0002	Baxley, City of	1.400	1.400	Floridan
Ware	148-0005	Ware County Water Department	1.700	1.300	Floridan
Jeff Davis	080-0001	Amoco Fabrics & Fibers Co	1.000	1.000	Floridan
Glynn	063-0038	Glynn County - Golden Isles	1.000	1.000	Miocene
Ware	148-0006	Waycross Moulded Products, Inc	0.800	0.800	Floridan
Glynn	063-0014	Millennium Specialty Chemicals	0.860	0.760	Floridan, Miocene
Bacon	003-0001	Alma, City of	0.900	0.670	Floridan
Glynn	063-0022	Jekyll Island Authority - Golf Course	1.000	0.550	Miocene, Floridan
Glynn	063-0032	Skarpalezos Realty Company, Inc	0.550	0.550	Miocene (Brunswick)
Glynn	063-0018	Brunswick, City of - I95 & 341 Interchange	0.600	0.540	Floridan
Glynn	063-0033	Sea Island Co - Ocean Forest Golf Course	0.500	0.500	Miocene
Glynn	063-0027	Hampton Group	0.800	0.500	Miocene
Pierce	113-0001	Blackshear, City of	0.550	0.480	Floridan
Bacon	003-0002	Milliken & Co - Alma Plant	0.520	0.470	Floridan
Ware	148-0002	CSX Transportation	0.640	0.470	Floridan
Glynn	063-0037	Jekyll Island Authority - Oleander Golf Course	0.500	0.450	Miocene
Glynn	063-0020	Sea Island Co - Sea Island Golf Course	0.850	0.420	Miocene, Floridan
Glynn	063-0024	Sea Palms Development Corp	0.688	0.400	Floridan
Glynn	063-0036	Jekyll Island Authority - Indian Mounds Golf Course	0.400	0.360	Miocene
Glynn	063-0015	Rich-SeaPak Corporation	0.350	0.350	Floridan
Glynn	063-0039	Georgia-Pacific - Thalmann Woodyard	0.350	0.350	Floridan, Miocene
Glynn	063-0023	Glynn County W&S - North Mainland	0.450	0.350	Floridan
Glynn	063-0013	Lewis Crab Factory	0.310	0.300	Floridan
Ware	148-0007	International Paper - Waycross Plant	0.300	0.300	Floridan, Miocene
Atkinson	002-0001	Pearson, City of	0.350	0.300	Floridan
Glynn	063-0025	Glynn County - I95 & US17 Interchange System	0.300	0.300	Floridan
Glynn	063-0001	King & Prince Seafood Corp	0.325	0.270	Floridan
Glynn	063-0040	Wade & Claire - Coastal Pines Golf Club	0.300	0.250	Miocene
Camden	020-0006	Woodbine, City of	0.325	0.250	Floridan

GEORGIA COUNTY	PERMIT NUMBER	PERMIT USER NAME	PERMITTED MONTHLY AVG W/D (MGD)	PERMITTED YEARLY AVG W/D (MGD)	PERMITTED AQUIFER
Glynn	063-0029	Georgia-Pacific- Gypsum Corporation	0.225	0.225	Floridan
Glynn	063-0021	Sea Island Co - Island Club Golf Course	0.500	0.200	Miocene, Floridan
Atkinson	002-0003	Cady Bag Company	0.200	0.200	Miocene
Glynn	063-0026	Georgia Ports Authority	0.200	0.200	Miocene (Basal)
Glynn	063-0031	Glynn County - Hampton Plantation	0.280	0.170	Floridan
Glynn	063-0006	Georgia Power Company - Plant McManus	0.150	0.150	Floridan
Brantley	013-0001	Nahunta, City of	0.150	0.150	Floridan
Glynn	063-0019	Georgia Ports Authority - Colonels Island	0.150	0.150	Floridan
Wayne	151-0003	Screven, City of	0.125	0.125	Floridan
Glynn	063-0012	Glynco Golf Course	0.250	0.100	Floridan
Glynn	063-0030	Oak Grove Island Plantation Water Co	0.065	0.065	Floridan
Jeff Davis	080-0002	Hazelhurst, City of	1.010	0.850	Floridan
Atkinson	002-0002	Willacoochee, City of	0.500	0.400	Floridan

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.

3.2.4 Flooding and Floodplain Management

The Satilla River basin was unaffected by the massive flooding that occurred in parts of Georgia in 1994, however, many counties within the Satilla, Suwannee, Ochlockonee and St. Marys 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 Satilla, Suwannee and St. Marys 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.

All of the counties within the Satilla River basin currently participate in the National Flood Insurance Program (NFIP).

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. On May 13, 1999, the Floodplain Management Office held a workshop 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 at Jekyll Island. This conference provides information to the public about the NFIP, floodplain management and other related topics.

3.3 Ground Water Quantity

3.3.1 Ground Water Sources

The Satilla River basin in Georgia 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 Satilla basin includes all of Bacon, Brantley, and Pierce counties and portions of twelve other counties. The main groundwater source in these counties is the Floridan Aquifer. 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 3-6, 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 Satilla River basin is large. Generally agricultural areas use the Floridan aquifer for 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 3-6.

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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