GROUND-WATER QUALITY IN GEORGIA JANUARY 2003 THROUGH JANUARY 2004

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GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
GEORGIA GEOLOGIC SURVEY

ATLANTA
2004

CIRCULAR 12S

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CHAPTER 1 <u>INTRODUCTION</u>

1.1 PURPOSE AND SCOPE

This report, covering the calendar year 2003 and January of calendar year 2004, is the nineteenth in a series of summaries discussing the chemical quality of ground water statewide across Georgia. Future summaries will evaluate potential ground-water impairment within specific areas of Georgia or for specific types of wells.

These summaries are among the tools used by the Georgia Environmental Protection Division (EPD) to assess trends in the quality of the State's ground-water resources. EPD is the State organization with regulatory responsibility for maintaining and, where possible, improving ground-water quality and availability. EPD has implemented a comprehensive statewide ground-water management policy of anti-degradation (EPD, 1991; 1998). Five components comprise EPD's current ground-water quality assessment program:

1. The Georgia Ground-Water Monitoring Network. The Geologic Survey Branch of EPD maintains this program, which is designed to evaluate the ambient ground-water quality of nine aquifer systems throughout the State of Georgia. The data collected from sampling of the Ground-Water Monitoring Network form the basis for this report.

2. Sampling of public drinking water wells as part of the Safe Drinking Water Program (Water Resources Management Branch). This program provides data on the quality of ground water that the residents of Georgia are using.

3. Special studies addressing specific water quality issues. A survey of nitrite/ nitrate levels in shallow wells located throughout the State of Georgia (Shellenberger, et al., 1996; Stuart, et al., 1995), operation of a Pesticide Monitoring Network conducted jointly by the Geologic Survey Branch and the Georgia Department of Agriculture (GDA) (Tolford, 1999; Glen, 2001), and the Domestic Well Water Testing Project conducted jointly by the Geologic Survey Branch and the GDA (Overacre, 2001; 2002; 2003) are examples of these types of studies.

4. Ground-water sampling at environmental facilities such as municipal solid waste landfills, RCRA facilities, and sludge disposal facilities. The primary agencies responsible for monitoring these facilities are EPD’s Land Protection, Water Protection, and Hazardous Waste Management Branches.

5. The wellhead protection program (WHP), which is designed to protect the area surrounding a municipal drinking water well from contaminants. The U.S. Environmental Protection Agency (EPA) approved Georgia's WHP Plan on September 30, 1992. The WHP Plan became a part of the Georgia Safe Drinking Water Rules, effective July 1, 1993. The protection of public water supply wells

from contaminants is important not only for maintaining ground-water quality, but also for ensuring that public water supplies meet health standards.

Analyses of water samples collected for the Georgia Ground-Water Monitoring Network during the period January 2003 through January 2004 and from previous years form the database for this summary. The Georgia Ground-Water Monitoring Network is comprised of 128 wells and springs. All stations are generally sampled on an annual basis, however, stations showing recent pollution or contamination may be subject to confirmatory sampling on a basis more frequent than annual. Testing for most stations is restricted to volatile organic compounds and nitrate/nitrite.

During the January 2003 through January 2004 period, EPD personnel collected 132 samples from 115 wells and 9 springs. A review of the data from this period and comparison of these data with those for samples collected as early as 1984 indicate that ground-water quality at most of the 128 sampling sites generally has changed little and remains excellent.

1.2 FACTORS AFFECTING CHEMICAL GROUND-WATER QUALITY

The chemical quality of ground water is the result of complex physical, chemical, and biological processes. Among the more significant controls are the chemical quality of the water entering the ground-water flow system, the reactions of infiltrating water with the soils and rocks that are encountered, and the effects of the well-and-pump system.

Most water enters the ground-water system in upland recharge areas. Water seeps through interconnected pores and joints in the soils and rocks until discharged to a surface-water body (e.g., stream, river, lake, or ocean). The initial water chemistry, the amount of recharge, and the attenuation capacity of soils have a strong influence on the quality of ground water in recharge areas. Chemical interactions between the water and the aquifer host rocks have an increasing significance with longer underground residence times. As a result, ground water from discharge areas tends to be more highly mineralized than ground water in recharge areas.

The well-and-pump system can also have a strong influence on the quality of the well water. Well casings, through compositional breakdown, can contribute metals (e.g., iron from steel casings) and organic compounds (e.g., tetrahydrofuran from PVC pipe cement) to the water. Pumps often aerate the water being discharged. An improperly constructed well can present a conduit that allows local pollutants to enter the ground-water flow system.

1.3 HYDROGEOLOGIC PROVINCES OF GEORGIA

This report defines three hydrogeologic provinces in Georgia by their general geologic and hydrologic characteristics (Figure 1-1). These provinces consist of:

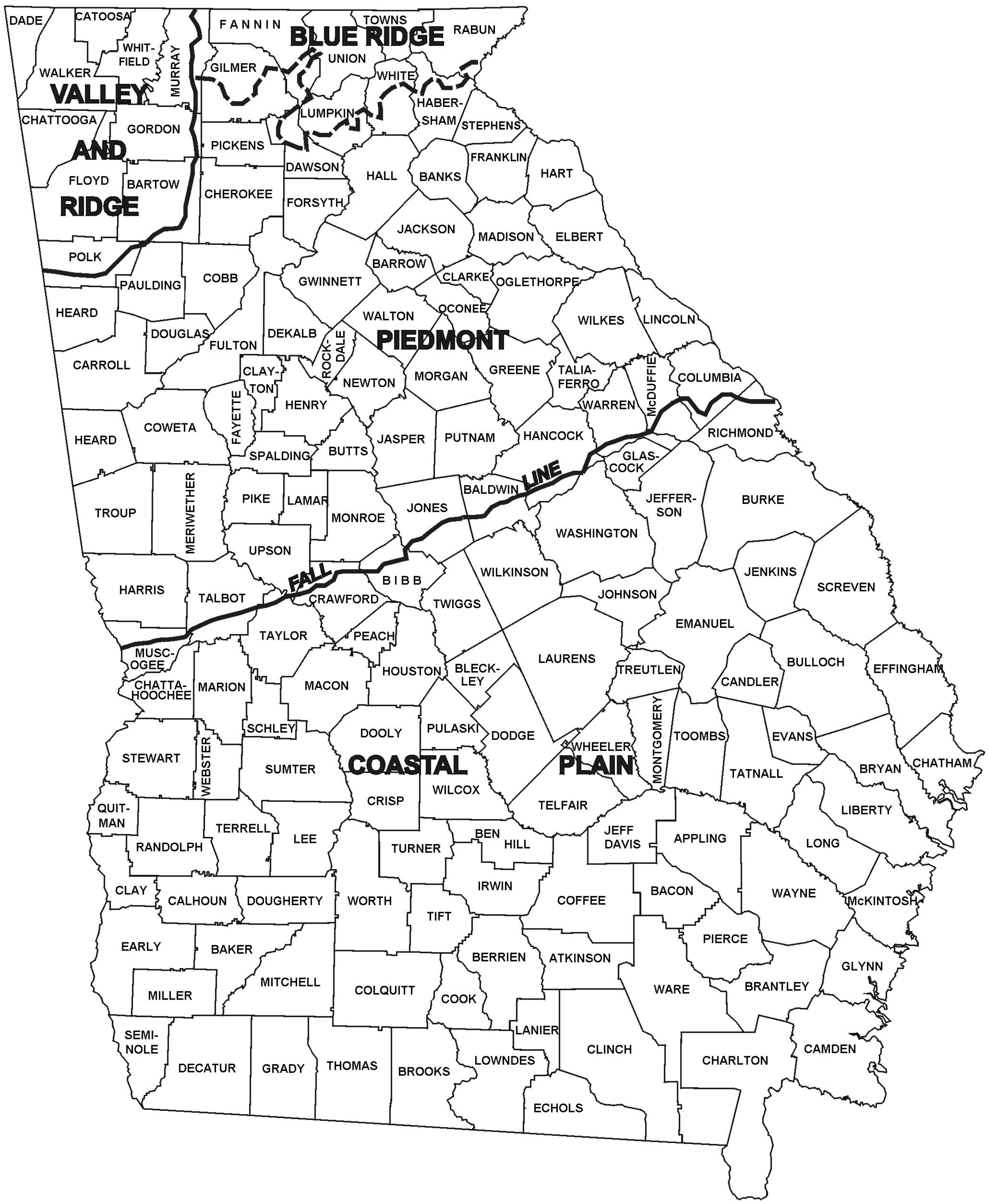


Figure 1-1 The Hydrogeologic Provinces of Georgia

1. the Coastal Plain Province of south Georgia;

2. the Piedmont/Blue Ridge Province, which includes all but the northwest corner of north Georgia; and

3. the Valley and Ridge Province of northwest Georgia.

1.3.1 Coastal Plain Province

Georgia's Coastal Plain Province generally comprises a wedge of loosely consolidated sediments that gently dip and thicken to the south and southeast. Ground water in the Coastal Plain Province flows through interconnected pore space between grains in unconsolidated material and through solution-enlarged voids in rock.

The oldest outcropping sedimentary formations (Cretaceous) are exposed along the Fall Line (Figure 1-1), which is the northern limit of the Coastal Plain Province. Successively younger formations occur at the surface to the south and southeast.

The Coastal Plain of Georgia contains seven major confined and unconfined aquifers. Confined aquifers are those in which a layer of impermeable material (i.e., clay or shale) overlies the aquifer and may hold the top of the water column below the level to which it would normally rise (an artesian condition). Water enters the aquifers in their updip outcrop areas, where permeable sediments of the aquifer are often exposed. Many Coastal Plain aquifers are unconfined in their updip outcrop areas, but become confined in downdip areas to the southeast, where they are overlain by successively younger rock formations. Ground-water flow through confined Coastal Plain aquifers is generally to the south and southeast, in the direction of the dip of the rocks.

The sediments forming the seven major aquifers in the Coastal Plain range in age from Cretaceous to Miocene. Horizontal and vertical changes in the permeability of the rock units that form these aquifers determine the thickness and extent of the aquifers. Several aquifers may be present in a single geographic area, forming a vertical “stack”.

The Cretaceous and Jacksonian aquifer systems (primarily sands) are a common source of drinking water within a 35-mile wide band that lies adjacent to and south of the Fall Line. Southwestern Georgia relies on four vertically stacked aquifers (sands and carbonates) for drinking-water supplies: the Providence, Clayton, Claiborne and Floridan aquifer systems. The Floridan aquifer system (primarily carbonates) serves most of south-central and southeastern Georgia. The Miocene aquifer system (primarily sands) is the principal “shallow” unconfined aquifer system occupying much of the same broad area underlain by the Floridan aquifer system. It becomes confined in the coastal counties and locally in the Grady, Thomas, Brooks and Lowndes County area of south Georgia.

1.3.2 Piedmont/Blue Ridge Province

Crystalline rocks of metamorphic and igneous origin (primarily Precambrian and Paleozoic in age) underlie the Piedmont and Blue Ridge Provinces. These two provinces differ geologically, but are discussed together here because they share common hydrologic properties. The principal water-bearing features are fractures, compositional layers, and other geologic discontinuities in the rock, as well as intergranular porosity in the overlying soil and saprolite horizons. Thick soils and saprolites are often important as the "reservoir" that supplies water to the water-bearing fracture and joint systems. Ground water typically flows from local highlands toward discharge areas along streams. However, during prolonged dry periods or in areas of heavy pumpage, surface water may flow from the streams into the ground-water systems.

1.3.3 Valley and Ridge Province

Consolidated Paleozoic sedimentary formations characterize the Valley and Ridge Province. The principal permeable features of the Valley and Ridge Province are fractures and solution voids; intergranular porosity also is important in some places. Locally, ground-water and surface-water systems closely interconnect. Dolostones and limestones of the Knox Group are the principal aquifers where they occur in the axes of broad valleys. The greater hydraulic conductivities of the thick carbonate sections in this Province, in part due to solution-enlarged joints, permit development of higher yielding wells than in the Piedmont/Blue Ridge Province.

1.4 REGIONAL GROUND-WATER PROBLEMS

Data from ground-water investigations in Georgia, including those from the Ground-Water Monitoring Network, indicate that virtually all of Georgia has shallow ground water sufficient for domestic supply. Iron, aluminum, and manganese are the only constituents that occur routinely in concentrations exceeding drinking-water standards. These metals are mainly naturally occurring and do not pose a health risk. Iron and manganese can cause reddish to brownish stains on objects.

Only a few occurrences of polluted or contaminated ground waters are known from North Georgia (see Chapter 4). Aquifers in the outcrop areas of Cretaceous sediments south of the Fall Line typically yield acidic water that may require treatment. The acidity occurs naturally and results both from the inability of the sandy aquifer sediments to neutralize acidic rainwater and from biologically influenced acid-producing reactions between infiltrating water and soils and sediments. Nitrite/nitrate concentrations in shallow ground water from the farm belt of southern Georgia are usually within drinking-water standards, but are somewhat higher than levels found in other areas of the State.

Besides the karst plain area (Dougherty Plain) in southwest Georgia, the Floridan aquifer system contains two other areas of naturally occurring reduced ground-water quality.

The first is the area of the Gulf Trough, a narrow, linear geological feature extending from southwestern Decatur County through northern Effingham County. Here, ground water is typically high in total dissolved solids and contains elevated levels of barium, sulfate, and radionuclides. The second is the coastal area of Georgia, where influx of water with high dissolved solids content presents problems. In the Brunswick area, ground-water withdrawal from the upper Floridan results in up-coning of water with high dissolved solids content from deeper parts of the aquifer. In the Savannah region, a cone of depression caused by pumping in and around Savannah has apparently induced saline water to enter the Floridan aquifer via breeches in the Miocene confining unit along the bottoms of waterways and sand-filled paleochannels in the Beaufort/Hilton Head area of South Carolina and to flow down-gradient toward Savannah (Foyle et al., 2001; Krause and Clarke, 2001).

CHAPTER 2 GEORGIA GROUND-WATER MONITORING NETWORK

2.1 MONITORING STATIONS

Stations for the period January 2003 through January 2004 Ground-Water Monitoring Network are situated in the seven major aquifers and aquifer systems of the Coastal Plain Province, and in the unconfined ground-water systems of the Piedmont/Blue Ridge, and the Valley and Ridge Provinces (Table 2-1). Monitoring stations are located in three critical settings:

1. areas of surface recharge;
2. areas of potential pollution related to regional activities (e.g., agricultural and industrial areas); and
3. areas of significant ground-water use.

Most of the monitoring stations are municipal, industrial, and domestic wells that have reliable well-construction data. The Monitoring Network also includes monitoring wells in specific areas where the State's aquifers are recognized to be especially susceptible to contamination or pollution (e.g., the Dougherty Plain of southwestern Georgia and the State's coastal area).

2.2 USES AND LIMITATIONS

Regular sampling of wells and springs of the Ground-Water Monitoring Network permits analysis of ground-water quality with respect to location (spatial trends) and time of sample collection (temporal trends). Spatial trends are useful for assessing the effects of the geologic framework of the aquifer and regional land-use activities on ground-water quality. Temporal trends permit an assessment of the effects of rainfall and drought periods on ground-water quantity and quality. Both trends are useful for the detection of non-point source pollution. Non-point source pollution arises from broad-scale phenomena such as acid rain deposition and application of agricultural chemicals on crop lands.

It should be noted that the data of the Ground-Water Monitoring Network represent water quality in only limited areas of Georgia. Monitoring water quality at 128 sites located throughout Georgia provides an indication of ground-water quality at the locality sampled and at the horizon corresponding to the screened interval in the well or to the head of the spring at each station in the Monitoring Network. Caution should be exercised in drawing strict conclusions and applying any results reported in this study to ground waters that are not being monitored.

Stations of the Ground-Water Monitoring Network are intentionally located away from known point sources of pollution. The wells provide baseline data on ambient water

Table 2-1. Georgia Ground-Water Monitoring Network, January 2003 through January 2004.

AQUIFER SYSTEM	**NUMBER OF MONI-TORING STATIONS VISITED & SAMPLES TAKEN, JAN. 2003 THROUGH JAN. 2004**	**PRIMARY STRATIGRAPHIC EQUIVALENTS**	**AGE OF AQUIFER FORMATIONS**
Cretaceous	17 stations (17 samples)	Ripley Formation, Cusseta Sand, Blufftown Formation, Eutaw Formation, Tuscaloosa Formation, Steel Creek Formation, Gaillard Formation, Pio Nono Formation	Late Cretaceous
Providence	4 stations (4 samples)	Providence Sand	Late Cretaceous
Clayton	5 stations (5 samples)	Clayton Formation	Paleocene
Claiborne	5 stations (5 samples)	Claiborne Group	Middle Eocene
Jacksonian	8 stations (8 samples)	Barnwell Group	Late Eocene
Floridan	49 stations (56 samples)	Predominantly Suwannee Limestone and Ocala Group	Predominantly Middle Eocene to Oligocene
Miocene	6 stations (6 samples)	Predominantly Altamaha Formation and Hawthorn Group	Miocene-Recent
Piedmont/Blue Ridge	21 stations (22 samples)	Various igneous and metamorphic complexes	Predominately Paleozoic and Precambrian
Valley and Ridge	9 stations (9 samples)	Shady Dolomite, Knox Group, and Conasauauga Group	Paleozoic: Cambrian and Ordovician

quality in Georgia. EPD requires other forms of ground-water monitoring for activities that may result in point source pollution (e.g., landfills, hazardous waste facilities and land application sites) through its environmental facilities permit programs.

Ground-water quality changes gradually and predictably in the areally extensive aquifers of the Coastal Plain Province. The Monitoring Network allows for some definition of the chemical processes occurring in large confined aquifers. Unconfined aquifers in northern Georgia and the surface recharge areas of southern Georgia are of comparatively small areal extent and more open to interactions with land-use activities. The wide spacing of monitoring stations does not permit equal characterization of water-quality processes in these settings. The quality of water from monitoring wells completed in unconfined aquifers represents only the general nature of ground water in the vicinity of the monitoring wells. Ground water in the recharge areas of the Coastal Plain aquifers is the future drinking-water resource for down-flow areas. Monitoring wells in these recharge areas, in effect, constitute an early warning system for potential future water quality problems in confined portions of the Coastal Plain aquifers.

2.3 ANALYSES AND DATA RETENTION

Analyses are available for 132 water samples collected from 124 stations (115 wells and 9 springs) during the period January 2003 through January 2004. In 1984, the first year of the Ground-Water Monitoring Network, hydrogeologists sampled water from 39 wells in the Piedmont/Blue Ridge and Coastal Plain Provinces. Since 1984, the Ground-Water Monitoring Network has been expanded through addition of further wells and springs to cover all three hydrogeologic provinces, with most of the monitoring performed in the Coastal Plain.

Ground water from all monitoring stations is tested for nitrate/nitrite and volatile organic compounds (VOCs) including methyl tert-butyl ether (MTBE). Testing for metals and select anions that are subject to Primary Maximum Contaminant Levels (MCLs) continues for stations that have shown past contamination by these substances. A sample from one well (GWN-J7) received testing for organochlorine pesticides at the request of the operator. For stations used as public water supplies and having histories of trihalomethane contamination, EPD personnel also test for free and total chlorine. Before collecting a sample, EPD personnel also observe and record certain field parameters -- pH, conductivity, dissolved oxygen, and temperature -- using field instruments. This Circular includes the pH, conductivity, and chemical analysis results.

The Drinking Water Program of EPD's Water Resources Management Branch has established MCLs for certain parameters included in analyses performed on Ground-Water Monitoring Network samples (EPD, 2002). Primary MCLs pertain to parameters that may have adverse effects on human health when their values are exceeded. Secondary MCLs pertain to parameters that may give drinking water objectionable, though not health-threatening, properties that may cause persons served by public water systems to cease its use. Foul odor and unpleasant taste are examples of such properties. MCLs apply only to treated water offered for public consumption; nevertheless, they are useful guidelines for evaluating the quality of untreated (raw) water. Tables A-1 and A-2 in the Appendix list the Primary and Secondary MCLs for Ground Water Monitoring Network parameters.

Most of the wells originally on the Monitoring Network had in-place pumps. Using such pumps to purge the wells and collect samples reduces the potential for cross-contamination of wells. For those wells that lacked in-place pumps, EPD personnel used portable pumps for purging and sampling. All wells, however, that lacked in-place pumps were dropped from the Monitoring Network.

Sampling procedures are adapted from techniques used by USGS and USEPA. Hydrogeologists purge the wells (three to five times the volume of the water column in the well) before collecting a sample to reduce the influence of the well, pump and distribution system on water quality. Municipal, industrial and domestic wells typically require approximately 30 to 45 minutes of purging before sample collection.

Previously during purging, a manifold captured flow at the pump system discharge point before the water was exposed to the atmosphere and conducted it past field instrument probes while EPD personnel observed and recorded field parameters. In October of 2002, a single instrument with a multiple parameter probe replaced the manifold with multiple field instrument probes. With the new system, water enters the bottom of a container, rises past the probe, and discharges out of the top of the container. With increased purging time, typical trends for field parameters include a lowering of pH, dissolved oxygen content, and conductivity, and a transition toward the mean annual air temperature in the shallower wells (in deeper wells, geothermal warming can become pronounced). The hydraulic flow characteristics of unconfined aquifers, depth of withdrawal, and pump effects may alter these trends.

Samples are collected once field parameters stabilize or otherwise indicate that the effects of the well have been minimized. EPD personnel fill the sample bottles and promptly place them on ice to preserve the water quality. For public wells with a history of low-level trihalomethane contamination, field personnel test for free and total chlorine (these species may be present if treated water leaks back into the well). If the tests are positive, a premeasured amount of ascorbic acid is added to the VOC sample water as a preservative. (Ascorbic acid neutralizes chlorine and other reactive halogen species which attack naturally occurring organic matter, forming trihalomethanes. Adding ascorbic acid thus prevents the formation of spuriously high levels of trihalomethanes.) Personnel transport samples to the laboratories for analysis on or before the Friday of the week in which they were collected, well before holding times for the samples lapse. Field parameters (pH and conductivity) and analytical results are provided in the Appendix.

Files at the Geologic Survey Branch contain records of all field parameter measurements and chemical analyses. Owners of wells or springs receive copies of analysis sheets and are notified in writing if any MCLs are exceeded. EPD's Drinking Water Program receives notification of Primary MCL exceedences or near-exceedences involving public water supplies. Field parameters and analytical data are forwarded to STORET, a national water quality database maintained by USEPA. Pending an upgrade of STORET, the forwarding of data has been temporarily suspended.

CHAPTER 3 GROUND-WATER QUALITY IN GEORGIA

3.1 OVERVIEW

Georgia's nine major aquifers and aquifer systems are grouped into three hydrogeologic provinces for the purposes of this report.

The Coastal Plain Province comprises seven major aquifers or aquifer systems that are restricted to specific regions and depths within the province **(**Figure 3-1). These major aquifer systems commonly incorporate smaller aquifers that are locally confined. Ground-Water Monitoring Network wells in the Coastal Plain aquifers are generally located in three settings:

1. Recharge (or outcrop) areas that are located in regions that are geologically updip and generally to the north of confined portions of these aquifers.

2. Updip, confined areas that are located in regions that are proximal to the recharge areas, yet are confined by overlying geologic formations. These areas are generally south to southeast of the recharge areas.

3. Downdip, confined areas, located to the south and southeast in the deeper, confined portions of the aquifers distal to the recharge areas.

Small-scale, localized ground-water flow patterns characterize the two hydrogeologic provinces of north Georgia, the Piedmont/Blue Ridge Province and the Valley and Ridge Province. Deep regional flow systems are unknown in northern Georgia. Geologic discontinuities (such as fractures) and compositional changes within the aquifer generally control ground-water flow in the Piedmont/Blue Ridge Province. Local topographic features, such as hills and valleys, influence ground-water flow patterns. Many of the factors controlling ground-water flow in the Piedmont/Blue Ridge Province also apply in the Valley and Ridge Province. The Valley and Ridge Province possesses widespread karst features, which significantly enhance porosity and permeability in localized areas and exert a strong influence on local ground-water flow patterns.

3.2 CRETACEOUS AQUIFER SYSTEM

The Cretaceous aquifer system is a complexly interconnected group of aquifer subsystems developed in Late Cretaceous sands of the Coastal Plain Province. These sands crop out in an extensive recharge area immediately south of the Fall Line in west and central Georgia (Figure 3-2). Overlying Tertiary sediments restrict Cretaceous outcrops to valley bottoms in parts of the northeastern Coastal Plain. Five distinct subsystems of the Cretaceous aquifer system, including the Providence aquifer system,

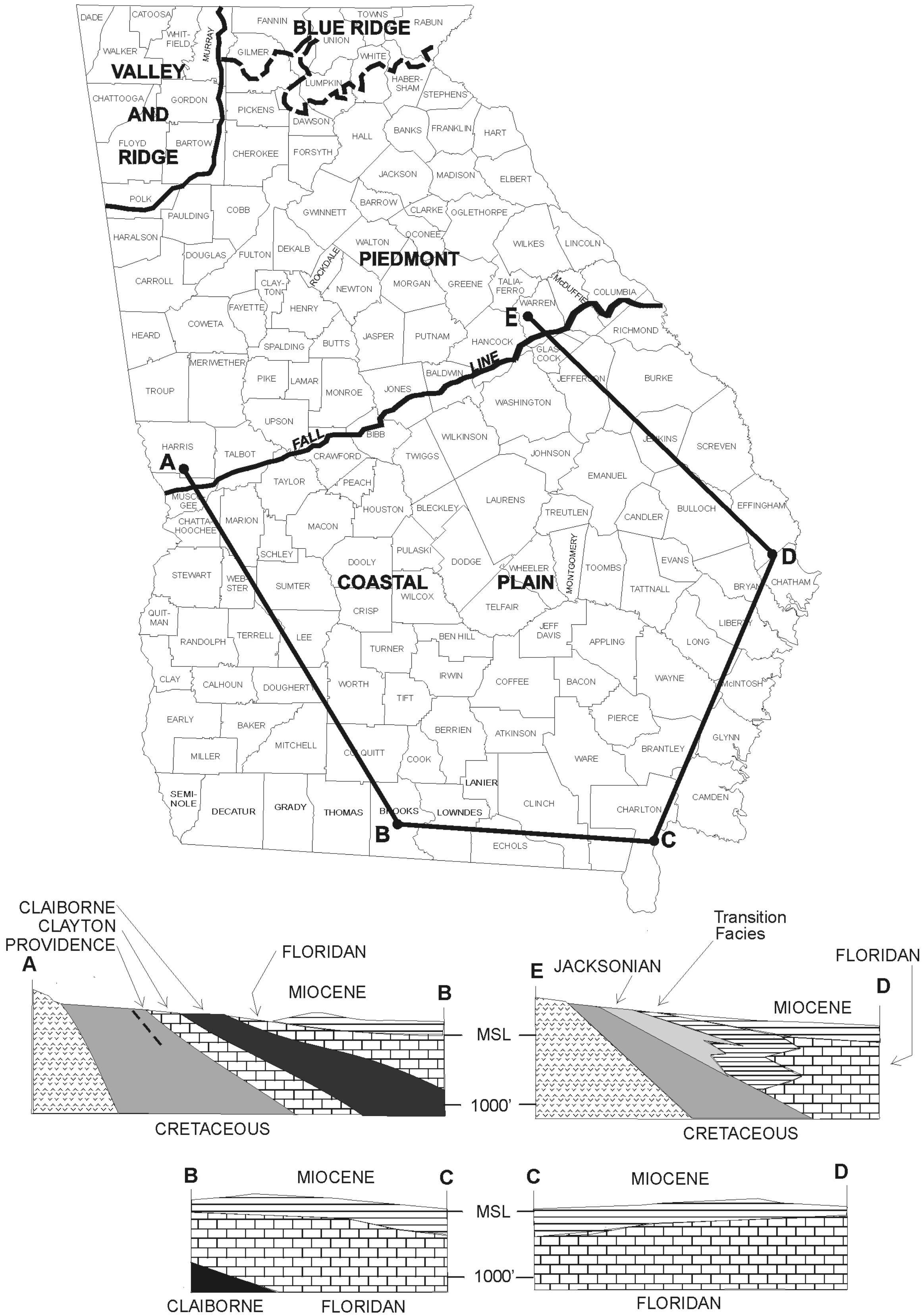


Figure 3-1 The Seven Major Aquifer Systems of the Coastal Plain Province

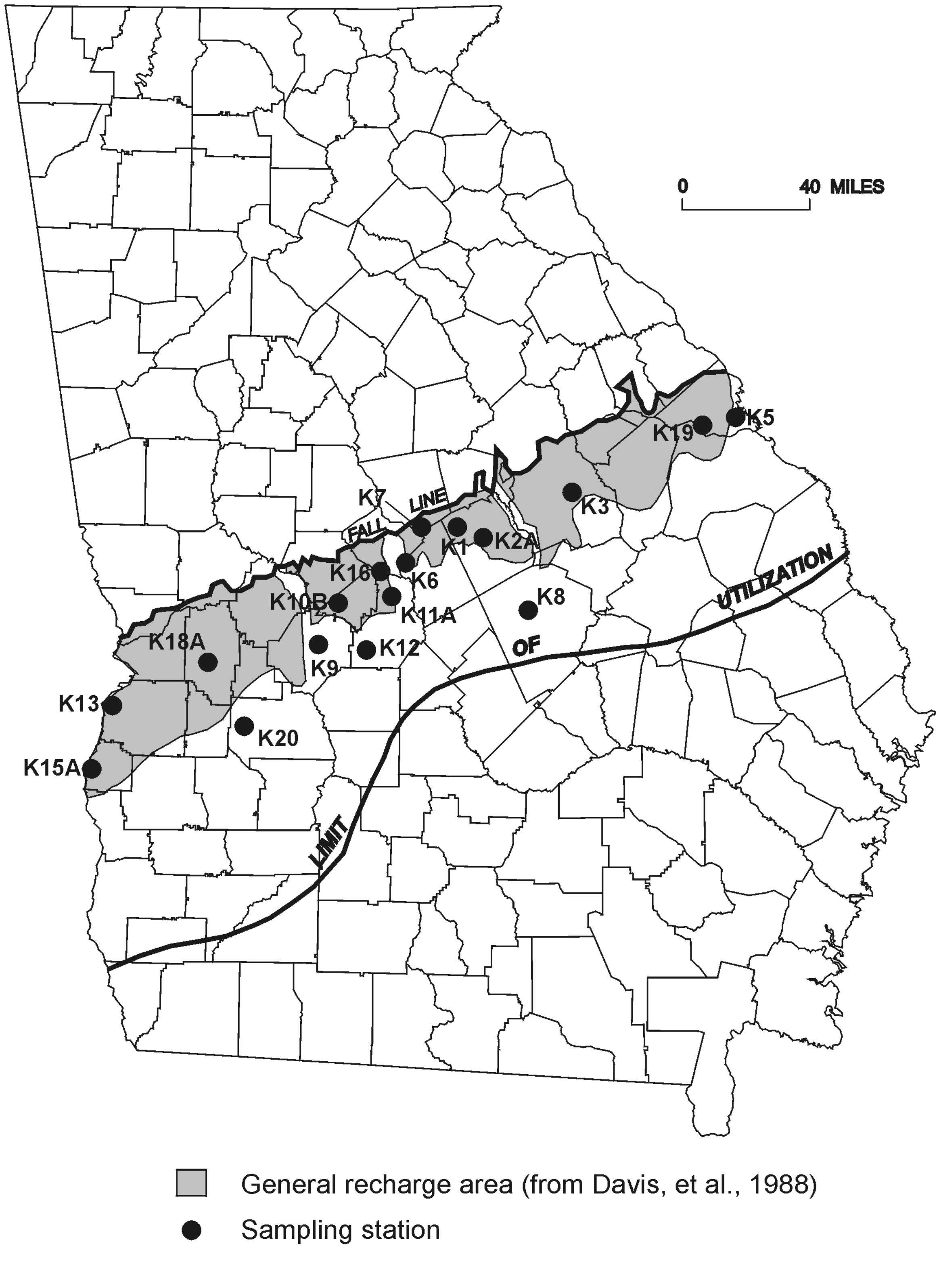


Figure 3-2 Locations of Stations Monitoring the Cretaceous Aquifer System

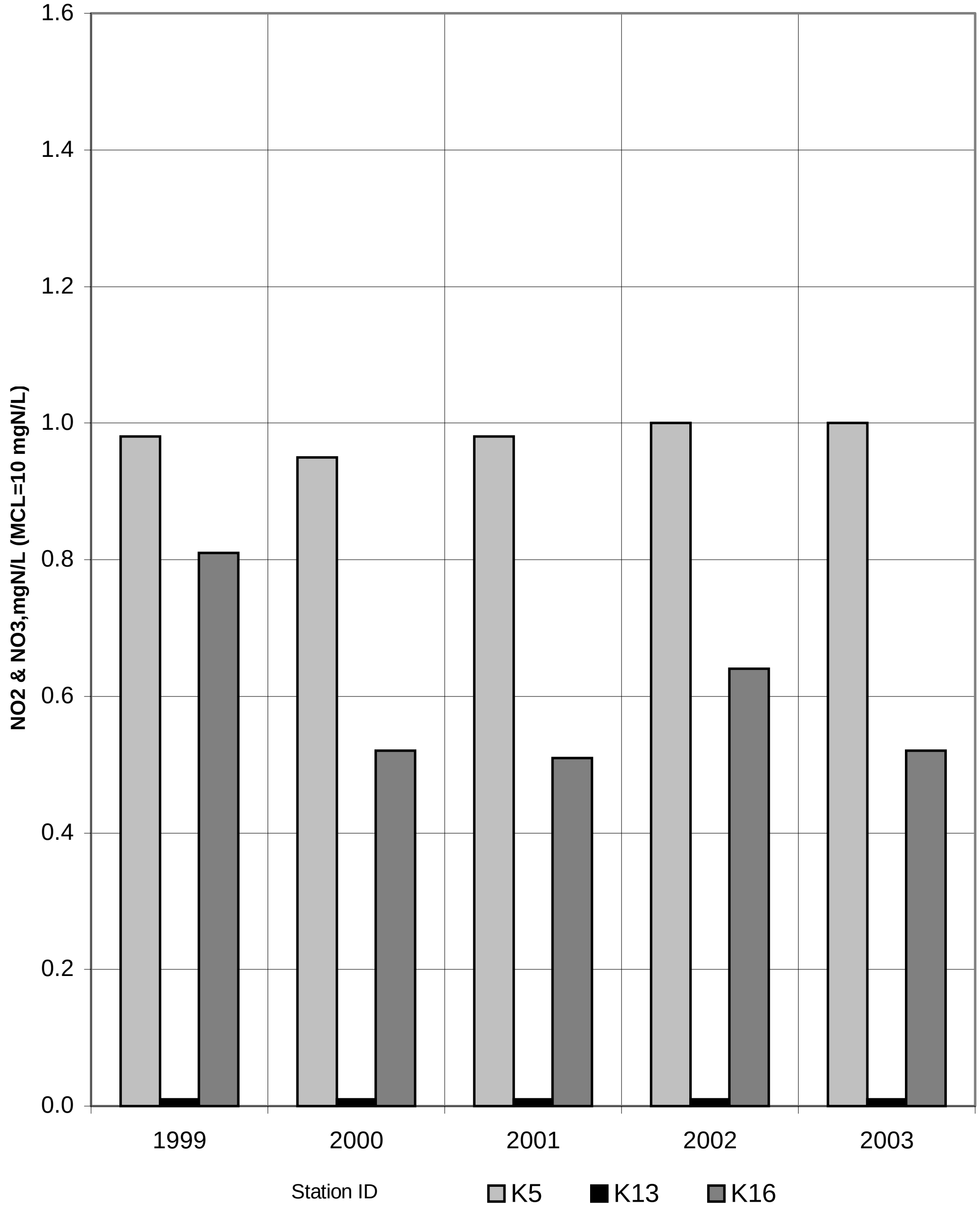
are recognized west of the Ocmulgee River (Pollard and Vorhis, 1980). These merge into three subsystems to the east (Clarke, et al., 1985; Huddlestun and Summerour, 1996). Aquifer sands thicken southward from the Fall Line where they pinch out against crystalline Piedmont rocks, to a sequence of sand and clay approximately 2,000 feet thick at the southern limits of the main aquifer-use area (limit of utilization, Figure 3-2). Vertical leakage from overlying members of the aquifer system provides significant recharge in downdip areas.

EPD collected 17 samples from 17 wells to monitor water quality of the Cretaceous aquifer system, exclusive of the Providence aquifer system (Figure 3-2). Table A-3 lists analytical results for samples collected from the Cretaceous aquifer system. Four of the sampled wells, GWN-K8, GWN-K9, GWN-K12, and GWN-K20 are located away from the Cretaceous outcrop and recharge area, while the remainder lie within or near the recharge area. pHs are available for 16 wells and ranged from 3.44 to 9.23, with the majority (13) being acidic. The pHs measured in 2003 for wells GWN-K5, GWN-K9, GWN-K10B, GWN-K11A, and GWN-K16 declined markedly from those obtained during the previous four years (declines of more than 0.8 versus 2002 values). These declines coincide with the end of an extended drought. (The water system operator at Marshallville (GWN-K9) complained of having to use more soda ash in 2003 to adjust the pH during water treatment.) Conductivities are available for all wells and ranged from 10 to 187 microsiemens (uS/cm), with the lowest generally occurring in waters from recharge area wells.

Water samples from all 17 wells were analyzed for nitrite/nitrate and volatile organic compounds (VOCs), including MTBE. Ten wells yielded samples with detectable nitrate/ nitrite, with the highest concentration, 1.0 ppm as nitrogen, occurring in a sample from well GWN-K5. Figure 3-3 shows trends in levels of nitrate/nitrite (reported as parts per million [ppm] nitrogen) for three selected wells.

Two wells gave samples containing VOCs. Wells GWN-K1 and GWN-K5 yielded samples containing trichloroethylene (TCE) (1.8 ppb and 2.9 ppb, respectively). Both wells are located in industrial settings, with GWN-K1 being used for industrial process water and GWN-K5 being used as a public supply well.

For well GWN-K1, regular testing for VOCs did not begin until 1999. Before that year, VOC testing had been performed twice, with one occasion finding low-level pollution by TCE and 1,2-dichloroethylene and the other finding no detectable VOCs. Well GWN-K5 has been tested regularly for VOCs since 1993, but has experienced pollution by VOCs only since 1999. Because of the recent contamination history, no follow-up sampling was deemed necessary. The Water Resources Management Branch, however, was notified of the results. A study has commenced in an attempt to locate the source(s) of the TCE pollution in this well.



Nitrate/nitrite levels below the detection limit are assigned a value of 0.01 ppm.

Figure 3-3 Nitrate/Nitrite Concentrations for Selected Wells in the Cretaceous Aquifer System

3.3 PROVIDENCE AQUIFER SYSTEM

Sand and coquinoid limestones of the Late Cretaceous Providence Formation comprise the Providence aquifer system of southwestern Georgia. Outcrops of the aquifer system ex-tend from northern Clay and Quitman Counties through eastern Houston County (Figure 3-4).At its updip extent, the aquifer system thickens both to the east and to the west of a broad area adjacent to the Flint River. The aquifer system also generally thickens downdip, with an area where the thickness exceeds 300 feet existing in Pulaski County, and an area of similar thickness indicated in the Baker/Calhoun/Early county region (Clarke, et al., 1983). Figure 3-4 also shows the downdip limit of the area in which the aquifer system is utilized.

The permeable Providence Formation-Clayton Formation interval forms a single aquifer in the updip areas (Long, 1989) and to the east of the Flint River (Clarke, et al., 1983). This same interval is recognized as the Dublin aquifer system to the east of the Ocmulgee River (Clarke, et al., 1985). Outcrop areas and adjacent covered areas to the east of the Flint River, where permeable sand units overlie the aquifer, are surface recharge areas. The Chattahoochee River forms the western discharge boundary for this aquifer system in Georgia.

EPD sampled four wells drawing from the Providence aquifer system during the period January 2003 through January 2004. Two wells, GWN-PD2B and GWN-PD5, are situated in the recharge area, whereas wells GWN-PD3 and GWN-PD6 tap confined portions of the aquifer. Conductivity data are available for all four wells and range from 26 uS/cm to 244 uS/cm. pH data are available from all four wells. Both recharge area wells yielded acidic water, while both down-dip wells produced basic water. Detectable nitrate/nitrite was present only in the recharge area well samples. Figure 3-5 shows trends in levels of nitrate/nitrite (reported as parts per million [ppm] nitrogen) for a recharge area well and a downdip well. Well GWN-PD6, a downdip well, yielded a sample containing dichloromethane and chloroform. Both compounds may arise from the reflux of treated water into the well bore, allowing disinfectants in the treated water to react with organic matter naturally present in the raw water. Analytical results are presented in Table A-4.

3.4 CLAYTON AQUIFER SYSTEM

The Clayton aquifer system of southwestern Georgia is developed mainly in the middle limestone unit of the Paleocene Clayton Formation. Limestones and calcareous sands of the Clayton aquifer system crop out in a narrow belt extending from northeastern Clay County to southwestern Schley County (Figure 3-6). Aquifer thickness varies, ranging from 50 feet near outcrop areas to 265 feet in southeastern Mitchell County (Clarke, et al., 1984). Both the Flint River, to the east, and the Chattahoochee River, to the west, are areas of discharge for the aquifer system in its updip extent. Leakage from the underlying Providence aquifer system and from permeable units in the overlying Wilcox confining zone provides significant recharge in downdip areas (Clarke, et al., 1984). The

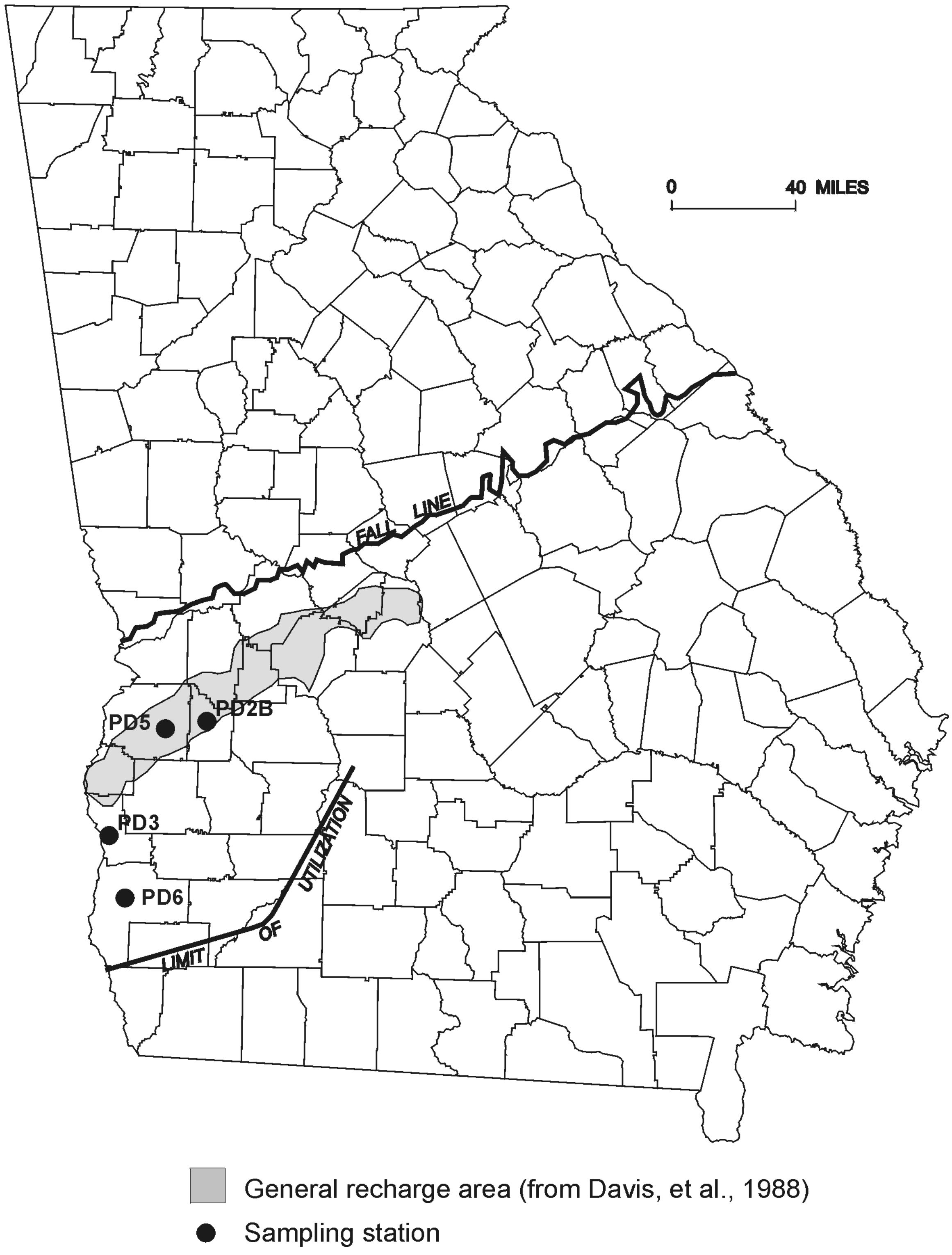
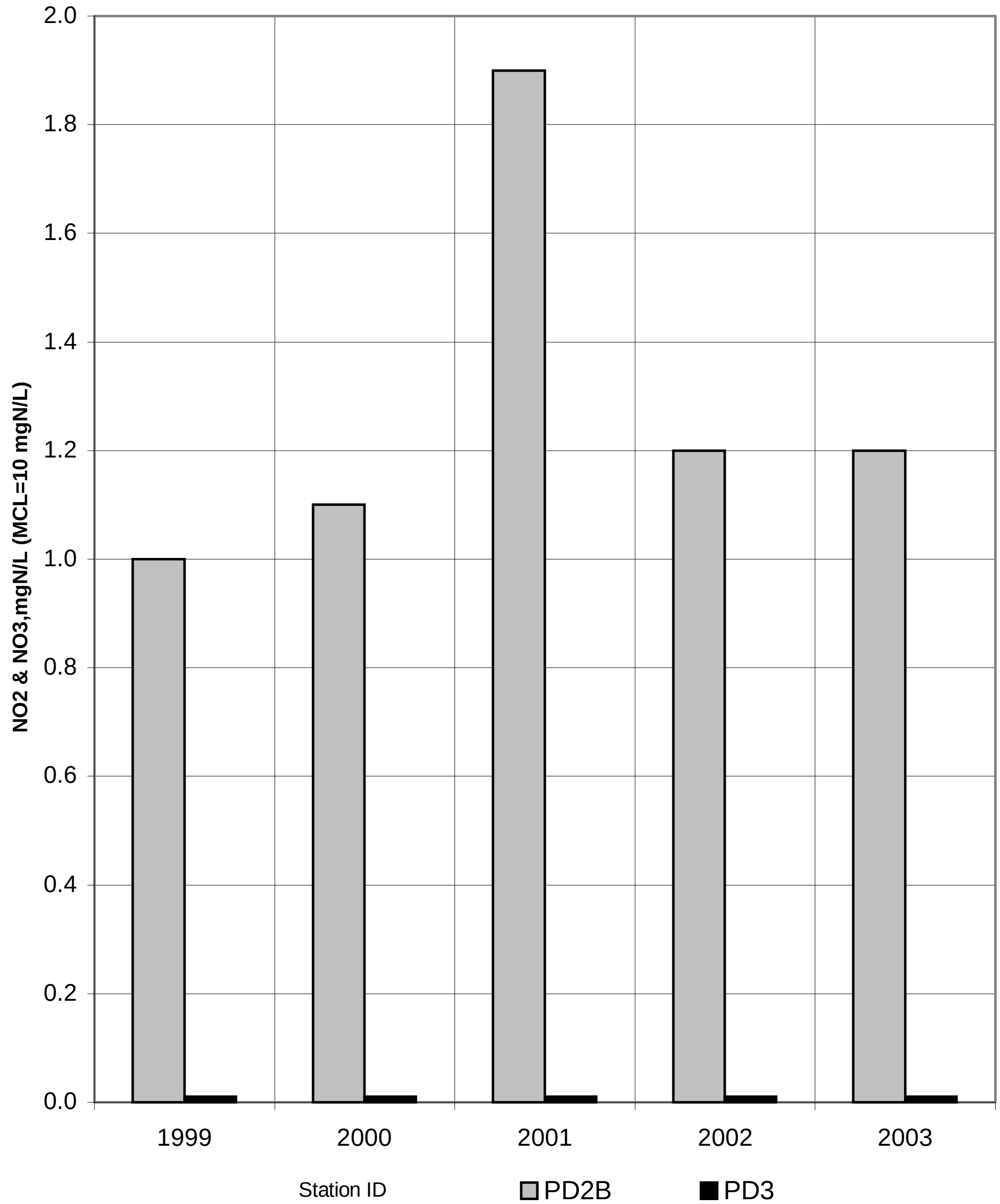


Figure 3-4 Locations of Stations Monitoring the Providence Aquifer System



Nitrate/nitrite levels below the detection limit are assigned a value of 0.01 ppm. A missing bar indicates that samples were not collected for that year.

Figure 3-5 Nitrate/Nitrite Concentrations for Selected Wells in the Providence Aquifer System

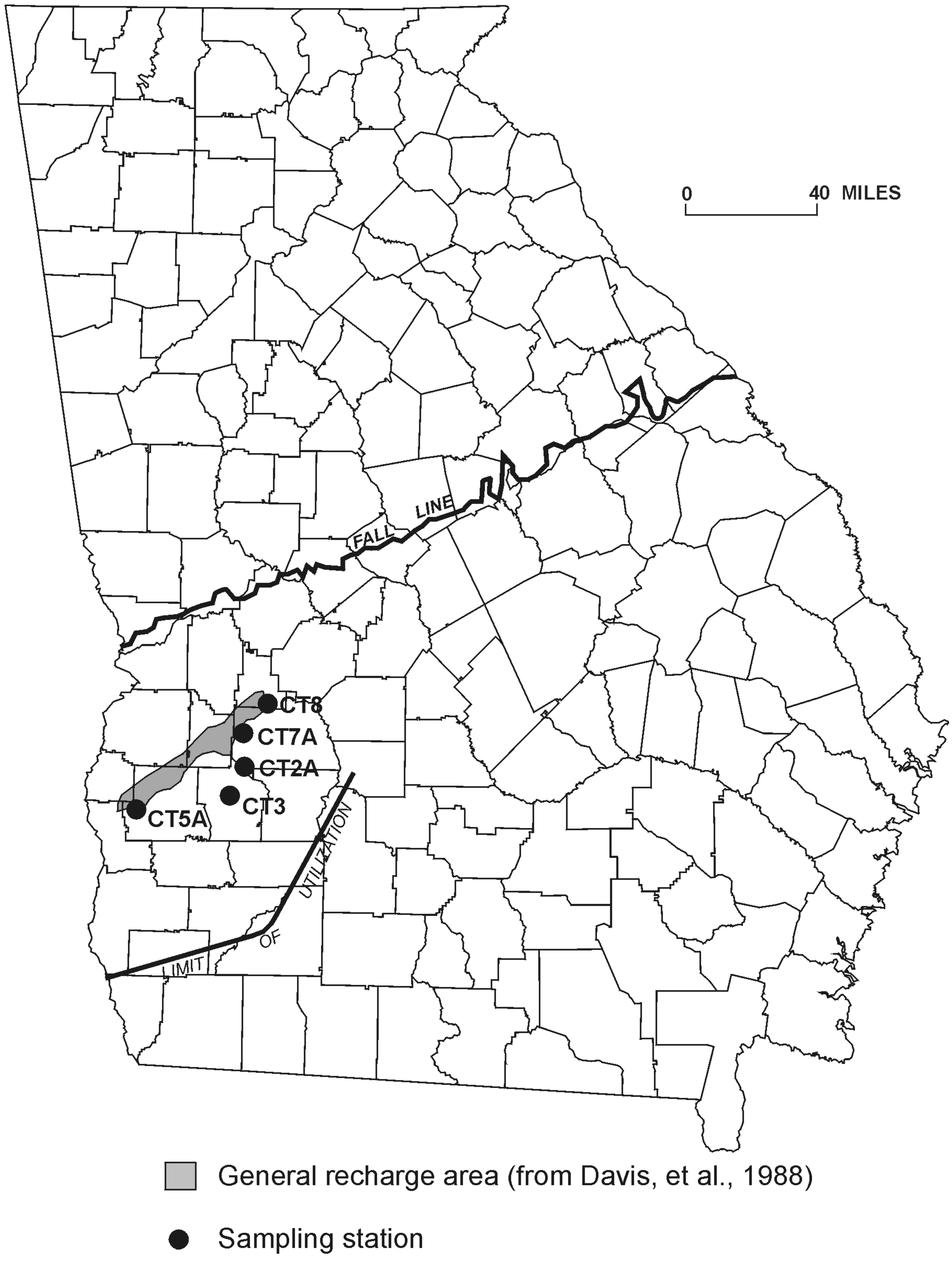


Figure 3-6 Locations of Stations Monitoring the Clayton Aquifer System

Clayton and Providence Formations merge to form a single aquifer unit in updip areas (Long, 1989) as well as east of the Flint River (Clarke, et al., 1983). West of the Flint River and downdip, the Clayton/Providence confining zone, a silt and clay-bearing interval, confines the aquifer below (McFadden and Perriello, 1983). In the area east of the Ocmulgee River, the combination of these two aquifers is referred to as the Dublin aquifer system (Clarke, et al., 1985). Figure 3-6 also shows the downdip limit of the area in which the aquifer system is used

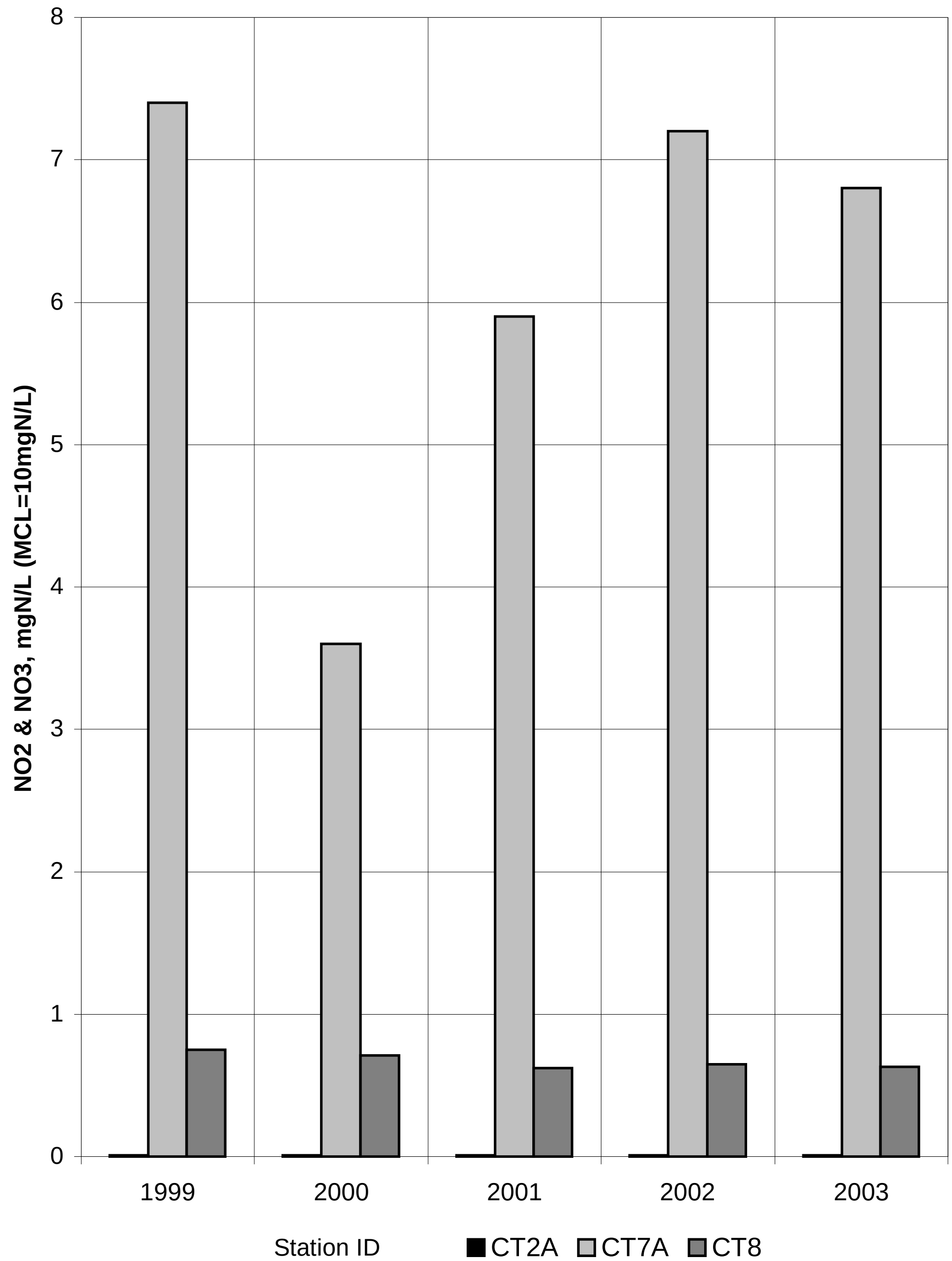
EPD collected five water samples from five wells to monitor water quality in the Clayton aquifer system (Figure 3-6). Three wells (GWN-CT5A, GWN-CT7A, GWN-CT8) are located in or near the recharge area, with the latter two wells being less than 100 feet deep. Wells GWN-CT2A and GWN-CT3 were used to sample the downdip portion of the aquifer system.

The pH of waters from the Clayton wells ranged from acidic to slightly basic. The two shallow recharge area wells yielded waters with lower conductivities and acidic pHs. All samples were analyzed for VOCs (including MTBE) and nitrate/nitrite. Nitrate/nitrite levels ranged from undetected to 6.8 ppm as nitrogen. Well GWN-CT7A, a shallow updip well located near a livestock enclosure, produced the sample with the elevated 6.8 ppm nitrate/nitrite level ("elevated" being greater than the 5 ppm "trigger level" for public water supplies but less than the Primary MCL). Figure 3-7 shows trends in nitrate/nitrite concentrations for three selected wells in the Clayton aquifer system. No VOCs were detected in any of the samples. Table A-5 lists analyses for water samples from the Clayton wells.

3.5 CLAIBORNE AQUIFER SYSTEM

The Claiborne aquifer system is developed primarily in the sandy units in the middle and lower portions of the Middle Eocene Claiborne Group of southwestern Georgia. Claiborne Group sands crop out in a belt extending from northern Early County through western Dooly County. Recharge to the aquifer system occurs both as direct infiltration of precipitation in the recharge area and as leakage from the overlying Floridan aquifer system (Hicks, et al., 1981; Gorday, et al., 1997). Discharge boundaries of the aquifer system are the Ocmulgee River to the east and the Chattahoochee River to the west. The aquifer is more than 350 feet thick near its downdip limit of utilization (Figure 3-8) (Tuohy, 1984).

The aquifer generally thickens from the outcrop area toward the southeast. The clay-rich upper portion of the Claiborne Group, the Lisbon Formation, acts as a confining layer and separates the aquifer from the overlying Floridan aquifer (McFadden and Perriello, 1983; Long, 1989; Huddlestun and Summerour, 1996). The lower water-bearing parts of the group had been correlated to the Tallahatta Formation (e.g., McFadden and Perriello, 1983; Long, 1989; Clarke et al., 1996) or, more recently, have been divided into two formations, the upper one termed the Still Branch Sand and the



Nitrate/nitrite levels below the detection limit are assigned a value of 0.01 ppm.

Figure 3-7 Nitrate/Nitrite Concentrations for Selected Wells in the Clayton Aquifer System

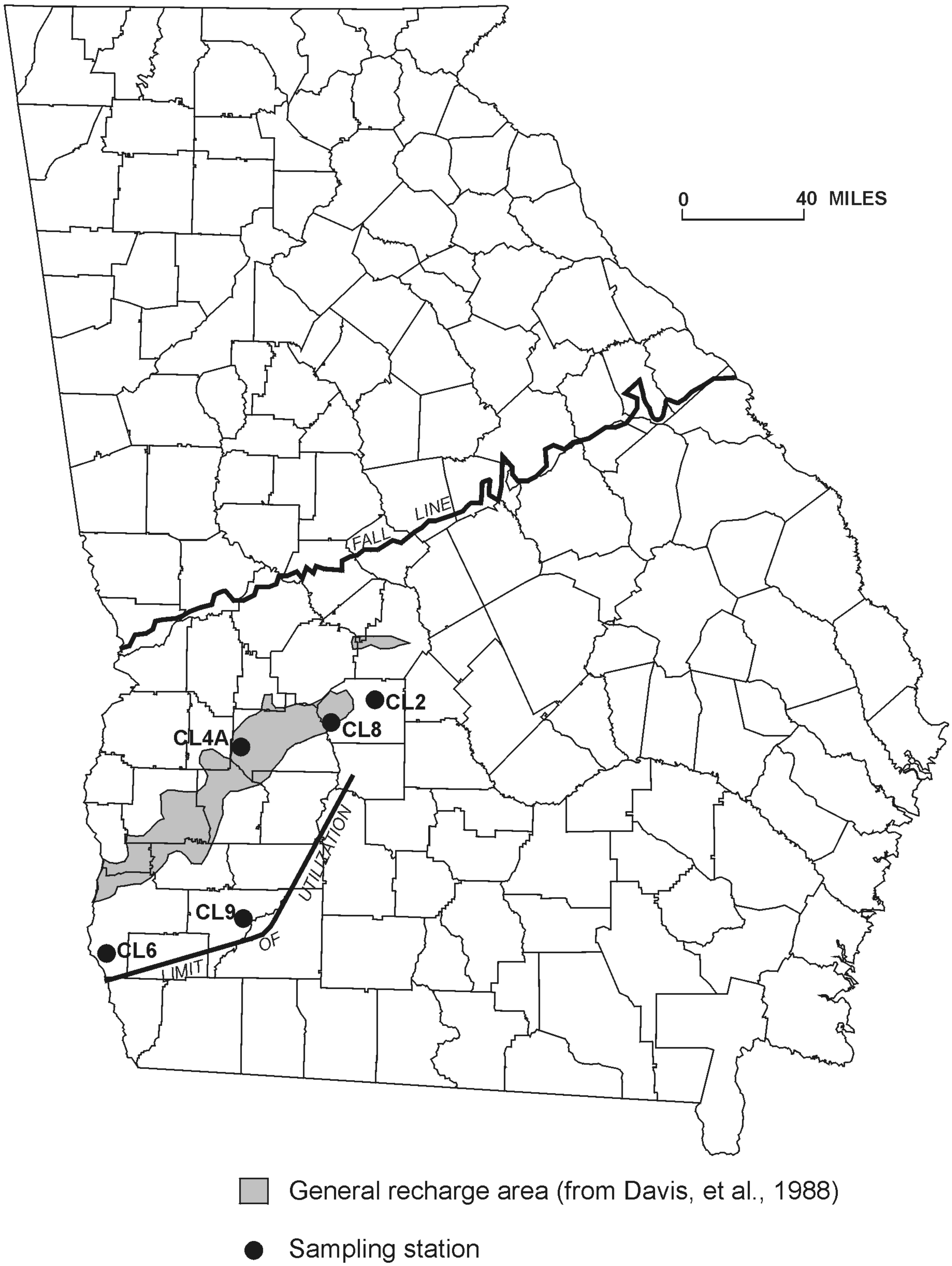


Figure 3-8 Locations of Stations Monitoring the Claiborne Aquifer System

lower one correlated to the Congaree Formation (Huddlestun and Summerour, 1996). The permeable lower units are included in the Gordon aquifer system east of the Ocmulgee River (Brooks, et al., 1985).

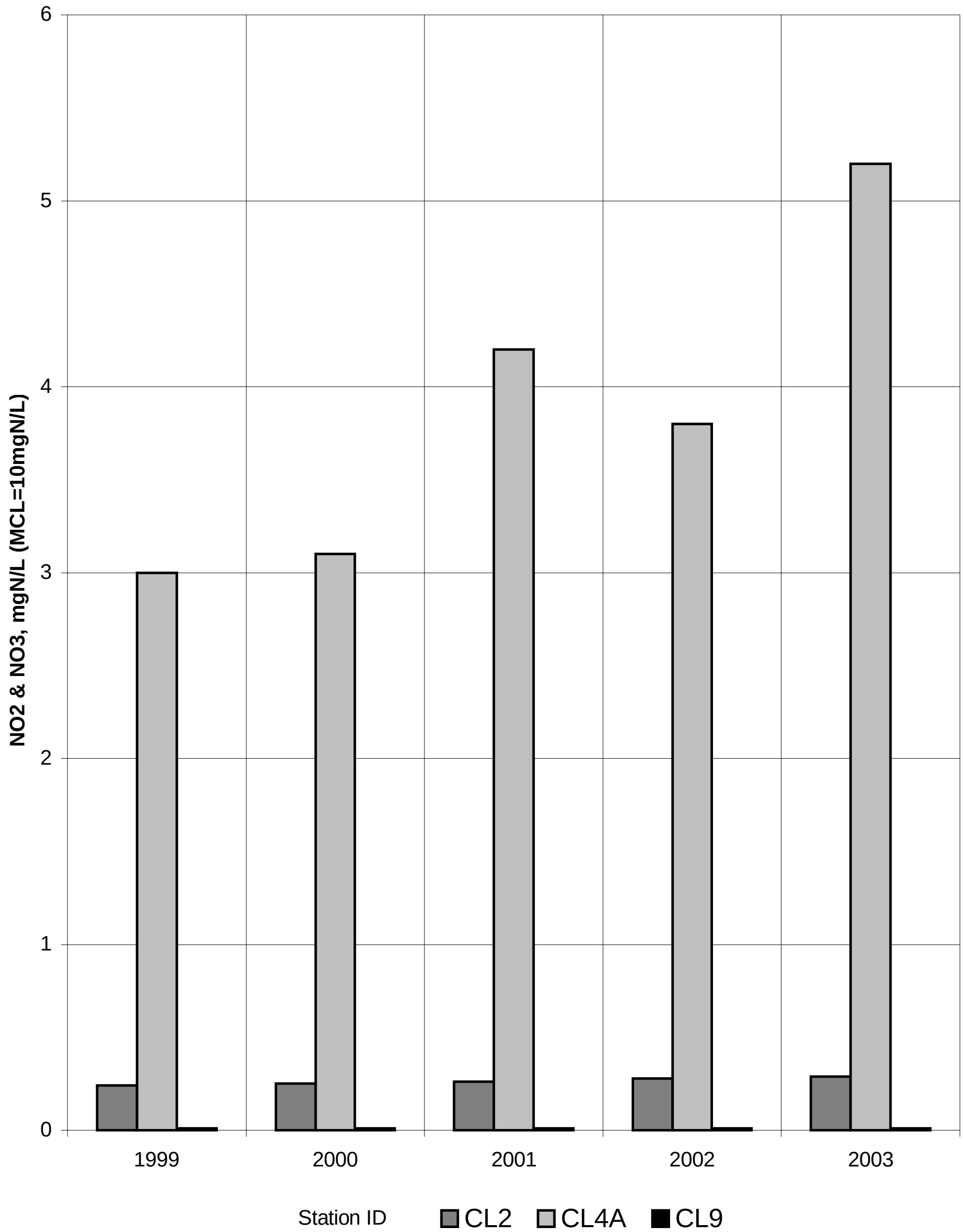
During the period January 2003 through January 2004, EPD personnel obtained five samples from five wells to monitor the water quality of the Claiborne aquifer system. Wells GWN-CL2, GWN-CL4A, and GWN-CL8 lie within or near the recharge area, and wells GWN-CL6 and GWN-CL9 tap the downdip portion of the aquifer system, near the limit of utilization.

Two of the recharge area wells yielded acidic water, while one recharge area well and the two-downdip wells yielded basic water. The lowest conductivity was measured at an updip well (GWN-CL8), while the highest was measured in a downdip well (GWN-CL6). All samples were analyzed for VOCs (including MTBE) and none were detected. All samples were also analyzed for nitrate/nitrite, which was detected in two recharge area samples. The nitrate/nitrite level in one of these samples, from well GWN-CL4A, a public supply well adjoining a row crop field, was elevated (5.2 ppm as nitrogen). Figure 3-9 shows trends in nitrate/nitrite concentrations for three selected wells, and Table A-6 provides analytical results for the Claiborne wells.

3.6 JACKSONIAN AQUIFER SYSTEM

The Jacksonian aquifer system of central and east-central Georgia is predominantly comprised of sands of the Eocene Barnwell Group, though isolated limestone bodies are locally important. Barnwell Group outcrops extend from Macon and Crawford Counties (Hetrick, 1990) eastward to Burke and Richmond Counties (Hetrick, 1992). Figure 3-10 shows the most significant Jacksonian recharge areas. Aquifer sands form a northern clastic facies of the Barnwell Group; the sands grade southward into less permeable silts and clays of a transition facies (Vincent, 1982). The water-bearing sands are relatively thin, ranging from ten to fifty feet in thickness. Limestones equivalent to the Barnwell Group form a southern carbonate facies and are included in the Floridan aquifer system. The Savannah River and Ocmulgee River are eastern and western discharge boundaries respectively for the updip flow system of the Jacksonian aquifer system. The Jacksonian aquifer system is equivalent to the Upper Three Runs aquifer as used in Summerour et al. (1994).

EPD monitored the water quality of the Jacksonian aquifer system in by taking eight samples from eight wells (Figure 3-10). Well GWN-J8, a domestic well left unsampled last year due to a drought-induced low water level, recovered more than enough this year to allow sampling. Six wells are in the clastic facies (one, GWN-J2A, drawing from an isolated limestone body), and two wells (GWN-J3 and GWN-J5) are in the transition facies. The pH of the sampled water ranged from 4.62 to 7.44. Conductivity measurements were lowest for the shallow updip clastic facies well GWN-J7. Table A-7 lists analytical results for all the Jacksonian aquifer wells sampled.



Nitrate/nitrite levels below the detection limit are assigned a value of 0.01 ppm. A missing bar indicates that samples were not collected for that year.

Figure 3-9 Nitrate/Nitrite Concentrations for Selected Wells in the Claiborne Aquifer System

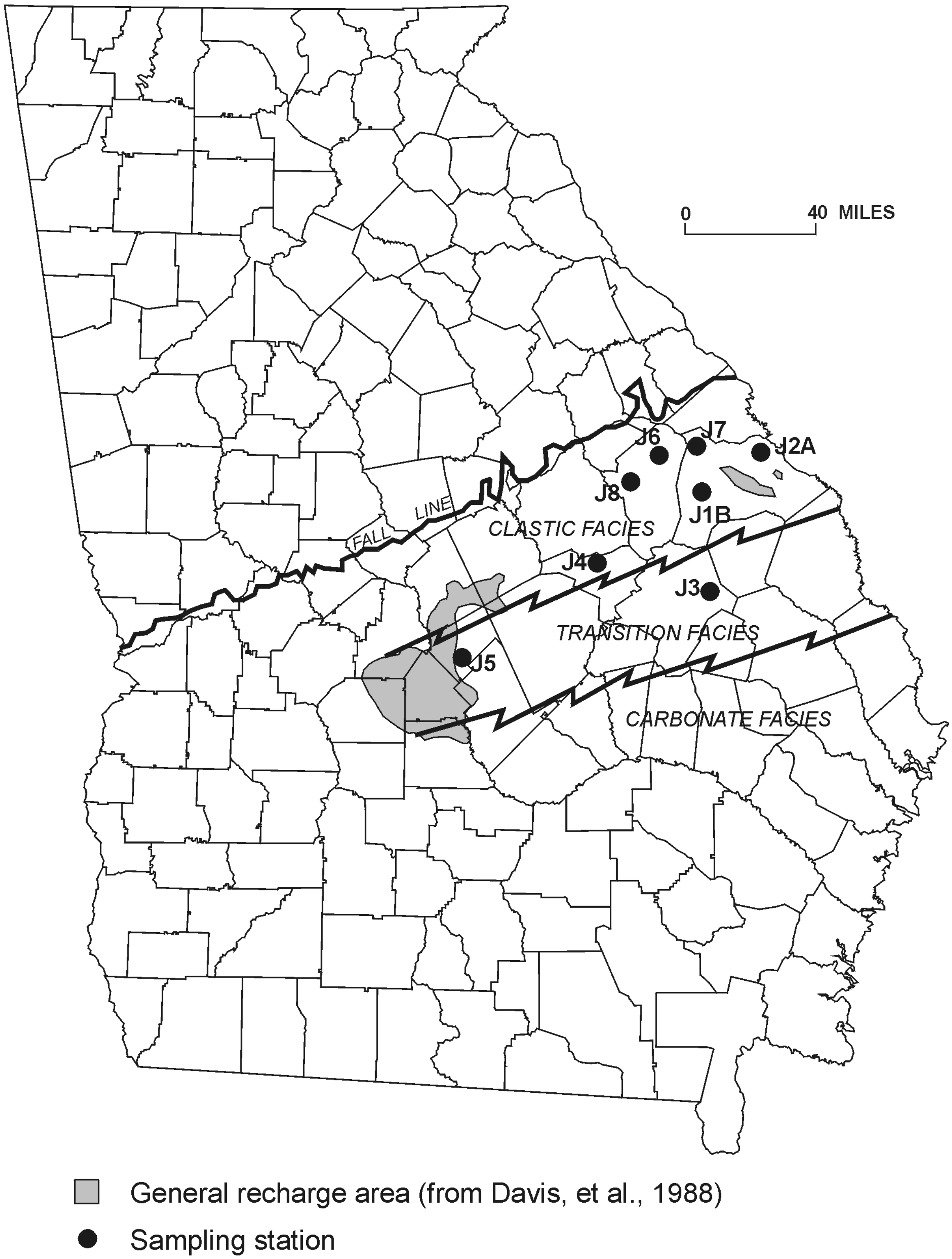


Figure 3-10 Locations of Stations Monitoring the Jacksonian Aquifer System

All samples were analyzed for nitrate/nitrite and VOCs (including MTBE). No VOCs were detected. Well GWN-J8 has, in the past, given samples with excessive beryllium and received testing for metals. Beryllium was detected but remained below the Primary MCL (4 ppb). Nitrate/ nitrite, as nitrogen, ranged from undetectable to 7.6 ppm and was detectable in samples from six wells. The sample with the elevated 7.6 ppm value came from well GWN-J8. Figure 3-11 depicts trends in nitrite/nitrate concentrations for three selected wells.

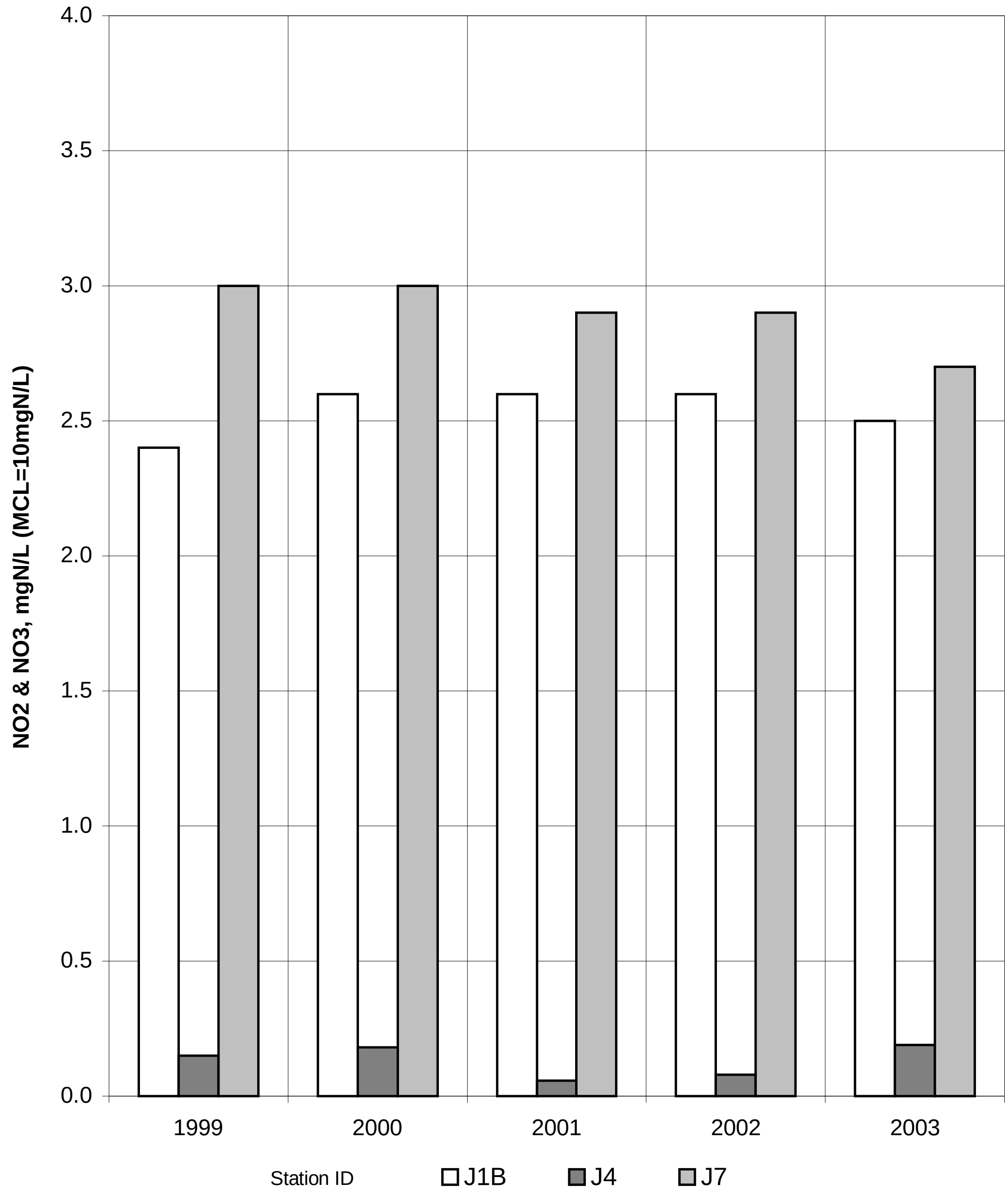
3.7 FLORIDAN AQUIFER SYSTEM

The Floridan aquifer system consists predominantly of Eocene and Oligocene limestones and dolostones that underlie most of the Coastal Plain Province. The aquifer is a major source of ground water for much of its outcrop area and throughout its downdip extent to the south and east.

The upper water-bearing units of the Floridan are the Eocene Ocala Group and the Oligocene Suwanee Limestone (Crews and Huddlestun, 1984). These limestones crop out in the Dougherty Plain (a karstic area in southwestern Georgia) and in adjacent areas along a strike to the northeast. In parts of Camden and Wayne counties the Oligocene unit is absent, and the upper part of the Floridan is restricted to units of Eocene age (Clarke, et al., 1990). The lower portion of the Floridan consists mainly of dolomitic limestone of middle and early Eocene age and pelletal, vuggy, dolomitic limestone of Paleocene age, but extends into the late Cretaceous in Glynn County. The lower Floridan is deeply buried and not widely used, except in several municipal and industrial wells in the Savannah area (Clarke, et al., 1990). From its updip limit, defined in the east by clays of the Barnwell Group, the aquifer thickens to well over 700 feet in coastal Georgia. A dense limestone facies along the trend of the Gulf Trough locally limits ground-water quality and availability (Kellam and Gorday, 1990; Applied Coastal Research Laboratory, 2002). The Gulf Trough is a linear depositional feature in the Coastal Plain that extends from southwestern Decatur County through northern Effingham County.

A ground-water divide separates a smaller southwestward flow regime in the Floridan aquifer system in the Dougherty Plain from the larger southeastward flow regime in the remainder of Georgia. Rainfall infiltration in outcrop areas and downward leakage from extensive surficial residuum recharge the Dougherty Plain flow system (Hayes, et al., 1983). The main body of the Floridan aquifer system, to the east, is recharged by leakage from the Jacksonian aquifer system and by rainfall infiltration in outcrop areas and in areas where overlying strata are thin. Significant recharge also occurs in the area of Brooks, Echols and Lowndes counties, where the Withlacoochee River and numerous sinkholes breach upper confining beds (Krause, 1979).

During the period January 2003 through January 2004, EPD collected 56 samples from 49 wells in the Floridan aquifer system (Figure 3-12). All samples underwent testing for nitrate/nitrite and VOCs (including MTBE). Measurements of pH are available



A missing bar indicates that samples were not collected for that year.

Figure 3-11 Nitrate/Nitrite Concentrations for Selected Wells in the Jacksonian Aquifer System

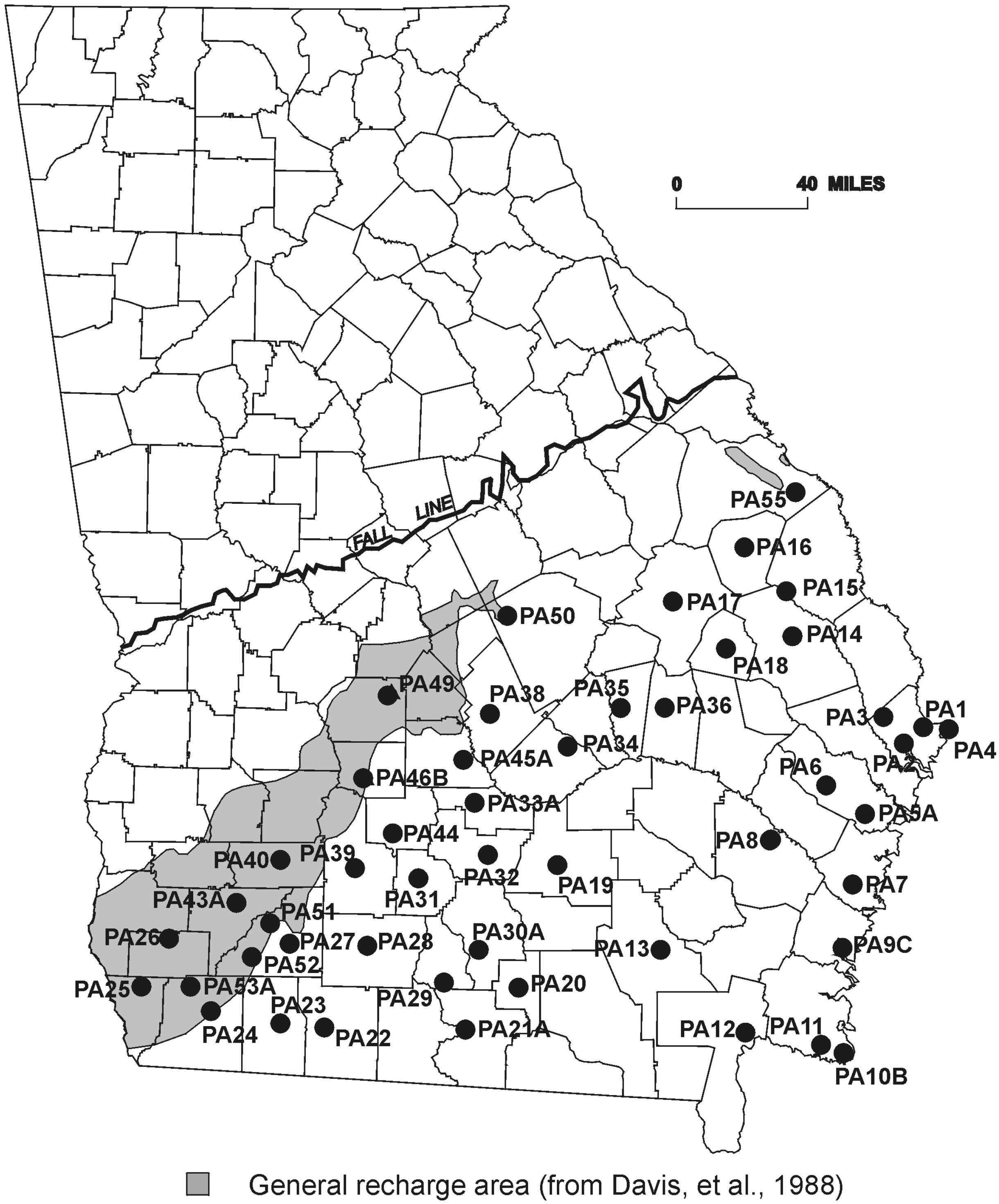


Figure 3-12 Locations of Stations Monitoring the Floridan Aquifer System

for 49 stations and all were basic. Conductivities ranged from 130 uS/cm to 1160 uS/cm. Most of the wells yielding water with higher conductivity are deeper ones located along the coast. Table A-8 lists analytical results for the Floridan wells.

Five wells -- GWN-PA1, GWN-PA14, GWN-PA17, GWN-PA25, and GWN-PA33A -- yielded samples indicating pollution by trihalomethane compounds. The levels of these compounds did not exceed the Primary MCL for total trihalomethanes (100 ppb) for any of the wells. Chloroform and other trihalomethanes may arise from the reflux of treated water into the well bore, allowing disinfectants in the treated water to react with organic matter naturally present in the raw water. No other VOCs were detected.

Detectable nitrate/nitrite concentrations occurred in samples from 22 stations, with the high concentration being 4.4 ppm as nitrogen. Most of the wells yielding water with the highest nitrate/nitrite contents are located in the Dougherty Plain. Figure 3-13 shows trends in nitrate/nitrite levels for four selected Floridan wells.

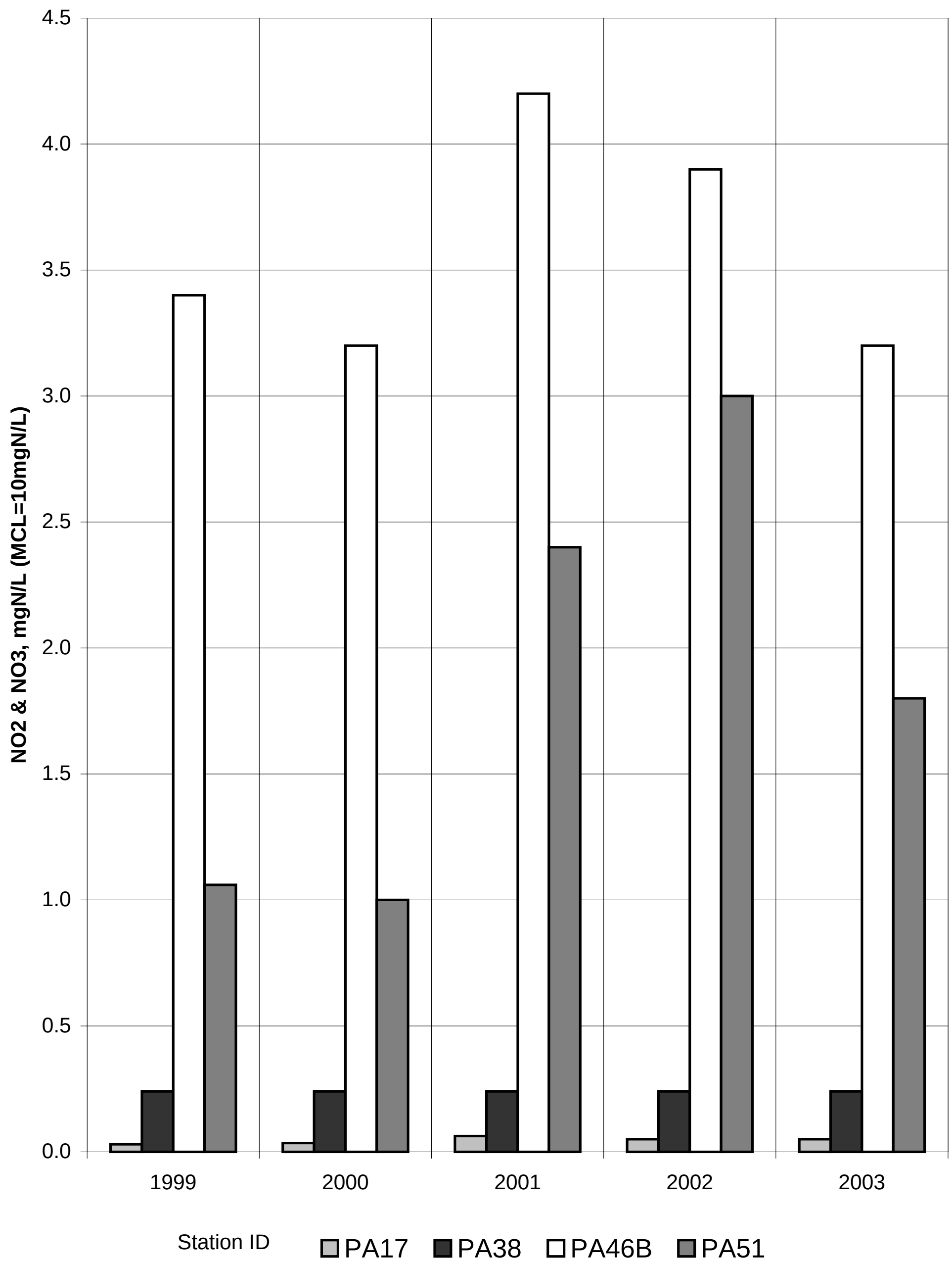
3.8 MIOCENE AQUIFER SYSTEM

Much of south-central and southeastern Georgia lies within outcrop areas of the Miocene Altamaha Formation and Hawthorn Group (according to Weems and Edwards (2001), the term "Hawthorn" has precedence over "Hawthorne"). Discontinuous lens-shaped bodies of sand, 50 to 80 feet thick, are the main permeable units. Miocene clays and sandy clays are thickest, more than 500 feet, in Wayne County (Watson, 1982).

Areas of confinement exist in the coastal counties. Leakage from overlying surface aquifers into the Miocene aquifer system and, in some areas, from the underlying Floridan aquifer system is significant in the coastal counties (Watson, 1982). Here, two principal aquifer units are present (Joiner, et al., 1988). Clarke et al. (1990) use the names upper and lower Brunswick aquifers to refer to these two sandy aquifer units. Weems and Edwards (2001) refer the Marks Head Formation and the Tybee Phosphorite Member of the Coosawhatchie Formation to the upper Brunswick and the Tiger Leap Formation to the lower Brunswick. These workers include aquifers in the uppermost Miocene Ebenezer Formation among the surface aquifers.

EPD collected six water samples from six wells to monitor water quality in the Miocene aquifer system (Figure 3-14). The pH of the samples ranged from 3.69 to 7.63, with five stations producing acidic water. Conductivities ranged from 58 uS/cm to 160 uS/cm. Table A-9 lists analytical results for Miocene samples.

Nitrate/nitrite data are available for all six stations. Concentrations ranged from undetected to 14 ppm as nitrogen. Two wells, GWN-MI9A and GWN-MI15 produced samples with concentrations in excess of the Primary MCL of 10 ppm as nitrogen. The first well is used as a garden well and the second for household water supply. One other well, GWN-MI5, a household water supply well, gave a sample with an elevated nitrate/nitrite concentration. Wells GWN-MI9A and GWN-MI15 lie near row crop fields,



Nitrate/nitrite levels below the detection limit are assigned a value of 0.01 ppm. A missing bar indicates that samples were not available for that year.

Figure 3-13 Nitrate/Nitrite Concentrations for Selected Wells in the Floridan Aquifer System

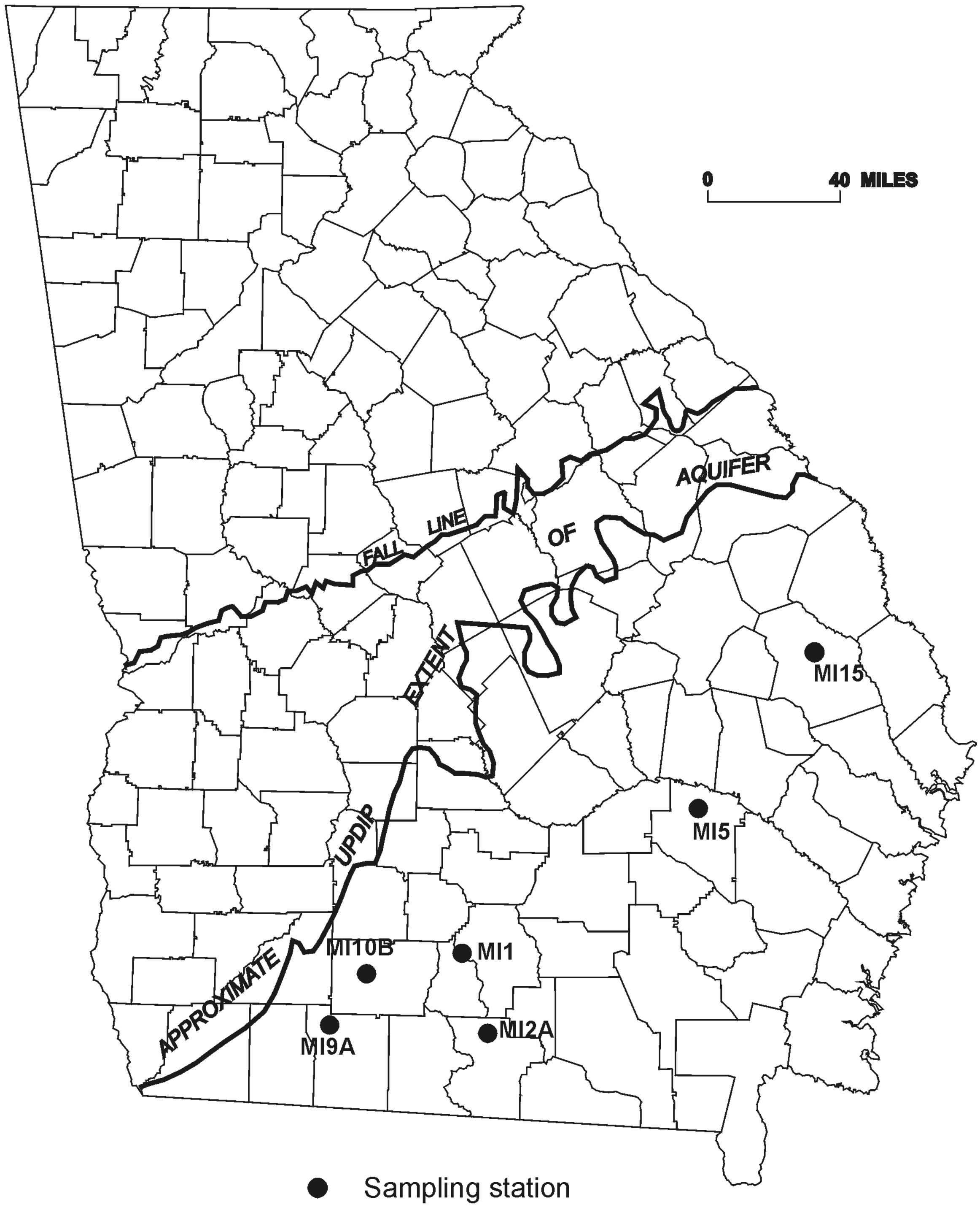


Figure 3-14 Locations of Stations Monitoring the Miocene Aquifer System

while well GWN-MI5 is located near an animal enclosure. Figure 3-15 illustrates trends in nitrate/nitrite concentrations for selected wells drawing from the Miocene aquifer system. VOC tests were performed for all six samples and none contained detectable VOCs (including MTBE).

3.9 PIEDMONT/BLUE RIDGE UNCONFINED AQUIFERS

Georgia's Piedmont and Blue Ridge Physiographic Provinces are developed on metamorphic and igneous rocks that are predominantly Precambrian and Paleozoic in age. Soil and saprolite horizons and fractures, joints, and openings along compositional layer contacts in the rocks are the major water-bearing features. Khallouf and Williams (2003) noted the solution enlargement of compositional layer fractures, which enhances their water-bearing capacity. The density of, size of and interconnection among the various void spaces provide the primary controls on the rate of water flow into wells completed in crystalline rocks. The permeability and thickness of soils and saprolite horizons determine the amount of well yield that can be sustained.

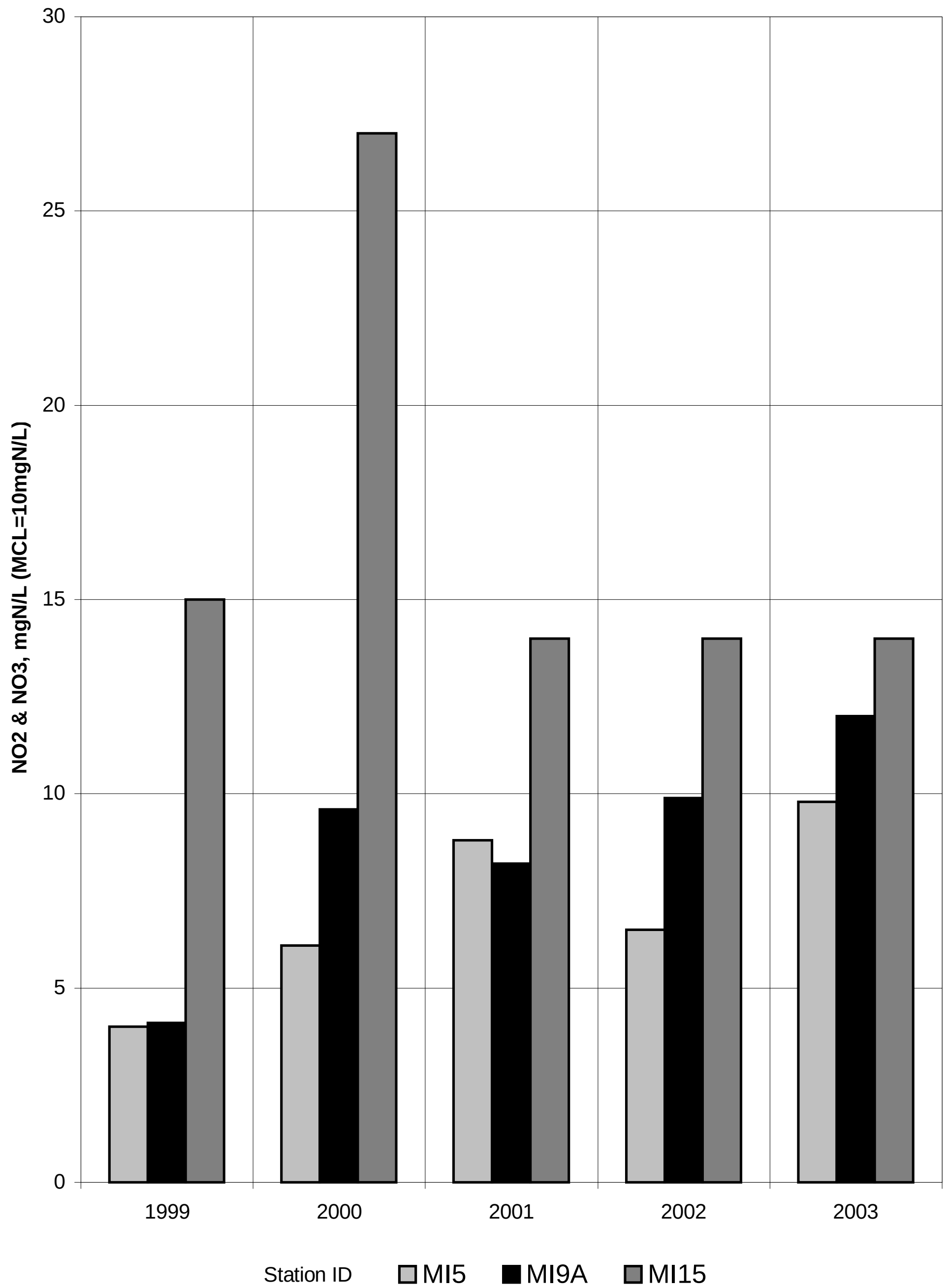
EPD collected 22 samples from seventeen wells and four springs to monitor water quality in the Piedmont/Blue Ridge unconfined aquifers. Figure 3-16 shows the locations of the monitoring stations. The pH of the water samples ranged from 4.40 to 7.87, with the majority of the stations yielding slightly acidic water. Conductivities ranged from 11 uS/cm to 379 uS/cm.

All samples were tested for nitrate/nitrite and for VOCs (including MTBE). Because of a history of high fluoride concentrations at station GWN-P12A, the sample from that station also was analyzed for inorganic anions. Nitrate/nitrite concentrations ranged from undetectable to 1.8 ppm as nitrogen (the Primary MCL is 10 ppm as nitrogen). Figures 3-17 and 3-18 show nitrite/ nitrate concentrations in selected stations from the Piedmont and Blue Ridge sectors, respectively. An analytical summary for the Piedmont/Blue Ridge sampling stations appears in Table A-10.

Samples from two wells and two springs contained VOCs. MTBE occurred in samples from two wells, GWN-P1 and GWN-P15A and one spring, GWN-P18. Chloroform was present in a sample from spring GWN-P13A, at a level considerably below the Primary MCL (100 ppb total trihalomethanes). Trichloroethylene exceeded the Primary MCL of 5 ppb in the sample from well GWN-P1.

Trihalomethanes may originate when treated water leaks back into a well, allowing disinfectants in the treated water to react with organic matter naturally present in raw water. The source of the chloroform in spring GWN-P13A is problematical as no apparent attempt is made to treat the water.

The fluoride content of the sample from spring GWN-P12A exceeded the Primary MCL of 4 ppm. The source of the fluoride in spring GWN-P12A is almost certainly natural.



A missing bar indicates that samples were not collected for that year.

Figure 3-15 Nitrate/Nitrite Concentrations for Selected Wells in the Miocene Aquifer System

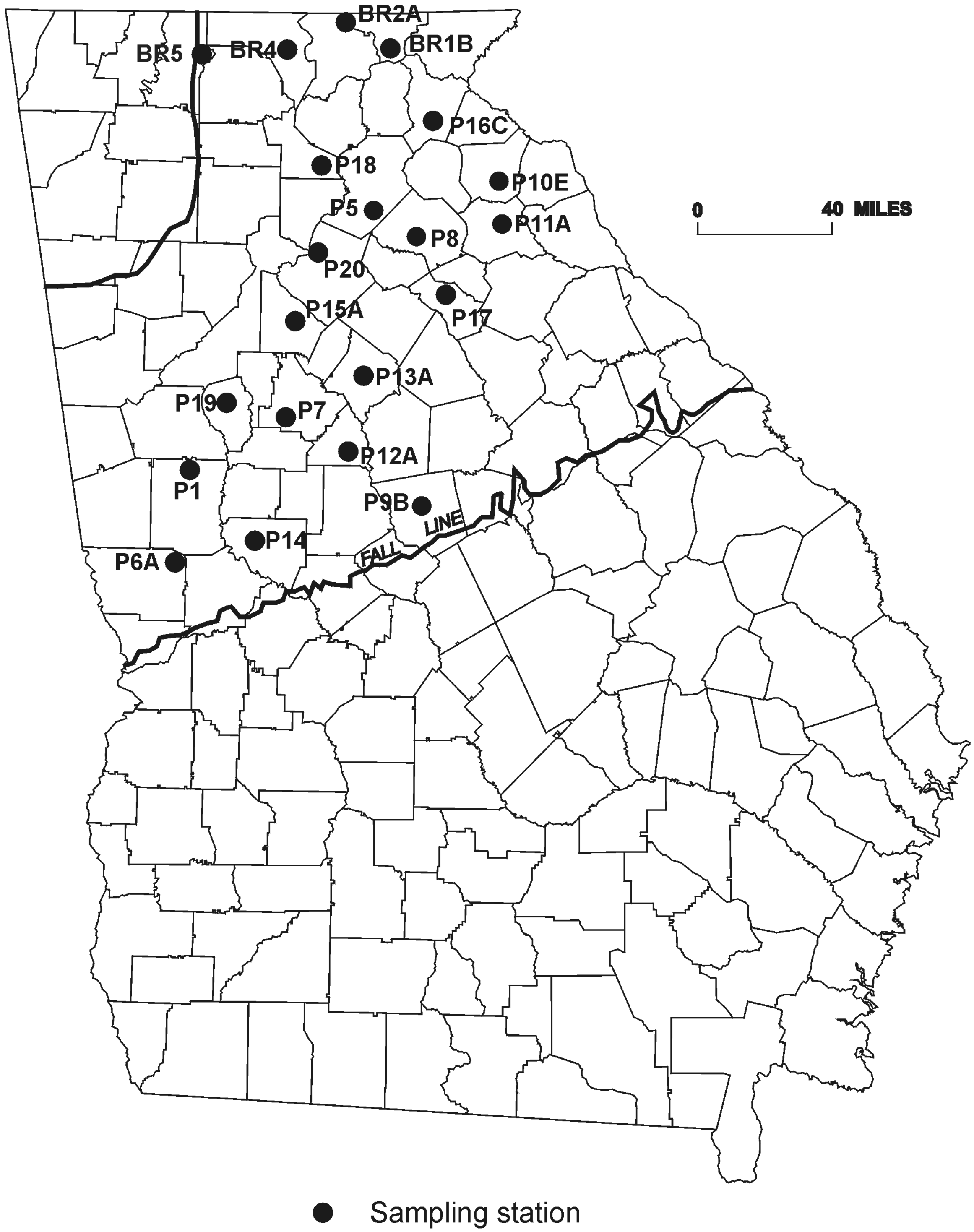
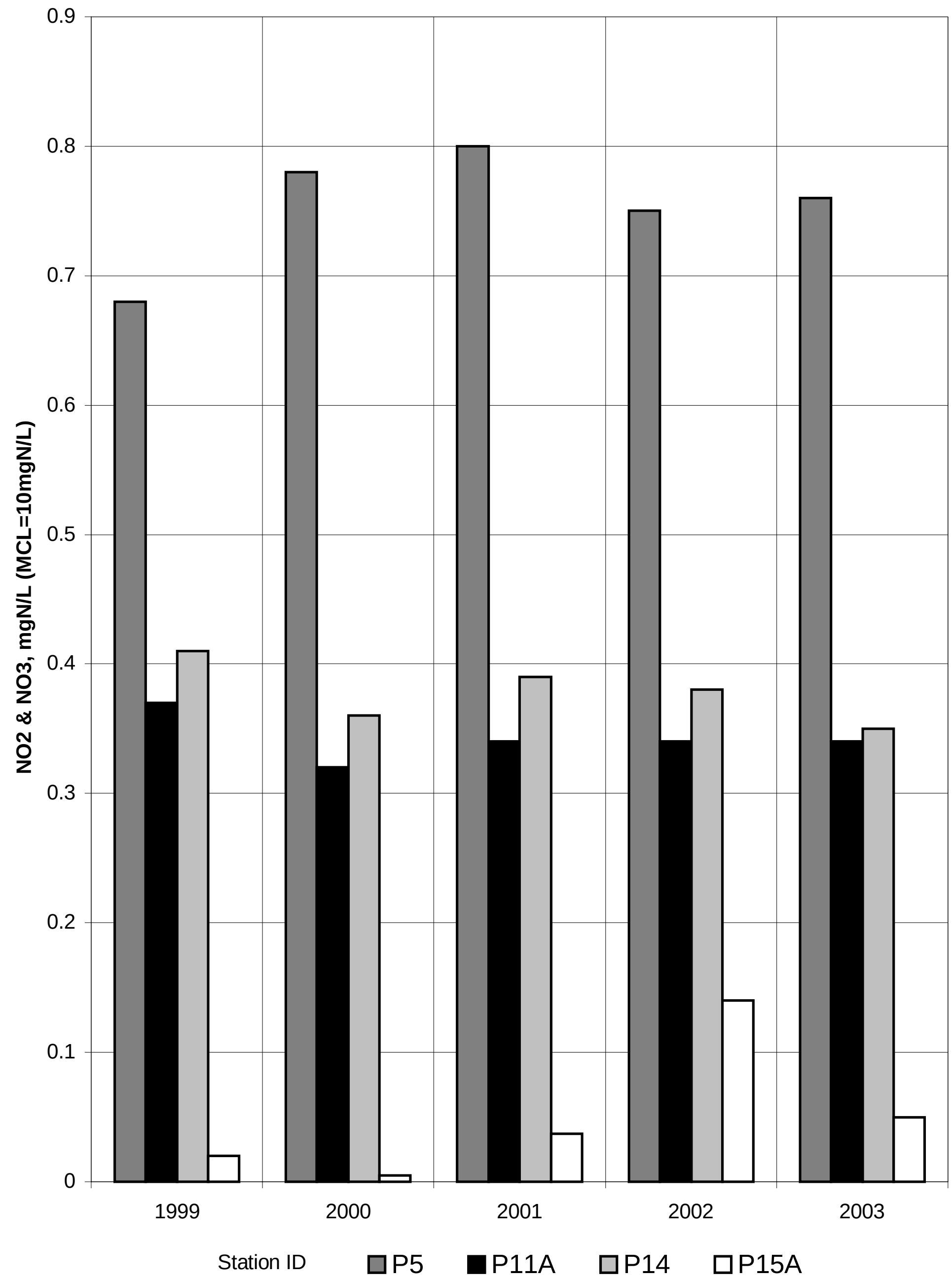
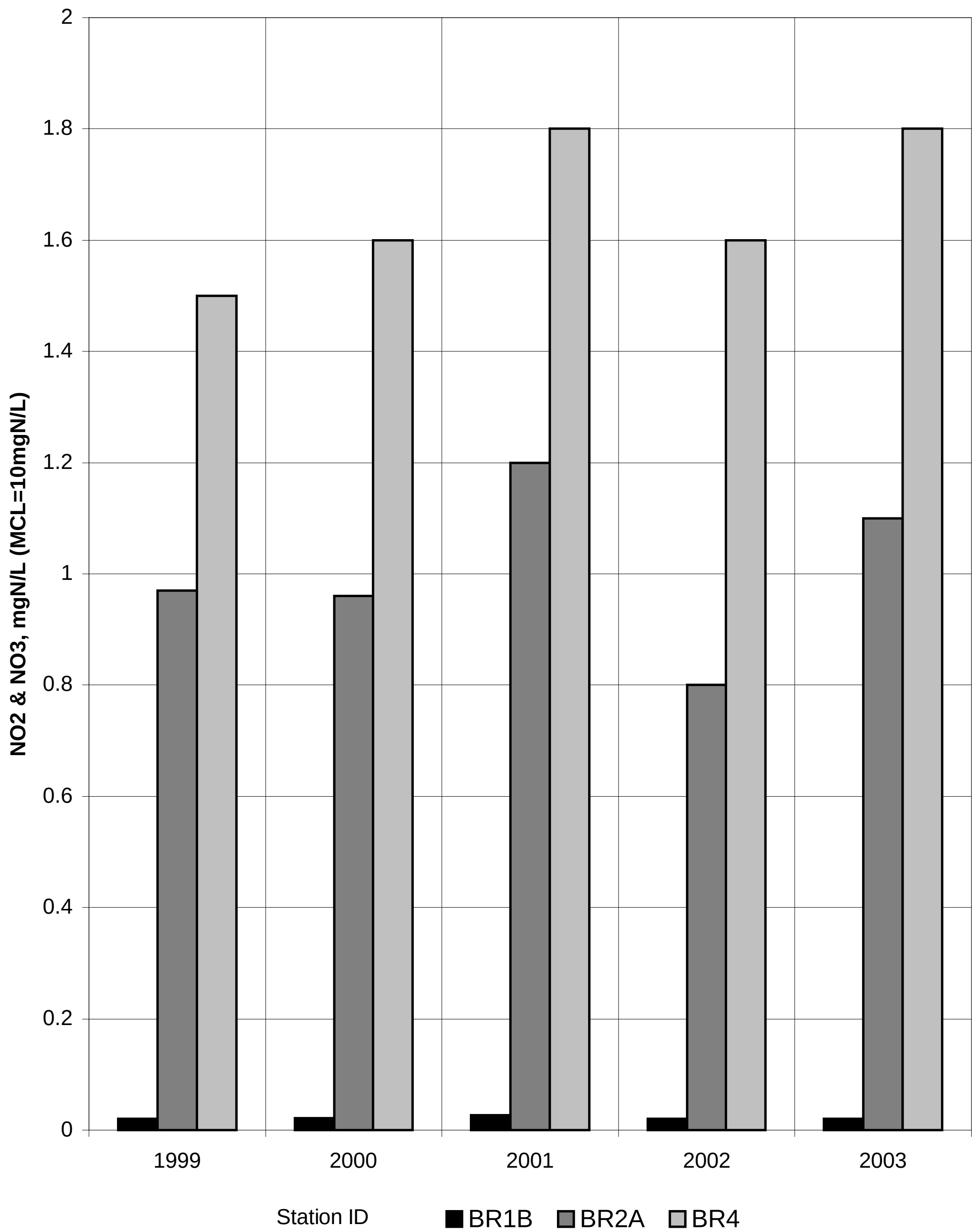


Figure 3-16 Locations of Stations Monitoring the Piedmont/Blue Ridge Unconfined Aquifers



Nitrate/nitrite levels below the detection limit are assigned a value of 0.005 ppm. A missing bar indicates that samples were not collected for that year.

Figure 3-17 Nitrate/Nitrite Concentrations for Selected Wells in the Piedmont/Blue Ridge Unconfined Aquifer: Piedmont Sector



Nitrate/nitrite levels below the detection limit are assigned a value of 0.005 ppm. A missing bar indicates that samples were not collected for that year.

Figure 3-18 Nitrate/Nitrite Concentrations for Selected Wells in the Piedmont/Blue Ridge Unconfined Aquifers: Blue Ridge Sector

Well GWN-P17, a public supply well, yielded water that was milky because of fine gas bubbles, a condition that caused complaints from some water system customers. The composition of the gas is unknown.

3.10 VALLEY AND RIDGE UNCONFINED AQUIFERS

Soil and residuum form low-yield unconfined aquifers across most of the Valley and Ridge Province of northwestern Georgia. Valley bottoms underlain by dolostones and limestones of the Cambro-Ordovician Knox Group are the locations of most higher-yielding wells and springs that are suitable for municipal supplies.

Four wells and five springs were used to monitor the water quality in the Valley and Ridge unconfined aquifers (Figure 3-19). Three of the wells and four springs produced water from Knox Group carbonates. Spring GWN-VR10 derives water from the Cambrian Conasauga Group, while well GWN-VR6 taps the Cambrian Shady Dolomite.

Sample pHs were mostly basic and ranged from 6.89 to 7.50. Conductivities ranged from 155 uS to 256 uS. All samples were tested for nitrate/nitrite and for VOCs (including MTBE).

Nitrate/nitrite ranged from 0.62 ppm to 3.4 ppm as nitrogen. Figure 3-20 shows nitrite/nitrate levels for three selected sampling stations in the Valley and Ridge aquifers. VOCs were present in samples from two stations. One of these, spring GWN-VR8, located near a commercial area, provided a sample containing low levels of MTBE and benzene. The spring has intermittently experienced contamination from motor fuel components in the past. Another, well GWN-VR6, gave a sample containing 1,1-dichloroethylene and tetrachloroethylene. The well is located in an industrial area and has, in the past, provided samples contaminated with chlorinated aliphatic compounds. None of the volatile organic compounds exceeded the Primary MCLs. Table A-11 presents the analytical summary for the wells and springs located in the Valley and Ridge unconfined aquifers.

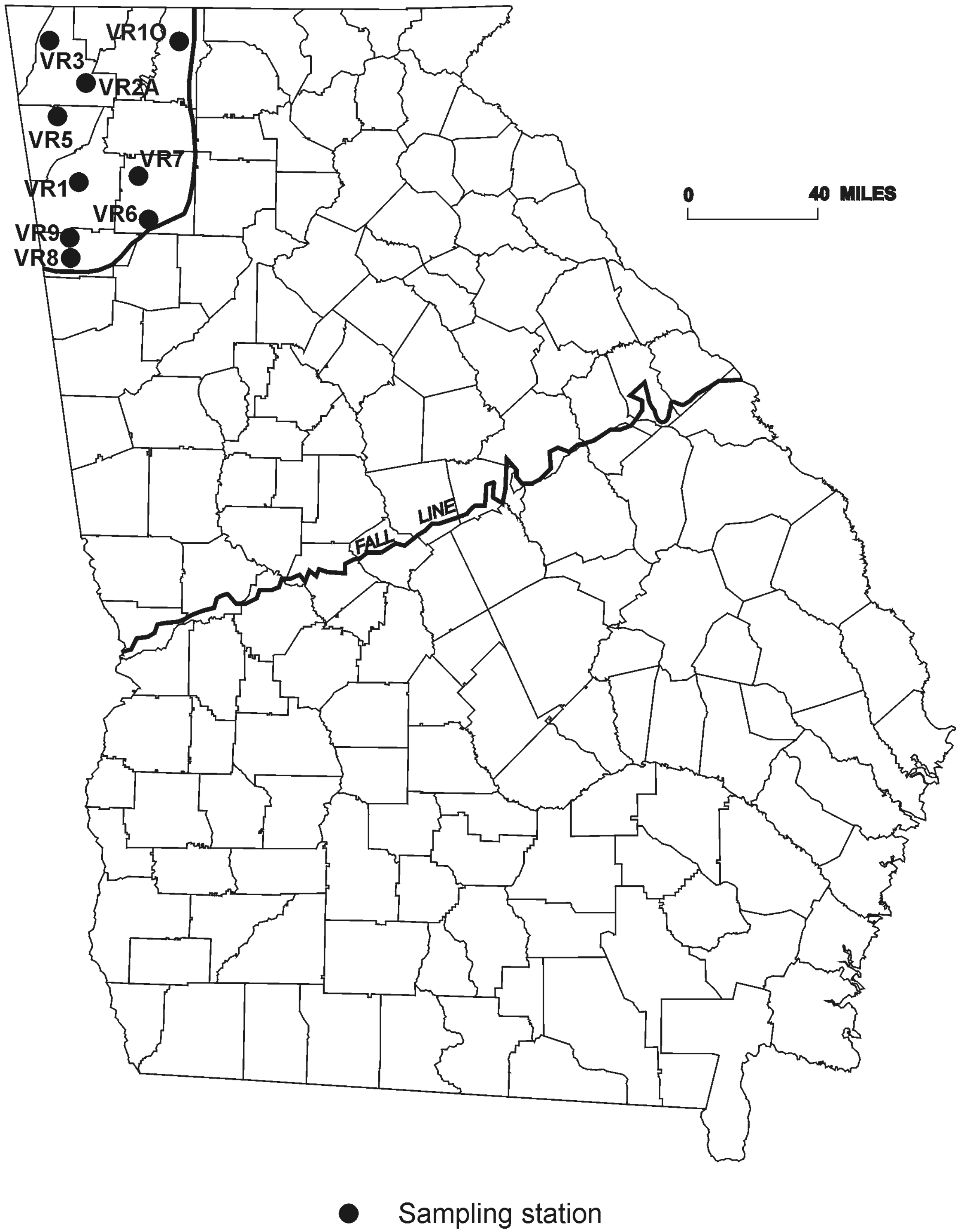
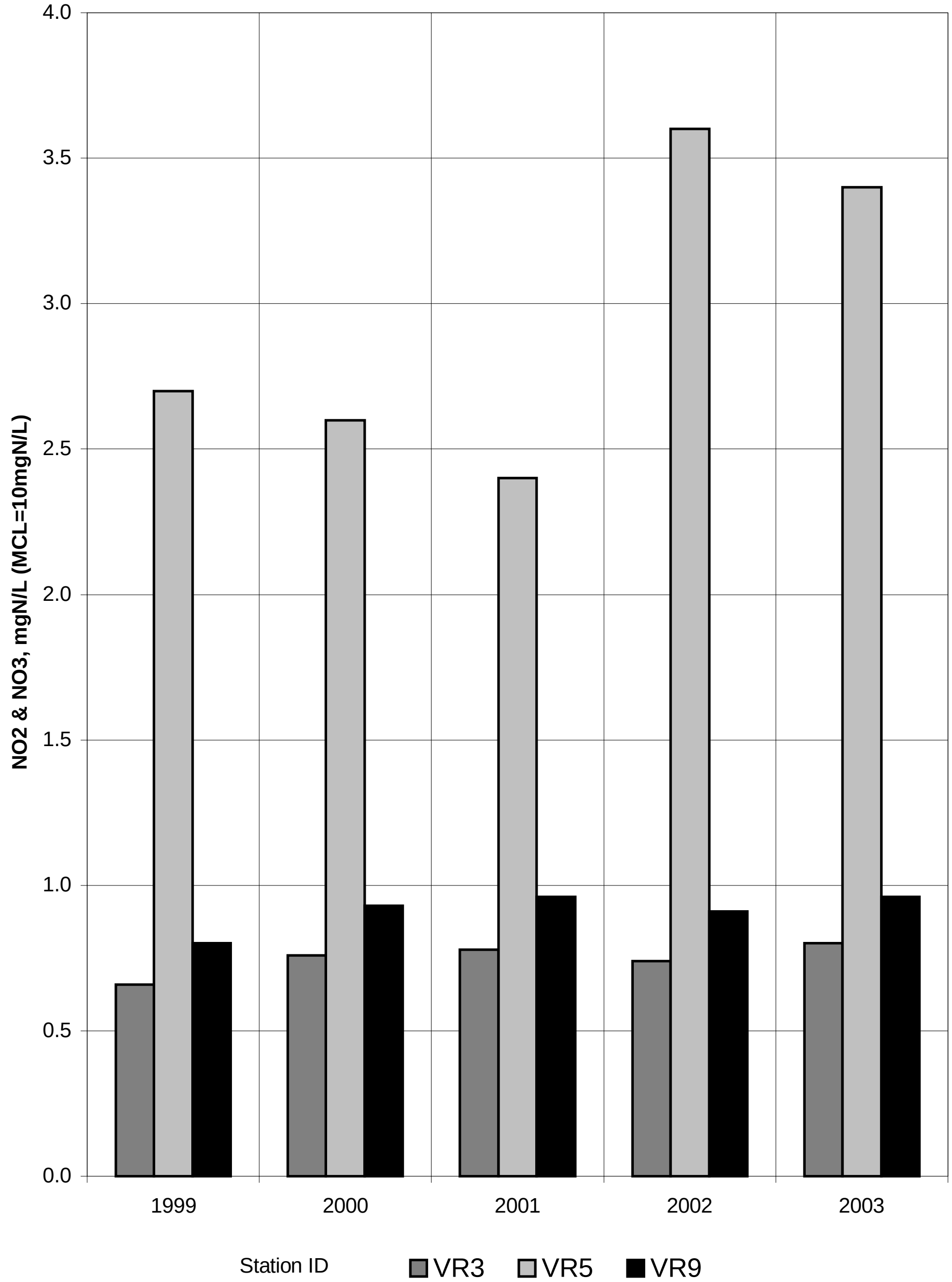


Figure 3-19 Locations of Stations Monitoring the Valley and Ridge Unconfined Aquifers



A missing bar indicates that samples were not collected for that year.

Figure 3-20 Nitrate/Nitrite Concentrations for Selected Wells and Springs in the Valley and Ridge Unconfined Aquifers

CHAPTER 4 SUMMARY AND CONCLUSIONS

EPD personnel collected 132 water samples from 115 wells and nine springs on the Ground-Water Monitoring Network during the period January 2003 through January 2004 for volatile organic and limited inorganic analysis. These wells and springs monitor the water quality of nine aquifer systems in Georgia:

- Cretaceous aquifer system
- Providence aquifer system
- Clayton aquifer system
- Claiborne aquifer system
- Jacksonian aquifer system
- Floridan aquifer system
- Miocene aquifer system
- Piedmont/Blue Ridge unconfined aquifers
- Valley and Ridge unconfined aquifers

Comparisons of analyses of water samples collected during the period January 2003 through January 2004 were made with analyses for the Ground-Water Monitoring Network dating back to 1984, permitting the recognition of temporal trends. Table 4-1 lists the contaminants and pollutants detected at stations of the Ground-Water Monitoring Network during 2003-2004. Although isolated water quality problems existed at specific localities, the quality of water from most of the Ground-Water Monitoring Network stations remains excellent.

Nitrates/nitrites are the most common substances present in ground water in Georgia that can have adverse health effects. Two wells (GWN-MI15 and GWN-MI9A), both shallow domestic wells tapping the Miocene aquifer system, yielded water samples with nitrate/nitrite concentrations exceeding the Primary MCL of 10 ppm as nitrogen (Table 4-1). Samples from four other wells (GWN-CL4A, GWN-CT7A, GWN-J8 and GWN-MI5) also had nitrate/nitrite levels that were elevated, though concentrations did not exceed the Primary MCL. Well GWN-CL4A is a public supply well, while the remainder are domestic wells. All are relatively shallow. Wells GWN-MI5 and GWN-CT7A are located near animal enclosures. Wells GWN-CL4A, GWN-J8, GWN-MI9A, and GWN-MI15 are located near row crop fields. The nitrate/nitrite level for well GWN-CT7A seems to depend on whether or not the nearby animal enclosure is occupied. The level was elevated in 1999, 2001, and 2002 when the enclosure was occupied and was depressed in 2000 when the enclosure was vacant (for 2003, no animals were present during the sampling visit). All well or spring owners receive copies of analytical results.

Spatial and temporal limitations of the Ground-Water Monitoring Network preclude the identification of exact sources of increased levels of nitrogen compounds in some of Georgia's ground water. Nitrate/nitrite originates in ground water from direct sources and through oxidation of other forms of dissolved nitrogen deriving from both natural

Table 4-1. Pollution and Contamination Incidents, January 2003 through January 2004.

Station	Contaminant/Pollutant	MCL	Year Sampled
GWN-K1	TCE=1.8 ppb	TCE=5 ppb (1st MCL)	2003
GWN-K5	TCE=2.9 ppb	TCE=5 ppb (1st MCL)	2003
GWN-K16	chloroform=1.3 ppb	total trihalomethanes=100 ppb (1st MCL)	2003
GWN-PD6	chloroform=4.3 ppb dichloromethane=1.4 ppb	total trihalomethanes=100 ppb (1st MCL) dichloromethane=5 ppb (1st MCL)	2003
GWN-PA1	bromodichloromethane=0.71 ppb chlorodibromomethane=1.1 ppb	total trihalomethanes=100 ppb (1st MCL) total trihalomethanes=100 ppb (1st MCL)	2003
GWN-PA14	chloroform =3.7 ppb bromodichloromethane=1.8 ppb chlorodibromomethane=1.2 ppb	total trihalomethanes=100 ppb (1st MCL) total trihalomethanes=100 ppb (1st MCL) total trihalomethanes=100 ppb (1st MCL)	2003
GWN-PA17	chloroform=0.69 ppb	total trihalomethanes=100 ppb (1st MCL)	2003
GWN-PA25	chloroform =0.50 ppb	total trihalomethanes=100 ppb (1st MCL)	2003
GWN-PA25	chloroform =0.51 ppb	total trihalomethanes=80 ppb (1st MCL)	2004*
GWN-PA33A	chloroform =0.72 ppb	total trihalomethanes=100 ppb (1st MCL)	2003
GWN-PA33A	chloroform =0.57 ppb	total trihalomethanes=80 ppb (1st MCL)	2004*
GWN-MI9A	NO_x =12 ppm	NO_x =10 ppm (1st MCL)	2003
GWN-MI15	NO_x =14 ppm	NO_x =10 ppm (1st MCL)	2003
GWN-P1	TCE=8.6 ppb MTBE=6.8 ppb	TCE=5 ppb (1st MCL) (none)	2003
GWN-P12A	F^-=5.8 ppm	F^-=4 ppm (1st MCL)	2003
GWN-P13A	chloroform =0.61 ppb	total trihalomethanes=100 ppb (1st MCL)	2003
GWN-P15A	MTBE=0.87 ppb	(none)	2003
GWN-P18	MTBE=0.91 ppb	(none)	2003
GWN-VR6	PCE=3.0 ppb 1,1-dichloroethylene=2.8 ppb	PCE=5 ppb (1st MCL) 1,1-dichloroethylene=7 ppb (1st MCL)	2003
GWN-VR8	benzene=0.85 ppb MTBE=2.8 ppb	benzene=5 ppb (1st MCL) (none)	2003

Notes:

F^- = Fluoride
NO_x = Nitrate/Nitrite
MTBE = Methyl tert-butyl ether
TCE = Trichloroethylene
PCE = Tetrachloroethylene
1st MCL= Primary MCL
***** Primary MCL for total trihalomethanes changed from 100 ppb to 80 ppb on January 1, 2004.

and manmade sources. The most common sources of manmade dissolved nitrogen in Georgia usually consist of septic systems, agricultural wastes, and storage or application of fertilizers (Robertson, et. al., 1993). Dissolved nitrogen also is present in rainwater and can be derived from terrestrial vegetation and volatilization of fertilizers (Drever, 1988). The conversion of other nitrogen species to nitrate occurs in aerobic environments such as recharge areas. Anaerobic conditions in ground water, which commonly develop along the flow path of ground water, foster the denitrification process. However, the lack of denitrifying bacteria in ground water may inhibit this process (Freeze and Cherry, 1979).

Volatile organic compounds were detected in samples from fifteen stations. MTBE was detected in samples from two wells (GWN-P1 and GWN-P15A) and two springs (GWN-P18 and GWN-VR8). All four of these stations are located in or near built-up areas.

Samples from seven wells and one spring contained low levels of trihalomethanes. For wells GWN-K16, GWN-PD6, GWN-PA1, GWN-PA14, GWN-PA17, GWN-PA25 and GWN-PA33A, the trihalomethanes probably originated from the reflux of treated water down the well bores. The halogens from disinfectants in the water then react with naturally occurring dissolved organic matter to form trihalomethanes. The reason for the presence of the trihalomethane, chloroform, in spring GWN-P13A is not clear. Well GWN-PD6 also contained dichloromethane, a possible disinfectant byproduct, though not a trihalomethane.

Samples from four wells were contaminated with chlorinated ethane and ethylene compounds. The level of trichloroethylene for well GWN-P1 exceeded the Primary MCL. Three wells (GWN-K1, GWN-K5, and GWN-VR6) are located in industrial settings. One well (GWN-P1) is located near a built-up area.

Spring GWN-VR8 was the only station to produce a sample contaminated with a BTEX (benzene, toluene, ethylbenzene, xylenes, and related compounds) compound, an amount of benzene below the Primary MCL. The spring is a public water source located near a commercial area and has a history of intermittent low-level contamination by motor fuel components.

Fluoride exceeded the Primary MCL (4 ppm) in the sample from spring GWN-P12A, which is located in the Piedmont and has previously provided samples containing excessive fluoride. A sign placed near the spring advises against consuming the water. The source of the fluoride is almost certainly natural.

Measurements of pH at some stations within or near Cretaceous recharge areas underwent an apparent decline of 0.8 units or more in 2003 versus 2002. The cause of this is uncertain but may be related to the end of the recent drought.

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APPENDIX

Laboratory Data

LABORATORY DATA

The standard testing regimen for all samples collected for the Ground-Water Monitoring Network consisted of laboratory analyses for volatile organic compounds and nitrate/nitrite and of field measurements of pH and conductivity. Optional tests were carried out at three stations (GWN-J7, GWN-J8, GWN-P12A) for additional substances.

Except for fluoride analysis, USEPA has set forth a series of (serially numbered) analytical methods officially recognized as suitable for environmental purposes. For fluoride analysis, USEPA defers to the method listed in Standard Methods for the Examination of Water and Wastewater (American Public Health Association et al., 1995). The EPD laboratory cites USEPA method numbers and the Standard Methods… method number along with analysis results, and Tables A-1 and A-2 list the method numbers appropriate to the various analytes.

Tables A-3 through A-11 regularly list results for the following parameters: pH, conductivity, nitrate/nitrite, trihalomethanes, MTBE, benzene, toluene, ethylbenzene, and total xylenes. Other VOCs are listed if detected. Owing to the intermittent detection of beryllium in the past (Primary MCL is 4 ppb), results for station GWN-J8 also list metals. Results for station GWN-P12A, which has a history of excessive fluoride, (Primary MCL is 4 ppm) list substances amenable to EPA method 300.0 and Standard Methods… method 4500-F-E -- fluoride, chloride, and sulfate. Results for station GWN-J7 list organochlorine pesticides, which were analyzed per request of the well operator. The abbreviation "ppm", where used in a nitrate/nitrite entry in these tables, is understood to mean parts per million as nitrogen.

For this appendix, the following abbreviations are used:

su	= standard units
mg/L	= milligrams per liter (parts per million)
ppm	= parts per million
ug/L	= micrograms per liter (parts per billion)
ppb	= parts per billion
uS/cm	= microsiemens/centimeter
nd	= not detected
--	= not analyzed
rl	= reporting limit

Note:

The reporting limit (rl) for the same substance can vary among different laboratories and can vary for a single laboratory if a sample is diluted to lower the concentration of interfering substances, or if the array of standards used to develop the reporting limit is revised.

Table A-1. Standard Water Quality Analyses: Anions, Volatile Organic Compounds, and Other Parameters.

ANIONS			
Parameter	**Test Method**	**Typical Reporting Limit**	**Primary Maximum Contaminant Level**
Nitrate/Nitrite (NOx)	EPA 353.2	0.02 mg/L as N	10 mg/L as N

VOLATILE ORGANIC COMPOUNDS			
Parameter	**Type of Test**	**Reporting Limit**	**Primary Maximum Contaminant Level**
Vinyl Chloride	EPA 524.2	0.5 ug/L	2.0 ug/L
1,1-Dichloroethylene	EPA 524.2	0.5 ug/L	7.0 ug/L
Dichloromethane	EPA 524.2	0.5 ug/L	5.0 ug/L
Trans-1,2-Dichloroethylene	EPA 524.2	0.5 ug/L	100 ug/L
Cis-1,2-Dichloroethylene	EPA 524.2	0.5 ug/L	70.0 ug/L
1,1,1-Trichloroethane	EPA 524.2	0.5 ug/L	200 ug/L
Carbon Tetrachloride	EPA 524.2	0.5 ug/L	5.0 ug/L
Benzene	EPA 524.2	0.5 ug/L	5.0 ug/L
1,2-Dichloroethane	EPA 524.2	0.5 ug/L	5.0 ug/L
Trichloroethylene	EPA 524.2	0.5 ug/L	5.0 ug/L
1,2-Dichloropropane	EPA 524.2	0.5 ug/L	5.0 ug/L
Toluene	EPA 524.2	0.5 ug/L	1000 ug/L
1,1,2-Trichloroethane	EPA 524.2	0.5 ug/L	5.0 ug/L
Tetrachloroethylene	EPA 524.2	0.5 ug/L	5.0 ug/L
Chlorobenzene	EPA 524.2	0.5 ug/L	100 ug/L
Ethylbenzene	EPA 524.2	0.5 ug/L	700 ug/L
Total Xylenes	EPA 524.2	0.5 ug/L	10,000 ug/L

Table A-1 (Continued). Standard Water Quality Analyses: Anions, Volatile Organic Compounds, and Other Parameters.

VOLATILE ORGANIC COMPOUNDS			
Parameter	**Type of Test**	**Reporting Limit**	**Primary Maximum Contaminant Level**
Styrene	EPA 524.2	0.5 ug/L	100 ug/L
1,4-Dichlorobenzene (P)	EPA 524.2	0.5 ug/L	75.0 ug/L
1,2-Dichlorobenzene (O)	EPA 524.2	0.5 ug/L	600 ug/L
1,2,4-Trichlorobenzene	EPA 524.2	0.5 ug/L	70.0 ug/L
Dichlorodifluoro-methane	EPA 524.2	0.5 ug/L	None
Chloromethane	EPA 524.2	0.5 ug/L	None
Bromomethane	EPA 524.2	0.5 ug/L	None
Chloroethane	EPA 524.2	0.5 ug/L	None
Trichlorofluoro-methane	EPA 524.2	0.5 ug/L	None
1,1-Dichloroethane	EPA 524.2	0.5 ug/L	None
2,2-Dichloropropane	EPA 524.2	0.5 ug/L	None
Bromochloro-methane	EPA 524.2	0.5 ug/L	None
Chloroform	EPA 524.2	0.5 ug/L	100 ug/L, 80 ug/L *
1,1-Dichloropropylene	EPA 524.2	0.5 ug/L	None
Dibromomethane	EPA 524.2	0.5 ug/L	None
Bromodichloro-methane	EPA 524.2	0.5 ug/L	100 ug/L, 80 ug/L *
Cis-1,3-Dichloropropylene	EPA 524.2	0.5 ug/L	None
Trans-1,3-Dichloropropylene	EPA 524.2	0.5 ug/L	None
1,3-Dichloropropane	EPA 524.2	0.5 ug/L	None
Dibromochloro-methane	EPA 524.2	0.5 ug/L	100 ug/L, 80 ug/L *

Table A-1 (Continued). Standard Water Quality Analyses: Anions, Volatile Organic Compounds, and Other Parameters.

VOLATILE ORGANIC COMPOUNDS			
Parameter	**Type of Test**	**Reporting Limit**	**Primary Maximum Contaminant Level**
1,2-Dibromoethane	EPA 524.2	0.5 ug/L	None
1,1,1,2-Tetrachloroethane	EPA 524.2	0.5 ug/L	None
Bromoform	EPA 524.2	0.5 ug/L	100 ug/L, 80 ug/L *
Isopropylbenzene	EPA 524.2	0.5 ug/L	None
1,1,2,2,-Tetra-chloroethane	EPA 524.2	0.5 ug/L	None
Bromobenzene	EPA 524.2	0.5 ug/L	None
1,2,3-Trichloropropane	EPA 524.2	0.5 ug/L	None
N-Propylbenzene	EPA 524.2	0.5 ug/L	None
2-Chlorotoluene (O)	EPA 524.2	0.5 ug/L	None
1,3,5-Trimethylbenzene	EPA 524.2	0.5 ug/L	None
4-Chlorotoluene (P)	EPA 524.2	0.5 ug/L	None
Tert-Butylbenzene	EPA 524.2	0.5 ug/L	None
1,2,4-Trimethylbenzene	EPA 524.2	0.5 ug/L	None
Sec-Butylbenzene	EPA 524.2	0.5 ug/L	None
P-Isopropyltoluene	EPA 524.2	0.5 ug/L	None
1,3-Dichlorobenzene (M)	EPA 524.2	0.5 ug/L	None
N-Butylbenzene	EPA 524.2	0.5 ug/L	None
1,2-Dibromo-3-Chloropropane	EPA 524.2	0.5 ug/L	0.2 ug/L
Hexachlorobutadi-ene	EPA 524.2	0.5 ug/L	None
Naphthalene	EPA 524.2	0.5 ug/L	None

Table A-1 (Continued). Standard Water Quality Analyses: Anions, Volatile Organic Compounds, and Other Parameters.

VOLATILE ORGANIC COMPOUNDS			
Parameter	**Type of Test**	**Reporting Limit**	**Primary Maximum Contaminant Level**
1,2,3-Trichlorobenzene	EPA 524.2	0.5 ug/L	None
Methyl Tert-butyl Ether	EPA 524.2	0.5 ug/L	None

OTHER PARAMETERS**		
Parameter	**Units**	**Maximum Contaminant Level**
pH	0.01 su	None
Conductivity	1.0 uS	None

Notes:

Primary MCL's from Georgia Rules for Safe Drinking Water, as amended December 10, 2002 (EPD, 2002).

* Indicates a trihalomethane compound. The Primary MCL for total trihalomethanes is 100 ug/L until January 1, 2004, when it decreases to 80 ug/L.

**pH and conductivity are measured in the field (see Chapter 2).

Table A-2. Optional Water Quality Analyses: Metals, Anions, and Pesticides.

METALS			
Parameter	**Test Method**	**Reporting Limit**	**Max.Contaminant Level**
Antimony (Sb)	EPA 200.8	5 ug/L	6 ug/L[1]
Arsenic (As)	EPA 200.8	5 ug/L	50 ug/ L[1]**
Barium (Ba)	EPA 200.8	1 ug/L	2000 ug/L[1]
Beryllium (Be)	EPA 200.8	1 ug/L	4 ug/L[1]
Cadmium (Cd)	EPA 200.8	1 ug/L	5 ug/L[1]
Chromium (Cr)	EPA 200.8	5 ug/L	100 ug/L[1]
Cobalt (Co)	EPA 200.7	5 ug/L	None
Copper (Cu)	EPA 200.8	5 ug/L	1000 ug/L[2]
Lead (Pb)	EPA 200.8	1 ug/L	None
Nickel (Ni)	EPA 200.8	5 ug/L	100 ug/L[1]
Selenium (Se)	EPA 200.8	5 ug/L	50 ug/L[1]
Silver (Ag)	EPA 200.8	5 ug/L	100 ug/L[2]
Thallium (Tl)	EPA 200.8	1 ug/L	2 ug/L[1]
Tin (Sn)	EPA 200.8	10 ug/L	None
Vanadium (V)	EPA 200.7	1 ug/L	None
Zinc (Zn)	EPA 200.8	10 ug/L	5000 ug/L[2]

ANIONS			
Parameter	**Test Method**	**Reporting Limit**	**Max.Contaminant Level**
Chloride (Cl)	EPA 300.0	10 mg/L	250 mg/L[2]
Sulfate (SO_4)	EPA 300.0	10 mg/L	250 mg/L[2]
Fluoride (F)	4500-F-E	5.0 mg/L	4.0 mg/L[1], 2.0 mg/L[2]

Table A-2. (Continued). Optional Water Quality Analyses: Metals, Anions, and Pesticides.

PESTICIDES			
Parameter	**Test Method**	**Reporting Limit**	**Max.Contaminant Level**
Lindane (g-BHC)	EPA 8081A	0.05 ug/L	0.2 ug/ L[1]
a-BHC	EPA 8081A	0.05 ug/L	None
b-BHC	EPA 8081A	0.06 ug/L	None
d-BHC	EPA 8081A	0.15 ug/L	None
Chlordane	EPA 8081A	2.0 ug/L	2.0 ug/ L[1]
4,4-DDD	EPA 8081A	0.10 ug/L	None
4,4-DDE	EPA 8081A	0.05 ug/L	None
4,4-DDT	EPA 8081A	0.06 ug/L	None
Dieldrin	EPA 8081A	0.05 ug/L	None
Endosulfan I	EPA 8081A	0.10 ug/L	None
Endosulfan II	EPA 8081A	0.10 ug/L	None
Endosulfan Sulfate	EPA 8081A	0.10 ug/L	None
Endrin	EPA 8081A	0.10 ug/L	2.0 ug/ L[1]
Endrin Aldehyde	EPA 8081A	0.10 ug/L	None
Heptachlor	EPA 8081A	0.05 ug/L	0.4 ug/ L[1]
Heptachlor Epoxide	EPA 8081A	0.05 ug/L	0.2 ug/ L[1]
Toxaphene	EPA 8081A	2.0 ug/L	3.0 ug/ L[1]
Chlorpyriphos (Dursban)	EPA 8081A	0.10 ug/L	None
Hexachlorobenzene	EPA 8081A	0.05 ug/L	1.0 ug/ L[1]
Methoxychlor	EPA 8081A	0.20 ug/L	40 ug/ L[1]
Mirex	EPA 8081A	0.30 ug/L	None
Aldrin	EPA 8081A	0.05 ug/L	None

Table A-2. (Continued). Optional Water Quality Analyses: Metals, Anions, and Pesticides.

PESTICIDES			
Parameter	**Test Method**	**Reporting Limit**	**Max.Contaminant Level**
gamma-Chlordane	EPA 8081A	0.10 ug/L	see "Chlordane"
alpha-Chlordane	EPA 8081A	0.10 ug/L	see "Chlordane"

Notes:

MCL's from Georgia Rules for Safe Drinking Water, as amended December 10, 2002 (EPD, 2002):

1=Primary Maximum Contaminant Level (MCL).
2=Secondary MCL.

*=USEPA concluded that the originally suggested Secondary MCL of 50 ppb for aluminum would not be a workable one for many water systems. They therefore adopted a range of 50 ppb – 200 ppb and left the establishment of precise limits to the States (see page 3573, Federal Register Vol. 56, No. 20, 1991). Georgia has adopted the range as is.

**=A new Primary MCL of 10 ppb for arsenic was proposed on December 4, 2002, and will become enforceable on January 23, 2006.

Table A-3. 2003-2004 Ground-Water Quality Analyses of the Cretaceous Aquifer System.

GWN-K1			
Well Name:	Englehard Kaolin Company #2		
County:	Wilkinson		
Date Sampled:	04/23/2003		
Nitrate/Nitrite		0.27	ppm
pH		4.05	su
conductivity		70	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds: trichloroethylene		1.8	ppb
Other:			

GWN-K2A			
Well Name:	Irwinton #303		
County:	Wilkinson		
Date Sampled:	04/23/2003		
Nitrate/Nitrite		0.06	ppm
pH		5.53	su
conductivity		63	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K3			
Well Name:	Sandersville #7B		
County:	Washington		
Date Sampled:	04/24/2003		
Nitrate/Nitrite		0.06	ppm
pH		5.78	su
conductivity		68	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K5			
Well Name:	Richmond County #101		
County:	Richmond		
Date Sampled:	08/27/2003		
Nitrate/Nitrite		1.0	ppm
pH		3.53	su
conductivity		14	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds: trichloroethylene		2.9	ppb
Other:			

GWN-K6			
Well Name:	Huber #6		
County:	Twiggs		
Date Sampled:	06/18/2003		
Nitrate/Nitrite		nd	ppm
pH		5.06	su
conductivity		27	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K7			
Well Name:	Jones County #4		
County:	Jones		
Date Sampled:	04/23/2003		
Nitrate/Nitrite		0.16	ppm
pH		4.82	su
conductivity		16	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-3 (Continued). 2003-2004 Ground-Water Quality Analyses of the Cretaceous Aquifer System.

GWN-K8			
Well Name:	Mohawk Industries #3		
County:	Laurens		
Date Sampled:	06/19/2003		
Nitrate/Nitrite		nd	ppm
pH		6.62	su
conductivity		160	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K9			
Well Name:	Marshallville #1		
County:	Macon		
Date Sampled:	05/22/2003		
Nitrate/Nitrite		nd	ppm
pH		3.44	su
conductivity		33	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K10B			
Well Name:	Fort Valley #6		
County:	Peach		
Date Sampled:	05/22/2003		
Nitrate/Nitrite		0.66	ppm
pH		3.84	su
conductivity		11	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K11A			
Well Name:	Warner Robins #2		
County:	Houston		
Date Sampled:	09/11/2003		
Nitrate/Nitrite		0.89	ppm
pH		3.98	su
conductivity		13	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K12			
Well Name:	Perry/Holiday Inn Well		
County:	Houston		
Date Sampled:	09/11/2003		
Nitrate/Nitrite		nd	ppm
pH		3.81	su
conductivity		33	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K13			
Well Name:	Omaha #1		
County:	Stewart		
Date Sampled:	11/25/2003		
Nitrate/Nitrite		nd	ppm
pH		9.06	su
conductivity		132	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-3 (Continued). 2003-2004 Ground-Water Quality Analyses of the Cretaceous Aquifer System.

GWN-K15A			
Well Name:	Georgetown #3		
County:	Quitman		
Date Sampled:	03/26/2003		
Nitrate/Nitrite		nd	ppm
pH		9.23	su
conductivity		187	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K16			
Well Name:	Pactiv, Inc. North Well		
County:	Bibb		
Date Sampled:	09/11/2003		
Nitrate/Nitrite		0.52	ppm
pH		4.71	su
conductivity		18	uS/cm
Trihalomethanes: chloroform		1.3	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K18A			
Well Name:	Buena Vista #4		
County:	Marion		
Date Sampled:	03/12/2003		
Nitrate/Nitrite		0.16	ppm
pH		4.89	su
conductivity		16	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K19			
Well Name:	Hephzibah/Murphy St. Well		
County:	Richmond		
Date Sampled:	08/27/2003		
Nitrate/Nitrite		0.09	ppm
pH		--	su
conductivity		10	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-K20			
Well Name:	Plains #7		
County:	Sumter		
Date Sampled:	03/12/2003		
Nitrate/Nitrite		nd	ppm
pH		8.04	su
conductivity		78	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-4. 2003-2004 Ground-Water Quality Analyses of the Providence Aquifer System.

GWN-PD2B			
Well Name:	Preston #4		
County:	Webster		
Date Sampled:	03/12/2003		
Nitrate/Nitrite		1.2	ppm
pH		5.59	su
conductivity		27	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PD3			
Well Name:	Fort Gaines #2		
County:	Clay		
Date Sampled:	03/26/2003		
Nitrate/Nitrite		nd	ppm
pH		8.25	su
conductivity		244	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PD5			
Well Name:	Brooklyn #2		
County:	Stewart		
Date Sampled:	11/25/2003		
Nitrate/Nitrite		0.64	ppm
pH		5.54	su
conductivity		26	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PD6			
Well Name:	Blakely #4		
County:	Early		
Date Sampled:	03/26/2003		
Nitrate/Nitrite		nd	ppm
pH		7.91	su
conductivity		217	uS/cm
Trihalomethanes: chloroform		4.3	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds: dichloromethane		1.4	ppb
Other:			ppb

Table A-5. 2003-2004 Ground-Water Quality Analyses of the Clayton Aquifer System.

GWN-CT2A			
Well Name:	Mashburn house well		
County:	Sumter		
Date Sampled:	03/27/2003		
Nitrate/Nitrite		nd	ppm
pH		7.51	su
conductivity		155	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CT3			
Well Name:	Dawson/ Crawford St. Well		
County:	Terrell		
Date Sampled:	03/27/2003		
Nitrate/Nitrite		nd	ppm
pH		7.53	su
conductivity		169	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CT5A			
Well Name:	Cuthbert #3		
County:	Randolph		
Date Sampled:	03/27/2003		
Nitrate/Nitrite		nd	ppm
pH		7.46	su
conductivity		168	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CT7A			
Well Name:	St. John farm well		
County:	Sumter		
Date Sampled:	09/24/2003		
Nitrate/Nitrite		6.8	ppm
pH		4.23	su
conductivity		76	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CT8			
Well Name:	Weathersby house well		
County:	Schley		
Date Sampled:	09/24/2003		
Nitrate/Nitrite		0.63	ppm
pH		4.04	su
conductivity		14	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-6. 2003-2004 Ground-Water Quality Analyses of the Claiborne Aquifer System.

GWN-CL2			
Well Name:	Unadilla #3		
County:	Dooly		
Date Sampled:	09/11/2003		
Nitrate/Nitrite		0.29	ppm
pH		7.61	su
conductivity		137	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CL4A			
Well Name:	Plains #5		
County:	Sumter		
Date Sampled:	03/12/2003		
Nitrate/Nitrite		5.2	ppm
pH		4.61	su
conductivity		58	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CL6			
Well Name:	Maverick Tube Central Supply Well		
County:	Early		
Date Sampled:	03/26/2003		
Nitrate/Nitrite		nd	ppm
pH		7.35	su
conductivity		205	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CL8			
Well Name:	Flint River Nursery Office Well		
County:	Dooly		
Date Sampled:	05/22/2003		
Nitrate/Nitrite		nd	ppm
pH		5.77	su
conductivity		53	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-CL9			
Well Name:	Newton #3		
County:	Baker		
Date Sampled:	03/13/2003		
Nitrate/Nitrite		nd	ppm
pH		8.15	su
conductivity		175	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-7. 2003-2004 Ground-Water Quality Analyses of the Jacksonian Aquifer System.

GWN-J1B			
Well Name:	McNair house well		
County:	Burke		
Date Sampled:	11/06/2003		
Nitrate/Nitrite		2.5	ppm
pH		7.13	su
conductivity		185	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-J2A			
Well Name:	Oakwood Village Mob. Home Park #2		
County:	Burke		
Date Sampled:	11/06/2003		
Nitrate/Nitrite		0.53	ppm
pH		7.23	su
conductivity		154	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-J3			
Well Name:	J.W. Black house well		
County:	Emanuel		
Date Sampled:	08/28/2003		
Nitrate/Nitrite		0.02	ppm
pH		7.44	su
conductivity		171	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-J4			
Well Name:	Wrightsville #4		
County:	Johnson		
Date Sampled:	04/24/2003		
Nitrate/Nitrite		0.19	ppm
pH		7.25	su
conductivity		178	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-J5			
Well Name:	Cochran #3		
County:	Bleckley		
Date Sampled:	06/18/2003		
Nitrate/Nitrite		nd	ppm
pH		7.02	su
conductivity		228	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-J6			
Well Name:	Wrens #4		
County:	Jefferson		
Date Sampled:	04/24/2003		
Nitrate/Nitrite		nd	ppm
pH		6.78	su
conductivity		169	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-7 (Continued). 2003-2004 Ground-Water Quality Analyses of the Jacksonian Aquifer System.

GWN-J7			
Well Name:	Templeton livestock well		
County:	Burke		
Date Sampled:	12/11/2003		
Nitrate/Nitrite		2.7	ppm
pH		4.62	su
conductivity		37	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			
Organochlorine pesticides		nd	ppb

GWN-J8			
Well Name:	Kahn house well		
County:	Jefferson		
Date Sampled:	11/18/03		
Nitrate/Nitrite		7.6	ppm
pH		4.84	su
conductivity		71	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			
Beryllium		3.5	ppb
Nickel		15	ppb
Copper		15	ppb
Zinc		32	ppb
Cadmium		1.5	ppb
Barium		43	ppb

Table A-8. 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA1			
Well Name:	Thunderbolt #1		
County:	Chatham		
Date Sampled:	11/05/2003		
Nitrate/Nitrite		nd	ppm
pH		7.69	su
conductivity		171	uS/cm
Trihalomethanes: bromodichloromethane chlorodibromomethane		0.71 1.1	ppb ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA2			
Well Name:	Savannah #13		
County:	Chatham		
Date Sampled:	11/05/2003		
Nitrate/Nitrite		nd	ppm
pH		7.96	su
conductivity		162	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA3			
Well Name:	Grist Equipment Co. shop well		
County:	Chatham		
Date Sampled:	10/22/2003		
Nitrate/Nitrite		nd	ppm
pH		7.92	su
conductivity		154	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA4			
Well Name:	Tybee #1		
County:	Chatham		
Date Sampled:	11/05/2003		
Nitrate/Nitrite		nd	ppm
pH		7.87	su
conductivity		427	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA5A			
Well Name:	Interstate Paper #1		
County:	Liberty		
Date Sampled:	05/07/2003		
Nitrate/Nitrite		nd	ppm
pH		7.65	su
conductivity		210	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA6			
Well Name:	Hinesville #5		
County:	Liberty		
Date Sampled:	05/07/2003		
Nitrate/Nitrite		nd	ppm
PH		7.87	su
conductivity		185	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA7			
Well Name:	Darien New South Well		
County:	McIntosh		
Date Sampled:	02/26/2003		
Nitrate/Nitrite		nd	ppm
pH		7.60	su
conductivity		505	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA8			
Well Name:	ITT Rayonnier #4D		
County:	Wayne		
Date Sampled:	05/07/2003		
Nitrate/Nitrite		nd	ppm
pH		7.55	su
conductivity		238	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA9C			
Well Name:	Miller Ball Park TW 25		
County:	Glynn		
Date Sampled:	02/26/2003		
Nitrate/Nitrite		nd	ppm
pH		7.81	su
conductivity		1160	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA10B			
Well Name:	Durango Georgia #11		
County:	Camden		
Date Sampled:	05/08/2003		
Nitrate/Nitrite		nd	ppm
pH		7.57	su
conductivity		648	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			ppb

GWN-PA11			
Well Name:	St. Marys #2		
County:	Camden		
Date Sampled:	02/26/2003		
Nitrate/Nitrite		nd	ppm
pH		7.30	su
conductivity		658	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA12			
Well Name:	Folkston #3		
County:	Charlton		
Date Sampled:	02/26/2003		
Nitrate/Nitrite		nd	ppm
pH		7.32	su
conductivity		602	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA13			
Well Name:	Waycross #3		
County:	Ware		
Date Sampled:	05/08/2003		
Nitrate/Nitrite		nd	ppm
pH		7.62	su
conductivity		264	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA14			
Well Name:	Statesboro #7		
County:	Bulloch		
Date Sampled:	01/29/2003		
Nitrate/Nitrite		nd	ppm
pH		7.50	su
conductivity		219	uS/cm
Trihalomethanes:	chloroform	3.7	ppb
	bromodichloromethane	1.8	ppb
	chlorodibromomethane	1.2	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA15			
Well Name:	King America Finishing, Inc. Fire Well		
County:	Screven		
Date Sampled:	08/28/2003		
Nitrate/Nitrite		0.02	ppm
pH		7.82	su
conductivity		160	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA16			
Well Name:	Millen #1		
County:	Jenkins		
Date Sampled:	01/29/2003		
Nitrate/Nitrite		nd	ppm
pH		7.44	su
conductivity		251	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA17			
Well Name:	Swainsboro #7		
County:	Emanuel		
Date Sampled:	01/29/2003		
Nitrate/Nitrite		0.04	ppm
pH		7.44	su
conductivity		231	uS/cm
Trihalomethanes: chloroform		0.69	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA18			
Well Name:	Metter #2		
County:	Candler		
Date Sampled:	01/29/2003		
Nitrate/Nitrite		nd	ppm
pH		7.71	su
conductivity		197	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA19			
Well Name:	Douglas #4		
County:	Coffee		
Date Sampled:	02/27/2003		
Nitrate/Nitrite		nd	ppm
pH		7.76	su
conductivity		289	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA20			
Well Name:	Lakeland #2		
County:	Lanier		
Date Sampled:	01/15/2003		
Nitrate/Nitrite		nd	ppm
pH		7.57	su
conductivity		324	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA21A			
Well Name:	Valdosta New #4		
County:	Lowndes		
Date Sampled:	01/15/2003		
Nitrate/Nitrite		nd	ppm
pH		7.76	su
conductivity		238	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA22			
Well Name:	Thomasville #6		
County:	Thomas		
Date Sampled:	02/13/2003		
Nitrate/Nitrite		0.11	ppm
pH		7.59	su
conductivity		359	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA23			
Well Name:	Cairo #8		
County:	Grady		
Date Sampled:	01/14/2003		
Nitrate/Nitrite		0.02	ppm
pH		7.68	su
conductivity		328	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA24			
Well Name:	Bainbridge #1		
County:	Decatur		
Date Sampled:	01/14/2003		
Nitrate/Nitrite		2.2	ppm
pH		7.61	su
conductivity		217	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA24			
Well Name:	Bainbridge #1		
County:	Decatur		
Date Sampled:	01/21/2004		
Nitrate/Nitrite		2.0	ppm
pH		7.81	su
conductivity		153	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA25			
Well Name:	Donalsonville /7th St. Well		
County:	Seminole		
Date Sampled:	01/14/2003		
Nitrate/Nitrite		1.6	ppm
pH		--	su
conductivity		267	uS/cm
Trihalomethanes: chloroform		0.50	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA25			
Well Name:	Donalsonville /7th St. Well		
County:	Seminole		
Date Sampled:	01/21/2004		
Nitrate/Nitrite		1.5	ppm
pH		7.56	su
conductivity		192	uS/cm
Trihalomethanes: chloroform		0.51	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA26			
Well Name:	Colquitt #3		
County:	Miller		
Date Sampled:	01/14/2003		
Nitrate/Nitrite		2.2	ppm
pH		7.48	su
conductivity		220	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA26			
Well Name:	Colquitt #3		
County:	Miller		
Date Sampled:	01/21/2004		
Nitrate/Nitrite		2.0	ppm
pH		7.72	su
conductivity		156	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA27			
Well Name:	Camilla/Industrial Park Well		
County:	Mitchell		
Date Sampled:	02/12/2003		
Nitrate/Nitrite		0.5	ppm
pH		7.33	su
conductivity		220	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA28			
Well Name:	Moultrie #1		
County:	Colquitt		
Date Sampled:	02/13/2003		
Nitrate/Nitrite		nd	ppm
pH		7.79	su
conductivity		380	uS/cm
Trihalomethanes: chloroform		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA29			
Well Name:	Adel #6		
County:	Cook		
Date Sampled:	01/15/03		
Nitrate/Nitrite		nd	ppm
pH		7.56	su
conductivity		303	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA30A			
Well Name:	Amoco/Nashville Mills #1		
County:	Berrien		
Date Sampled:	01/15/2003		
Nitrate/Nitrite		nd	ppm
pH		7.66	su
conductivity		327	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA31			
Well Name:	Tifton #6		
County:	Tift		
Date Sampled:	09/10/2003		
Nitrate/Nitrite		0.02	ppm
pH		7.35	su
conductivity		185	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA32			
Well Name:	Ocilla #3		
County:	Irwin		
Date Sampled:	01/30/2003		
Nitrate/Nitrite		nd	ppm
pH		7.59	su
conductivity		189	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA32			
Well Name:	Ocilla #3		
County:	Irwin		
Date Sampled:	01/22/2004		
Nitrate/Nitrite		nd	ppm
pH		7.77	su
conductivity		136	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA33A			
Well Name:	Fitzgerald #G		
County:	Ben Hill		
Date Sampled:	01/30/2003		
Nitrate/Nitrite		nd	ppm
pH		7.62	su
conductivity		188	uS/cm
Trihalomethanes: chloroform		0.72	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA33A			
Well Name:	Fitzgerald #G		
County:	Ben Hill		
Date Sampled:	01/22/2004		
Nitrate/Nitrite		nd	ppm
pH		7.86	su
conductivity		135	uS/cm
Trihalomethanes: chloroform		0.57	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA34			
Well Name:	McRae #2 (Telfair Ave.)		
County:	Telfair		
Date Sampled:	06/18/2003		
Nitrate/Nitrite		nd	ppm
pH		7.36	su
conductivity		216	uS/cm
Trihalomethanes: chloroform		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA35			
Well Name:	Mt. Vernon New Well		
County:	Montgomery		
Date Sampled:	06/19/2003		
Nitrate/Nitrite		nd	ppm
pH		7.81	su
conductivity		182	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA36			
Well Name:	Vidalia #1		
County:	Toombs		
Date Sampled:	06/19/2003		
Nitrate/Nitrite		nd	ppm
pH		7.96	su
conductivity		153	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA38			
Well Name:	Eastman #4		
County:	Dodge		
Date Sampled:	06/18/2003		
Nitritate/Nitrite		0.25	ppm
pH		7.35	su
conductivity		150	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA39		
Well Name:	Sylvester #1	
County:	Worth	
Date Sampled:	02/12/2003	
Nitrate/Nitrite	0.04	ppm
pH	7.39	su
conductivity	268	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-PA40		
Well Name:	Merck #8	
County:	Dougherty	
Date Sampled:	02/12/2003	
Nitrate/Nitrite	1.8	ppm
pH	7.23	su
conductivity	270	uS/cm
Trihalomethanes:	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-PA43A		
Well Name:	Owen & Williams Fish Farm office well	
County:	Baker	
Date Sampled:	09/24/2003	
Nitrate/Nitrite	3.8	ppm
pH	7.22	su
conductivity	193	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-PA44		
Well Name:	Sycamore #2	
County:	Turner	
Date Sampled:	02/12/2003	
Nitrate/Nitrite	0.18	ppm
pH	7.71	su
conductivity	175	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-PA45A		
Well Name:	Abbeville #1	
County:	Wilcox	
Date Sampled:	01/30/2003	
Nitrate/Nitrite	0.53	ppm
pH	7.27	su
conductivity	238	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-PA45A		
Well Name:	Abbeville #1	
County:	Wilcox	
Date Sampled:	01/22/2004	
Nitrate/Nitrite	0.47	ppm
pH	7.59	su
conductivity	174	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

Table A-8 (Continued). 2003-2004 Ground-Water Quality Analyses of the Floridan Aquifer System.

GWN-PA46B			
Well Name:	Wenona Mobile Home Park Well		
County:	Crisp		
Date Sampled:	09/25/2003		
Nitrate/Nitrite		3.2	ppm
pH		7.70	su
conductivity		173	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA49			
Well Name:	Harmony Church Well		
County:	Dooly		
Date Sampled:	01/30/2003		
Nitrate/Nitrite		1.6	ppm
pH		7.54	su
conductivity		181	uS/cm
Trihalomethanes:		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA49			
Well Name:	Harmony Church Well		
County:	Dooly		
Date Sampled:	01/22/2004		
Nitrate/Nitrite		1.6	ppm
pH		7.85	su
conductivity		130	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA50			
Well Name:	Reynolds house well		
County:	Laurens		
Date Sampled:	10/23/2003		
Nitrate/Nitrite		1.2	ppm
pH		7.40	su
conductivity		199	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA51			
Well Name:	Adams house well		
County:	Mitchell		
Date Sampled:	03/13/2003		
Nitrate/Nitrite		1.8	ppm
pH		7.89	su
conductivity		162	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA52			
Well Name:	Simmons house well		
County:	Mitchell		
Date Sampled:	03/13/2003		
Nitrate/Nitrite		3.3	ppm
pH		7.91	su
conductivity		151	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-8 (Continued). 2003 Ground-Water Quality Analyses of the Floridan Aquifer. System.

GWN-PA53A			
Well Name:	Cato new house well		
County:	Decatur		
Date Sampled:	05/21/2003		
Nitrate/Nitrite		4.4	ppm
pH		7.27	su
conductivity		141	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-PA55			
Well Name:	Parrish/Royal house well		
County:	Burke		
Date Sampled:	10/23/2003		
Nitrate/Nitrite		0.05	ppm
pH		7.59	su
conductivity		171	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			ppm

Table A-9. 2003-2004 Ground-Water Quality Analyses of the Miocene Aquifer System.

GWN-MI1		
Well Name:	McMillan house well	
County:	Cook	
Date Sampled:	09/10/2003	
Nitrate/Nitrite	nd	ppm
pH	7.63	su
conductivity	160	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-MI2A		
Well Name:	S. Boutwell house well	
County:	Lowndes	
Date Sampled:	09/10/2003	
Nitrate/Nitrite	4.5	ppm
pH	3.69	su
conductivity	58	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-MI5		
Well Name:	Carter house well	
County:	Appling	
Date Sampled:	10/22/2003	
Nitrate/Nitrite	9.8	ppm
pH	4.90	su
conductivity	102	uS
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-MI9A		
Well Name:	Murphy garden well	
County:	Thomas	
Date Sampled:	05/21/2003	
Nitrate/Nitrite	12	ppm
pH	5.66	su
conductivity	112	uS
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-MI10B		
Well Name:	Calhoun house well	
County:	Colquitt	
Date Sampled:	05/21/2003	
Nitrate/Nitrite	nd	ppm
pH	6.27	su
conductivity	83	uS
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-MI15		
Well Name:	Aldrich house well	
County:	Bulloch	
Date Sampled:	08/28/2003	
Nitrate/Nitrite	14	ppm
pH	3.88	su
conductivity	110	uS
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

Table A-10. 2003-2004 Ground-Water Quality Analyses of the Piedmont/Blue Ridge Aquifer System.

GWN-BR1B			
Well Name:	Young Harris New Well		
County:	Towns		
Date Sampled:	07/31/2003		
Nitrate/Nitrite		0.02	ppm
pH		6.88	su
conductivity		95	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-BR2A			
Well Name:	Notla Water Authority #3		
County:	Union		
Date Sampled:	07/30/2003		
Nitrate/Nitrite		1.1	ppm
pH		5.14	su
conductivity		40	uS/cm
Trihalomethanes: chloroform		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-BR4			
Well Name:	Morganton Old Well		
County:	Fannin		
Date Sampled:	07/30/2003		
Nitrate/Nitrite		1.8	ppm
pH		5.54	su
conductivity		69	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-BR5			
Well Name:	Chatsworth/Nix Spring		
County:	Murray		
Date Sampled:	07/30/2003		
Nitrate/Nitrite		0.42	ppm
pH		5.90	su
conductivity		22	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P1			
Well Name:	Luthersville New Well		
County:	Meriwether		
Date Sampled:	08/14/2003		
Nitrate/Nitrite		0.02	ppm
pH		5.67	su
conductivity		82	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		6.8	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds: trichloroethylene		8.6	ppb
Other:			

GWN-P5			
Well Name:	Flowery Branch #1		
County:	Hall		
Date Sampled:	10/09/2003		
Nitrate/Nitrite		0.76	ppm
pH		6.78	su
conductivity		110	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-10 (Continued). 2003-2004 Ground-Water Quality Analyses of the Piedmont/Blue Ridge Aquifer System.

GWN-P6A			
Well Name:	Shiloh #1		
County:	Harris		
Date Sampled:	07/17/2003		
Nitrate/Nitrite		0.02	ppm
pH		6.88	su
conductivity		99	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P7			
Well Name:	Hampton #6		
County:	Henry		
Date Sampled:	08/12/2003		
Nitrate/Nitrite		0.29	ppm
pH		5.98	su
conductivity		90	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P8			
Well Name:	Wayne Farms #4		
County:	Jackson		
Date Sampled:	10/08/2003		
Nitrate/Nitrite		0.62	ppm
pH		6.68	su
conductivity		182	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P9B			
Well Name:	Gray #10		
County:	Jones		
Date Sampled:	04/23/2003		
Nitrate/Nitrite		0.02	ppm
pH		6.18	Su
conductivity		379	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P10E			
Well Name:	Franklin Springs #14		
County:	Franklin		
Date Sampled:	10/08/2003		
Nitrate/Nitrite		0.07	ppm
pH		6.90	su
conductivity		75	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P11A			
Well Name:	Danielsville #2		
County:	Madison		
Date Sampled:	10/08/2003		
Nitrate/Nitrite		0.34	ppm
pH		6.35	su
conductivity		83	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-10 (Continued). 2003-2004 Ground-Water Quality Analyses of the Piedmont/Blue Ridge Aquifer System.

GWN-P12A			
Well Name:	Indian Spring		
County:	Butts		
Date Sampled:	07/17/2003		
Nitrate/Nitrite		nd	ppm
pH		7.49	su
conductivity		172	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			
Chloride		12	ppm
Fluoride		--	ppm
Sulfate		30	ppm

GWN-P12A			
Well Name:	Indian Spring		
County:	Butts		
Date Sampled:	11/18/2003		
Nitrate/Nitrite		nd	ppm
pH		7.35	su
conductivity		176	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			
Chloride		13	ppm
Fluoride		5.8	ppm
Sulfate		30	ppm

GWN-P13A			
Well Name:	Covington/Academy Spring		
County:	Newton		
Date Sampled:	07/17/2003		
Nitrate/Nitrite		0.56	ppm
pH		5.88	su
conductivity		46	uS/cm
Trihalomethanes: chloroform		0.61	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P14			
Well Name:	Upson County/Sunset Village Well		
County:	Upson		
Date Sampled:	07/17/2003		
Nitrate/Nitrite		0.35	ppm
pH		4.40	su
conductivity		11	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P15A			
Well Name:	Bolton garden well		
County:	DeKalb		
Date Sampled:	08/14/2003		
Nitrate/Nitrite		0.05	ppm
pH		6.55	su
conductivity		123	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		0.87	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-P16C			
Well Name:	Mt. Airy #4		
County:	Habersham		
Date Sampled:	07/31/2003		
Nitrate/Nitrite		0.23	ppm
pH		4.90	su
conductivity		15	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-10 (Continued). 2003-2004 Ground-Water Quality Analyses of the Piedmont/Blue Ridge Aquifer System.

GWN-P17		
Well Name:	Oconee County/Hillcrest Well	
County:	Oconee	
Date Sampled:	10/07/2003	
Nitrate/Nitrite	nd	ppm
pH	7.05	su
conductivity	364	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-P18		
Well Name:	Dawsonville City Spring	
County:	Dawson	
Date Sampled:	10/09/2003	
Nitrate/Nitrite	1.5	ppm
pH	5.62	su
conductivity	32	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	0.91	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-P19		
Well Name:	Fayetteville #1	
County:	Fayette	
Date Sampled:	08/12/2003	
Nitrate/Nitrite	0.10	ppm
pH	7.02	su
conductivity	262	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

GWN-P20		
Well Name:	Suwanee #1	
County:	Gwinette	
Date Sampled:	11/17/2003	
Nitrate/Nitrite	0.39	ppm
pH	7.87	su
conductivity	209	uS/cm
Trihalomethanes	nd	ppb
Methyl tert-butyl ether	nd	ppb
Benzene	nd	ppb
Toluene	nd	ppb
Ethylbenzene	nd	ppb
Total Xylenes	nd	ppb
Other Volatile Organic Compounds	nd	ppb
Other:		

Table A-11. 2003-2004 Ground-Water Quality Analyses of the Valley and Ridge Aquifer System.

GWN-VR1			
Well Name:	Floyd County/Kingston Road Well		
County:	Floyd		
Date Sampled:	06/04/2003		
Nitrate/Nitrite		0.68	ppm
pH		7.41	su
conductivity		160	uS/cm
Trihalomethanes:		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-VR2A			
Well Name:	LaFayette/Lower Big Spring		
County:	Walker		
Date Sampled:	06/04/2003		
Nitrate/Nitrite		2.2	ppm
pH		7.22	su
conductivity		176	uS/cm
Trihalomethanes:		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-VR3			
Well Name:	Crawfish Spring/Chickamauga		
County:	Walker		
Date Sampled:	06/04/2003		
Nitrate/Nitrite		0.80	ppm
pH		6.89	su
conductivity		163	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-VR5			
Well Name:	Chattooga County #4		
County:	Chattooga		
Date Sampled:	06/04/2003		
Nitrate/Nitrite		3.4	ppm
pH		6.89	su
conductivity		256	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-VR6			
Well Name:	Chemical Products East Well		
County:	Bartow		
Date Sampled:	06/05/2003		
Nitrate/Nitrite		1.0	ppm
pH		7.50	su
conductivity		178	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds:			
1,1-dichloroethylene		2.8	ppb
tetrachloroethylene		3.0	ppb
Other:			

GWN-VR7			
Well Name:	Adairsville/Lewis Spring		
County:	Bartow		
Date Sampled:	06/05/2003		
Nitrate/Nitrite		0.62	ppm
pH		7.35	su
conductivity		155	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

Table A-11 (Continued). 2003-2004 Ground-Water Quality Analyses of the Valley and Ridge Aquifer System.

GWN-VR8			
Well Name:	Cedartown Spring		
County:	Polk		
Date Sampled:	06/05/2003		
Nitrate/Nitrite		0.72	ppm
pH		7.23	su
conductivity		174	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		2.8	ppb
Benzene		0.85	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-VR9			
Well Name:	Polk County #2		
County:	Polk		
Date Sampled:	06/05/2003		
Nitrate/Nitrite		0.96	ppm
pH		7.03	su
conductivity		188	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			

GWN-VR10			
Well Name:	Chatsworth/Eton Spring		
County:	Murray		
Date Sampled:	07/30/2003		
Nitrate/Nitrite		1.6	ppm
pH		7.19	su
conductivity		171	uS/cm
Trihalomethanes		nd	ppb
Methyl tert-butyl ether		nd	ppb
Benzene		nd	ppb
Toluene		nd	ppb
Ethylbenzene		nd	ppb
Total Xylenes		nd	ppb
Other Volatile Organic Compounds		nd	ppb
Other:			