
CHAPTER 7

Watershed Protection Programs

Program Perspective

The first major legislation to deal with water pollution control in Georgia was passed in 1957. The Act was ineffective and was replaced by the Water Quality Control Act of 1964. This Act established the Georgia Water Quality Control Board, the predecessor of the Environmental Protection Division of the Georgia Department of Natural Resources which was established in 1972. Early efforts by the Board in the late 1960's and early 1970's included documenting water quality conditions, cleanup of targeted pollution problems and the establishment of water use classifications and water quality standards. Trend monitoring efforts were initiated and a modest State construction grants program was implemented.

In 1972 the Federal Water Pollution Control Act of 1972 was enacted by Congress. Today, this law is known as the Clean Water Act (CWA). The CWA set the national agenda for water protection and launched the national objective to provide "for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water". The CWA established the NPDES permit system for regulation of municipal and industrial water pollution control plants, a water use classifications and standards process, and a construction grants process to fund the construction of municipal water pollution control facilities.

Most industries in Georgia had installed modern, effective water pollution control facilities by the end of 1972. In the mid/late 1970's emphasis was placed on the design and construction of municipal facilities through the federal Construction Grants Program. First and second round NPDES permits were negotiated and operation and maintenance, compliance monitoring, and enforcement programs initiated. Basin planning, trend monitoring, intensive surveys, modeling and wasteload allocation work was well underway.

In 1987 Congress made significant changes to the Clean Water Act. The Water Quality Act of 1987 placed increased emphasis on toxic substances, control of nonpoint source pollution, clean lakes, wetlands and estuaries. The Act required that all States evaluate water quality standards and adopt numeric criteria for toxic substances to protect aquatic life and public health. This work was initiated and completed by the GAEPD in the late 1980s. The Act also required each

State to evaluate nonpoint source pollution impacts and develop a management plan to deal with documented problems.

In the late 1980s and early 1990s, the Georgia General Assembly passed a number of laws that set much of the agenda for the GAEPD in the early 1990s. Laws such as the Growth Strategies Act which helps protect sensitive watersheds, wetlands, and groundwater recharge areas and the ban on high phosphate detergents to reduce nutrient loading to rivers and lakes were enacted. Legislation was passed in 1990 that required the GAEPD to conduct comprehensive studies of major publicly owned lakes and establish specific water quality standards for each lake. In addition in 1991 the General Assembly passed a law requiring a phosphorus limit of 0.75 mg/l for all major point sources discharging to the Chattahoochee River between Buford Dam and West Point Lake. Major river corridors were accorded additional protections with laws passed in 1991. Also in 1991, the General Assembly passed the Georgia Environmental Policy Act that requires an environmental effects report be developed for major State funded projects. In 1992, the General Assembly passed the River Basin Management Planning Act that required the GAEPD develop and implement plans for water protection for each major river basin in Georgia. In 2004, the General Assembly passed the Statewide Comprehensive Water Management Planning Act. This legislation replaced the river basin management planning legislation and charged the EPD with the responsibility of developing a comprehensive statewide water management plan for Georgia in accordance with the following policy statement: "Georgia manages water resources in a sustainable manner to support the state's economy, protect public health and natural systems, and to enhance the quality of life for all citizens," The work ongoing to implement this significant legislation was discussed in detail in Chapter 2 and at appropriate locations through this report.

In 2004-2005 high priority was placed on Comprehensive Statewide Water Management Planning, monitoring and assessment, water quality modeling and TMDL development, TMDL implementation plan development, State revolving loan programs, NPDES permitting and enforcement, nonpoint source pollution abatement, stormwater management, erosion and sediment control, and public participation projects.

Comprehensive Statewide Water Planning

Comprehensive statewide water planning efforts were expanded significantly in 2004 with the passage of O.C.G.A. 12-5-520 by the Georgia General Assembly. The Act provides for the development of river basin management plans for the major rivers in the State. The Act provides guidance regarding the content of the plans and for local input to plan development. The Act also provides that upon adoption of a plan by the Board of Natural Resources all permitting and other

activities conducted by or under the control of the Department of Natural Resources are consistent with the plan. This work is discussed in Chapter 2.

Watershed Projects

The GAEPD is working with the United States Environmental Protection Agency (USEPA) and South Carolina on several Savannah River projects; with the USEPA and the Alabama Department of Environmental Management (ADEM) on water quality issues in the Coosa River and Lake Weiss; and with the Florida Department of Environmental Protection and the Suwannee River Water Management District to coordinate water protection efforts in the Suwannee River Basin. Significant work was also done by Alabama, Florida and Georgia in cooperation with the Corps of Engineers to conduct studies of the Apalachicola/Chattahoochee/Flint and Alabama/Coosa/Tallapoosa river basins to facilitate efforts to develop agreements regarding water allocations. The GAEPD supports these projects to avoid duplication of effort and to effectively leverage resources to accomplish watershed protection in interstate river basins.

Water Quality Monitoring

The goal of the water protection program in Georgia is to effectively manage, regulate, and allocate the water resources of Georgia. In order to achieve this goal, it is necessary to monitor the water resources of the State to establish baseline and trend data, document existing conditions, study impacts of specific discharges, determine improvements resulting from upgraded water pollution control plants, support enforcement actions, establish wasteload allocations and/or total maximum daily loads (TMDLs) for new and existing facilities, verify water pollution control plant compliance, and document water use impairment and reasons for problems causing less than full support of designated water uses. Trend monitoring, intensive surveys, toxic substances monitoring, aquatic toxicity testing and facility compliance sampling are some of the monitoring tools used by the GAEPD. Monitoring programs are discussed in Chapter 3.

Water Quality Modeling/Wasteload Allocations/TMDL Development

The GAEPD conducted a significant amount of modeling in 2004-2005 in support of the development of wasteload allocations and total maximum daily loads (TMDLs). In 2003, TMDLs were developed and publicly noticed for segments on the Georgia 2002 303(d) list in the Coosa, Tallapoosa and Tennessee River Basins. These TMDLs were finalized, submitted to and approved by the EPA in 2004. In 2004, TMDLs were developed and publicly noticed for segments on the Georgia 2004 303(d) list for the Savannah and Ogeechee River Basins. These TMDLs were finalized, submitted to and approved by EPA in 2005. Also in 2005, TMDLs were developed and public noticed for segments on the 2004 303(d) list

for waters in the Ochlockonee, Suwanee, Satilla, and St Marys River Basins. These TMDLs will be finalized and submitted to EPA for approval in early 2006. Over the 2004-2005 period, more than 135 TMDLs were developed. To date more than 1250 TMDLs have been developed for 303(d) listed waters in Georgia.

TMDL Implementation

As TMDLs are developed, plans are needed to guide implementation of pollution reduction strategies. TMDLs are implemented through changes in NPDES permits to address needed point source improvements and/or implementation of best management practices to address nonpoint sources of pollution. Changes in NPDES permits to address point issues are made by the GAEPD in coordination with local governments and industries. Planning for implementation of management practices and activities to address the nonpoint sources of pollution is being conducted through the development of Tier 3 level TMDL implementation plans prepared by GAEPD and Tier 2 plans prepared through contracts with Regional Development Centers (RDCs) and other public contractors. Tier 3 plans are developed in-house by GAEPD staff for segments “partially impaired due to fecal coliform; segments “impaired” due to natural conditions, fish consumption advisories, legacy sediment; or segments where TMDL models estimate a zero percent load reduction would be necessary to achieve standards. The Tier 2 plans are intended as platforms for instituting and continuing a local water quality protection and restoration process. They initiate public outreach, bring together local stakeholder groups who work together to assess the sources and causes of the impairment, identify appropriate management practices and activities, and set forth a plans of action to monitor progress and achieve the TMDL for each segment impairment.

In 2004 a total of 213 TMDL implementation plans and revisions were developed for TMDLs in the Chattahoochee and Flint River Basins. Another 147 plans and revisions for TMDLs in the Coosa, Tallapoosa, and Tennessee River Basin were initiated in 2005 and scheduled for completion in 2006. To date a total of 864 plans and revisions have been prepared to implement TMDLs in Georgia.

State Revolving Loan and Georgia Fund Loan Programs

Georgia presently administers loans through the Georgia Environmental Facilities Authority (GEFA) and the GAEPD a State Revolving Loan Fund (SRF) and a Georgia Fund program that provide low interest loans for the construction of municipal wastewater treatment facilities and nonpoint source pollution control projects. The SRF program was initiated in 1988 to the full extent allowed by the 1987 amendments to the Clean Water Act. With the initiation of SRF, the federal

Construction Grants program has been phased out and all federal monies received through the Environmental Protection Agency are being used to capitalize the SRF program.

Considerable amounts of money have been required for water pollution abatement in Georgia and additional expenditures will be needed in the future. Local governments have the responsibility of securing funding for water pollution control projects including CSO controls. In addition to the SRF program and the Georgia Fund program, other funding sources are available, grants and loans from the Rural Economic and Community Development Administration (RECD), the Appalachian Regional Commission, and various programs administered by the Georgia Department of Community Affairs. Table 7-1 lists the major funding sources utilized by Georgia communities in 2004-2005 for wastewater treatment system and CSO control construction and improvements.

TABLE 7-1
Municipal Facility Sources of Investment
2004-2005

SRF & GEFA Loans	\$132,706,000
Local or Federal	\$609,493,293
TOTAL	\$742,200,000

Of the twenty-two wastewater treatment projects funded by SRF/GEFA loans during 2004-2005, nine were for upgrades of existing systems. The twenty-two projects represented 123.7 million gallons per day of treatment capacity.

Upgrading the level of wastewater treatment produces direct benefits by reducing pollutant discharges to Georgia streams, rivers, and lakes/reservoirs. The most widely used measure of municipal pollution is the extent to which the organic content of treated wastewater depletes oxygen in the receiving water and reduces the oxygen available to fish and aquatic life. In 2005, of the nearly 1.7 million pounds per day of oxygen demanding pollutants produced by municipalities, approximately 95% was removed by municipal water pollution control plants.

GEFA Implementation Unit. The Metropolitan North Georgia Water Planning District (District) was created on April 5, 2001 (2001 S.B. 130) as a planning entity dedicated to developing comprehensive regional and watershed-specific plans to be implemented by local governments in the District.

The enabling legislation required the District to develop plans for stormwater management, wastewater treatment, and water supply and conservation in its 16-county area that includes Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Fulton, Forsyth, Gwinnett, Hall, Henry, Paulding, Rockdale and Walton Counties. These plans are designed to protect water quality and public water supplies, protect recreational values of the waters, and to minimize potential adverse impacts of development on waters in and downstream of the region.

Limited water resources combined with the region's growth places the District in a unique position relative to other areas in Georgia. With a finite water resource and a population of nearly 4 million and growing, the need to carefully and cooperatively manage and protect Metropolitan Atlanta's rivers and streams has become a priority.

The EPD was charged with the enforcement of these plans. SB 130 states that the EPD Director shall not approve any application by a local government in the District to issue, modify, or renew a permit, if such permit would allow an increase in the permitted water withdrawal, public water system capacity, or waste-water treatment system capacity of such local government, or any NPDES Phase I or Phase II General Stormwater permit; unless such local government is in compliance with the applicable provisions of the plan, or the Director certifies that such local government is making good faith efforts to come into compliance.

EPD, upon application for a permit for an increase in the water withdrawal, public water system capacity, or wastewater treatment system capacity, or renewal of any NPDES Phase I or Phase II General Stormwater permit, will conduct an audit to determine whether the local government is in compliance with the District Plans. This audit process was initiated in the fall of 2005 and at present there are 2 EPD associates to perform audits of the 109 local governments affected.

Georgia's Land Conservation Program

On April 14, 2005, Governor Sonny Perdue signed House Bill 98, creating the Land Conservation Program. The act created a flexible framework within which cities and counties, the Department of Natural Resources, other state and federal agencies, and private partners can protect the state's valuable natural resources. The Land Conservation Program will protect Georgia's valued resources by developing a process that will strategically align the state's conservation needs with the ability to steward the land through public/private partnerships.

The land conservation goals set forth in the Act include: water quality protection for rivers, streams, and lakes; flood protection; wetlands protection; reduction of

erosion through protection of steep slopes, erodible soils, and stream banks; protection of riparian buffers, natural habitats and corridors for native plant and animal species; protection of prime agricultural and forestry lands; protection of cultural sites, heritage corridors, and archaeological and historic resources; scenic protection; provision of recreation and outdoor activities; and connection of existing or planned areas.

Funding available for 2005-2006 is \$100 million: \$55 million from the Clean Water State Revolving Fund; \$13,000 from the Land Conservation Grant Program; \$25 million pledged from a private foundation for grants; and \$20 million in bond funds for state purchases.

In 2005, the Land Conservation Program acquired through purchase, easement, lease or donation more than 13,728 acres. Of that acreage, 3,649 acres adjoined existing tracts in Jeff Davis and Coffee Counties, and will protect 3.5 miles of Ocmulgee River frontage. With the addition of these tracts into the program, the State of Georgia protects more than 13,000 contiguous acres. Funds came from a variety of sources including U.S. Forest Service Forest Legacy Grant, The Nature Conservancy (TNC), and state bond funds.

An additional 10,079 acres were protected on the Altamaha River in Wayne and Glynn Counties. These tracts contain tidal swamp forests, bottomland forests and steep river bluff habitats as well as pine uplands. Acquisition of these tracts will protect 5.8 miles of river frontage at Clayhole Swamp and 8.5 miles of river frontage at Penholoway Swamp along the scenic Altamaha River. Funds came from U.S. Fish and Wildlife Grants, private donations from TNC, Ducks Unlimited, and National Wild Turkey Federation, matching DNR non-game, timber revenue, and state bond funds for a total purchase price of \$13.2 million.

National Pollutant Discharge Elimination System (NPDES) Permit Program

The NPDES permit program provides a basis for municipal and industrial discharge permits, monitoring compliance with limitations, and appropriate enforcement action for violations.

In 2004-2005, a significant amount of personnel time was allocated to the reissuance of NPDES permits. Permits were issued, modified or reissued for 208 municipal and private discharges and for 150 industrial discharges. In addition, 55 private dischargers were covered under general permit No. GA0550000. In contrast to many other areas in the nation, Georgia had a very small backlog of permits to be issued.

In addition to permits for point source discharges, the GAEPD has developed and implemented a permit system for land application systems. Land application systems for final disposal of treated wastewaters have been encouraged in Georgia. Land application systems are used as alternatives to advanced levels of treatment or as the only alternative in some environmentally sensitive areas. A total of 203 (municipal and private) and 55 (industrial and Federal) permits for land application systems were in effect in 2005.

Concentrated Animal Feeding Operations

Georgia has over 4000 livestock and poultry farms. On June 10, 1999, Georgia adopted Rule 391-3-6-.20 "Swine Feeding Operation Permit Requirements". On January 24, 2001, Georgia adopted rule 391-3-6-.21, "Animal (Non-Swine) Feeding Operation Permit Requirements." These actions followed three years of stakeholder input, public meetings, hearings and Georgia Board of Natural Resources deliberations and resulted in State rules that equaled or exceeded Federal regulations at that time. The Georgia rules required that medium size feeding operations with more than 300 animal units (AU) but less than 1000 AU (1000 AU equals 1000 beef cows, or 700 dairy cows, or 2500 swine, etc.) must apply for a wastewater permit under Georgia's Land Application System (LAS) permitting program. Large animal feeding operations with more than 1000 AU must apply for a wastewater permit under the Federal National Pollutant Discharge Elimination System (NPDES) program. EPD has been delegated authority to administer the NPDES program in Georgia by the U.S. Environmental Protection Agency (EPA). Consequently, 173 medium size farms received State LAS permits and 57 large farms received Federal NPDES concentrated animal feeding operation (CAFO) permits.

On December 15, 2002, EPA promulgated a greatly expanded NPDES permit regulation and effluent limitation guideline for CAFOs, 40 CFR 122 and 40 CFR 412. Dry manure poultry operations larger than 125,000 broilers or 82,000 layers were added, as well as other changes. In order to implement the new Federal rule, the Georgia EPD completed necessary State rule amendments on September 15, 2003. Dry litter poultry and swine nursery permit applications were due by October 31, 2005. Permits are to be issued and nutrient management plans implemented for dry litter poultry and swine nurseries by October 31, 2006. It is estimated that there are a minimum of 600 dry manure poultry farms which had to submit NPDES CAFO permit applications by October 31, 2005. The Georgia EPD has contracted with the Georgia Department of Agriculture Livestock/Poultry Section (GDA) for inspections, complaint investigations, nutrient management plan reviews and permit administrative support.

The GDA has already processed over 500 NPDES applications from dry manure poultry operations. However, the EPA CAFO regulation was successfully appealed on February 28, 2005 [decision by the Second Circuit Court of Appeals issued in *Waterkeeper v. EPA*, 399 F.3d 486 (2nd Cir. 2005)]. That CAFO regulation contains the requirement that by February 13, 2006, all newly defined CAFOs must apply for an NPDES permit. The CAFO rule also requires that all CAFOs develop and implement a nutrient management plan by December 31, 2006. The EPA is in the process of developing options for revising their CAFO regulation to comply with the Second Circuit Court of Appeals' decision and has extended both the permit application date and the nutrient management plan due date to July 31, 2007. In response to many inquiries from Georgia growers, the Georgia Attorney General reviewed the State animal feeding rules and found that our deadlines for permit application submittal and nutrient management plan implementation are enforceable irrespective of changes in the EPA CAFO regulation. However, EPD will defer issuing permits where possible in order to allow the Georgia Board of Natural Resources time to reconsider its rules in light of revisions that the EPA may make.

Combined Sewer Overflows

The GAEPD has issued NPDES Permits to the three cities in Georgia that have Combined Sewer Overflows (CSOs) in their wastewater collection systems (Albany, Atlanta and Columbus). The permits require that the CSO must not cause violations of Georgia Water Quality Control Standards. In addition, the CSOs must be controlled to prevent the following conditions for waters downstream of the CSO:

- materials which settle to form sludge deposits that become putrescent, unsightly or to interfere with legitimate water uses;
- oil, scum and floating debris in amounts sufficient to be unsightly or to interfere with legitimate water uses;
- materials which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses;
- toxic, corrosive, acidic and caustic substances in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life.

In 1998 the City of Atlanta signed a Consent Decree that requires a long-term control plan be implemented to remediate the overflow from combined sewers in 2007. The Consent Decree stipulated, among other things, the development and

implementation of short-term remedial measures to improve operations, maintenance and treatment performance of the existing CSO facilities. Some of the other tasks required by the Consent Decree include: installation of warning signs along the streams receiving CSO discharges, a one-time stream cleanup, greenway acquisition plan, and creating Maintenance, Operations, and Management Systems (MOMS) Plans to provide guidance to City personnel regarding the operations and maintenance requirements of each of the City's CSO facilities as well as management strategies to control CSOs.

The City of Atlanta submitted their long-term control plan in April 2001. The selected option calls for 27% sewer separation including the elimination of two CSO facilities, additional storage for the eastside CSOs to an upgraded CSO treatment facility at the current Intrenchment Creek facility and a tunnel connecting the westside CSOs to a new CSO treatment facility on the Chattahoochee River near the R. M. Clayton Water Reclamation Center. November 7, 2007 is the date in the Consent Decree for compliance with water quality standards.

Compliance and Enforcement

The Georgia Water Quality Control Act requires that every point source discharge obtain a NPDES permit, and that zero discharge systems obtain a Land Application System Permit from the GAEPD which specifies allowable discharge limits for the receiving streams or land application sites. Insuring compliance with permit limitations is an important part of the Georgia water pollution control program. Staff review discharge and groundwater monitoring reports, inspect water pollution control plants, sample effluents, investigate citizen complaints, provide on-site technical assistance and, if necessary, initiate enforcement action.

As of December 2005, of the 125 major municipal water pollution control plants (facilities with design flow >1.0 mgd), six were in significant noncompliance with the final limitations. These six facilities are under compliance schedules and/or enforcement actions to resolve the noncompliance, or implementing infiltration/inflow strategies which will allow compliance at the plant to be achieved. Enforcement action has been taken by the GAEPD to insure problems are alleviated.

Data evaluations (using annual reports, GAEPD sampling and biomonitoring results) were performed on NPDES permitted municipal facilities to determine the need to reopen specific permits for inclusion of numerical limits and monitoring for appropriate toxic pollutants.

Increased emphasis was placed on the industrial pretreatment programs for municipalities to ensure that the cities comply with the new requirements for pretreatment established in the November 1988 Amendments to the Federal General Pretreatment Regulations (40 CFR Part 403).

Industries in Georgia achieved a high degree of compliance in 2004-2005. The forty major industrial facilities were in compliance about 98% of the time during 2004-2005.

The GAEPD utilizes all reasonable means to obtain compliance, including technical assistance, noncompliance notification letters, conferences, consent orders, administrative orders, and civil penalties. Emphasis is placed on achieving compliance through cooperative action. However, compliance cannot always be achieved in a cooperative manner. The Director of the GAEPD has the authority to negotiate consent orders or issue administrative orders. In 2004-2005, 768 Orders were issued and approximately of \$3,200,000 in negotiated settlements was collected.

Storm water compliance for municipalities and industries is most often reached through education and inspections. The vast majority of storm water enforcement Orders are used in connection with construction activities. In 2004-2005 a total of 339 stormwater Orders were issued and a total of \$1,073,312 in negotiated settlements was collected.

Zero Tolerance

In January 1998, the Georgia Board of Natural Resources adopted a resolution requiring that regulatory initiatives be developed to ensure polluters are identified, and that appropriate enforcement action is taken to correct problems. The resolution also directed EPD to provide the "best quality of effort possible in enforcing Georgia's environmental laws". High growth areas that have been identified as in need of enhanced protection include the Chattahoochee River Basin (from the headwaters through Troup County), Coosa River Basin, Tallapoosa River Basin, and the greater metropolitan Atlanta area. EPD developed a "zero tolerance" strategy for these identified geographic areas. This strategy requires enforcement action on any and all noncompliance issues. The strategy includes simple orders (Expedited Enforcement Compliance Order and Settlement Agreement) with a directive to correct the cause of noncompliance with a monetary penalty for isolated, minor violations, and more complex orders (consent orders, administrative orders, emergency orders) with conditions and higher monetary penalties for chronic and/or major violations. In addition to the enforcement strategy, inspections and surveillance activities were also increased.

Storm Water Management

The Water Quality Act of 1987 requires permits to be issued for certain types of storm water discharges, with primary focus on storm water runoff from industrial operations and large urban areas. The USEPA promulgated Storm Water Regulations on November 16, 1990. The GAEPD subsequently received delegation from the USEPA in January 1991 to issue NPDES Permits for regulating storm water in Georgia. GAEPD has developed and implemented a storm water strategy which assures compliance with the Federal Regulations.

Phase I of the Federal Regulations set specific application submittal requirements for large (population 250,000 or more) and medium (population 100,000 to 250,000) municipal separate storm sewer systems (MS4). The GAEPD has determined that the metropolitan Atlanta area is a large municipal system as defined in the regulations. Clayton, Cobb, DeKalb, Fulton and Gwinnett Counties and all the incorporated cities within these counties were required to comply with the application submittal target dates for a large municipal area. Forty-five individual storm water permits were issued to the Atlanta area municipalities on June 15, 1994 and reissued in 1999 and 2004.

Augusta, Macon, Savannah, Columbus, the counties surrounding these cities and any other incorporated cities within these counties were identified as medium municipal systems as defined in the storm water regulations. Thirteen individual storm water permits were issued to the medium municipal systems in April and May, 1995. These permits were reissued in April 2000 and 2005.

The storm water permits for large and medium municipal systems require the submittal of Annual Reports to GAEPD. Each year, the Georgia storm water permitting program reviews the Annual Reports from the large and medium municipalities. Among other things, the Annual Report includes a detailed description of the municipality's implementation of its Storm Water Management Program. The GAEPD provides comments on the Annual Reports to the MS4 permittees, noting areas of noncompliance and recommending improvements to the local Storm Water Management Programs.

On December 8, 1999 USEPA promulgated the Phase II Rules for Storm Water. Phase II requires NPDES permitting and the development of Storm Water Management Programs for a large number of smaller cities and counties.

Construction sites from 1 to 5 acres and municipally-owned industrial facilities will also be regulated.

Phase II regulations for MS4s required permit coverage for all municipalities with a population less than 100,000 and located within an urbanized area, as defined by the latest Decennial census. In addition, EPD was required to develop criteria to designate any additional MS4s which had the potential to contribute to adverse water quality impacts. In December 2002, EPD issued an NPDES General Permit which covered 84 Phase II MS4s, including 55 cities and 29 counties. The NPDES General Permit does not require any monitoring or contain specific effluent limitations. Instead, each Phase II MS4 permittee is required to institute best management practices that will control stormwater pollution. The Phase II permittees were required to submit a Notice of Intent (NOI) for coverage under the NPDES Permit by March 10, 2003. As part of the NOI, the MS4 was required to develop a SWMP that included best management practices in six different areas or minimum control measures. These six minimum control measures are Public Education, Public Involvement, Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, Post-Construction Storm Water Management, and Pollution Prevention.

The GAEPD has issued general permits for the eleven industrial subcategories defined in the Phase I Federal Storm Water Regulations. During 1993, the GAEPD issued a general NPDES permit (GAR000000) that regulates the discharge of storm water from 10 categories of industrial activity. This permit was reissued in 1998. The permit was administratively extended in 2003, with approximately 3500 facilities retaining coverage. Multiple stakeholder meetings were held in the following two years, leading to a new permit issuance in March 2005. This permit was appealed in April 2005 by one industry and several environmental groups. Many months of negotiation meetings are expected to result in a new draft permit in Spring 2006.

A second general NPDES permit that would regulate storm water discharges from construction activities was issued by GAEPD and subsequently appealed in 1992, 1994, 1995, 1996 and 1999. Settlement negotiations involving the regulated community who filed the three petitions, several environmental organizations, GAEPD, and a professional facilitator began in October 1999. After months of negotiation, GAEPD issued a revised general NPDES permit GAR100000 for construction activities on June 12, 2000. The permit became effective on August 1, 2000. That permit regulated storm water discharges associated with land disturbances of five acres or greater. A three-tiered permitting structure allowed a differentiation of responsibility between permittees.

The NPDES permit that regulates storm water discharges from construction activities was reissued by GAEPD on August 13, 2003. The permit was reissued as three permits: Stand Alone, Infrastructure and Common Development, and required coverage for projects disturbing one acre or more. Changes to the permit included a reduction in monitoring requirements, and the addition of a plan submittal requirement for projects located in areas that do not have a local issuing authority or are exempt from local issuing authority ordinances. The reissuance of the permit was facilitated by the Storm Water General Permit Advisory Committee (GPAC) who had been holding regular meetings since November 2000 to discuss permit issues. GPAC was comprised of those parties who were involved in the 1999 settlement negotiations, as well as additional stakeholders such as Georgia DOT. GPAC was tasked with recommending appropriate changes to the current permit, and examining how Phase II NPDES permitting for sites disturbing between one acre and five acres would be incorporated into the permits. The construction permits require permittees to implement best management practices, conduct inspections, and sample storm water leaving their site after certain rainfall events. Approximately 6,600 primary NOIs and 15,000 NOIs have been received by GAEPD as of September 30, 2005.

The Erosion and Sedimentation Control Technical Study Committee (Dirt II) was formed in 1996. Dirt II developed a two-phase mission statement. The first phase involved developing practical guidance for project site management and erosion and sediment control techniques with an emphasis on protecting water quality. The second phase focused on determining how best to meet turbidity levels recommended in previous "Dirt I" report. This involved an evaluation of new and emerging engineering tools, "state of the practice" erosion and sediment control devices and techniques, and resultant performance levels for both under various site and rainfall scenarios. The Dirt II Committee, whose efforts were partially funded by a \$400,000 state grant, presented their findings and recommendations in a final report published by the Chattahoochee-Flint Regional Development Center in July 2001.

An important component of storm water management in Georgia is information exchange/technology transfer. GAEPD staff participated in many meetings and seminars throughout Georgia in an effort to disseminate information concerning Georgia's storm water requirements to the regulated community. In addition, staff from the central Atlanta office conducted inspections at approximately 85 industrial facilities to assess compliance with the industrial general storm water permit during 2004-2005. Approximately 12 of these inspections involved coordination with GAEPD Regional Office personnel.

The GAEPD will continue to regulate storm water runoff from industrial facilities, construction sites and urban areas as a part of the point-source permitting process to protect water quality.

Erosion and Sedimentation Control

The Erosion and Sedimentation Act (Act) was signed into law in April 1975. This legislation was the result of over five years of work, debate, and legislative compromise. Agencies and groups that coordinated their efforts to this end included the Georgia Association of Conservation Districts, the State Soil and Water Conservation Commission, and the GAEPD.

The intent of the Act is to establish a statewide and comprehensive program for erosion and sedimentation control to conserve and protect air, water and land resources of the State. The Act provides a mechanism for controlling erosion and sedimentation as related to certain land disturbing activities. Land disturbing activities are any activities which may result in soil erosion and the movement of sediments into State waters and onto lands within the State. Such activities may include, but are not limited to, clearing, dredging, grading, excavating, transporting, and filling of land. Activities not regulated under the Act include surface mining, construction of single family homes being constructed by the owner or under contract to an owner, and minor activities such as home landscaping and gardening.

Implementation of the Act involves local units of governments and State agencies. The Act provides for municipalities and Counties to adopt local ordinances and to become delegated "Issuing Authorities". The GAEPD delegates local "Issuing Authority" and administers the GAEPD rules where there is no local authority, and oversees local program implementation. Currently 212 municipalities and 119 counties have adopted ordinances, which have been reviewed by the GAEPD for compliance with the Act.

The Erosion and Sediment Control Overview Council (Council) was created in accordance with Senate Bill 524, which amended the Georgia Erosion and Sedimentation Act in May 2000. The Council was tasked with developing recommendations governing the preparation of plans and the installation and maintenance of best management practices for erosion and sediment control for Georgia Department of Transportation (DOT) projects. The Erosion and Sediment Control Overview Council did not meet during 2004 or 2005.

House Bill 1426 was the second of the two amendments to the Act passed during the 2000 session. This amendment made changes to the stream buffer minimum requirements and required that the Georgia Board of Natural Resources establish new rules for the implementation of these changes. Other changes were the establishment of stop work procedures and minimum mandatory penalties for violations.

House Bill 285 was passed during the 2003 legislative session. The legislation amended the Georgia Erosion and Sedimentation Act to create an integrated permitting program for erosion and sedimentation control for land disturbing activities of one acre or greater, thereby standardizing the requirements for local Land Disturbing Activity Permits and the NPDES Construction Storm Water Permits. The legislation incorporated feedback from the Erosion and Sediment Control Overview Council, recommendations from an Erosion and Sedimentation Program Performance Audit of September 2001, and information from various erosion and sedimentation committees. The amendment to the Act required that the Georgia Board of Natural Resources establish new rules to implement the changes to the Act, created Georgia's first NPDES permit fee system, and established training and education requirements for individuals involved in land development design, review, permitting, construction, monitoring or inspection of any land disturbing activity. The changes to the Act included elimination of Land Disturbing Activity Permits for jurisdictions that do not have a local issuing authority, requirement of a site visit by the plan preparer before creation of an erosion and sedimentation plan, replaced mandatory penalties with mandatory stop work orders for three specific types of violations, changes to permit exemptions, and reduction of the minimum permitting acreage limit from 1.1 project acres to 1.0 disturbed acres.

Senate Bill 460 was passed during the 2004 legislative session. The legislation amended the Georgia Erosion and Sedimentation Act to add three new criteria under which the EPD director can consider stream buffer variances. The legislation also required The Georgia Board of Natural Resources to adopt amendments to the Erosion and Control Rules to implement the new criteria. In December 2004, the Georgia Board of Natural Resources adopted amendments to the Erosion and Sedimentation Control Rules. These amendments, which went into effect on January 10, 2005, established three new criteria, deleted one existing criteria, and amended another criteria for the consideration of stream bank buffer variances. Also amended were the procedures for the review of stream buffer variances to implement the changes to the criteria.

During the 2004-2005 period, the GAEPD decertified as issuing authorities 8 counties and 14 cities. Nine of the cities and 8 of the counties requested decertification. Four of the cities were decertified because they did not update

their local ordinances in response to the 2003 changes to the Act. One city had its certification revoked for poor implementation of its erosion and sedimentation program. During this same period, 6 cities and 1 county were certified as local issuing authorities.

The GAEPD issued 52 stream buffer variances under the new rules established by Senate Bill 460 which went into effect on January 10, 2005.

GAEPD's Erosion and Sedimentation Control Program was audited by the State Department of Audits in 2001. Their September 2001 report made several recommendations to improve the program. The primary recommendation is for better implementation of the program at the state and local level, particularly in the area of enforcement. The statutory, regulatory and permit changes that have occurred since that time have addressed the recommendations in the audit report.

Nonpoint Source Management Program

Nonpoint sources of water pollution are both diffuse in nature and difficult to define. Nonpoint source pollution can generally be defined as the pollution caused by rainfall or snowmelt moving over and through the ground. As water moves over or through the soil, it picks up and carries away natural pollutants and pollutants resulting from human activities, finally depositing them in lakes, rivers, wetlands, coastal waters and ground waters. Habitat alteration (e.g., removal of riparian vegetation) and hydrological modification (e.g., channelization, bridge construction) can cause adverse effects on the biological and physical integrity of surface waters and are also treated as nonpoint sources of pollution.

The diffuse nature of nonpoint sources (e.g., agriculture, construction, mining, silviculture, urban runoff) and the variety of pollutants generated by them create a challenge for their effective control. Although progress has been made in the protection and enhancement of water quality, much work is still needed to identify nonpoint source management strategies that are both effective and economically achievable under a wide range of conditions.

The control of dominant point source problems has allowed the GAEPD to place increasing emphasis on the prevention, control and abatement of nonpoint sources of pollution. The GAEPD is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and ground water. Consequently, the GAEPD has been designated as the administering or lead agency for implementing the State's *Nonpoint Source Management Program*. This program combines regulatory and non-regulatory approaches, in

cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, non-governmental organizations and individual citizens.

The Georgia Soil and Water Conservation Commission (GSWCC) have been designated by the GAEPD as the lead agency for implementing the agricultural component of the State's *Nonpoint Source Management Program*. Similarly, the Georgia Forestry Commission (GFC) has been designated as the lead agency for implementing the silvicultural component of the State's *Nonpoint Source Management Program*, and the Department of Community Affairs (DCA) has been designated the lead agency and point of contact for urban/rural nonpoint source pollution.

Georgia's initial *Nonpoint Source Assessment Report* was completed in compliance with the Federal Clean Water Act and approved by the USEPA in January 1990. This report, *Water Quality in Georgia 2000-2001*, as required by Section 305(b) of Public Law 92-500, serves as the current process to update the *Nonpoint Source Assessment Report*.

The revision of the State's *Nonpoint Source Management Program* in FFY 2000 met the requirements for funding under Section 319(b) of the Federal Clean Water Act and delineated short and long-term goals and implementation strategies. Just as important, it is also an information resource for the wide range of stakeholders across the State involved in the prevention, control and abatement of nonpoint sources of pollution. It was developed as an inventory of the full breadth of nonpoint source management (regulatory and non-regulatory) in Georgia, including activities for the time period FFY 2000 through FFY 2004.

Currently, the State is in the process of revising the *Nonpoint Source Management Program* to update the goals, activities and implementation strategies of the Program. The plan update will focus on the comprehensive categories of nonpoint sources of pollution identified by the USEPA: Agriculture, Silviculture, Construction, Urban Runoff, Hydrologic/Habitat Modification, Land Disposal, Resource Extraction and Other Nonpoint Sources, and will be developed through a consultation process, incorporating input from a wide range of stakeholders involved in nonpoint source management activities throughout the State: local, regional, State and Federal agencies, as well as private, non-governmental organizations. This process will encourage intergovernmental resource sharing and increased stakeholder involvement. This revision of the State's *Nonpoint Source Management Program* will establish new partnerships and strengthened existing partnerships in the development and implementation of nonpoint source strategies.

Local governments, regional development centers, private non-governmental organizations and the general public have a critical role in developing and implementing nonpoint source management strategies. The State continues to expand its role in facilitating and supporting local and regional nonpoint source management activities. The GAEPD is currently in the process of forming a Statewide Nonpoint Source Task Force to assist in the direction and focus of the State's nonpoint source activities. The Task Force is assembled from a variety of stakeholder groups. The initial meeting of the Urban/Rural NPS Task Force Technical Advisory Committee has begun to meet to address specific nonpoint source issues or concerns. Additional Technical Advisory committees will be formed to address additional issues or concerns (agriculture, silviculture, habitat/hydrologic modification, etc.)

Under Section 319(h) of the Federal Clean Water Act, the USEPA awards a Nonpoint Source Implementation Grant to the GAEPD to fund eligible projects that support the implementation of the State's *Nonpoint Source Management Program*. Section 319(h) Grant funds for the prevention, control and/or abatement of nonpoint sources of pollution are made available annually to public agencies in Georgia. Section 319(h) of the Clean Water Act provides grants to the States to implement nonpoint source projects. The funds are distributed via competitive process to public agencies and governmental agencies. Receiving agencies are required to show substantial local commitment by providing at least 40% of the total project cost in local match or in-kind efforts. Priorities for projects include projects implementing the nonpoint source components of TMDL implementation plans, or projects addressing the violated criteria of listed streams. Education, demonstration, and technical assistance projects are also eligible for funding, subject to restrictions. In FY 04, Georgia's Section 319(h) grant project funded 17 projects for over \$3.8 million, and 9 projects for over \$4 million. For FY06, Georgia is poised to award over \$3 million to local governments and agencies to support streambank restoration, watershed planning, TMDL implementation, and support of Georgia's Coastal Nonpoint Source Management Program.

Currently, Georgia's Nonpoint Source Program administers more than 130 Section 319(h) projects, totaling more than \$35 million dollars in funds awarded to cooperating agencies. Projects activities include implementing TMDL implementation plans and Watershed Management Plans, watershed planning, monitoring and assessment, enforcement, technical assistance, and information and education.

Priorities for projects include projects implementing the nonpoint source components of TMDL implementation plans, or projects addressing the violated

criteria of listed streams. Education, demonstration, and technical assistance projects are also eligible for funding, subject to restrictions.

The GAEPD uses a competitive process to ensure that the most appropriate projects are selected for funding. In accordance with the Fair and Open Grant Act, the GAEPD publishes a description of the Section 319(h) Nonpoint Source Implementation Grant Program with the Secretary of State prior to disbursement of any grant funds. In accordance with the provisions of O.C.G.A. 28-5-122, the grant description filed with the Secretary of State includes information regarding the general scope and purpose of the grant program, general terms and conditions of the grant, eligible recipients of the grant, criteria for the award, and directions and deadlines for applications.

Section 319(h) Grant projects must specifically identify the nonpoint sources of pollution being addressed and the activities proposed to prevent, control and/or abate these nonpoint sources of pollution. Types of activities which are eligible include: regulatory or non-regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer, watershed projects, demonstration projects, update and refinement of nonpoint source programs and assessments, monitoring to assess the success of specific nonpoint source implementation projects, urban stormwater control activities not specifically required by a draft or final NPDES permit, and certain ground water activities. Lake protection and restoration activities are eligible provided that they are not used for *in-lake* work such as aquatic macrophyte harvesting or dredging unless the nonpoint sources of pollution will be remediated.

Eligible recipients of Section 319(h) Nonpoint Source Implementation Grant funds include local, regional and State units of government, local authorities which operate local government service delivery programs, regional development centers, local school systems, State colleges and universities, and State agencies. Local governments must have Qualified Local Government status, in compliance with the requirements of the Georgia Planning Act of 1989 and Service Delivery Strategy Law of 1997.

Priority is given to project proposals which implement the nonpoint source components of Total Maximum Daily Loads that have been approved under Section 303(d) of the Federal Clean Water Act; develop and/or implement the nonpoint source components of Watershed Restoration Action Strategies; and implement action to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are partially or not supporting designated or beneficial uses due to nonpoint sources of pollution.

In addition, priority is given to projects that encompass or support a watershed management approach and result in measurable improvements in water quality. A watershed approach is a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. Major features of a watershed management approach are: targeting priority problems, promoting a high level of stakeholder involvement, integrated solutions that make use of the expertise and authority of multiple agencies, and measuring success through monitoring and other data gathering. The application of increased Section 319(h) Grant funds to focus on solving nonpoint source pollution problems will enable the State to make great strides in achieving water quality goals.

Agriculture

Georgia's Agriculture Nonpoint Source Management Program is implemented through a statewide non-regulatory approach. Benefits have accrued to Georgia as a result of voluntarily installed best management practices and the implementation of conservation incentive programs. These voluntary programs are enhanced by numerous financial, technical assistance, education, demonstration, and research activities delineated in the State's *Nonpoint Source Management Program*. Implementation of the Agriculture Nonpoint Source Management Program supports Georgia's River Basin Management Planning process as a critical State initiative to identify priority waters and to target nonpoint source management activities.

Agriculture nonpoint source pollution prevention opportunities can be broken down into handling of animal waste runoff, soil erosion, nutrients, pesticides, and agrichemicals. Water quality degradation and soil erosion can often be limited or prevented through the implementation of proven techniques. Georgia's Agriculture Nonpoint Source Management Program supports BMP demonstration projects, technical assistance, and research activities to explore and promote these techniques. Nutrient management plans and land application of effluent can improve soil and maintain water quality. This is an expanding area of research and demonstration in the specialized aquaculture segment and the traditional poultry, swine, and beef production sectors of the agriculture industry. Precision farming, integrated pest management (IPM), and other best management practices can often be used to decrease the need for agrichemical inputs and to increase their effectiveness on cropping systems. Many improved methods of storing and handling agrichemicals are based firmly in the principles of reducing risk of environmental contamination. Georgia has growing programs in pesticide container recycling, outdated pesticide collection, and self-administered risk assessment consistent with the goals of pollution prevention in agricultural production and management. Agriculture nonpoint source management efforts that maintain or improve environmental quality, focus on

pollution prevention, and demonstrate techniques for economic viability will continue to guide Georgia toward sustainable agricultural systems.

The statewide non-regulatory approach uses cooperative partnerships with various agencies and a variety of activities and programs. Agencies that form the basis of the partnerships include the GSWCC (designated lead agency administrating the Agriculture Nonpoint Source Management Program), SWCD, NRCS, UGACAES, CES, FSA, GFC and the GDA. These agencies work closely with Georgia agricultural commodity commissions and organizations such as the GFBF, GAC, RC&D Councils, Cattleman's Association, Milk Producers, Pork Producers Association, Poultry Federation, Goldkist, The Georgia Conservancy, and GWF as well as other producer groups and agriculture support industries to prevent and solve water quality problems. In addition to the agriculture agencies and interest groups, a working partnership with individual land users is the cornerstone of soil and water conservation in Georgia.

The cooperating agencies have specific functions and directions. All have an information, education, and public participation component to support their objective to improve and maintain water quality. Of the agriculture agencies, only the GDA has enforcement authority. The GSWCC works with GAEPD, the enforcement agency for the Georgia Water Quality Control Act, to resolve agricultural water quality complaints, where appropriate. The UGACAES and NRCS produce and distribute numerous brochures and fact sheets dealing with agriculture best management practices and water quality.

A cooperative effort between UGACAES and P²AD is providing pollution prevention information, education and technical assistance to the farmer and green industry professionals to reduce nonpoint source pollution as a result of fertilizer and pesticide use. The GSWCC, UGACAES, GAEPD and the P²AD have established the Georgia Farm-A-Syst Program to address the problems of nonpoint source contamination of surface and groundwater from agricultural sources. The overall objective of this program is to develop and test voluntary agricultural self assessment materials to fit the needs and conditions throughout the State. The self assessments, fact sheets, and action plans encourage farmers to become environmentally proactive and to ultimately take steps to prevent nonpoint source pollution. Additional information is available at the national Farm-A-Syst website, www.uwex.edu/farmasyst, with links to the Georgia Farm-A-Syst Program.

The GSWCC has continued to sponsor local demonstration projects, provide farmers with visual demonstrations and information on the use and installation of best management practices, and collect data and generate computer databases on land use, animal units and agricultural BMP implementation. The GSWCC

has published and continues to distribute the following guidebooks for implementing agricultural best management practices to protect the State's waters: *Agricultural Best Management Practices for Protecting Water Quality in Georgia*, *Planning Considerations for Animal Waste Systems*, *A Georgia Guide to Controlling EROSION with Vegetation*, and *Guidelines for Streambank Restoration*.

Since 1990, approximately \$11,650,000 in Section 319(h) Grant monies have been used to fund agricultural water quality demonstration projects in Georgia. In addition to the minimum 40% required non-federal in-kind match, the NRCS has contributed hundreds of hours of time worth many millions of dollars in technical assistance to support these projects. The UGACAES, GSWCC, FSA, GFC and other agencies have also contributed significant technical assistance to support these projects. These projects offer solutions, as well as financial and technical implementation assistance, in identified priority watersheds.

The 2002 Farm Bill contains conservation provisions that will have far reaching impacts on the protection of water quality from nonpoint source pollution in Georgia. The conservation provisions seek to improve the flexibility and efficiency of existing programs by diversifying agency participation in the delivery of conservation programs that protect water quality and related natural resources.

2002 Farm Bill Programs under NRCS supervision include the Forestry Incentive Program (FIP), Wetland Reserve Program (WRP), the Environmental Quality Incentives Program (EQIP), the Wildlife Habitats Incentives Program (WHIP), the Conservation Reserve Program (CRP), the Farmland Protection Program and the new conservation Security Program (CSP). Collectively these programs, described more fully in the State's *Nonpoint Source Management Program*, will continue to have a significant and positive impact on Georgia's natural resources.

The conservation program delivery process initiated by the Bill will cause a number of positive events to occur at the local, state, regional, and national levels. The Bill focuses first and foremost on resource concerns and considers conservation programs as tools with which to address the identified concerns. Multiple agencies, therefore, can take advantage of their common goals to protect and improve the natural resources of this State. Programs in the Bill seek to address high priority environmental protection goals through the cooperative work of Federal, State, and local agencies, as well as an active State Technical Committee. This cooperative effort will continue to identify and set resource concern priorities thereby establishing Georgia's agricultural priority environmental protection goals. Applying common goals to address resource

concerns in many of Georgia's geographic settings, which vary greatly, will encourage multiple agencies to find common solutions to resource impairment.

The Federal cost-share programs in the Bill will bring millions of dollars to Georgia. By requiring priority areas to be identified and ranked, conservation assistance will maximize the environmental benefit per dollar expended. Therefore, capital funding and technical expertise can be leveraged to enhance ongoing State and local efforts to more efficiently manage our natural resources.

Another benefit arising from this new process is the focus on the locally led conservation program delivery process, which should lead to a higher rate of landowner participation. Under a voluntary approach, the programs can only be effective to the extent that they are used. The process will result in a sense of ownership at the local level arising from local identification of local resource concerns, needs, and goals. Landowners will better understand the impact of their actions on their communities and will be better equipped to comply with environmental regulations, including the nonpoint source components of approved TMDLs.

The Environmental Quality Incentive Program (EQIP) is a voluntary conservation program that promotes environmental quality to producers and helps farmers and ranchers reduce soil erosion, improve water use efficiency and protect grazing land by installing conservation practices that protect natural resources. EQIP provides technical, financial and educational assistance.

NRCS is the lead agency for EQIP and works with many State and local partners to identify local priorities and recommend priority areas and program policy. In 2003, the EQIP program provided over \$10 million in incentive payments and cost-sharing for conservation practices through 720 contracts. Requests for funds were more than four times the available funds. In 2004, more than \$12 million dollars in cost-share funds were available for implementation in Georgia.

In 2005, the EQIP program provided over \$10 million in incentive payments and cost-sharing for conservation practices covering more than 200,000 acres, including 400,000 linear feet of fencing, 140,000 acres of heavy use protection, and 4,500 stream crossings. In 2006, \$14.3 million in EQIP cost-share funds will be available for implementation in Georgia, and more than \$21 million dollars in overall Farm Bill programs.

The Conservation Security Program (CSP) is a voluntary conservation program that supports ongoing stewardship of working agricultural lands by providing payments for maintaining and enhancing natural resources. CSP identifies and rewards those farmers who are meeting the highest standards of conservation

and environmental management on their operations. In addition, CSP creates powerful incentives for other producers to meet those same standards of conservation performance. Through these rewards and incentives, CSP builds a foundation of conservation that provides current and future benefits to the public.

The Natural Resources Conservation Service (NRCS) uses watersheds to determine CSP participation as a best science-based way to group together producers working on similar environmental issues. As CSP grows, more watersheds will be added to the areas eligible for sign up each year.

For 2004, Georgia's Little River Watershed, part of the Suwannee River Basin was targeted. 37 contracts were approved for the Little River Watershed, covering more than 32,000 acres. A total of \$915,928 in payments were approved, averaging \$25,000 per contract.

Five contiguous watersheds were selected to participate in 2005: the Middle Flint, Ichaway-nochaway, Kinchafoonee-Muckalee, Little, and Upper Ochlockonee Watersheds. 111 contracts were approved in the five watershed area, including management practices to address water quality, nutrients, soil quality, and wildlife habitat. More than \$2.8 million in payments were approved, averaging \$25,000 per contract. Georgia's CSP watersheds for 2006 will be the Withlacoochee and Little Ocmulgee.

Watersheds that are selected to participate contain a variety of land uses and input intensities, have high-priority resource issues to be addressed, including issues that meet State priorities, have a history of good land stewardship on the part of landowners, and have the technical tools necessary to streamline program implementation. Watersheds also were evaluated from a national perspective regarding regional resource issues. Additional information may be found at: www.nrcs.usda.gov/programs/csp/

Silviculture

The Georgia Forestry Commission has been an integral partner with the GAEPD since 1977, committed to protect and maintain the integrity and quality of the State's waters. The GAEPD designated the Georgia Forestry Commission (GFC) as the lead agency for the silviculture portion of the State's *Nonpoint Source Management Program*. The Silviculture Nonpoint Source Management Program is managed and implemented by the GFC, with the support of the forestry industry, for the voluntary implementation of best management practices.

This program is managed by a Statewide Water Quality Coordinator and 12 foresters serving as District Water Quality Coordinators. The GFC Statewide and

District Water Quality Coordinators have received specialized training in erosion and sediment control, forest road layout and construction, stream habitat assessment and wetland delineation. The Statewide and District Water Quality Coordinators provide local and statewide training to forest community through workshops, field demonstrations, presentations, management advice to landowners and distribution of *Georgia's Best Management Practices for Forestry* manual and brochures.

The GFC also investigates and mediates complaints involving forestry operations. After notifying the landowner, the GFC District Coordinators conduct field inspections to determine if best management practices were followed, if the potential for water quality problems exists, if a contract was used and who purchased the timber. If a written contract was executed, the GFC District Coordinators will verify if the contractual agreement contains a clause specifying the implementation of BMP. If problems do exist, the GFC District Coordinator will work with the timber buyer and/or logger on behalf of the landowner to correct the problems. Complaints usually involve logging debris left in streams and are resolved without involving the GAEPD. However, the GFC is not a regulatory authority. Therefore, in situations when the GFC cannot get satisfactory compliance, the case is turned over to the GAEPD for enforcement action as provided under the Georgia Water Quality Control Act.

The State Board of Registration for Foresters has adopted procedures to sanction or revoke the licenses of registered foresters involved in unresolved complaints where actions or lack of supervision to implement best management practices have resulted in violations of the Board's land ethic criterion, Georgia Water Quality Control Act, or Federal wetlands regulations.

A long-term goal of Georgia's Nonpoint Source Management Program is to achieve 100% compliance in implementation of recommended Best Management Practices for silviculture. Since 1981, partner agencies in Georgia have been promoting silviculture BMPs to protect water quality in their educational programs. To determine the success of educational programs, and the effectiveness of recommended BMPs, the GFC (with financial support from Section 319(h) funds) conducts a biennial Statewide BMP Compliance Survey. The survey assesses the application of best management practices by logging operations.

In 2002, the GFC completed a biennial standardized survey of BMP compliance, including the rates of BMP implementation, units (areas, miles, crossings) in BMP compliance, effectiveness of BMPs, and areas to target for future BMP training. Overall BMP compliance was 99.1% (out of 49,452 acres evaluated.) This is a one percent increase from the 1998 survey, and more than seven

percent increase from the 1992 survey. Out of the 12,195 applicable, individual BMPs evaluated, 86% were implemented, a seven percent increase from the 1998 survey, and a nearly 20% increase from 1992. Out of the 226 miles of streams evaluated, more than 94% were found to have no impacts or impairments from forestry practices. The results from the biennial Statewide BMP Compliance Surveys will be used to update and revise the Silviculture Nonpoint Source Management Program.

The survey results for 2004 increased overall BMP compliance to 99.4% (out of 43,947 acres evaluated.) This is a point three (0.3) percent increase from the 2002 survey. Out of the 12,093 applicable, individual BMPs evaluated, 89.8% were implemented, a three point nine (3.9) percent increase from the 2002 survey. Out of the 234.68 miles of streams evaluated, more than 95.9% were found to have no impacts or impairments from forestry practices. This is an improvement of 1.7% from the 2002 survey. The results from the biennial Statewide BMP Compliance Surveys will be used to update and revise the Silviculture Nonpoint Source Management Program.

Currently, silviculture BMP compliance is estimated to be at more than 99%. As of this report, the Georgia Forestry Commission has instructed over 3,000 individuals in proper BMP uses. In addition, the Georgia Forestry Commission has addressed and resolved over 75 different logging complaints, and has conducted more than 150 one-to-one conferences with silviculture workers and professionals on-site or in the field.

The Georgia Forestry Association (GFA) and the forestry industry have played a significant role in encouraging the voluntary implementation of BMPs in Georgia. The forest industry has initiated numerous education workshops and training programs. The American Forest and Paper Association (AFPA) has adopted the Sustainable Forestry Initiative Program. The objective of the Sustainable Forestry Initiative Program is to induce and promote a proactive approach to forest management, including the protection of water resources. Two pertinent aspects of this program are: 1) A continuing series of 2½ day Master Timber Harvester Workshops with a component devoted to the protection of water resources and the implementation of best management practices, and 2) A Land Owner Outreach Program which endeavors to deliver information about forestry management and the protection of water resources to forest land owners.

Urban Runoff

The 1990 report of the Community Stream Management Task Force, *We All Live Downstream*, established a road map for urban runoff nonpoint source management in Georgia. The task force was convened in 1988 to assist the

Georgia Department of Natural Resources with impacts on urban streams. The task force's report emphasized the importance of cooperative partnerships and building working relationships between the units of government responsible for land and water quality management. Educational, management, and support strategies were recommended to help move toward an integrated structure which would allow continued evolution of intergovernmental and private sector structures and promote development of urban stream management activities over time.

The task force recognized two major impediments to effective management of urban water bodies. The first is the division between statutory responsibilities for management of water quality, granted to GAEPD, and local governments' constitutional responsibility for management of the land activities that affect urban waterbodies. The second impediment is the diffuse nature of nonpoint source pollution and the variety of activities that may contribute to impacts from urban runoff. They concluded that urban runoff nonpoint source management would require a cooperative partnership between layers of government, the private sector, and the general public. The development of such a partnership will require a strong impetus to accept new institutional roles and make the structural changes necessary to support and sustain the stream management process.

Since publication of *We All Live Downstream*, urban runoff nonpoint source management in Georgia has continued to evolve. Consistent with the multiple sources of urban runoff, the management systems have multiple focuses. Some programs focus on specific sources of urban runoff, targeting implementation of structural and/or management BMPs on individual sites or systemwide. Other programs treat corridors along waterbodies as a management unit to prevent or control the impacts of urban runoff on urban streams. Additional programs focus on comprehensive watershed management. This approach, which considers the impacts of all the land draining into a waterbody and incorporates integrated management techniques, is particularly critical to protecting and enhancing the quality of urban streams. Urban waterbodies cannot be effectively managed without controlling the adverse impacts of activities in their watersheds.

While the State continues to have an important regulatory role, aspects of the cooperative intergovernmental partnerships envisioned by the task force have emerged and are being strengthened. GAEPD is implementing programs which go beyond traditional regulation, providing the regulated community with greater flexibility and responsibility for determining management practices. The GAEPD is also expanding its role in facilitation and support of local watershed management efforts.

In this next decade, water resource management and the regulatory issues pertaining to water will be the most critical environmental issues faced by many local governments. Unlike many of the environmental issues local governments have faced in the past, water issues must be addressed on a regional or watershed basis to be truly effective. The major urban/industrial region of the State is highly dependent upon limited surface water resources found in the northern portion of the State. With limited storage capacity and limited ground water resources in this region, it is imperative that these limited water resources be used wisely and their quality be maintained. In South Georgia, groundwater resources must be managed carefully to prevent contamination and salt water intrusion from excess water withdrawals. A stable, reliable framework and clearinghouse for regional cooperation, information sharing, and technical assistance is needed to prepare local governments and citizens to meet these challenges. The Georgia Department of Community Affairs' Urban Nonpoint Source Management Program will fulfill this need.

Georgia Department of Community Affairs (DCA) is the lead partner and point of contact for urban nonpoint source pollution. As a lead partner with GAEPD, and utilizing Section 319(h) Grant funds, Georgia DCA is developing an Urban Nonpoint Source Management Program to foster regional watershed approaches to protect and enhance water quality. The Program will establish a single point of contact for local governments to use when they are seeking state or federal support to address issues related to water quality in their community. As an information and networking center, the Program will provide water resources tools, one-on-one technical assistance, and workshops to address regional water quality issues to more than 2,500 local elected officials currently serving 159 counties and 532 cities. The Urban Nonpoint Source Management Program will also provide tools to link land-use and water quality in land-use planning, promote smart growth principles, and provide public education materials and programs on protecting water resources. DCA has recently completed an intensive and creative technical assistance period (charrette) with Tybee Island. This charrette helped Tybee island to create a plan for managing stormwater, and urban runoff. DCA completed the charrette March 14, 2005.

Additionally, an array of programs to manage urban runoff are under development or being implemented in a variety of locales. Catalysts which contribute to more comprehensive management of urban waterbodies include public interest groups, local governments, regional development centers, State agencies, and State laws and regulations (e.g., Metropolitan Rivers Protection Act, Georgia Planning Act Part V Standards). The development and implementation of Total Maximum Daily Loads for waterbodies not meeting water quality standards will continue to spur local and regional watershed management initiatives.

Other initiatives have been implemented to further statewide coordination and implementation of urban runoff best management practices. The Atlanta Regional Commission (ARC) and the GAEPD published the *Georgia Stormwater Management Manual – Volume 1, Stormwater Policy Guide and Volume 2, Technical Handbook* in August 2001. This guidance manual for developers and local governments illustrates proper design of best management practices for controlling stormwater and nonpoint source pollution in urban areas in Georgia.

The University of Georgia's Marine Extension Service (MAREX) has partnered with local government officials to improve water quality through the Nonpoint Education for Municipal Officials (NEMO) program, part of the national Nonpoint Education for Municipal Officials (NEMO) network. The project is funded with a Coastal Incentive grant funds, and is also working closely with the Department of Community Affairs on their overall Statewide nonpoint source education efforts. MAREX provides educational programming, applied research, and technical assistance to communities along Georgia's coast

Other initiatives have been implemented to further statewide coordination and implementation of urban runoff best management practices. The Atlanta Regional Commission (ARC) and the GAEPD published the *Georgia Stormwater Management Manual – Volume 1, Stormwater Policy Guide and Volume 2, Technical Handbook* in August 2001. This guidance manual for developers and local governments illustrates proper design of best management practices for controlling stormwater and nonpoint source pollution in urban areas in Georgia.

The GAEPD and the University of Georgia School of Environmental Design developed land development code recommendations for incorporation into existing and/or new local government ordinances. The document, *Land Development Provisions to Protect Georgia Water Quality*, describes provisions that could be modified in or added to local development regulations to better protect water quality. This report also includes two sections introducing the problem of runoff water quality and its relationship to urban development. This document is intended to serve as a partial "menu" from which each municipality can select appropriate provisions and adapt them to the local conditions. Municipal ordinances where these provisions could be used include zoning and subdivision ordinances, erosion and sedimentation control codes, stormwater management ordinances and design standards documents.

In cooperation with the ARC, the GAEPD has also produced and distributed the reports, *Protecting Community Streams: A Guidebook for Local Governments in Georgia* and *Urban Streams Assessment and Evaluation Guidelines*. The guidebooks outline actions that a local community can undertake to protect its

healthy streams and restore its degraded streams. The guidebooks provide details of where and how to collect information on stream water quality, how to evaluate the quality of a community's streams, what protection measures should be considered and how all of this can be put together in an integrated planning and management program. The guidebooks are intended for use by government officials, public works departments, planning departments and drainage departments, but are also useful resources to any individual or community group interested in stream protection. The focus of the guidebooks is not only the stream and the stream's edge but the entire land area of watershed that drains into the stream. Streams are best protected through careful development of the land that they drain.

To a large extent, however, the conclusions of the Community Stream Management Task Force (CSMTF) still hold. The division between the State's responsibilities for water quality management and local responsibility for land management, as well as the variety of activities and sources which contribute to urban runoff problems, continue to pose challenges for management of nonpoint sources.

The water quality in an urban and/or developing watershed is the result of both point source discharges and the impact of diverse land activities in the drainage basin (i.e., nonpoint sources). Activities which can alter the integrity of urban waterbodies include habitat alteration, hydrological modification, erosion and sedimentation associated with land disturbing activities, stormwater runoff, combined sewer overflows, illicit discharges, improper storage and/or disposal of deleterious materials, and intermittent failure of sewerage systems. In a more recent assessment, studies reviewed by the CSMTF indicated that waterbodies throughout the State are threatened by the effects of urban development. During urbanization, pervious, vegetated ground is converted to impervious, unvegetated land. Land imperviousness in urban areas - as rooftops, roads, parking lots, and sidewalks - can range from 35% in lightly urbanized areas to nearly 100% in heavily urbanized areas. Increases in pollutant loading generated from human activities are associated with urbanization, and imperviousness results in increased stormwater volumes and altered hydrology in urban areas.

While the State has statutory responsibilities for water resources, local governments have the constitutional authority for the management of land activities. Therefore, it is necessary to forge cooperative partnerships between the State, local and regional governments, business and industry, and the general public. Watershed planning and management initiatives are necessary to identify local problems, implement corrective actions and coordinate the efforts of cooperating agencies.

Georgia Project WET (Water Education for Teachers) Program

Nonpoint sources of pollution are diffuse and varied; therefore, prevention, control and abatement of nonpoint source impacts will require action by a wide range of audiences. Effective nonpoint source management must address numerous activities of individuals, businesses, industries and governments that can adversely affect urban and rural waters. In many cases, these groups are unaware of the potential impacts of their activities or the corrective actions which may be taken.

A report outlining a plan for nonpoint source education in Georgia was completed in 1994. The *Georgia Urban Waterbody Education Plan and Program* delineated nonpoint source education strategies for seven target audiences: general public, environmental interest organizations, civic associations, educators, business associations, local government officials and State government officials. Given the limited resources and the scope of effort required to target each of these audiences concurrently, statewide nonpoint source education and outreach programs have been limited to the Georgia Project WET Program and the Georgia Adopt-A-Stream Program.

In October 1996, the Georgia EPD selected Project WET (Water Education for Teachers) curriculum as the most appropriate water science and nonpoint source education curriculum for the State. The Project WET curriculum is an interdisciplinary water science and education curriculum that can be easily integrated into the existing curriculum of a school, museum, university pre-service class, or a community organization. The goals of the Georgia Project WET Program are to facilitate and to promote awareness, appreciation, knowledge and stewardship of water resources through the development and dissemination of classroom (K-12) ready teaching aids.

The success of the Georgia Project WET Program has been phenomenal. Since 1997, several Project WET facilitator training workshops have been successfully completed across the State with over 400 Project WET facilitators trained statewide. In addition, more than 250 Project WET educator workshops have been completed in Georgia with more than 5,200 formal and non-formal educators implementing the Project WET curriculum in Georgia with a substantial number of students – over 600,000 students annually!

The Georgia Project WET Program provides educators with additional resources such as the Enviroscope Nonpoint Source, Wetlands and Groundwater Flow Models – demonstration tools used to emphasize the impacts of nonpoint source pollution to surface and ground waters, scripted theatrical performances and

costumes for *Mama Bass and the Mudsliders*, and promotional and instructional training videos. In addition, the *Dragonfly Gazette*, a bi-annual newsletter, is published and distributed to over 4000 educators statewide and nationally. Information is also available on the Georgia Project WET website, www.gaprojectwet.org

Each year, the Georgia Project WET Program partners with the Environmental Education Alliance of Georgia to conduct an Statewide conference and awards ceremony. The 2005 conference, *Keys for Successful Partnerships*, was held at the Unicoi State Park and Lodge near Helen, Georgia with over 250 participants.

During the conference each year, Georgia Project WET announces the *Project WET School of the Year*. Schools are selected based on their efforts to increase awareness about water issues and their commitment to water education. The chosen school receives funding and organizational assistance to host a Water Education Festival at their school. This annual event, *Make a Splash with Project WET*, is a national effort sponsored by Project WET USA and Nestle Waters, Inc. The *Make a Splash with Project WET* water festivals around the country consist of structured learning stations and exhibits where students actively engage in hands-on activities and investigations. More than 50,000 children around the country join together raising awareness about the importance of protecting our water resources. Additional information is available on the International Project WET website, www.projectwetusa.org.

In 2004, Georgia Project WET partnered with the City of Atlanta's Department of Watershed Management to produce *The Urban Watershed: A Supplement to the Project WET Curriculum and Activity Guide*. This supplement includes twelve real-world, engaging activities that have been designed for 4-8th grade students. The activities address topics such as water quality, non-point source pollution, drinking water systems, wastewater systems and impervious surfaces. It is the first curriculum of its kind, focusing on the Chattahoochee River watershed and the unique issues that face an urban watershed. To date, over 65 educators have been trained to implement the curriculum in their classrooms and in the field. In addition, the City of Atlanta was honored with the Public Education Award from the Association of Water Professionals as a result of its part in developing this Urban Supplement to Project WET.

The Georgia Project WET Program has been nationally recognized as a model program for its training strengths and techniques – specifically, the use of arts in environmental education. The Georgia Project WET Program offers educators in Georgia the opportunity to participate in the *River of Words*, an international poetry and art contest for students (K-12). This contest provides students with the opportunity to explore their own watersheds and to learn their “ecological”

addresses through poetry and art. The Georgia Project WET Program offers a free River of Words Teacher's Guide for educators with specific information about Georgia's watersheds. In addition, several nature centers throughout Georgia offer *River of Words* field trips for students and teachers.

National winners are selected by the former U.S. Poet Laureate, Robert Hass, and the International Children's Art Museum. Annually, only eight students are selected as National Grand Prize Winners to be honored at the Library of Congress in Washington DC or in San Francisco, California.

Over 20,000 entries are submitted to the *River of Words* contest each year and in 2001– three out of the eight National Grand Prize Winners were from Georgia! Since 1997, eleven students from Georgia have been recognized as National Grand Prize Winners and over 75 students have been selected as National Finalists and Merit Winners. In addition to the students that are recognized Nationally, Georgia Project WET conducts a State judging each year in which approximately 30 students are honored as State winners.

The State and National winners' work display in the *Georgia River of Words Exhibition*. Each year, Georgia Project WET partners with the Atlanta Botanical Garden to conduct the *Georgia River of Words Awards Ceremony* recognizing State and National winners from across the State. The event is a huge success—with over 250 guests from all regions of the State attending each year.

Georgia Adopt-A-Stream Program

The Georgia Adopt-A-Stream Program is a citizen monitoring and stream protection program with two staff positions in the Georgia EPD and over 50 local community and watershed Adopt-A-Stream coordinators. The community and watershed coordinators are a network of college, watershed, or local government-based training centers located throughout Georgia. This network of local coordinators provides training workshops and educational presentations that allow the Georgia Adopt-A-Stream Program to be accessible to all areas of the State. The Regional Training Centers ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control.

Stakeholder involvement and stewardship are essential to implementing Georgia's River Basin Management Planning (RBMP) approach to water resource management. The Georgia Adopt-A-Stream Program objectives support the RBMP strategies for stakeholder involvement and stewardship: (1) increase individual's awareness of how they contribute to nonpoint source pollution problems, (2) generate local support for nonpoint source management

through public involvement and monitoring of waterbodies, and (3) provide educational resources and technical assistance for addressing nonpoint source pollution problems statewide.

Currently, more than 13,000 volunteers participate in 240 individual and over 50 community sponsored Adopt-A-Stream Programs. Volunteers conduct clean ups, stabilize streambanks, monitor waterbodies using biological and chemical methods, and evaluate habitats and watersheds at over 265 sites throughout the State. These activities lead to a greater awareness of water quality and nonpoint source pollution, active cooperation between the public and local governments in protecting water resources, and the collection of basic water quality data. The Georgia Adopt-A-Stream Program focuses on what individuals and communities can do to protect from nonpoint sources of pollution.

Volunteers are offered different levels of involvement. Each level involves an education and action component on a local waterbody. The introductory level consist of setting up a project (i.e., identifying a stream segment, lake, estuary or wetland, identifying partners, registering with the Georgia Adopt-A-Stream Program), evaluating land use and stream conditions during a watershed walk, conducting quarterly visual operations and clean-ups, and public outreach activities. Volunteers create a “Who to Call for Questions or Problems” list so that if something unusual is noted, immediate professional attention can be obtained. Advanced levels of involvement include biological monitoring, chemical monitoring, habitat improvement or riparian restoration projects.

The Georgia Adopt-A-Stream Program provides volunteers with additional resources such as the *Getting to Know Your Watershed and Visual Stream Survey*, *Biological and Chemical Stream Monitoring*, *Adopt-A-Wetland*, *Adopt-A-Lake*, and *Adopt-A-Stream Teacher’s Guide* manuals, PowerPoint presentations, and promotional and instructional training videos. Every two months a newsletter is published and distributed to over 4,500 volunteers statewide with program updates, workshop schedules, and information about available resources. Additional information about the Georgia Adopt-A-Stream Program, watershed investigation and water quality monitoring is available on the *Rivers Alive* website, [at](http://www.GaAAS.org) www.GaAAS.org. All Georgia Adopt-A-Stream Program activities have been correlated to the Georgia Performance Standards (GPS) for grades K – 12 and certified teachers in Georgia participating in Georgia Adopt-A-Stream Program training workshops will receive Professional Learning Unit (PLU) credits. Additional information about the GPS correlations and PLU credits can be found online. A recent update to the website includes links for viewing volunteer monitoring data and landuse and professional water quality data in a single format via the Internet. Data sharing developments like this website will

improve volunteer monitor's capacity to learn about and protect local water bodies.

In February 2005, Georgia Adopt-A-Stream partnered with the Georgia River Network to present the Watershed Track at their annual conference. This event helped connect citizens with activities that help protect and improve Georgia waters. In March 2005, the Georgia Adopt-A-Stream Program partnered with the Environmental Education Alliance of Georgia to conduct an annual conference and awards ceremony. The 2005 conference, *Georgia Environment - Keys for Successful Partnership*, was held at Unicoi State Park and Lodge, near Helen, Georgia with over 250 participants.

In addition, the Georgia Adopt-A-Stream Program organizes Georgia's annual volunteer river clean up event, *Rivers Alive*, held throughout the month of October. *Rivers Alive* is a statewide event that targets clean-ups across all waterways in the State including streams, rivers, lakes wetlands and coastal waters. The mission of *Rivers Alive* is to create awareness of and involvement in the preservation of Georgia's water resources.

During the 2005 river cleanup, more than 24,500 volunteers cleaned over 2,450 miles of waterways and removed over 680,000 pounds of trash and garbage including refrigerators, couches, a shower stall, televisions, microwaves, tires, shingles and general trash. *Rivers Alive* is an annual event that receives key support in the form of corporate sponsorship for the purchase of t-shirts, watershed posters, bookmarks and educational materials. The cleanup event also provides signs, press releases through public service announcements and advertises on local television stations. In addition to protecting and preserving the State's waterways, *Rivers Alive* cleanup events include diverse activities such as stormdrain stenciling, water quality monitoring and riparian restoration workshops, riverboat tours, wastewater treatment facility tours and environmental education workshops.

The goals for *Rivers Alive* are to have at least 25,000 volunteers with at local events in every county across Georgia. These goals represent increased efforts that will result in cleaner waters in the State. Additional information about *Rivers Alive* is available on the website, www.riversalive.org.

Emergency Response Program

The GAEPD maintains a team of Environmental Emergency Specialists capable of responding to oil or hazardous materials spills 24-hours a day. Each team member is cross-trained to address and enforce all environmental laws administered by the GAEPD. The team members interact at the command level

with local, state and federal agency personnel to ensure the protection of human health and the environment during emergency and post emergency situations. The majority of the team members are located in Atlanta in order to facilitate rapid access to the major interstates. Two additional team members operate out of the Environmental Protection Division office in Savannah to provide rapid response to water quality concerns along the coast of Georgia and to assist the United States Coast Guard Marine Safety Office when needed.

A significant number of reported releases involve discharges to storm sewers. Many citizens and some industries do not understand the distinction between storm and sanitary sewers and intentional discharge to storm sewers occurs all too frequently. A problem which arises several times a year involves the intentional discharge of gasoline to storm sewers, with a resulting buildup of vapors to explosive limits. A relatively small amount of gasoline can result in explosive limits being reached in a storm sewer. The resulting evacuations and industry closures cost the citizens of Georgia hundreds of thousands of dollars each year.

The GAEPD is designated in the Georgia Emergency Operations Plan as the lead state agency in responding to hazardous materials spills. Emergency Response Team members serve in both a technical support and regulatory mode during an incident. The first goal of the Emergency Response Team is to minimize and mitigate harm to human health and the environment. In addition, appropriate enforcement actions including civil penalties are taken with respect to spill incidents. Emergency Response Team members work directly with responsible parties to coordinate all necessary clean-up actions. Team members can provide technical assistance with clean-up techniques, as well as guidance to ensure regulatory compliance.

Environmental Radiation

In 1976, the Georgia Radiation Control Act was amended to provide the GAEPD with responsibility for monitoring of radiation and radioactive materials in the environment. The Environmental Radiation Program was created to implement these responsibilities for environmental monitoring. Since that time, the Program has also been assigned responsibility for implementing the GAEPD lead agency role in radiological emergency planning, preparedness and response, and for analyzing drinking water samples collected pursuant to the Safe Drinking Water Act for the presence of naturally-occurring radioactive materials such as uranium, ²²⁶Ra, ²²⁸Ra and gross alpha activity.

The Environmental Radiation Program monitors environmental media in the vicinity of nuclear facilities in or bordering Georgia to determine if radioactive

materials are being released into the environment in quantities sufficient to adversely affect the health and safety of the citizens of Georgia or the quality of Georgia's environment. Among the more important of the facilities monitored by the Program are:

- Georgia Power Company Edwin I. Hatch Nuclear Plant, located in Appling County, Georgia;
- Alabama Power Company Joseph M. Farley Nuclear Plant, located in Houston County, Alabama;
- Georgia Power Company Vogtle Electric Generating Plant, located in Burke County, Georgia;
- U.S. Department of Energy Savannah River Site, located in Aiken and Barnwell Counties, South Carolina;
- Naval Submarine Base, Kings Bay, located in Camden County, Georgia;
- Tennessee Valley Authority Sequoyah Nuclear Plant, located in Hamilton County, Tennessee; and
- Duke Power Company Oconee Nuclear Plant, located in Oconee County, South Carolina.

On a routine basis, associates in the Environmental Radiation Program collect samples of groundwater, surface water, stream sediment and/or aquatic species (i.e. fish, shellfish) from each of these facilities. The Program contracts with the Environmental Radiation Laboratory (ERL) at Georgia Tech for laboratory analysis of these samples for natural and man-made radionuclides such as ^{90}Sr , ^{131}I , ^{137}Cs and ^3H (tritium).

The results of the GAEPD monitoring around Plant Hatch indicate very little evidence of releases of radioactive materials, with the exception of monitoring related to a 1986 spill of spent fuel pool water, as discussed in the GAEPD Environmental Monitoring Reports. Slightly elevated levels of ^{60}Co , ^{65}Zn , ^{134}Cs , and ^{137}Cs have been detected in fish and river sediment from the Altamaha River downstream to the coastal area near Darien. Slightly elevated levels of ^{137}Cs are observed in vegetation samples from a background station plant cannot be attributed to plant operations, as similar levels are not found at indicator stations closer to the plant. Overall, it appears that Plant Hatch operations have not added significant quantities of radioactive materials to the environment.

The results of the GAEPD monitoring around Plant Farley indicate little evidence of releases of radioactive materials, with the exception of slightly elevated levels of tritium (^3H) in surface water and slight traces of ^{58}Co and ^{60}Co in river sediment.

Results of the GAEPD monitoring around SRS and Plant Vogtle show evidence of current and previous releases of radioactive materials from SRS. Elevated levels of tritium (^3H) due to airborne and liquid releases are routinely detected in fish, milk, precipitation, surface water and vegetation. Elevated levels of ^{137}Cs and ^{60}Co , attributed to releases from previous SRS operations, are found in sediments from the Savannah River. Elevated ^{137}Cs , gross beta, and ^{90}Sr levels are also found in fish from the Savannah River. Staff of the Environmental Radiation Program are working with SRS personnel on a study of the effects on human health from consumption of contaminated fish. The GAEPD monitoring results also show evidence of current and previous releases of radioactive materials from Plant Vogtle. Slightly elevated concentrations of ^{54}Mn , ^{58}Co , and ^{60}Co have been detected in aquatic vegetation and sediment downstream of Plant Vogtle, and ^{134}Cs has been detected in fish downstream of the plant.

The results of the GAEPD monitoring around Kings Bay indicate little evidence of releases of radioactive materials. Elevated gross beta concentrations in surface water are due to naturally-occurring ^{40}K in sea-water. Overall, it appears that operations at Naval Submarine Base, Kings Bay have not added significant quantities of radioactive materials to the environment.

The results of the GAEPD monitoring around the Sequoyah Nuclear Plant indicate no evidence of releases of radioactive materials.

Results of the GAEPD monitoring around the Oconee Nuclear Plant indicate no evidence of releases of radioactive materials. Elevated gross alpha and gross beta concentrations observed in ground water at one location are due to the presence of ^{226}Ra (naturally-occurring radioactive isotope).

CHAPTER 8

Groundwater, Ground and Surface Water Withdrawals/Availability, and Ground and Surface Water Drinking Water Supplies

Groundwater

Georgia began the development of its Comprehensive State Groundwater Protection Program (CSGWPP) in the 1970s with enactment of the Ground Water Use Act in 1972. By the mid-1980s, groundwater protection and management had been established by incorporation in a variety of environmental laws and the rules. In 1984, the GAEPD published its first Groundwater Management Plan, in which the various regulatory programs dealing with groundwater were integrated.

Most laws providing for protection and management of groundwater are administered by the GAEPD. Laws regulating pesticides are administered by the Department of Agriculture, environmental planning by the Department of Community Affairs, and on-site sewage disposal by the Department of Human Resources. The GAEPD has established formal Memoranda of Understanding (MOU) with these agencies. The Georgia Groundwater Protection Coordinating Committee was established in 1992 to coordinate groundwater management activities between the various departments of state government and the several branches of the GAEPD.

The first version of Georgia's Groundwater Management Plan (1984) has been revised several times to incorporate new laws, rules and technological advances. The current version, Georgia Geologic Survey Circular 11, was published in February, 1998. This document was GAEPD's submission to the USEPA as a "core" CSGWPP. The USEPA approved the submittal in September of 1997. Georgia is now one of approximately 20 percent of the states with an EPA approved CSGWPP.

Groundwater is extremely important to the life, health, and economy of Georgia. For example, in 2002, groundwater made up approximately 20 percent of the public water supply, 100 percent of rural drinking water sources, 58 percent of the irrigation use and 47 percent of the industrial and mining use. Total

groundwater withdrawals in 2002 were approximately 1.26 billion gallons per day. For practical purposes, outside the larger cities of the Piedmont, groundwater is the dominant source of drinking water. The economy of Georgia and the health of millions of persons could be compromised if Georgia's groundwater were to be significantly polluted.

Relatively few cases of ground water contamination adversely affecting public drinking water systems or privately owned drinking water wells have been documented in Georgia, and currently, the vast majority of Georgia's population is not at risk from ground water pollution of drinking water. However, there are various old petroleum underground storage tanks, old landfills and other sites with known ground water contamination which (1) pose a threat to public drinking water systems or individual drinking water wells, or (2) render the existing ground water on or near those sites unusable for drinking water should that use be considered now or in the future. These sites are being addressed primarily through State laws and programs dealing with underground storage tanks, hazardous waste management or hazardous site remediation. Data on the major sources of groundwater contamination are provided in Table 8-1.

The GAEPD's groundwater regulatory programs follow an anti-degradation policy under which regulated activities will not develop into significant threats to the State's groundwater resources. This anti-degradation policy is implemented through three principal elements:

- Pollution prevention,
- Management of groundwater quantity, and
- Monitoring of groundwater quality and quantity.

The prevention of pollution includes (1) the proper siting, construction and operation of environmental facilities and activities through a permitting system, (2) implementation of environmental planning criteria by incorporation in land-use planning by local government, (3) implementation of a Wellhead Protection Program for municipal drinking water wells, (4) detection and mitigation of existing problems, (5) development of other protective standards, as appropriate, where permits are not required, and (6) education of the public to the consequences of groundwater contamination and the need for groundwater protection. Management of groundwater quantity involves allocating the State's groundwater, through a permitting system, so that the resource will be available to present and future generations. Monitoring of groundwater quality and quantity involves continually assessing the resource so that changes, either good or bad, can be identified and corrective action implemented when and where needed. Table 8-2 is a summary of Georgia groundwater protection programs.

**TABLE 8-1
MAJOR SOURCES OF GROUND WATER CONTAMINATION**

Contaminant Source	Contaminant Source Selection Factors	Contaminants
Agricultural Activities		
Agricultural chemical facilities		
Animal feedlots		
Drainage wells		
Fertilizer applications		
Irrigation practices		
Pesticide applications		
Storage and Treatment Activities		
Land application		
Material stockpiles		
Storage tanks (above ground)		
Storage tanks (underground)*	C, D, F	D
Surface impoundments		
Waste piles		
Waste tailings		
Disposal Activities		
Deep injection wells		
Landfills*	C, D, F	D, G, H
Septic systems*	C	E, K, L
Shallow injection wells		

Contaminant Source	Contaminant Source Selection Factors	Contaminants
Other		
Hazardous waste generators		
Hazardous waste sites*	F	C, H
Industrial facilities*	C, F	C, D, H
Material transfer operations		
Mining and mine drainage		
Pipelines and sewer lines*	F	D
Salt storage and road salting		
Salt water intrusion*	B, C, E, F	G
Spills*	F	D
Transportation of materials		
Urban runoff*	D, E	Variable
Natural iron and manganese* Natural radioactivity	F	H, I

*10 highest-priority sources

Factors used to select each of the contaminant sources.

- A. Human health and/or environmental risk (toxicity)
- B. Size of the population at risk
- C. Location of the sources relative to drinking water sources
- D. Number and/or size of contaminant sources
- E. Hydrogeologic sensitivity
- F. State findings, other findings

Contaminants/classes of contaminants considered to be associated with each of the sources that were checked.

- | | |
|-------------------------|-------------------|
| A. Inorganic pesticides | G. Salinity/brine |
| B. Organic pesticides | H. Metals |
| C. Halogenated solvents | I. Radio nuclides |
| D. Petroleum compounds | J. Bacteria |
| E. Nitrate | K. Protozoa |
| F. Fluoride | L. Viruses |

TABLE 8-2
SUMMARY OF STATE GROUND WATER PROTECTION PROGRAMS

Programs or Activities	Check (X)	Implementation Status	Responsible State Agency
Active SARA Title III Program	X	Fully Established	GAEPD
Ambient ground water monitoring system	X	Fully Established	GAEPD
Aquifer vulnerability assessment	X	Ongoing	GAEPD
Aquifer mapping	X	Ongoing	GAEPD
Aquifer characterization	X	Ongoing	GAEPD
Comprehensive data management system	X	Ongoing	GAEPD
EPA-endorsed Core Comprehensive State Ground Water Protection Program (CSGWPP)	X	Fully Established	GAEPD
Ground water discharge		Prohibited	
Ground water Best Management Practices	X	Pending	GAEPD
Ground water legislation	X	Fully Established	GAEPD
Ground water classification		Not applicable	
Ground water quality standards	X	Ongoing	GAEPD
Interagency coordination for ground water protection initiatives	X	Fully Established	GAEPD
Nonpoint source controls	X	Pending	GAEPD
Pesticide State Management Plan	X	Fully Established	DOA
Pollution Prevention Program	X	Fully Established	DNR
Resource Conservation and Recovery Act (RCRA) Primacy	X	Fully Established	GAEPD
State Superfund	X	Fully Established	GAEPD
State RCRA Program incorporating more stringent requirements than RCRA Primacy	X	Fully Established	GAEPD
State septic system regulations	X	Fully Established	DHR
Underground storage tank installation requirements	X	Fully Established	GAEPD
Underground Storage Tank Remediation Fund	X	Fully Established	GAEPD
Underground Storage Tank Permit Program		Not applicable	
Underground Injection Control Program	X	Fully Established	GAEPD
Vulnerability assessment for drinking water/wellhead protection	X	Ongoing	GAEPD
Well abandonment regulations	X	Fully Established	GAEPD
Wellhead Protection Program (EPA-approved)	X	Fully Established	GAEPD
Well installation regulations	X	Fully Established	GAEPD

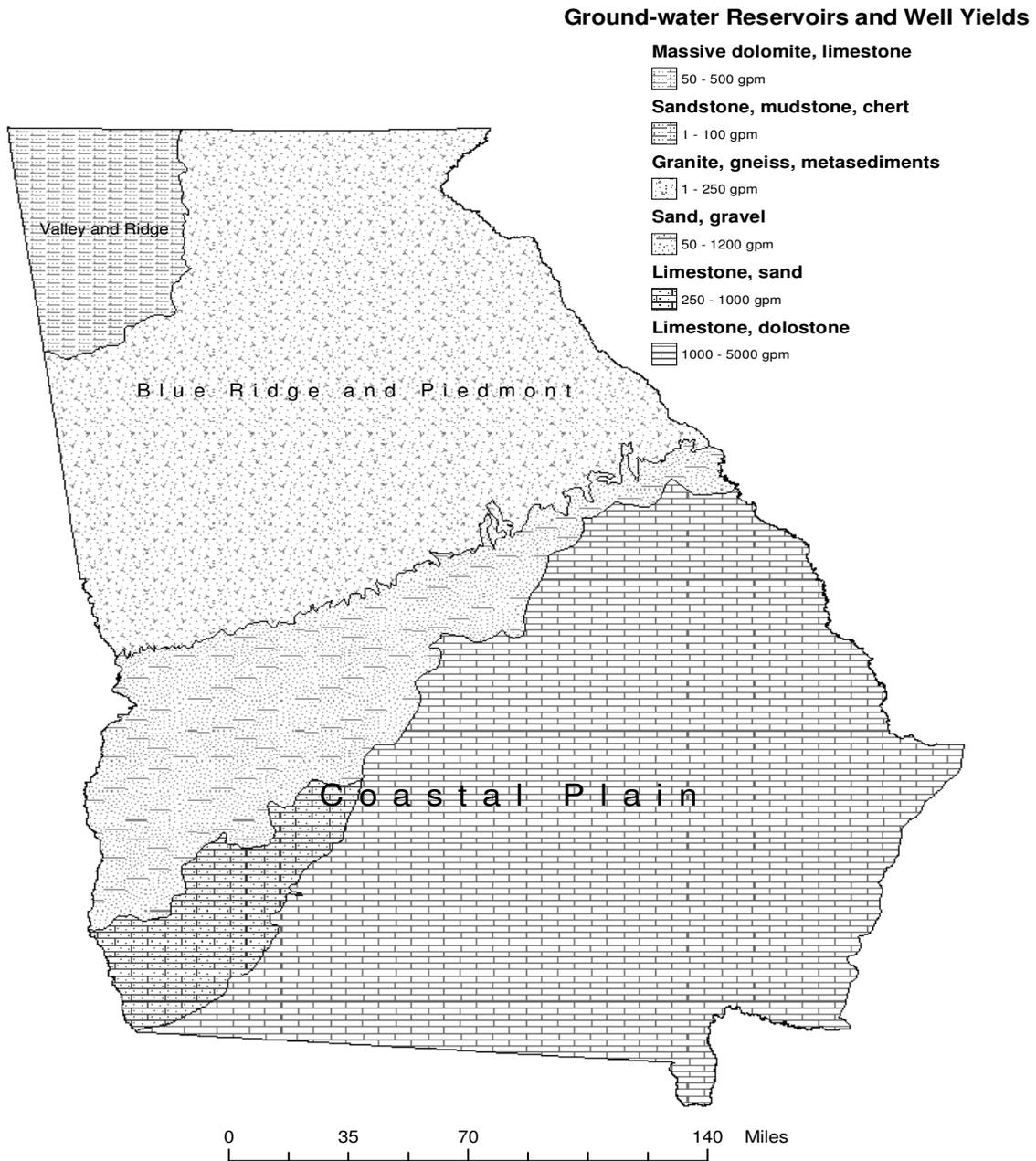
The State of Georgia possesses a groundwater supply that is both abundant and of high quality. Except where aquifers in the Coastal Plain become salty at great depth, all of the State's aquifers are considered as potential sources of drinking water. For the most part, these aquifers are remarkably free of pollution. The aquifers are continuously recharged by precipitation falling within the borders of the State and can, in most places, continue to provide additional water to help meet future water needs. While water from wells is safe to drink without treatment in most areas of Georgia, water to be used for public supply is required to be chlorinated (except for very small systems). Water for domestic use can also be treated if required.

Ambient groundwater quality, as well as the quantity available for development, is related to the geologic character of the aquifers through which it has moved. Georgia's aquifers can, in general, be characterized by the five main hydrologic provinces in the State (Figure 8-1).

In addition to sampling of public drinking water wells as part of the Safe Drinking Water Act and sampling of monitoring wells at permitted facilities, the GAEPD monitors ambient groundwater quality through the Georgia Groundwater Monitoring Network. The Network consists of approximately 100-130 wells, which are sampled periodically (Figure 8-2). Reports of water quality are issued periodically. These wells are located in all of the main aquifers and throughout the State in key areas. This network allows the GAEPD to identify groundwater quality trends before they become a problem. The only adverse trend noted to date is that nitrate, while still a fraction of the USEPA established MCL for drinking water, has slightly increased in concentration in the recharge areas of some Coastal Plain aquifers since 1984. General results of aquifer monitoring data for calendar years 2004 and 2005 are provided in Table 8-3.

To evaluate nitrate/nitrite from non-point sources in the State's groundwater, between 1991 and 1995 the GAEPD sampled over 5000 shallow domestic drinking water wells for nitrate/nitrite. Results indicated that water from 97 percent of the wells had less than 5 ppm nitrate as N, well below the MCL of 10 ppm. Water from less than one percent of the wells exceeded the MCL value. From 1996 through 2005, 968 water samples from Groundwater Monitoring Network wells were analyzed for nitrate/nitrite. Water from 1.2 percent of the samples exceeded the MCL value. In 2003 and 2004, 546 domestic well samples were tested for nitrate as part of the Domestic Well Pesticide Sampling Project. Water from 95 percent of the wells had less than 5 ppm nitrate as N. Water from 1.5 percent of the samples exceeded the MCL value. Nitrate can come from non-point sources such as natural and artificial fertilizer, natural sources, feedlots and animal enclosures. Septic tanks and land application of treated wastewater and sludge are other potential sources of nitrate. The

**FIGURE 8-1
HYDROLOGIC PROVINCES OF GEORGIA**



GAEPD's extensive sampling program demonstrates that nitrates, from non-point sources, are not a significant contributor to groundwater pollution in Georgia.

Agricultural chemicals are commonly used in the agricultural regions of the State (Figure 8-3). In addition to the Groundwater Monitoring Network and nitrate/nitrite sampling, the GAEPD has sampled:

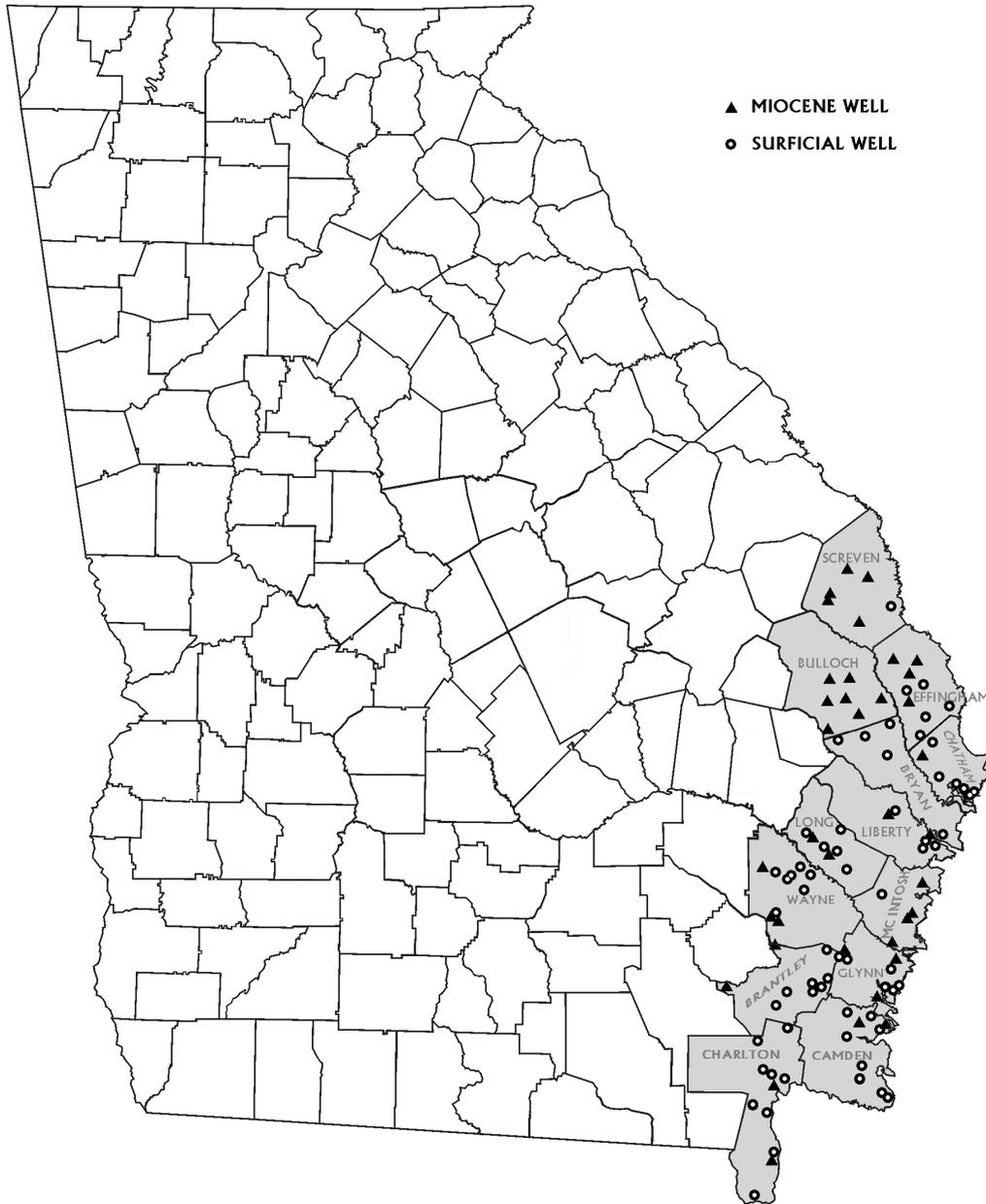
- A network of monitoring wells located downgradient from fields where pesticides are routinely applied,
- Domestic drinking water wells for pesticides and nitrates, and
- Agricultural Drainage wells and sinkholes in the agricultural regions of Georgia's Coastal Plain for pesticides.

Only a few pesticides and herbicides have been detected in groundwater in these studies. There is no particular pattern to their occurrence, and most detections have been transient; that is, the chemical is most often no longer present when the well is resampled.

From 1993 through 2000, the GAEPD cooperated with the Georgia Department of Agriculture to sample a network of special monitoring wells located downgradient from fields where pesticides were routinely applied. Pesticides were not detected in any of these monitoring wells, and this project was terminated in 2000. Beginning in 2000, the GAEPD began a five-year statewide screening of water samples from domestic wells for four target pesticides (alachlor, atrazine, metolachlor and simazine). Testing for nitrates was added in August 2003. The GAEPD sampled 3,095 domestic wells in Georgia by the end of the project in 2004. Laboratory analysis confirmed that only eighteen wells (0.58%) contained detectable concentrations of pesticides. Four of these wells (0.13%) containedalachlor at concentrations of 3.5 to 6.2 ppb, which were greater than the public drinking water MCL of 2.0 ppb. All homeowners whose wells tested positive for pesticides were advised of the results and referred to the University of Georgia's Cooperative Extension Service for assistance. Prudent agricultural use of pesticides does not appear to represent a significant threat to drinking water aquifers in Georgia at this time.

The most extensive contamination of Georgia's aquifers is from naturally occurring mineral salts (i.e., high total dissolved solids, or TDS levels). Areas generally susceptible to high TDS levels are shown in Figure 8-4. Intensive use of groundwater in the 24 counties of the Georgia coast has caused some groundwater containing high levels of dissolved solids to enter freshwater aquifers either vertically or laterally. Salt-water intrusion into the Upper Floridan Aquifer threatens groundwater supplies in the Hilton Head-Savannah and Brunswick areas. Intrusion rates, however, are quite slow, being more than a hundred years to reach Savannah. The GAEPD has placed limitations on additional withdrawals of groundwater in the affected areas. This has effectively slowed the rate of additional contamination. On April 23, 1997, the GAEPD

FIGURE 8-2
AMBIENT GROUNDWATER MONITORING NETWORK, 2004-2005



**TABLE 8-3
AQUIFER MONITORING DATA FOR CY 2004**

Aquifer System	County	No. of Wells	Nitrate Detections,	Pesticide Detections*	Salinity range %	Pesticide Exceedance	Nitrate Exceedance	Ocean-front County
MIOCENE (upper and lower Brunswick aquifers)	Brantley	1	0	0	0.00	0	0	No
	Bryan	0	--	--	--	--	--	Yes
	Bulloch	6	1	0	0.00	0	1	No
	Camden	2	0	0	0.01	0	0	Yes
	Charlton	0	--	--	--	--	--	No
	Chatham	0	--	--	--	--	--	Yes
	Effingham	4	0	0	0.00	0	0	No
	Glynn	3	0	0	0.01	0	0	Yes
	Liberty	2	0	0	0.00	0	0	Yes
	Long	0	--	--	--	--	--	No
	McIntosh	3	0	0	0.01	0	0	Yes
	Screven	5	1	0	0	0	0	No
Wayne	1	0	0	0.00	0	0	No	
SURFICIAL	Brantley	4	0	0	0.00-0.01	0	0	No
	Bryan	5	0	0	0.00	0	0	Yes
	Bulloch	0	--	--	--	--	--	No
	Camden	6	0	0	0.00-0.01	0	0	Yes
	Charlton	5	0	0	0.00-0.03	0	0	No
	Chatham	0	--	--	--	--	--	Yes
	Effingham	5	2	0	0.00	0	0	No
	Glynn	4	0	0	0.00-0.01	0	0	Yes
	Liberty	4	0	0	0.00	0	0	Yes
	Long	0	--	--	--	--	--	No
	McIntosh	1	0	0	0.00	0	0	Yes
	Screven	1	0	0	0.00	0	0	No
Wayne	7	3	0	0.00	0	0	No	

* Pesticides analyzed following EPA Method 525.2

-- No data

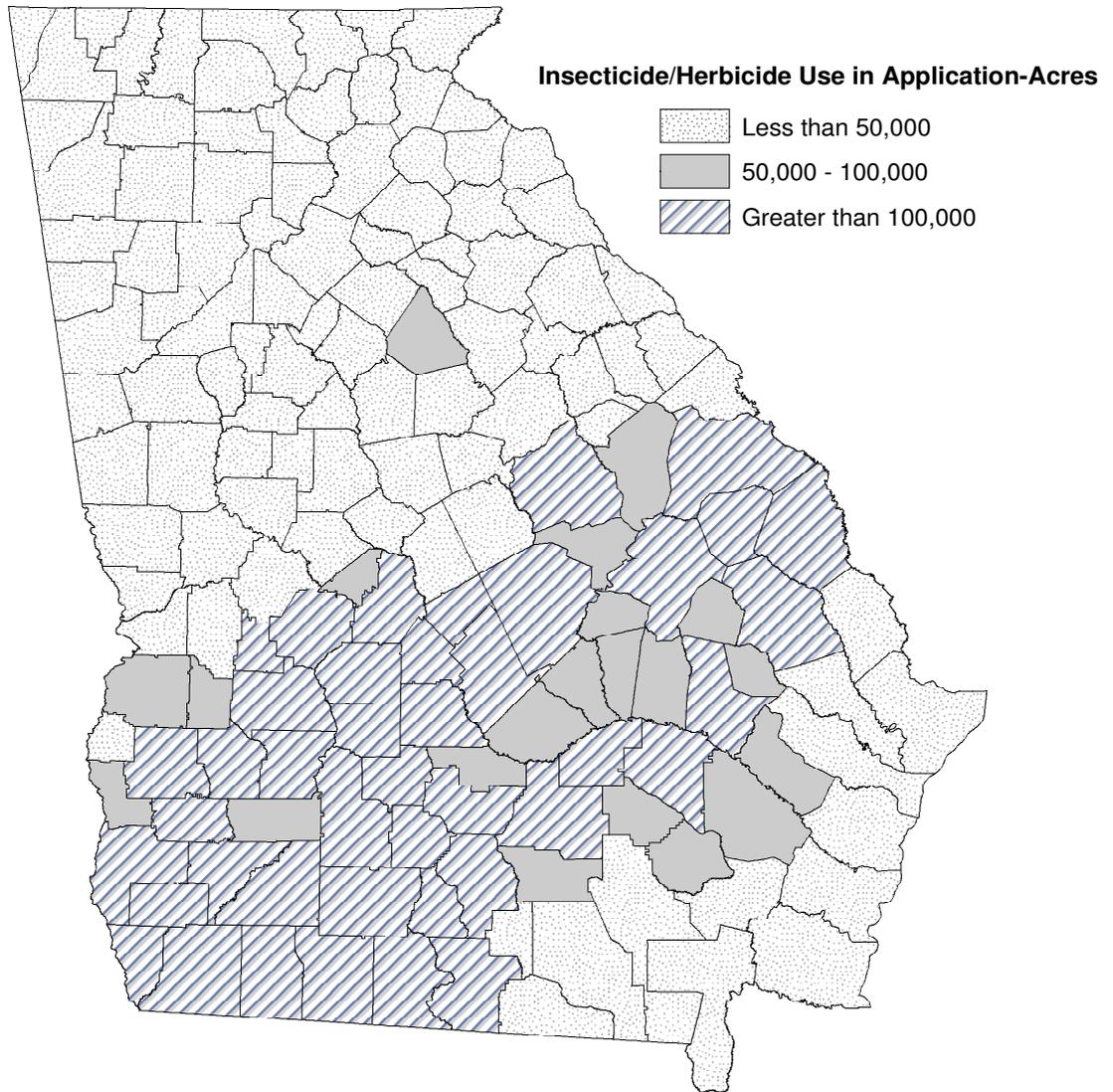
**TABLE 8-4
AQUIFER MONITORING DATA FOR CY 2005**

Aquifer System	County	No. of Wells	Nitrate Detections,	Pesticide Detections*	Salinity range %	Pesticide Exceedance	Nitrate Exceedance	Ocean-front County
MIOCENE (upper and lower Brunswick aquifers)	Brantley	1	0	0	0.00	0	0	No
	Bryan	0	--	--	--	--	--	Yes
	Bulloch	1	0	0	0.00	0	0	No
	Camden	0	--	--	--	--	--	Yes
	Charlton	2	0	0	0.01-0.02	0	0	No
	Chatham	1	0	0	0.00	0	0	Yes
	Effingham	0	--	--	--	--	--	No
	Glynn	0	--	--	--	--	--	Yes
	Liberty	0	--	--	--	--	--	Yes
	Long	2	0	0	0.00	0	0	No
	McIntosh	1	0	0	0.01	0	0	Yes
	Screven	0	--	--	--	--	--	No
Wayne	2	1	0	0.00	0	0	No	
SURFICIAL	Brantley	3	0	0	0.00-0.01	0	0	No
	Bryan	0	--	--	--	--	--	Yes
	Bulloch	0	--	--	--	--	--	Yes
	Camden	2	0	0	0.01	0	0	Yes
	Charlton	5	0	0	0.00-0.03	0	0	No
	Chatham	6	0	0	0.00-0.02	0	0	Yes
	Effingham	0	--	--	--	--	--	No
	Glynn	2	0	0	0.01	0	0	Yes
	Liberty	0	--	--	--	--	--	Yes
	Long	5	2	0	0.00	0	0	No
	McIntosh	0	--	--	--	--	--	Yes
	Screven	0	--	--	--	--	--	No
Wayne	0	--	--	--	--	--	No	

* Pesticides analyzed following EPA Method 525.2.

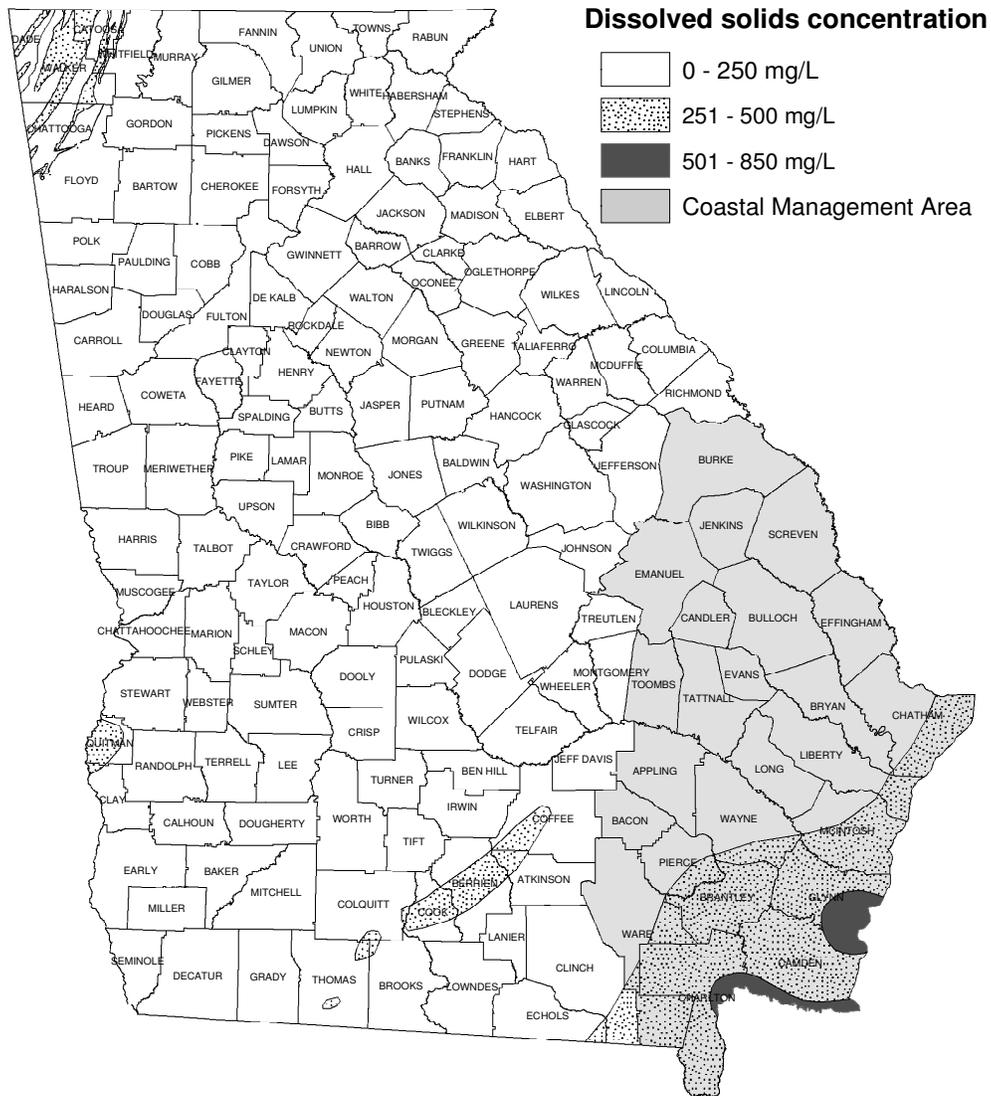
-- No data

FIGURE 8-3
INSECTICIDE/HERBICIDE USE IN GEORGIA, 1980



Note: An application-acre represents one application of insecticide-herbicide to one acre of land. Some crops may require multiple applications.

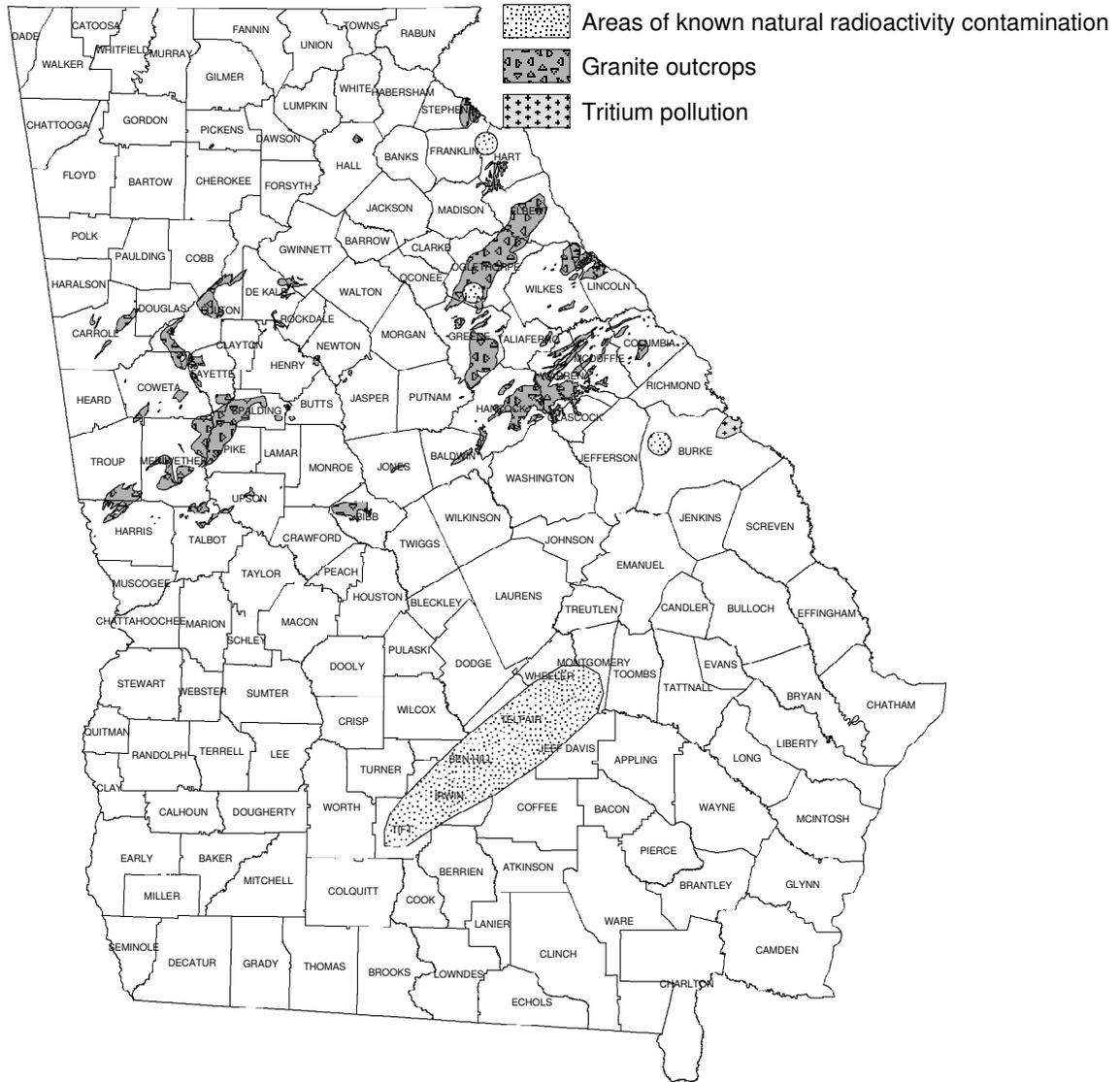
FIGURE 8-4
AREAS SUSCEPTIBLE TO NATURAL HIGH DISSOLVED SOLIDS AND 24
COUNTY AREA COVERED BY THE INTERIM COASTAL MANAGEMENT



implemented an Interim Strategy to protect the Upper Floridan Aquifer from salt-water intrusion in the 24 coastal counties. The strategy, developed in consultation with South Carolina and Florida, will continue until December 31, 2005 at which time the GAEPD plans to implement a Final Strategy that will (a) stop salt-water intrusion before municipal water supply wells on Hilton Head Island, South Carolina and in Savannah, Georgia are contaminated and (b) prevent an existing salt-water problem at Brunswick, Georgia from worsening. To accomplish this objective, the GAEPD will do the following:

- (1) Continue to conduct scientific and feasibility studies to determine with certainty how to permanently stop the salt-water intrusion moving towards Hilton Head Island, South Carolina and Savannah, Georgia and how to prevent the existing salt-water intrusion at Brunswick, Georgia from worsening.
- (2) Complete the collation and synthesis of the 24 county water supply plans into one comprehensive coastal area water supply planning document. As required by the Interim Strategy, each of the 24 coastal counties has submitted a planning document detailing current water usage in the county and projecting the quantities of future water use. The counties were to document any potential alternate water supply sources as well. Since each of the counties has already submitted a plan, there is no restriction on this account for any future proposed public water, agriculture or industrial water withdrawal permit.
- (3) Maintain caps on groundwater use in Glynn County, Chatham County, and portions of Bryan and Effingham counties, to avoid worsening the rate of salt-water intrusion at Hilton Head, Savannah and at Brunswick.
- (4) Reduce groundwater use in Chatham County by at least 10 million gallons per day by December 31, 2005 through conservation and substitution of surface water for groundwater. This will be affirmed through reductions in groundwater use permits.
- (5) Allow, on an interim basis, increases in groundwater withdrawals in the areas of southeast Georgia that have little impact on salt-water intrusion problems.
- (6) Encourage and promote water conservation and reduced groundwater usage wherever feasible, throughout southeast Georgia.

FIGURE 8-5
AREAS SUSCEPTIBLE TO NATURAL AND HUMAN INDUCED RADIATION



Some wells in Georgia produce water containing relatively high levels of naturally occurring iron and manganese. Another natural source of contamination is from radioactive minerals that are a minor rock constituent in some Georgia aquifers. While natural radioactivity may occur anywhere in Georgia (Figure 8-5), the most significant problems have occurred at some locations near the Gulf Trough, a geologic feature of the Floridan Aquifer in the Coastal Plain. Wells can generally be constructed to seal off the rocks producing the radioactive elements to provide safe drinking water. Radon, a radioactive gas produced by the radioactive minerals mentioned above, also has been noted in highly variable amounts in groundwater from some Georgia wells, especially in the Piedmont region. Treatment systems may be used to remove radon from groundwater.

Tritium, a radioactive isotope of hydrogen, was found in 1991 in excess of expected background levels by GAEPD sampling in Burke County aquifers. While the greatest amount of tritium thus far measured is only 15 percent of the USEPA MCL for tritium, the wells in which it has been found lie across the Savannah River from the Savannah River Plant in South Carolina, where tritium was produced for nuclear weapons (Figure 8-5). The tritium does not exceed MCLs for drinking water; therefore it does not represent a health threat to Georgia citizens at the present time. Results of the GAEPD's studies to date indicate the most likely pathway for tritium to be transported from the Savannah River Plant is through the air due to evapo-transpiration of tritiated water. The water vapor is condensed to form tritiated precipitation over Georgia and reaches the shallow aquifers through normal infiltration and recharge.

Man-made pollution of groundwater can come from a number of sources, such as business and industry, agriculture, and homes (e.g., septic systems). Widespread annual testing of more than 2000 public water supply wells for volatile organic chemicals (VOCs, e.g. solvents and hydrocarbons) is performed by the GAEPD. In 2000-2001, one water system had a VOC level high enough to exceed the MCL and become a violation. The sources of the VOCs most commonly are ill-defined spills and leaks, improper disposal of solvents by nearby businesses, and leaking underground fuel-storage tanks located close to the well. Where such pollution has been identified, alternate sites for wells are generally available or the water can be treated. In 2001, 5 water systems had MTBE, a gasoline additive, in the water at levels higher than 10 ppb. There is currently no MCL for MTBE.

The GAEPD evaluates public groundwater sources (wells and springs) to determine if they have direct surface water influence. Ground Water Under the Direct Influence of Surface Water (GWUDI) is defined as "Water beneath the surface of the ground with: (1) Significant occurrence of insects or other macro organisms, algae, or large diameter protozoa and pathogens such as Giardia

lamblia or Cryptosporidium; and significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface conditions." Microscopic Particulate Analysis (MPA) is a method of sampling and testing for significant indicators. Hundreds of MPA's have been performed each year since the program began in 1988. All of the known existing sources have been evaluated either on site or from information gathered from our files. Some are being re-evaluated as better information becomes available. Recently the primary focus of the program has been to monitor the nearly 100 public spring sources scattered around the state and to evaluate new wells and spring sources as they enter the source approval process.

On the basis of the information collected during investigations and microscopic analysis of raw water samples since 2002, twenty (20) sources were found to have direct surface water influence. Of these sources, eight (8) successfully removed the influence by taking corrective action, three (3) added treatment in the form of filtration, two (2) were taken out of service, and four (4) were proposed sources and never completed as a drinking water source

Groundwater protection from leaking underground storage tanks was enhanced with the enactment of the Georgia Underground Storage Tank Act in 1988. The program established a financial assurance trust fund and instituted corrective action requirements to clean up leaking underground storage tanks. Through December 31, 2003, confirmed releases have been identified at 10,313 sites and site investigation and corrective action procedures have been completed at 7,079 sites and initiated at the remaining 3,324 sites.

In 1992, the Georgia Legislature enacted the Hazardous Site Response Act to require the notification and control of releases of hazardous materials to soil and groundwater. Currently, there are 537 sites listed on the Georgia Hazardous Site Inventory (HSI). Since the initial publication of the HSI, cleanups and investigations have been completed on 188 sites. 334 Sites have cleanups in progress and 162 sites are under investigation. As with underground storage tanks, Georgia has established a trust fund raised from fees paid by hazardous waste generators for the purpose of cleaning abandoned hazardous waste sites. Using a combination of site assessment, and removal and transportation/disposal contractors, the Hazardous Site Response Program has issued over 100 contracts to investigate and cleanup abandoned sites, of which approximately 60 have been completed.

Leachate leaking from solid waste landfills is also a potential groundwater pollutant. Georgia has a program, utilizing written protocols, to properly site, construct, operate, and monitor such landfills so that pollution of groundwater will

not become a threat to drinking water supplies. In this regard, the GAEPD has completed a set of maps generated by a Geographic Information System that shows areas geotechnically unsuitable for a municipal solid waste landfill. Maps at the scale of 1:100,000 have been distributed to all of the State's Regional Development Centers. In addition, all permitted solid waste landfills are required to have an approved groundwater monitoring plan and monitoring wells installed in accordance with the GAEPD standards for groundwater monitoring. As of March 2004, there were 112 permitted active (operational) municipal solid waste landfills in Georgia. In addition, 26 landfills have ceased accepting waste and are currently closing the facility. There are 186 landfills in post-closure care (required to conduct groundwater monitoring for 30 years). Of these 324 landfills, 309 are monitoring groundwater with approved systems. The remaining landfills are in the process of installing monitoring systems, and/or are awaiting GAEPD approval.

The GAEPD also actively monitors sites where treated wastewaters are further treated by land application methods. Agricultural drainage wells and other forms of illegal underground injection of wastes are closed under another GAEPD program. The GAEPD identifies non-domestic septic systems in use in the State, collects information on their use, and has implemented the permitting of systems serving more than 20 persons. Very few of the systems are used for the disposal of non-sanitary waste, and the owners of those systems are required to obtain a site specific permit or stop disposing of non-sanitary waste, carry out groundwater pollution studies, and clean up any pollution that was detected. None of these sources represents a significant threat to the quality of Georgia's groundwater at the present time.

The GAEPD has an active Underground Injection Control Program. As of December 31, 2005, the program has issued 267 UIC permits covering 6,649 Class V wells. Most of the permits are for remediation wells for UST sites, petroleum product spills, and hazardous waste sites, or for non-domestic septic systems.

Georgia law requires that water well drillers constructing domestic, irrigation and public water supply wells be licensed and bonded. As of December 31, 2005, Georgia had 247 active licensed water well drillers that are required to follow strict well construction standards. The GAEPD actively pursues and works closely with the Courts to prosecute unlicensed water well contractors. The GAEPD continues to work with various drilling associations and licensed drillers to uphold and enforce the construction standards of the Water Well Standards Act. The GAEPD has taken an active role in informing all licensed drillers of the requirement that all irrigation wells must be permitted, and that such permits must be issued prior to the actual drilling of any irrigation well. All drillers

constructing monitoring wells, engineering and geologic boreholes must be bonded, and the well construction must be performed under the direction of a Professional Engineer or Professional Geologist registered in Georgia. The GAEPD maintains an active file of all bonded drilling companies and makes every attempt to stop the operations of all drillers who fail to maintain a proper bond. The GAEPD issues permits and regulates all oil and gas exploration in the state under the Oil & Gas and Deep Drilling Act.

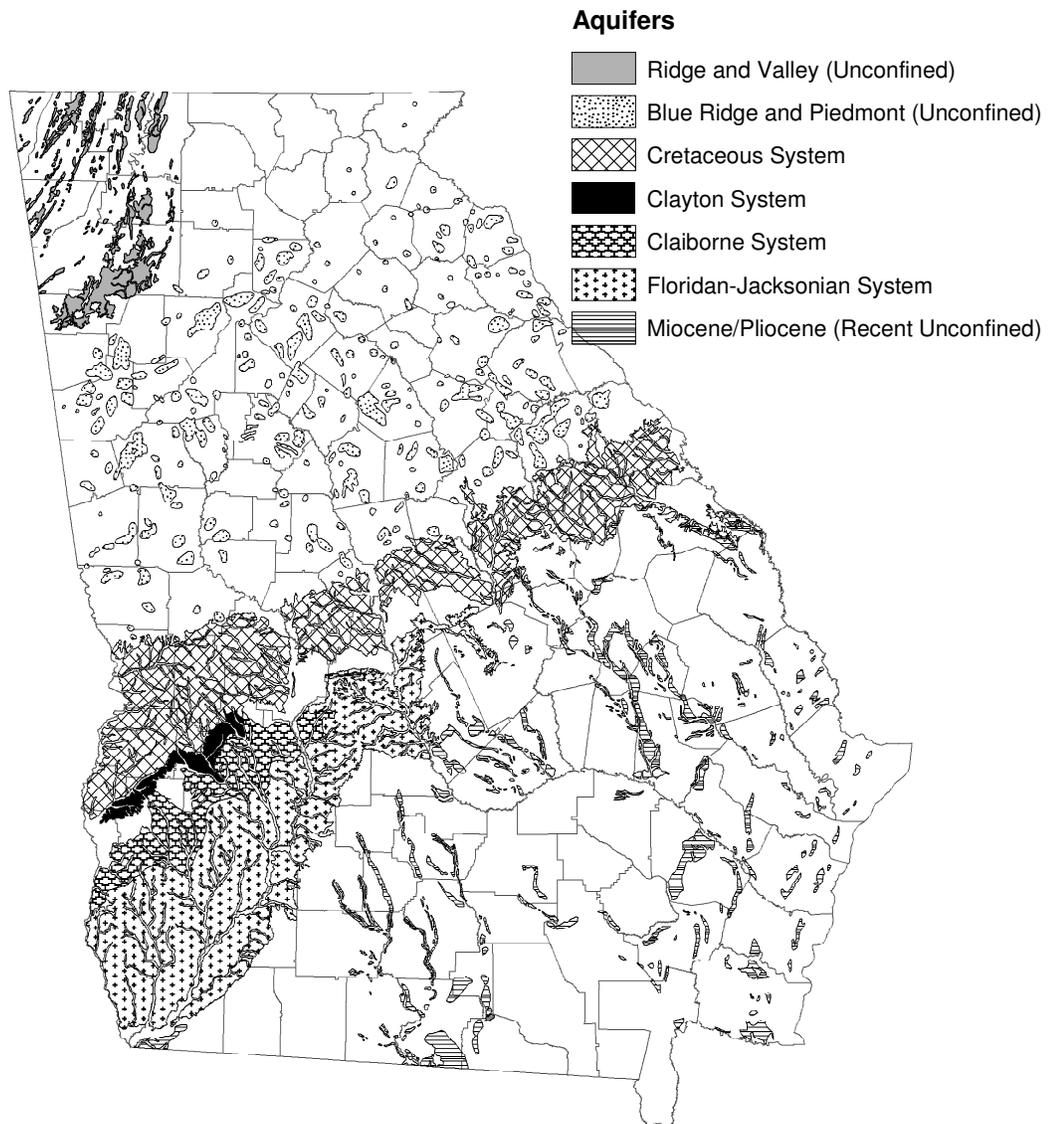
Activities affecting groundwater quality that take place in areas where precipitation is actively recharging groundwater aquifers are more prone to cause pollution of drinking water supplies than those taking place in other areas. In this regard, Georgia was one of the first states to implement a state-wide recharge area protection program. The GAEPD has identified the most significant recharge areas for the main aquifer systems in the State (Figure 8-6). The GAEPD has completed detailed maps showing the relative susceptibility of shallow groundwater to pollution by man's activities at the land surface. These maps at the scale of 1:100,000 have been distributed to the State's Regional Development Centers, and a state-wide map at the scale of 1:500,000 has been published as Hydrologic Atlas 20. In addition, the GAEPD is geologically mapping the recharge zones of important Georgia aquifers at a large scale of 1:24,000.

Recharge areas and areas with higher than average pollution susceptibility are given special consideration in all relevant permit programs. The GAEPD has developed environmental criteria to protect groundwater in significant recharge areas as required by the Georgia Comprehensive Planning Act of 1989. These criteria also reflect the relative pollution susceptibility of the land surface in recharge areas. Local governments are currently incorporating the pollution prevention measures contained in the criteria in developing local land use plans.

Some areas, where recharge to individual wells using the surficial or unconfined aquifers is taking place, are also significant recharge areas. To protect such wells, the GAEPD implemented a Wellhead Protection Program for municipal drinking water wells in 1993. Wells in confined aquifers have a small Wellhead Protection Area, generally 100 feet from the well. Wells using unconfined aquifers have Wellhead Protection Areas extending several hundred to several thousand feet from the well. Wells in karstic areas require even larger protection areas, which are defined using hydrogeologic mapping techniques.

Wellhead Protection Plans have been completed for all 1,642 permitted municipal wells in Georgia. Due to the closure of some municipal wells there are currently 1,619 active municipal ground water wells with Wellhead Protection

FIGURE 8-6
GENERALIZED MAP OF SIGNIFICANT GROUNDWATER RECHARGE
AREAS OF GEORGIA



Plans. A ten-year review of plans completed in 1995 will be completed in 2006. The review includes the addition of pertinent well information and an update of potential pollution sources. In addition, the GAEPD is carrying out vulnerability studies for non-municipal public water systems.

Table 8-1 summarizes the sources and nature of groundwater contamination and pollution in Georgia. In Table 8-1, an asterisk indicates that the listed source is one of the 10 highest sources in the state. Of these, the most significant source is salt-water intrusion in the 24 coastal counties. The second most significant source is naturally occurring iron, manganese, and radioactivity. On the otherhand, agricultural applications of pesticides and fertilizers are not significant sources. In 1996, USEPA requested that states report information on the type and number of contaminant sources within a specific reporting area or aquifer. The GAEPD does not collect such information; moreover, such data would be of little practical use in Georgia because of the State's complex hydrogeology and inter-aquifer leakage.

Table 8-2 is a summary of Georgia groundwater protection programs. Georgia, primarily the GAEPD, has delegated authority for all federal environmental programs involving groundwater. In addition, Georgia has several unique groundwater protection statutes that are more stringent than federal statutes. Of the 28 programs, identified by USEPA, only three are not applicable to Georgia: discharges to groundwater are prohibited; the State's hydrogeology is not compatible to classification; and, while managed through construction standards, actual permits for underground storage tanks are not issued.

Table 8-3 summarizes ambient groundwater quality monitoring results for calendar years 2004 and 2005. The data presented were developed from the annual Georgia Groundwater Monitoring Network reports.

The USEPA also has requested that States provide information on groundwater-surface water interactions. Contamination of groundwater by surface water occurred in 1994 when coliform bacteria entered the Upper Floridan Aquifer via sinkholes during flooding on the Flint River in southwest Georgia as a result of Hurricane Alberto. This is the only documented case of a groundwater aquifer in Georgia being contaminated by surface water, and monitoring in 1995 demonstrated that the aquifer was clean. As previously mentioned there are some wells and springs that GAEPD has determined to be under the influence of surface water. There are no documented cases in Georgia of groundwater polluting surface water sources.

Ground and Surface Water Withdrawals (including water availability analysis and conservation planning)

The Water Resources Management Program (WRMP) of the Water Resources Branch currently has three (3) major water withdrawal permitting responsibilities: (a) permitting of municipal and industrial ground water withdrawal facilities; (b) permitting of municipal and industrial surface water withdrawal facilities; and (c) permitting of both surface and groundwater agricultural irrigation water use facilities.

Any person who withdraws more than 100,000 gallons of surface water per day on a monthly average or more than 100,000 gallons of groundwater on any day or uses a 70 gpm pump or larger for agricultural irrigation, must obtain a permit from the GAEPD prior to any such withdrawal. Through the end of December 2003, GAEPD had 285 active municipal and industrial surface water withdrawal permits (180 municipal, 105 industrial), 481 active municipal and industrial groundwater withdrawal permits (281 municipal, 182 industrial, 18 golf course irrigation) and approximately 21,300 agricultural water use permits (encompassing both groundwater and surface water sources). Future efforts will focus on improving long-term permitting, water conservation planning, drought contingency planning and monitoring and enforcement of existing permits.

The Georgia Ground Water Use Act of 1972 requires all non-agricultural groundwater users of more than 100,000 gpd for any purpose to obtain a Ground Water Use Permit from GAEPD. Applicants are required to submit details relating to withdrawal location, historic water use, water demand projections, water conservation, projected water demands, the source aquifer system, and well construction data. A GAEPD issued Ground Water Use Permit identifies both the allowable monthly average and annual average withdrawal rate, permit expiration date, withdrawal purpose, number of wells, and standard and special conditions for resource use. Standard conditions define legislative provisions, permit transfer restrictions and reporting requirements (i.e., semi-annual groundwater use reports); special conditions identify such things as the source aquifer and conditions of well replacement. The objective of groundwater permitting is the same as that defined for surface water permitting.

The 1977 Surface Water Amendments to the Georgia Water Quality Control Act of 1964 require all non-agricultural surface water users of more than 100,000 gallons per day (gpd) on a monthly average (from any Georgia surface water body) to obtain a Surface Water Withdrawal Permit from the GAEPD. These users include persons, municipalities, governmental agencies, industries, military installations, and all other non-agricultural users. The 1977 statute

"grandfathered" all pre-1977 users who could establish the quantity of their use prior to 1977. Under this provision these pre-1977 users were permitted at antecedent withdrawal levels with no minimum flow conditions. Applicants for surface water withdrawal permits are required to submit details relating to withdrawal source, historic water use, water demand projections, water conservation, low flow protection (for non-grandfathered withdrawals), drought contingency, raw water storage, watershed protection, and reservoir management. A GAEPD issued Surface Water Withdrawal Permit identifies withdrawal source and purpose, monthly average and maximum 24-hour withdrawal limits, standard and special conditions for water withdrawal, and Permit expiration date. Standard conditions define legislative provisions, permit transfer restrictions and reporting requirements (i.e., usually annual water use reports); special conditions identify withdrawal specifics such as the requirement for protecting non-depletable flow (NDF). The NDF is that minimum flow required to protect instream uses, (e.g., waste assimilation, fish habitat, and downstream demand). The objective of surface water permitting is to provide a balance between resource protection and resource need.

The 1988 Amendments to both the Ground Water Use Act and the Water Quality Control Act require all agricultural groundwater and surface water users of more than 100,000 gpd on a monthly average to obtain an Agricultural Water Use Permit. "Agricultural Use" is specifically defined as the processing of perishable agricultural products and the irrigation of recreational turf (i.e., golf courses) except in certain areas of the state where recreational turf is considered as an industrial use. These areas are defined for surface water withdrawals as the Chattahoochee River watershed upstream from Peachtree Creek (North Georgia), and for groundwater withdrawals in the coastal counties of Chatham, Effingham, Bryan and Glynn. Applicants for Agricultural Water Use Permits who were able to establish that their use existed prior to July 1, 1988 and whose applications were received prior to July 1, 1991, are "grandfathered" for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with consideration for protecting the integrity of the resource and the water rights of permitted, grandfathered users. Currently, agricultural users are not required to submit any water use reports. A GAEPD issued Agricultural Water Use Permit identifies among other things the source, the purpose of withdrawal, total design pumping capacity, installation date, acres irrigated, inches of water applied per year, and the location of the withdrawal. Special conditions may identify minimum surface water flow to be protected or the aquifer and depth to which a well is limited. Agricultural Water Use Permits may be transferred and have no expiration date.

Since January, 1992, the states of Alabama, Florida, Georgia, and the United States Army Corps of Engineers - Mobile District have been cooperating partners

in an interstate water resources management study. The study area encompasses the Alabama-Coosa-Tallapoosa River system (shared by Alabama and Georgia), and the Appalachian-Chattahoochee-Flint River system (shared by the three states). These river basins make up 38 percent of Georgia's total land area, provide drinking water to over 60 percent of Georgia's people, and supply water for more than 35 percent of Georgia's irrigated agriculture. Significant portions of Georgia's industrial production and recreation-based economy are dependent on the water in these basins. The fish and wildlife resources that depend on these waters are also vital to Georgia. The goals of the study include, (a) forecasts of water demands for a myriad of uses in the two river systems through the year 2050; (b) estimates of ability of already developed water sources to meet the projected water demands; and (c) development of a conceptual framework for the basin wide management of the water resources of the two basins in a manner that would maximize the potential of the systems to meet expected water demands. At the end of December, 1997, the study was essentially completed. Work on most of the detailed scopes of work were completed, and the states along with the federal government, had executed river basin compacts for the two basins. The compacts are providing the framework under which the states and the federal government continue to negotiate water allocation formulas that will equitably apportion the waters of these basins. Once these allocation formulas are developed and agreed upon, the state and federal partners will manage the two river systems to comply with the formulas.

Under Georgia's comprehensive water management strategy, permit applicants for more than 100,000 gallons per day of surface water or groundwater for public drinking water have been required for a number of years to develop comprehensive water conservation plans in accordance with GAEPD guidelines. These plans primarily address categories such as system unaccounted-for water (leakage, un-metered use, flushing, etc.), metering, plumbing codes, water shortage planning, water reuse, public education, and so forth. Such plans must be submitted in conjunction with applications for new or increased non-agricultural ground and surface water withdrawals. Key provisions of the plans include the required submittal of water conservation progress reports 5 years after plan approval, the submittal of yearly "unaccounted-for" water reports, and greater emphasis on incorporating water conservation into long-term water demand projections.

Georgia law also requires the use of ultra-low flow plumbing fixtures (1.6 gpm toilets, 2.5 gpm shower heads and 2.0 gpm faucets) for all new construction. Local governments must adopt and enforce these requirements in order to remain eligible for State and Federal grants or loans for water supply and wastewater projects.

During times of emergency, the GAEPD Director is authorized to issue orders to protect the quantity and safety of water supplies. In general, municipal water shortage plans follow a phased reduction of water use based on the implementation of restrictions on non-essential water uses such as lawn watering, and so forth. These demand reduction measures typically include odd/even and/or time of day restrictions and progress from voluntary to mandatory with appropriate enforcement procedures. Severe shortages may result in total restriction on all nonessential water use, cut-backs to manufacturing and commercial facilities, and eventual rationing if the shortage becomes critical enough to threaten basic service for human health and sanitation. Water conservation efforts are extremely important to Georgia's future particularly in the north and central regions of the State.

Ground and Surface Drinking Water Supplies

Similar to groundwater, Georgia's surface water sources provide raw water of excellent quality for drinking water supplies. During 2002-2003, no surface water supply system reported an outbreak of waterborne disease. Since the Federal and State Surface Water Treatment Regulations (SWTR) went into effect on June 29, 1993, 227 surface water plants around the state have taken steps to optimize their treatment processes not only to meet the current SWTRs tougher disinfection and turbidity treatment technique requirements, but also to meet more stringent future drinking water regulations. The most recent regulations mandated by the U.S.E.P.A. include the control of disinfection byproducts and the microbial contaminants in drinking water.

The purpose of the new Interim Enhanced Surface Water Treatment Rule (IESWTR) and the Long Term 1 Enhanced Surface Water Treatment Rule is to improve public health protection through the control of microbial contaminants, particularly *Cryptosporidium* (including Giardia and viruses) for those public water systems that use surface water or ground water under the direct influence of surface water. The purpose of the new Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) is to improve public health protection by reducing exposure to disinfection by products in drinking water (total trihalomethanes and haloacetic acids). Stage 1 DBPR applies to all sizes of community and nontransient and noncommunity water systems that add a disinfectant to the drinking water during any part of the treatment process and transient noncommunity water systems that use chlorine dioxide. During 2002-2003, no surface water production systems were required to issue "boil water" advisories to their customers due to significant SWTR treatment technique violations, other than events due to water main breaks. However, several surface and ground water systems that have been monitoring for TTHMs and HAA5s during this period experienced exceedences of the established MCLs.

The Public Water System Supervision Program is designed to ensure that Georgia residents, served by public water systems, are provided high quality and safe drinking water. Its legal basis is the Georgia Safe Drinking Water Act and Rules. As of March 31, 2004, the GAEPD regulates 1,683 community, 249 non-transient, non-community and 553 transient non-community public ground and surface water systems (serving populations greater than 25), each of which must obtain a Permit to Operate from the GAEPD. These permits set forth operational requirements for wells, surface water treatment plants and distribution systems for communities, industries, trailer parks, hotels, restaurants and other public water system owners. Georgia's community and non-transient, non-community public water systems are currently monitored for 92 contaminants. Georgia closely follows the Federal Safe Drinking Water Act and implements the National Primary and Secondary Drinking Water Standards, involving about 92 contaminants (turbidity, 8 microbial or indicator organisms, 20 inorganic, 60 organic, 4 radiological contaminants). Maximum Contaminant Levels (MCLs) are set for 83 contaminants, treatment technique requirements are established for 9 contaminants to protect public health, and secondary standards for 15 contaminants are issued to ensure aesthetic quality.

The program is funded from State and Federal appropriations and grants respectively on a year-to-year basis and a Drinking Water Service Fee (DWSF), which has been in effect since July 1992. The DWSF was necessary to provide the resources to implement testing for (a) lead and copper and (b) Phase II and V Synthetic Organic and Inorganic Chemicals in public water systems. Water system owners who contract with the GAEPD for this testing are billed annually based on the system population. Fees range from \$30 per year for a transient non-community system to a maximum of \$24,000 per year for a large water system with three or more entry points. Participation in the DWSF is voluntary to the extent that a system may elect to use a public or certified commercial laboratory to analyze their required samples.

Testing for lead and copper in accordance with the Federal Lead and Copper Rule (LCR) began on January 1, 1992. Georgia's 17 largest water systems (population of greater than 50,000) performed two, six-month consecutive rounds of lead and copper monitoring starting January of 1992 and ending December of 1992. During this monitoring period, 6 systems exceeded the action levels for lead, copper, or both. In accordance with the requirements of the LCR, all large systems submitted a corrosion control plan to the GAEPD for approval. The plans were approved by the GAEPD and implemented by the systems. Beginning January of 1997, the large systems started a follow-up monitoring period of two, six-month consecutive rounds. After 1997, several medium systems, due to population increases, moved up to large system status. Of these, one of those

systems had previously exceeded the lead and/or copper action level, but had come back into compliance before achieving large system status. All of the 7 large systems that previously exceeded the lead and/or copper action levels have achieved compliance with the lead and copper action levels. All of the existing 21 large systems, as of September 26, 2002 have either completed all three rounds of reduced monitoring or started triennial monitoring.

The medium size systems, populations of 3,300-50,000, started their two initial, six month consecutive rounds of lead and copper monitoring in July of 1992 and completed them in June of 1993. The systems that did not exceed an action level went into a reduced monitoring phase of the LCR in May of 1995. During this phase the systems are required to collect a reduced number of samples once per year for a period of three years. Beginning June 30, 1999, medium size systems that were eligible started the three-year compliance cycle. As of September 26, 2002, 7 medium systems are exceeding lead and 2 medium systems are exceeding copper. Nine systems that had previously exceeded the lead and/ or copper action level are now on reduced monitoring and five additional systems are on triennial.

Between July of 1993 and June of 1994, the small water systems, populations of 25-3,000 in size, conducted their consecutive rounds of lead and copper monitoring. There are 154 small systems currently exceeding the action levels for lead, copper, or both. These systems will remain in full monitoring until they have completed two consecutive rounds of monitoring without an exceedance, installed corrosion control, and for those exceeding lead, continue to provide public education on an annual basis. There are a total of 300 small systems that had previously exceeded lead and/or copper action levels. Of those 179 are now on reduced monitoring, 119 are on triennial monitoring, and 2 have gone to inactive status.

Monitoring for the 16 inorganic chemicals, 55 volatile organic chemicals and 43 synthetic organic chemicals, pesticides, herbicides and polychlorinated biphenyls continued as the fourth three-year compliance cycle commenced on January 1, 2002. New systems were required to initiate baseline monitoring (quarterly for all organic monitoring and surface water nitrate monitoring, annual for surface water inorganic monitoring and once every three years for groundwater inorganic monitoring).

The fourth three-year compliance period afforded most community and non-community non-transient water systems to reduce their monitoring frequency for the volatile organic and synthetic organic compounds. Public water systems that demonstrated three consecutive years of Volatile Organic Chemical monitoring with none of the 21 regulated VOCs above the Method Detection Level of 0.0005

mg/l were placed on a reduced monitoring frequency of once every three years (2002-2004).

A majority of the community and non-community non-transient water systems completed their quarterly baseline synthetic organic chemical monitoring during the initial 1993-1995 compliance period. For systems with populations less than 3300, SOC monitoring was reduced to one event during the 1996-1998 compliance period. Systems with populations greater than 3300 are required to sample for two quarters during the 1996-1998 compliance period.

In order to reduce the Federal chemical monitoring requirements, the GAEPD conducts vulnerability studies for all public water sources. The studies are conducted to assist the GAEPD with the issuance of chemical monitoring waivers to public water systems. Water sources at low risk to contamination are issued waivers from the chemical monitoring requirements as specified by the Federal Phase II/Phase V regulations. To date, the GAEPD has issued statewide monitoring waivers for asbestos, cyanide, dioxin and most synthetic organic compounds. The GAEPD, however, does continue to monitor a representative number of water systems deemed to be of high vulnerability to contamination for asbestos, cyanide, dioxin and all waived synthetic organic compounds to obtain the chemical data needed to issue and maintain these state-wide waivers. The issuance of waivers from monitoring for the above chemical parameters has saved Georgia's public water systems millions of dollars in monitoring costs over the duration of the waiver terms.

In addition, the GAEPD is also preparing vulnerability studies for individual water sources. These studies include the preparation of countywide and site specific maps of the area immediately surrounding the water source, and a report about the water source. The maps include water wells, potential pollution sources around the wells, cultural information such as roads, and bodies of water. As of December 31, 2003, the GAEPD has prepared site specific maps for approximately 723 privately owned ground water public water systems.

Georgia's Source Water Assessment and Protection Implementation Plan (SWAP) was approved by EPA on April 24, 2000. Based on the 24-month deadline, a granted 18-month regulatory extension and another 12-month extension from the USEPA, Georgia's has until November 2004 to complete all assessments for surface and ground water sources of drinking water. Under SWAP, States must identify the areas that are sources of public drinking water, assess water systems' susceptibility to contamination, and inform the public of the results. The implementation plan was developed with coordinated participation of the Georgia SWAP team, citizens and technical advisory committees and lots of input from interested stakeholders. The plan is tailored

uniquely to Georgia while still satisfying all requirements of the 1996 Federal Safe Drinking Water Act. Due to the overlapping nature of a number of states water supply watersheds, the Division is encouraging regional watershed initiatives. Several watershed related initiatives are underway which will also fulfill SWAP requirements for the surface water system participants. An Alcovy River Basin Watershed Protection Study involving some 15 jurisdictions was completed for three water systems in early 2001. Columbus Water Works hosted a middle-Chattahoochee River Watershed Study involving the drinking water intakes for the cities of LaGrange, West Point, Opelika and Columbus. Source water assessments for these surface water intakes were completed in March 2001. With funding assistance from GAEPD, in December 2001, the Atlanta Regional Commission submitted source water assessments for 27 surface water intakes associated with 17 water systems within the 13 county metro Atlanta area. Other surface water intake initiatives have been completed in the Lake Lanier drainage basin of the upper Chattahoochee River basin, in the upper Oconee River basin, in the Lake Allatoona drainage area, and in the Augusta, Savannah and Macon areas.

GAEPD is preparing all the source water assessments for the privately owned community, non-community, non-transient, and non-community transient ground water systems. Through December 31, 2003, SWAPs have been prepared for approximately 800 privately owned ground water systems.

CHAPTER 9

Major Issues and Challenges

Comprehensive Statewide Water Management Planning

Georgia is one of the fastest growing states in the nation. The burgeoning population places considerable demands on Georgia's ground and surface water resources in terms of water supply, water quality and assimilative capacity. The problems and issues are further complicated by the fact that surface water resources are limited in South Georgia and groundwater resources are limited in North Georgia. In some locations, the freshwater resources are approaching their sustainable limits. Thus, several key issues and challenges to be addressed now and in the future years include (1) minimizing withdrawals of water by increasing conservation, efficiency and reuse, (2) maximizing returns to the basin through reducing interbasin transfers and limiting use of septic tanks and land application of treated wastewater where water is limited, (3) meeting instream and offstream water demands through storage, aquifer management and reducing water demands, (4) protecting water quality by reducing wastewater discharges and runoff from land to below the assimilative capacity of the streams. The implementation of the Comprehensive Statewide Water Management Planning process in Georgia provides a framework for addressing each of the key issues.

Nonpoint Source Pollution

The pollution impact on Georgia streams has radically shifted over the last two decades. Streams are no longer dominated by untreated or partially treated sewage discharges which resulted in little or no oxygen and little or no aquatic life. The sewage is now treated, oxygen levels have returned and fish have followed.

However, another source of pollution is now affecting Georgia streams. That source is referred to as nonpoint and consists of mud, litter, bacteria, pesticides, fertilizers, metals, oils, suds and a variety of other pollutants being washed into rivers and lakes by stormwater. This form of pollution, although somewhat less dramatic than raw sewage, must be reduced and controlled to fully protect Georgia's streams. In addition to structural pollution controls, nonstructural techniques such as pollution prevention and best management practices must be significantly expanded to minimize nonpoint source pollution. These include both watershed protection through planning, zoning, buffer zones, and appropriate

building densities as well as increased use of stormwater retention ponds, street cleaning and perhaps eventual limitations on pesticide and fertilizer usage.

Toxic Substances

The reduction of toxic substances in rivers, lakes, sediment and fish tissue is extremely important in protecting both human health and aquatic life.

The sources of toxic substances are widespread. Stormwater runoff may contain metals or toxic organic chemicals, such as pesticides (chlordane, DDE) or PCBs. Even though the production and use of PCB and chlordane is outlawed, the chemicals still persist in the environment as a result of previous use. One of the primary sources of mercury detected in fish tissue in Georgia and other states may be from atmospheric deposition. Some municipal and industrial treated wastewaters may contain concentrations of metals coming from plumbing (lead, copper, zinc) or industrial processes.

The concern over toxic substances is twofold. First, aquatic life is very sensitive to metals and even small concentrations of metals can cause impairment. Fortunately, metals at low concentrations are not harmful to humans. Second, the contrary is true for carcinogenic organic chemicals. Concentrations of these can accumulate in fish flesh without damage to the fish but may increase a person's cancer risk if the fish are eaten regularly.

The most effective method to reduce the release of toxic substances into rivers is pollution prevention which consists primarily of eliminating or reducing the use of toxic substances or at least reducing the exposure of toxic materials to drinking water, wastewater and stormwater. It is very expensive and difficult to reduce low concentrations of toxic substances in wastewaters by treatment technologies. It is virtually impossible to treat large quantities of stormwater for toxic substance reductions. Therefore, toxic substances must be controlled at the source.

Public Involvement

It is clear that local governments and industries, even with well funded efforts, cannot fully address the challenges of nonpoint source pollution control and toxic substances. Citizens must individually and collectively be part of the solution to these challenges.

The main focus is to achieve full public acceptance of the fact that some of everything put on the ground or street ends up in a stream. Individuals are littering, driving cars which drip oils and antifreeze, applying fertilizers and

pesticides and participating in a variety of other activities contributing to toxic and nonpoint source pollution. If streams and lakes are to be pollutant free, then some of the everyday human practices must be modified.

The GAEPD will be emphasizing public involvement; not only in decision-making, but also in direct programs of stream improvement. The first steps are education through Georgia Project WET (Water Education for Teachers) and Adopt-A-Stream programs.