A GROUND-WATER MANAGEMENT PLAN FOR GEORGIA

GEORGIA'S COMPREHENSIVE STATE GROUND-WATER PROTECTION PLAN

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
GEORGIA GEOLOGIC SURVEY

ATLANTA
1998

CIRCULAR 11

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The preparation of this report was funded in part through a grant from the U.S. Environmental Protection Agency under the provisions of Section 106 of the Federal Water Pollution Control Act of 1972, as amended.

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ATLANTA
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EXECUTIVE SUMMARY

Ground water in Georgia is of good quality and is suitable for most uses. It provides drinking water to about one third of Georgia's seven million citizens. Most ground-water withdrawals are in the southern part of the State where the aquifers are very productive. The ground-water resources of northern Georgia, for the most part, are an under-utilized but viable water supply capable of augmenting surface-water sources.

This document presents a ground-water management plan for the State of Georgia and compares the Georgia plan with the United States Environmental Protection Agency's (EPA's) expectations of a "Core" Comprehensive State Ground-Water Protection Plan (CSGWPP, Appendix A). EPA approved Georgia's Ground-Water Management Plan as a "Core" CSGWPP on September 24, 1997 (p. vii). In addition to the management plan, coordination of ground-water management requires the coordination of ground-water management activities, as relating to both quality and quantity, within the Environmental Protection Division (EPD) of the Georgia Department of Natural Resources, between EPD and other organizations, pollution prevention, and management of ground-water data also are addressed in the ground-water management plan. The first section provides introductory material and explains the need for proper ground-water management. A brief discussion of the occurrence and general conditions of ground water in Georgia follows. The implementation of Georgia's Ground-Water Management Plan is then discussed. The Georgia Ground-Water Monitoring Network also is described.

Georgia's ground-water protection goal is established by the Georgia Water Quality Control Act. A more succinctly phrased version of the legislative intent of Georgia's ground-water protection goal was developed in 1983 and is consistent with EPA's ground-water protection goal. Georgia will implement its ground-water protection goal through a policy of anti-degradation. The State's ground-water

management plan implements this policy through three principal elements:

- Protection of ground-water quality,
- Management of ground-water quantity, and
- Monitoring of ground-water quality and quantity.

Protection of ground-water quality involves: (a) the prevention of pollution which includes proper siting, construction, operation, and monitoring of environmental facilities and activities through the EPD's permit programs, as well as prevention of pollution through wellhead protection and through prudent land-use planning by local governments; (b) detection and mitigation of existing problems; (c) development of protective standards where permits are not required; and (d) educating the public of the consequences of ground-water pollution/contamination and the need for ground-water protection. Management of ground-water quantity involves allocating the State's ground-water so that the resource will be available to present and future generations. Monitoring of ground-water quality and quantity involves continually assessing the resource so that changes, either good or bad, can be identified and corrective action implemented when needed.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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SEP 24 1997

REF: 4WM-GW/DW

Mr. Harold F. Reheis
Director
Environmental Protection Division
Georgia Department of Natural Resources
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Dear Mr. Reheis:

On behalf of the Environmental Protection Agency, it is my pleasure to convey the Agency's decision to endorse the Georgia Core Comprehensive State Ground Water Protection Program (CSGWPP).

This endorsement commits each of EPA's ground water-related programs to work closely with the State on meeting its ground water priorities. The process of moving from a Core Program to a Fully-Integrating Program through multi-year program agreements is described in the enclosure. This endorsement also commits EPA to consider a States request for assistance and flexibility in reaching its goal.

The Georgia Core CSGWPP was reviewed several times by EPA program staff. Additional information was requested from the State and satisfactory responses were provided. It is my understanding that this submittal received extensive public comments through a series of public meetings held by the State.

Georgia is the second Core CSGWPP to be endorsed by EPA Region 4. Thank you for your cooperation and again, congratulations.

Sincerely,

John H. Hankinson, Jr.
Regional Administrator

Enclosure

What Does Endorsement of a "Core" Comprehensive State Ground Water Protection Program (CSGWPP) Mean for the Endorsed State and for EPA's Programs?

EPA endorsement means that the Agency agrees that the State has demonstrated at least a minimum level of commitment and is implementing a unified approach towards comprehensive ground water management. The State's Core CSGWPP also provides a solid foundation for working in partnership with EPA and other Federal agencies towards a Fully-Integrating CSGWPP.

A State with an endorsed Core CSGWPP will begin implementation with EPA to further improve its ground water activities including developing its vision of a Fully-Integrating CSGWPP. The vision should address the state agencies' goals for achieving integrated resource-focused ground water protection over the next five to ten years. Once the vision statement is completed, a state could identify possible ways for EPA to support the state's efforts.

Each state will then jointly develop a written multi-year program agreement with the EPA Regional Office. The agreement will include specific State implementation milestones for comprehensive ground water efforts. These milestones should include ways to further integrate ground water protection activities (e.g., priority setting, monitoring, data collection/management, legal authorities), promote cross-program decision making, and achieve protection of the resource focused on common ground water priorities. In addition, the agreement should detail specific actions EPA will take to support State ground water protection efforts. The multi-year agreement will be a guide for both the State and EPA to use in their annual planning efforts to further develop, in close coordination, their ground water protection programs.

EPA programs at the Regional level will work with the State to identify opportunities for flexibility in EPA programs that will increase overall environmental benefits. Other federal agencies also will be encouraged to participate in these discussions.

1.0 INTRODUCTION

1.1 Why does Georgia Need A Ground-Water Management Plan?

The State of Georgia possesses some of the largest and most pure aquifers in the world. Except where they may become salty at depth, almost all of the aquifers can be considered as potential sources of drinking water. These aquifers are under-utilized for the most part, remarkably free of contamination or pollution, and recharged from precipitation falling within the state on an annual basis.

Total ground-water use (1990 data; Georgia Geologic Survey Information Circular 90) in Georgia is nearly one billion (994 million) gallons per day (MGD), as follows:

Public supply	=	234 MGD
Domestic	=	130 MGD
Industry/Mining	=	354 MGD
Irrigation	=	263 MGD
Livestock	=	8 MGD

Ground-water use in Georgia closely reflects yearly climatic fluctuations. For example, in 1980 (a year of drought), irrigation use was about 376 MGD; in 1990 (a relatively wet year), irrigation use was only 263 MGD.

Georgia is not a large water using State. While Georgia ranks 10th in population, it ranks only 29th in total water use and 15th in ground-water use (1985 data from the USGS). Moreover, even though about a billion gallons of water are pumped each day from Georgia's aquifers, this represents only about one-half of one percent of all the water that infiltrates annually into the ground to recharge the aquifers. Groundwater not used eventually discharges into rivers and streams or flows out and discharges at the sea floor.

Water from most of Georgia's aquifers may be safely consumed without treatment. Incidents of ground-water pollution and ground-water contamination are rare. Ground water, however, is the **least understood** of Georgia's natural resources. In science fiction, as well as in courts of law, it has been erroneously described and treated as "underground streams." Despite the general lack of awareness and understanding surrounding it, ground water is an important source of the State's water supply and its availability in the future could be threatened by pollution and, in some areas, by depletion.

The ground-water regime is particularly susceptible to slow, insidious degradation, which may develop as a result of human activities on the land's surface. Moreover, ground-water use and ground-water quality are interrelated. Water quality may be modified simply by pumping wells. For example, deeply buried saline waters are moving upward into fresh-water zones of the Floridan aquifer at Brunswick as a result of pumping large volumes of ground water. In addition, the ground-water regime in many portions of the State, particularly in the Piedmont, Blue Ridge, and areas of karst terrain (areas characterized by limestone caves and sinkholes) is closely interconnected to the surface water regime. In these areas, surface-water quantity and quality affect ground-water quantity and quality.

Ground water is extremely important to the life, health, and economy of Georgia. Ground water made up about 24 percent of the public supply water use, 92 percent of the domestic water use, 59 percent of the irrigation water use and slightly more than half of the industrial water use in 1990. For practical purposes, outside the larger cities of the Piedmont, ground water is the dominant source of water in Georgia. Literally billions of dollars could be lost to the economy of the State and the health of millions of people could be compromised if Georgia's vast treasure house of clean ground water were to be significantly polluted.

Georgia's ground-water resources are replenished annually through recharge from precipitation. Some of the precipitation falling on the land percolates

downward through pores and tiny fractures in the soil into underlying aquifers, thus recharging them. EPD, since the late 1970's, has performed a number of major aquifer mapping investigations and has delimited the State's Most Significant Ground-Water Recharge Areas (published as Hydrologic Atlas No. 18, 1989) as well as the State's Ground-Water Pollution Susceptibility (published as Hydrologic Atlas No. 20, 1992). As a result of these studies, EPD assisted in the development of environmental criteria (rules) for the protection of recharge areas through the Georgia Planning Act of 1989 (Appendix B). Moreover, EPD is implementing an EPA approved wellhead protection program to protect ground-water capture zones in the immediate vicinity of municipal wells (Appendix C).

Considering the complexity of the hydrogeologic environment in Georgia, ground-water management should be based on case-by-case evaluations as to how any proposed action would affect the hydrologic system. EPD has determined that a systems approach should be the key to the management plan. A systems approach would be one in which the impact of a proposed activity on the hydrologic regime would be assessed. If the assessment indicated no significant adverse impact, the activity could be permitted.

To clarify the above, it is appropriate to cite a few examples:

- Whenever a new municipal solid waste landfill is proposed, an assessment is made regarding depth and flow characteristics of ground water beneath the site as well as the absorptive characteristics of site soils. With such knowledge in hand, the Land Protection Branch can establish concentration limits in the landfill permit and implement a design performance goal for the site in order to provide assurance to the public that the operation of the landfill will have little or no adverse effect on ground water.

- Large ground-water withdrawals have the potential to significantly affect ground-water flow regimes. In this regard, EPD analyzes applications for large withdrawals and calculates drawdown effects upon the aquifer. A permit for the withdrawal will be given only if those calculations indicate no significant potentiometric declines will occur.

- Municipal drinking water wells should be isolated from potential sources of ground-water pollution. As part of Georgia's EPA approved wellhead protection program, EPD is performing inventories of potential pollution sources within an existing well's capture zone, directing new wells to sites away from existing potential pollution sources, and either prohibiting new potential pollution sources or requiring such proposed potential pollution sources to be constructed/operated in a manner that would minimize ground-water pollution.

The Georgia Ground-Water Management Plan places emphasis on **management activities** to prevent pollution, establish priorities, protect aquifers, insure consistency, and coordinate the administrative functions within EPD so that **sustainable** quantities of high-quality ground water will be available for future generations. The plan does not address program functions, well design, permit conditions, and so forth. Rather, the plan identifies ground-water quality/protection standards (Maximum Contaminant Levels or MCLs, Appendix D) and how the various EPD programs will coordinate with one another, the public, and other organizations so that adequate ground-water management systems are institutionalized. The management plan, described in Section 4.0, is composed of four principal parts:

- A description of EPD's priority-setting process (Section 4.2),
- A description of key activities that EPD will perform to control and regulate potential pollution sources above the ground, in the ground, and in the ground water (Section 4.4),
- A description of EPD's ground-water quality standards, identification of ground-water protection plans to protect ground-water quality, and identification of ground-water conservation plans to protect ground-water availability (Section 4.5), and
- A description of EPD's 4-tiered monitoring program to provide ground-water quality and quantity data for the State's aquifers on a continuing basis, to identify changes of significance, and to assist in the environmental management decision-making process (Section 4.4.3 and Appendix E).

The ground-water management plan set forth in this document is designed exclusively for Georgia and is based on Georgia's environmental laws, administrative structure, and unique hydrogeologic setting. The plan is designed to complement the Georgia Rules for Safe Drinking Water, Water Quality Control, Solid Waste Management, Recharge Areas Protection, Hazardous Waste Management, Hazardous Sites Response, Ground-Water Use, Underground Injection Control (UIC), and Underground Storage Tanks (UST). The plan is not necessarily appropriate for other states. For example, Georgia has no oil and gas production. Consequently, reinjection of oil/gas-field brines, which is a significant cause of ground-water pollution in many states, is of no concern to Georgia.

1.2 Goal

The Goal for Georgia's ground-water management plan is:

> **"It shall be Georgia's goal to protect human health and environmental health by preventing and mitigating significant ground-water pollution. To do this Georgia will assess, protect and, where practical, enhance the quality of ground-waters to the levels necessary for current and projected future uses and for the public health and significant ecological systems."**

Georgia's ground-water protection goal guides all federal and all State ground-water related programs operating within the State that address potential sources of pollution, including federally-unregulated ones. The goal is derived from Section 12-5-21, dealing with the declaration of policy and legislative intent, of the Georgia Water Quality Control Act (O.C.G.A. 12-5-20, *et seq.*). This Act is the foundation of ground-water protection legislation in Georgia. All other statutes dealing with ground-water protection can be considered as derivatives of the Water Quality Control Act. The Act, and rules promulgated thereunder, empower the Director of EPD to protect the subsurface waters of the State and to assume responsibility for the maintenance of water quality and water quantity.

Georgia's ground-water protection goal, as written in this Circular, is a succinctly phrased version of the aforementioned legislative intent of the Water Quality Control Act and was established by the Director of EPD in 1983, in the form of a guidance memorandum for the direction of Georgia's first ground-water management plan. Georgia's goal was written in a manner to be consistent with that of the National Governor's Association. Since 1983, EPD has integrated the goal throughout all of its regulatory programs, including water supply programs. Moreover, the goal is not restricted to regulated environmental facilities as EPD also has applied the goal to protect wetlands and species habitats.

Georgia's ground-water protection goal is consistent with EPA's overall ground-water protection goal of preventing adverse effects to human health and the environment and protecting the environmental integrity of the nation's ground water. The goal, which recognizes that all ground water is not of the same value, is primarily preventative rather than curative. It also recognizes that ground-water resources should be maintained close to their present level of quality or improved. Of course, newly discovered ground-water quality problems should be remedied to the extent possible, but the long term objective of the plan to implement Georgia's ground-water protection goal is to prevent ground-water pollution before it occurs rather than to clean it up after the fact.

As will be discussed in greater detail in Section 4 dealing with Ground-Water Management, EPD will implement Georgia's ground-water goal through a policy of **anti-degradation**. Such a policy should not be construed to mean that EPD accepts ground-water pollution. The policy, rather, reflects the "real world" where mankind's day-to-day activities will generate some small, but manageable, releases to ground water. For example, properly functioning domestic septic systems are a well-recognized technology for handling and disposing of sanitary wastes. Effluent from septic drain fields, nevertheless, percolates downward, and some eventually reaches the water table. As long as lot sizes are relatively large and the underlying soils have appropriate

permeability, septic effluent rarely presents a problem. Some releases do occur, however. Thus, rigid adherence to a policy of non-degradation would, in effect, preclude the use of septic systems in Georgia.

1.3 Statutory Authority

Georgia has sufficient legal authority to address the State's ground-water protection needs. The Environmental Protection Division (EPD) of Georgia's Department of Natural Resources (DNR) has primary responsibility for administering and enforcing state water-quality laws as well as developing and implementing Georgia's Comprehensive State Ground-Water Protection Plan (CSGWPP). In addition, Georgia has several unique laws, such as the Water Well Standards Act of 1985 and the Georgia Planning Act of 1989, that address both ground-water availability and quality. While EPD administers most ground-water laws, the Georgia Departments of Agriculture (pesticides), Human Resources (on-site sewage management), and Community Affairs (planning) are also involved in ground-water protection. The relevant Georgia laws are listed in Table 1-1. The Director of the EPD and the Commissioners of the other departments are the officials responsible for the proper administration of water quality and quantity laws. Rules and regulations have been promulgated [in accordance with the Georgia Administrative Procedures Act (O.C.G.A. 50-13-1, *et seq.*) utilizing the public participation process] so that the laws may be implemented and administered.

As previously mentioned, the primary statute[1] for protecting Georgia's ground water is the Water Quality Control Act and the rules promulgated thereunder. The Water Quality Control Act defines "the waters of the state" to

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[1]EPD has legal authority under several other statutes to enforce ground-water remediation; these include, the Georgia Underground Storage Tank Act, the Georgia Comprehensive Solid Waste Management Act, the Georgia Hazardous Waste Management Act, and the Hazardous Sites Response Act.

Table 1-1: Environmental Laws Administered by the Georgia Environmental Protection Division and other State of Georgia Agencies.

Acts Administered by the Environmental Protection Division:
- Air Quality Act
- Asbestos Safety Act
- Water Quality Control Act (including Underground Injection Control)
- Comprehensive Solid Waste Management Act
- Hazardous Waste Management Act
- Hazardous Sites Response Act
- Erosion and Sedimentation Control Act
- Surface Mining Act
- Scrap Tire Act
- Safe Drinking Water Act
- Ground-Water Use Act
- Surface Water Allocation Amendments
- Oil and Gas and Deep Drilling Act
- Water Well Standards Act
- Underground Gas Storage Act
- Underground Storage Tank Act
- Radiation Control Act
- Oil and Hazardous Spills Reporting Act
- Safe Dams Act
- Mountain Protection Act
- Petroleum Pipeline Eminent Domain Act

Acts Administered by the Department of Agriculture:
- Pesticide Use and Application Act
- Pesticide Control Act

Act Administered by the Department of Community Affairs:
- Georgia Planning Act

Act Administered by the Department of Human Resources:
- Georgia Health Code (specifically those portions dealing with on-site sewage management)

Acts Affecting all Agencies:
- Environmental Policy Act
- Strategic Planning Amendments to Budget Acts
- Administrative Procedures Act

include, in addition to surface waters:

> "any...springs, wells, and all other bodies of...subsurface waters,...lying within...the state..."

The Act empowers EPD to "act in the interest of the people of the State to restore and maintain a reasonable degree of purity in the waters of the State." In other words, through the Water Quality Control Act, EPD can enforce remediation of ground-water pollution regardless of the source or the cause. Moreover, the Act empowers EPD to invoke penalties of up to $50,000.00 per day (up to $100,000.00 per day for repeat violations) for ground-water pollution violations.

The Georgia General Assembly enacted the Georgia Environmental Policy Act (O.C.G.A. 12-16-1, *et seq.*) in 1991. This Act requires state agencies (or any entity receiving 50 percent of its funds from the State) to prepare an environmental assessment prior to taking any action which may adversely affect the environment by land disturbing activities, land exchanges of more than 5 acres, or harvesting more than 5 acres of trees over 2 inches in diameter at breast height. As part of the environmental assessment (an environmental effects report), a determination must be made if the proposed activity is in an environmentally sensitive area such as wetlands, water supply area, water resource area, or ground-water recharge area. The Act specifically calls for consultation with other relevant parties, which can include state and federal agencies, local governments, stake holders, and the public.

The Entomology and Pesticides Division of the Georgia Department of Agriculture (GDA) regulates pesticide applications and has the authority to develop pesticide management plans. The Georgia Pesticide Use and Application Act of 1976 (O.C.G.A. 2-7-97, *et seq.*) specifically gives the Commissioner of GDA the authority to regulate the time, place, manner, methods, materials, and amounts of the usage of pesticides within Georgia. EPD and the Entomology and Pesticides Division of GDA have developed a formal Memorandum of Understanding (dated August 19, 1991) delimiting each agency's rules, responsibilities, and coordination

mechanisms.

The Environmental Health Section of the Georgia Department of Human Resources (DHR) regulates individual and non-domestic septic systems under the Georgia Health Code (O.C.G.A. 12-8-1, *et seq.*, 31-3-1, *et seq.*, 31-2-2, *et seq.*, and 31-4-4, *et seq.*). EPD and DHR also have developed a formal Memorandum of Understanding (dated October 19, 1994) whereby DHR will not permit any non-domestic septic system that accepts chemical wastes that could pollute ground water (e.g., cause an MCL to be exceeded); EPD, in turn, will enforce remediation of any non-domestic septic system polluting ground water with chemicals.

The Georgia Department of Community Affairs coordinates with local governments to implement inclusion of environmental planning criteria (rules) developed by EPD to protect ground-water recharge areas through land-use ordinances as part of the Georgia Planning Act of 1989 (O.C.G.A. 12-2-8, *et seq.*). The recharge area planning criteria are contained in Appendix B.

The ground-water protection role of local governments in Georgia is limited to land-use ordinances and water supply planing. Some examples of these include having larger septic tank lot sizes in significant recharge areas and requiring public water supplies to utilize water conserving plumbing in areas characterized by declining water levels. Local governments do not issue environmental permits nor do they enforce pollution violations; this is done by EPD at the state level. Table 1-2 summarizes the implementation status and responsible agency of Georgia ground-water protection programs.

1.4 State-Federal Interrelationship

Georgia will continue to have **primary** responsibility for ground-water quantity and quality management. Such management will be responsive to the differing needs, as well as hydrologic and climatic conditions, within the State. The federal government, on the other hand, should provide technical assistance, support research and development programs, and coordinate and disseminate

Table 1-2: Summary of State Ground Water Protection Programs

Programs or Activities	Implementation Status	Responsible State Agency
Active SARA Title III Program	Fully established	EPD
Ambient ground water monitoring system	Fully established	EPD
Aquifer vulnerability assessment	Ongoing	EPD
Aquifer mapping	Ongoing	EPD
Aquifer characterization	Ongoing	EPD
Comprehensive data management system	Ongoing	EPD
EPA-endorsed Core Comprehensive State Water Protection Program (CSGWPP)	Fully established	EPD
Ground water discharge permits	Not applicable	EPD
Ground water Best Management Practices	Pending	EPD
Ground water legislation	Fully established	EPD
Ground water classification	Not applicable	EPD
Ground water quality standards	Ongoing	EPD
Interagency coordination for ground water protection initiatives	Fully established	EPD/DHR/DOA
Nonpoint source controls	Pending	EPD
Pesticide State Management Plan	Pending	DOA
Pollution Prevention Program	Fully established	DNR
Resource Conservation and Recovery Act (RCRA) Primacy	Fully established	EPD
State Superfund	Fully established	EPD
State RCRA Program incorporating more stringent requirements than RCRA Primacy	Fully established	EPD
State septic system regulations	Fully established	DHR
Underground Storage Tank Installation Requirements	Fully established	EPD
Underground Storage Tank Remediation Fund	Fully established	EPD
Underground Storage Tank Permit Program	Not applicable	EPD
Underground Injection Control Program	Fully established	EPD
Vulnerability Assessment for Drinking Water/Wellhead Protection	Ongoing	EPD
Well Abandonment Regulation	Fully established	EPD
Wellhead Protection Program (EPA-Approved)	Fully established	EPD
Well Installation Regulations	Fully established	EPD

information to and between states.

Georgia currently has obtained primacy for enforcement of federal environmental laws involving ground-water quality where such laws allow States to obtain primacy. Georgia will seek or will continue primacy for enforcement of **reasonable** federal ground-water laws where allowed. For example, Georgia has developed and is enforcing an Safe Drinking Water Program as well as an Underground Storage Tank (UST) Program. Through these two programs, Georgia is able to minimize the threat to present and future public drinking water wells from underground storage tanks.

As generally outlined in EPA's 1990 paper on **State/Federal Relationship Issues in Ground-Water Protection**, the roles of federal and State Government in regulating specific sources of pollution or contamination should be based on the following factors:

- The federal government should take a prominent role; (a) when there is a need to establish regulatory consistency (e.g., in order to insure minimum protection, to prevent the development of "pollution havens," or to limit adverse impacts on interstate commerce); (b) when the scope of the effort requires national resources (e.g., research, regulations addressing complex environmental problems, assessing the toxicity of various chemical compounds, performing risk-assessment, promulgating MCLs, etc.); (c) when state-by-state efforts would create unwarranted and inefficient duplication (e.g., bans and research); and (d) when national security is involved (e.g., the disposal of high level radioactive waste).

- States should play the prominent regulatory role; (a) when the activities of concern are numerous (e.g., septic tanks) or highly localized; (b) when land-use management is a principal protection approach (e.g., wellhead protection, recharge area protection, etc.); (c) when there is the potential for contamination from naturally occurring mineral constituents (e.g., salt water encroachment, turbidity in sinkhole regions, etc.); (d) when States have primacy from EPA to manage national environmental laws; (e) when the technical qualifications of ground-water professionals (e.g., pesticide applicators, well drillers, engineers and geologists) can affect how ground water is used, studied, or managed; and (f) when technologies currently exist or are easily developed to address the problem.

Further, local governments should play the primary role in the implementation of ground-water protection ordinances.

While Georgia's hydrogeological conditions are unique to the State, EPD's approach to ground-water protection is consistent with that of EPA. On an annual basis, EPD compares its ground-water protection priorities with those of EPA. If changes in Georgia's priorities are determined by the Director to be in the State's best interest, then the priorities are changed and human and financial resources reallocated.

1.5 Staffing and Equipment Capabilities

In general, the approximately 400 EPD professional associates dealing with ground water (to variable degrees), are technically trained in geology, engineering, chemistry, and/or environmental science. Many have advanced degrees. A state-of-the-art Geographic Information System (GIS) and organic/inorganic analytical laboratories have been established by EPD on the campus of the Georgia Institute of Technology. Moreover, using its drilling rigs and its downhole and surface geophysical equipment, EPD can perform comprehensive field assessments of aquifers and of ground-water pollution incidents.

For special hydrogeological studies, EPD utilizes the expertise of scientists with the United States Geological Survey (USGS) or the University System of Georgia. Moreover, EPD, in cooperation with the USGS, maintains several regional ground-water flow models. A ground-water modeling center also has been established at the offices of the Geologic Survey Branch to assist in site evaluations.

Because of its hidden nature, ground water is often difficult for the lay person to understand. EPD, therefore, believes that it is important for ground-water practitioners to be appropriately educated and trained. EPD actively encourages that ground-water investigations be performed under the direction of a Georgia registered professional geologist (P.G.) or professional engineer (P.E.) for its own

associates as well as for consultants practicing in the private sector. EPD does not approve or review ground-water reports including remediation assessments not prepared under the direction of a P.G. or a P.E.

1.6 Definitions and Approaches

EPD has established basic definitions for ground-water terms and basic approaches (or protocols) for technical assessments. These terms and approaches are consistent from program to program. Words in this document, as well as those defined in EPD's Rules, generally have their customary and accepted meaning. All words of a technical nature or peculiar to the sciences of hydrology or chemistry are given their meanings defined in:

- General Introduction and Hydrologic Definitions (U.S. Geological Survey Water-Supply Paper 1541-A).
- Definitions of Selected Ground-Water Terms - Revisions and Conceptual Refinements (U.S. Geological Survey Water-Supply Paper 198).
- The most recent edition of Handbook of Chemistry and Physics (Chemical Rubber Publishing Co.).
- The most recent edition of the Glossary of Geologic Terms (American Geologic Institute).
- Code of Federal Regulations, Title 40 - Protection of the Environment.

Ground-water sampling is in accordance with the procedures defined in the most recent edition of (or equivalent):

- Manual of Ground-Water Sampling Procedures: Scalf, McNabb, Dunlap, Cosby, and Fryberger: Kerr Environmental Research Lab., Ada, Okla. 74820.
- EPA Region IV Sampling Procedure Manual.

- Procedures Manual for Ground-Water Monitoring at Solid Waste Disposal Facilities: Fenn, Cocozza, Isbister, Brains, and Yare: EPA Manual SW611, NTIS.

- Guidelines for Collection and Field Analysis of Ground-Water Samples for Selected Unstable Constituents. USGS TWRI Book 1, Chapter D2.

- The most recent edition of EPD's Ground-Water Monitoring Manual.

Analytical procedures for chemical analyses are those identified by the Environmental Protection Agency (EPA): 40 CFR Part 136, Guidelines Establishing Test Procedures of Analyses of Pollutants.

Ground-water assessments, including remediation assessments, generally follow procedures and methods described in:

- Dominico, Patrick A., and Schwartz, Franklin W., 1990, Physical and Chemical Hydrogeology: New York, John Wiley & Sons, 824 p.

- Driscoll, Fletcher G., 1986, Groundwater and Wells, 2nd Edition: St. Paul, Minnesota, Johnson Filtration Systems, Inc. 1089 p.

- Fetter, C.W. Jr., 1980, Applied Hydrogeology: Columbus, Ohio, Charles E. Merrill Publishing Company, 488 p.

- Freeze, R. Allen, and Cherry, John A., 1979, Groundwater: Englewood Cliffs, New Jersey, Prentice-Hall, Inc. 604 p.

Technical documents, such as sampling procedures do change with time. As new and improved protocols are developed, EPD will implement them.

Concepts of Comprehensive State Ground-water Protection Programs are described in EPA document 100-R-93-001, Final Comprehensive State Ground Water Protection Program Guidance, December, 1992.

2.0 CONSISTENCY WITH THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S EXPECTATIONS FOR GROUND-WATER PROTECTION

EPA outlined a new "Ground Water Protection Strategy" in July 1991. This strategy centers around the development of Comprehensive State Ground Water Protection Programs (CSGWPP) whereby each State is given the responsibility for developing and implementing its own unique ground-water protection strategy. To assist the States in the development of their CSGWPP, EPA released a National Ground Water Guidance document, in December 1992, delineating the six components that should comprise a CSGWPP (Figure 2-1):

- Establishing a ground-water protection goal to guide all relevant federal, State, and local programs operating within the State.
- Establishing priorities, based on characterization of the resource, identification of sources of pollution, and programmatic needs, to guide all relevant federal, State, and local programs and activities in the State toward the most efficient and effective means of achieving the State's common ground-water protection goal.
- Defining authorities, roles, responsibilities, resources, and coordinating mechanisms across relevant federal, State, and local programs for addressing identified ground-water protection priorities.
- Implementing all necessary efforts to accomplish the State's ground-water protection goal consistent with the State's priorities and schedules.
- Coordinating information collection and management to measure progress, re-evaluate priorities, and support all ground-water related programs.
- Improving public education and participation in all aspects of ground-water protection to achieve support of the State's protection goal, priorities, and program.

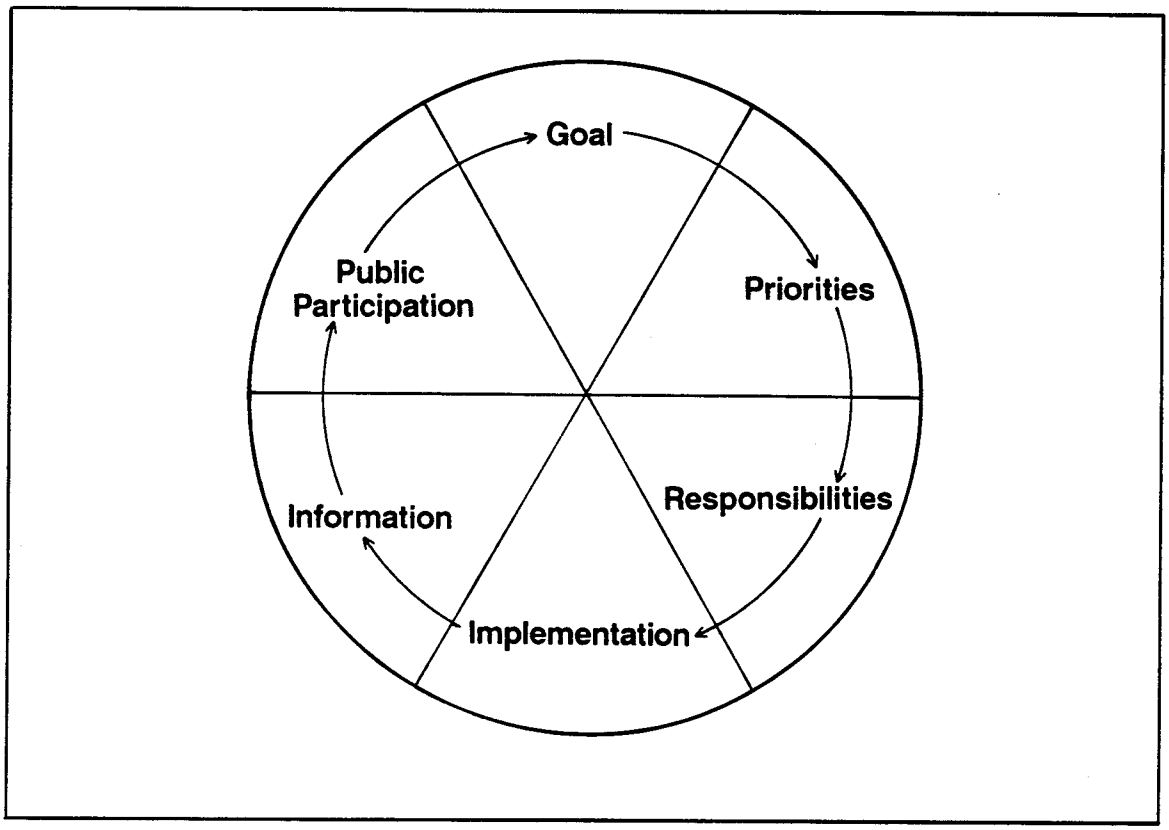

Figure 2-1. The six Strategic Activities of a CSGWPP are dynamic and inter-related; improvements in one activity lead to improvements in the other five (modified from EPA Publication 100-R-93-001).

Each of these "Strategic Activities" consists of several "Adequacy Criteria" that the States must demonstrate to EPA that they have achieved in order to have an adequate ground-water protection program. The first phase of a CSGWPP is the development of a "Core Program" that shows demonstrable progress in developing a CSGWPP. The second phase is the development of a "Fully Integrating Program" that represents the attainment of a sustainable, comprehensive, and fully developed ground-water protection program. The eventual attainment of a "Fully Integrating" CSGWPP means that ground-water protection efforts are coordinated and focused across all federal, State, and local programs based on the State's understanding and decisions regarding the relative use, value, and vulnerability of its ground-water resources, including the relative threat of all actual or potential pollution sources.

Georgia has had a formal Ground-Water Management Plan that includes protection of quality and management of quantity since 1983. Over the thirteen year period between 1983 and 1996, Georgia has achieved all of the "Adequacy Criteria" for a "Core Program" and many of the "Adequacy Criteria" for a "Fully Integrating Program." EPD's progress and accomplishments in meeting EPA's "Adequacy Criteria" for a "Core" CSGWPP are described in Appendix A.[2]

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[2]EPD has approved several State "Core" CSGWPPs where the overall State ground-water program was described in narrative format; and the State's progress in attaining EPA's "Adequacy Criteria" provided in separate Appendix. This is the format used in this document.

3.0 CHARACTERISTICS OF GEORGIA'S GROUND-WATER RESERVOIRS

For almost 100 years, EPD (or one of its predecessors) has been mapping and describing the characteristics of Georgia's ground-water resources. For almost the same length of time, the USGS, as part of its cooperative programs with State or local governments, also has performed assessments of Georgia's ground-water resources. These State and federal studies have been reported in numerous published and unpublished technical documents. The technical documents, in turn, serve as the basis for establishing priorities, determining remediation methods, and making siting decisions.

According to the USGS's 1986 **National Water Summary**: "Ground water in Georgia is of good quality, is suitable for most uses, and only a few occurrences of human-related ground-water contamination have been detected." While there are numerous small plumes of ground-water pollution in the surficial aquifer emanating from point sources of pollution such as leaking underground storage tanks, former disposal sites, unlined landfills, and so forth, few cases of ground-water pollution of drinking water aquifers have been documented in Georgia; and there is no known significant portion of the population at risk from ground-water pollution from any point or non-point source. No particular source of man-made pollution is known to be widespread or represents a significant threat to ground-water quality in the State.

Ground water provides drinking water to about one-third of Georgia's population of almost seven million. Most of the ground-water withdrawals are in the southern part of the State where the aquifers are very productive.

Ambient ground-water quality, as well as the quantity available for development, is related to the composition and character of the ground-water reservoirs and the nature of the geologic framework through which the ground-water has moved. The three rock types - igneous, metamorphic and

sedimentary - compose the geologic framework for the ground-water reservoirs in Georgia (Figure 3-1).

The Valley and Ridge and the Cumberland Plateau Provinces in northwestern Georgia are underlain by sinuous bands of layered sedimentary rocks, including sandstone, shale, limestone, dolomite, and chert, that have been folded and faulted. The complexity and close proximity of different lithologic units result in an extremely complicated map pattern of ground-water quality. Drilled wells in these sedimentary rocks normally range from 50 feet to 1,300 feet in depth. Wells less than 50 feet deep commonly obtain water directly from the soil or weathered rocks.

The Blue Ridge and Piedmont Provinces are underlain by metamorphic and igneous rocks which are overlain by a regolith of weathered rock of variable thickness. While these rocks are poorly permeable, they yield water to wells through fractures or other geologic discontinuities, which are more abundant in the upper few hundred feet of rock and at the transition zone between layers of different rock types. In general, ground water is stored in the regolith and transmitted to wells via the fractures or discontinuities. Recent technologic advances in siting Piedmont and Blue Ridge wells have led to increased well yields. Wells sited on the basis of favorable hydrogeology have yields on the order of 100 gallons per minute, whereas wells sited on the basis of convenience generally yield about 20 gallons per minute.

The Coastal Plain Province includes three major subdivisions of water producing sedimentary rocks (Figure 3-1). The first consists of limestone and dolomite and underlies the major portion of the Coastal Plain. The second is primarily limestone and sand and is limited to the southwestern part of the Coastal Plain. The third consists mainly of sand and some gravel and is located south of the Fall Line adjacent to the Piedmont Province. These Coastal Plain sedimentary rock units are layered and the layers dip gently to the southeast. Regional flow of ground water generally follows this dip. Single wells can produce water from one

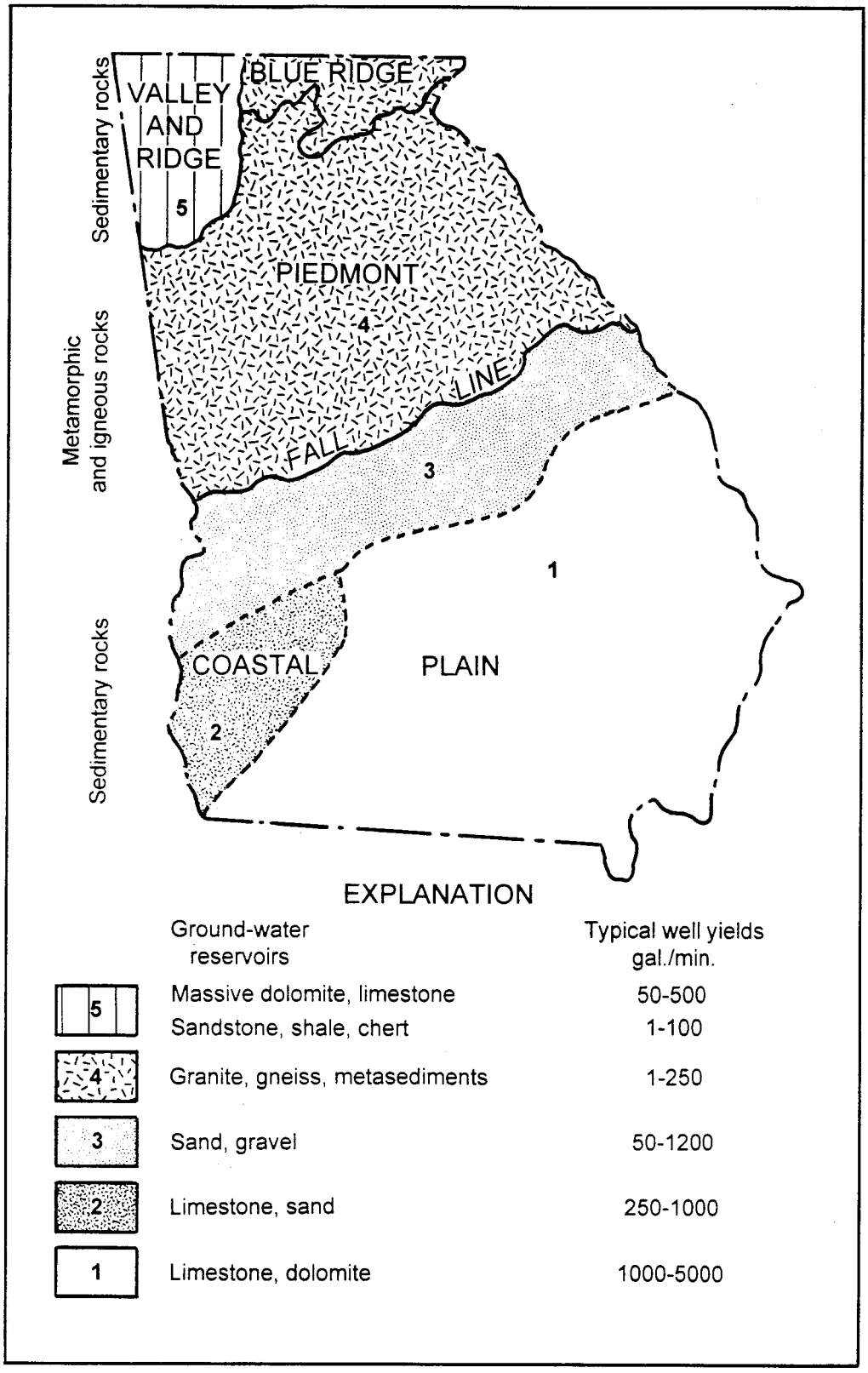

Figure 3-1. Hydrogeologic provinces of Georgia.

or more of these layered, ground-water reservoirs.

Major sources of ground-water contamination/pollution are found in Table 3-1. The greatest threat to the quality of ground water in Georgia is salt water encroachment. This threat, however, is primarily restricted to some areas located along the Atlantic Coast, specifically in Chatham, Glynn, and Camden Counties. Ground-water withdrawals in these areas for industrial and municipal use have resulted in lower quality water moving, either from the ocean or from lower parts of the aquifer, into the upper Floridan Aquifer. Naturally occurring mineral salts also occur in south central Georgia and in northwest Georgia. EPD has utilized its regulatory authority to limit additional withdrawals of ground water in these areas and thus prevent additional encroachment. Other relatively minor sources of ground-water pollution and contamination[3] in Georgia, listed in order of decreasing significance are: leaking underground storage tanks, naturally occurring metals such as iron and manganese, naturally occurring radioactive elements, hazardous waste and hazardous materials sites, and septic tanks. Pollution from approved field use of agricultural chemicals, as opposed to spills at manufacturing, handling or storage sites, has not been identified as a problem in the State.

Georgia's ground water is susceptible to pollution from surface sources in recharge areas. The State has been mapped into areas of higher than average (for Georgia), average, and lower than average pollution susceptibility (Hydrologic Atlas 20, 1992). Pollution can come from a number of sources, such as business and industry, agriculture, and homes (e.g., septic systems). Solvents and hydrocarbons would be expected in the vicinity of cities and towns. Insecticides, herbicides, and

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[3]As used by EPD, "pollution" refers to chemicals alien to the general ground-water regime whereas "contamination: refers to chemicals that naturally occur in the ground-water regime. For example, mercury that was released from an industrial facility would be an example of "pollution"; on the other hand, mercury leaching into the ground from the natural weathering of rocks would be an example of "contamination". This becomes significant as pollution is best managed by prevention, whereas contamination is best managed by avoidance.

Table 3-1: Major Sources of Ground Water Contamination/Pollution

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)* Surface Impoundments Waste Piles Waste Tailings	C, D, F	D
Disposal Activities Deep Injection Wells Landfills* Septic Systems* Shallow Injection Wells	 C,D,F C	 C,D,G,H E,K,L
Other Hazardous Waste Generators Hazardous Waste Sites* Industrial Facilities* Material Transfer Operations Mining and Mine Drainage Pipelines and Sewer Lines Salt Storage and Road Salting Salt Water Intrusion* Spills* Transportation of Materials Urban Runoff* Natural Iron and Manganese* Natural Radioactivity*	 F C,F B,C,E,F F D,E E,F E,F	 C,H C,D,H G D Variable H 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
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 was checked

A. Inorganic Pesticides
B. Organic Pesticides
C. Halogenated Solvents
D. Petroleum Compounds
E. Nitrate
F. Fluoride
G. Salinity/Brine
H. Metals
I. Radionuclides
J. Bacteria
K. Protozoa
L. Viruses

nitrates may be expected in agricultural regions of the State. Hazardous materials represent another potential source of pollution. Ground-water pollution from hazardous wastes and hazardous materials may occur at industrial sites (both active and abandoned) and at isolated sites as a result of "dumping" or unintentional equipment leaks (both past and present).

Some pollution sources common in other States tend to be rare or nonexistent in Georgia. For example, there are no documented cases of ground-water pollution resultant from agricultural applications of pesticides. In a similar light, sampling of over 5,000 domestic wells for nitrates indicates that there are only a handful of wells where the nitrate MCL has been exceeded (Geologic Survey Project Report 25).

When compared to other States (see the USGS's 1986 **National Water Summary**), instances of human-induced chemical pollution have been relatively infrequent in Georgia. The reasons for this lies in the State's geologic history. Northern Georgia has been exposed to subtropical weathering conditions for many millions of years. This has resulted in many rock forming minerals decomposing into clay, which in turn, acts as a protective barrier to pollution. Except for the recharge areas along the Fall Line and in the Dougherty Plain, southern Georgia is primarily characterized by buried artesian aquifers protected from surface pollution by confining strata. The State's ground water is most susceptible to pollution in the most significant recharge areas of its aquifers (Figure 3-2).

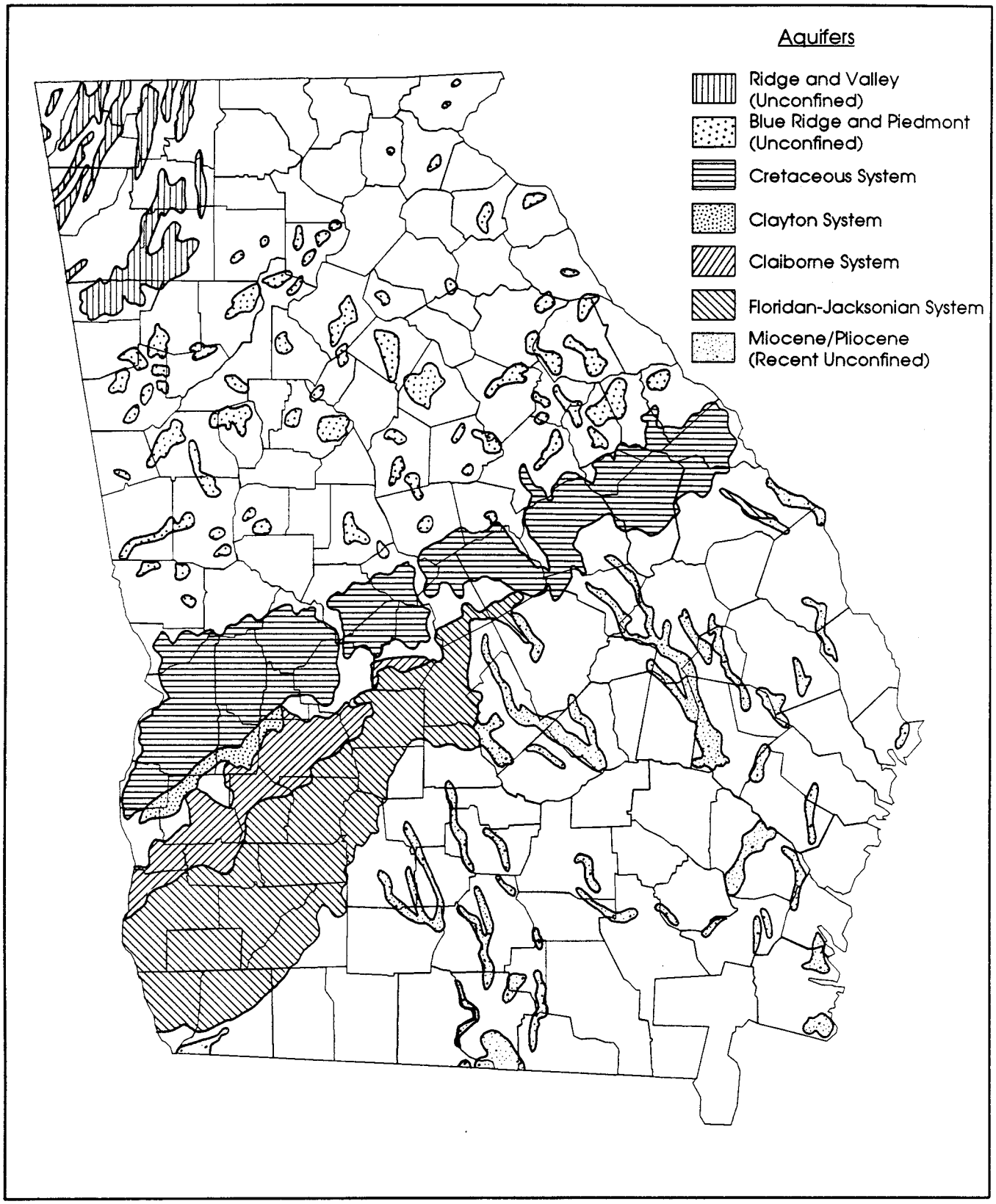

Figure 3-2. Generalized map of the most significant ground-water recharge areas of Georgia.

4.0 GROUND-WATER MANAGEMENT

4.1 Introduction

The Georgia approach to environmental protection is more of a management concept than a regulatory one, because the emphasis is oriented towards identification of the resource, development of a program that enables the resource to be wisely used, and protection of the interest of the general public as well as the interest of the user. In essence, management involves more flexibility as well as more responsibility for the State than mere regulation.[4]

With the above in mind, EPD is called upon each day to make many management decisions that can affect both ground-water quality and quantity. In order for such decisions to be sound, they should be consistent with all appropriate State and federal laws. Decisions should also be based upon the best scientific and engineering data and, quite importantly, be flexible enough to recognize the differing historical, geological, hydrological, legal, and social factors governing the ground-water regime.

EPD is committed to making consistent decisions regarding ground water on the basis of technical facts interpreted in accordance with good engineering and scientific judgement. EPD does not arrive at decisions arbitrarily. Rather, EPD believes that its decisions should be made in a "real world" context of reasonable probability.

EPD is made up of seven Branches (Figure 4-1). All seven are involved in protecting Georgia's ground-water resources. Such interbranch involvement is

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[4]The U.S. EPA launched its Common Sense Initiative to encourage common sense, flexibility, and innovation in all aspects of environmental protection in July, 1994. This new initiative recognizes the EPA's existing system of complicated statutes and reporting requirements is no longer an effective remedy for environmental protection as it encourages adversarial "us versus them" relationships rather than promoting partnering. This environmental management approach has been advocated by Georgia and other states for more than a decade.

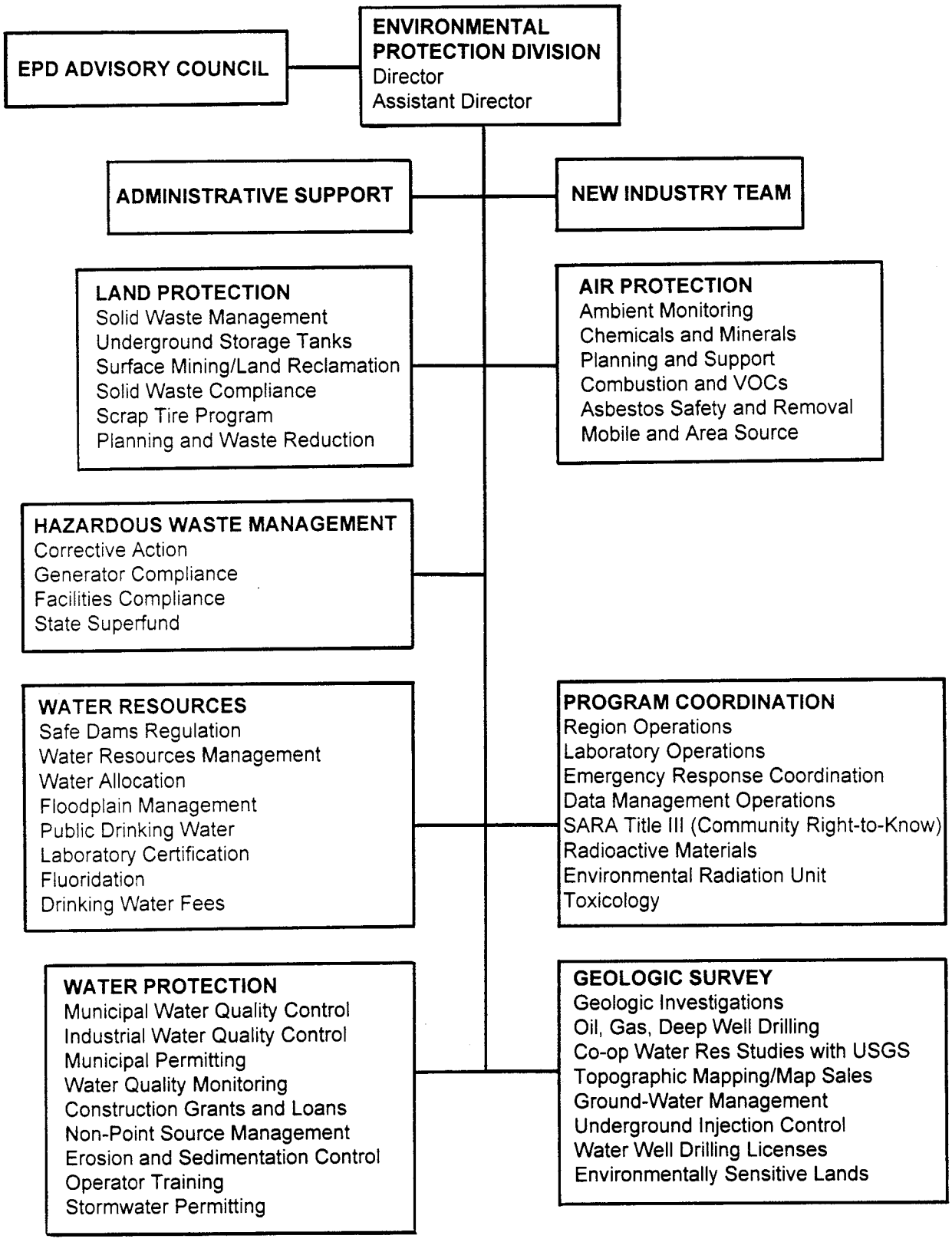

Figure 4-1. Organization Chart of the Environmental Protection Division.

necessary as ground-water quantity and quality can be significantly affected by widely varying activities. For example, as was previously mentioned in Section 1.1, the Land Protection Branch recommends the issuance of permits for solid waste landfills. However, water moving downward past these wastes through the vadose zone can generate leachate that, in turn, can reach the water table and move offsite to pollute nearby wells. For this reason, applicants for a landfill are required to perform a comprehensive site suitability investigation (described in Geologic Survey Circular 14) of candidate sites so that appropriate safeguards can be developed. Similarly, an accidental spill of hazardous chemicals has the potential to endanger nearby surface water bodies used for drinking water and then to enter the ground-water regime. If this were to occur, the Emergency Response Program of the Program Coordination Branch, working with the Water Protection Branch and other branches, would oversee clean-up operations so that both surface and underground water supplies would be protected.

Public input into EPD's priorities (Figure 4-2) is provided by the Environmental Advisory Council. The Council is composed of 15 members, appointed by the Governor, to provide a broad-based viewpoint of Georgia's environmental needs. Current members represent local government, business, environmental advocacy, agriculture, and science. Periodically, the Environmental Advisory Council holds public meetings to solicit input from Georgia citizens regarding what EPD "should or should not" be doing.[5]

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[5]During the fall of 1994, the Advisory Council held public meetings in Fort Valley, Atlanta, and Savannah to identify "new directions" for EPD. In January, 1995, the Environmental Advisory Council completed its recommendations for a strategic goal for EPD. The Council identified a strong need for EPD to improve its communication and outreach to the public. The Council recommended EPD create a formal Customer Assistance Program providing: a 1-800 information / assistance line, one central location of guidance, rules, and laws; newsletters, speakers, and education of the regulated community. EPD has since established a Customer Assistance Program consisting of six positions.

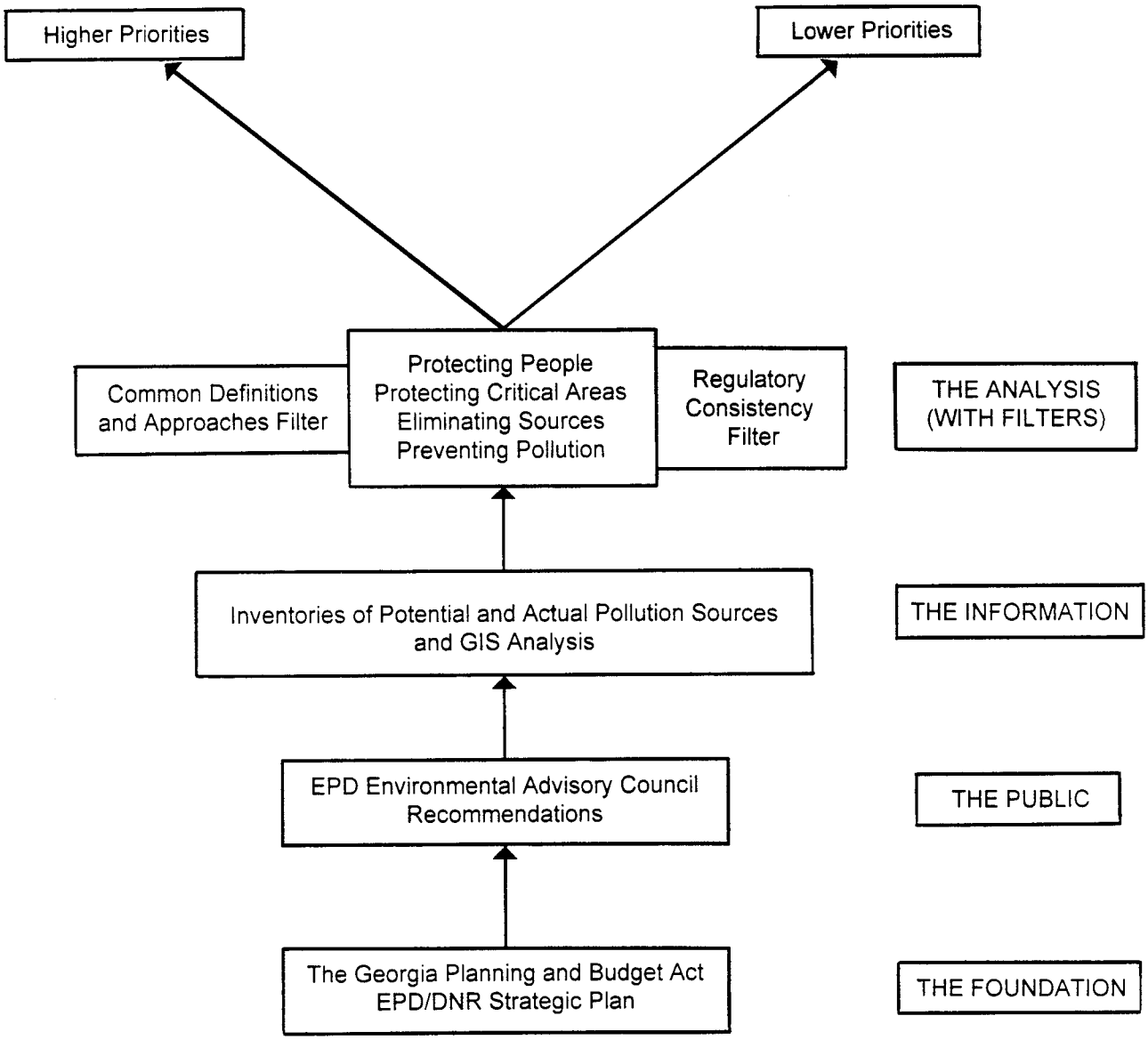

Figure 4-2. The Priority Setting Process.

4.2 Setting Priorities

The general priority-setting process, which is used by EPD, is conceptually illustrated in Figure 4-2. The process involves four interdependent components: The foundation, the public, the information, and the analysis (with filters). Each of these components is discussed in greater detail below:

- The Foundation: Extensive amendments to the Georgia Planning and Budget Act (O.C.G.A. 45-12-71 *et seq.*) resulted from passage of Senate Bill 335 in 1993. These amendments require that all State of Georgia agencies, including DNR and EPD, establish long term strategic objectives (a strategic plan) that do not change capriciously. This Act is the foundation for EPD's priority-setting process. Those strategic activities specifically identified as long term are deemed by EPD to warrant higher priority. Several CSGWPP strategic activities are also DNR/EPD's long term strategic activities. A copy of DNR/EPD's current Strategic Plan is provided in Appendix F.

- The Public: EPD receives guidance from the Environmental Advisory Council as previously mentioned in Section 4.1. The Council holds periodic public meetings to identify priority environmental issues and environmental concerns. On the basis of these public meetings, the Council makes recommendations for environmental legislation and environmental studies. For example, the Council met six times in 1995 and explored the following issues: environmental justice, land use planning, sustainable development, and non-point source pollution.

- The Information: To facilitate prioritization of ground-water protection, GIS maps have been prepared of population distribution and demographics, pollution sources (i.e. environmental facilities), public drinking water wells, ground-water pollution susceptibility, and significant ground-water recharge areas. Of these, The Ground-Water Pollution Susceptibility Map of Georgia (1992), serves as the foundation for much of EPD's priority setting. EPD can quickly assess the susceptibility of any site to ground-water pollution by using this map. For example, an abandoned hazardous waste site in a significant ground-water recharge area or in an area having higher pollution susceptibility, would receive priority consideration for remediation when compared to a similar site outside such a recharge area. The status of GIS inventories of pollution sources (as of July 1, 1995) is provided in Table 4-1.

Table 4-1. Status of Pollution Source Inventories and Other Relevant Inventories (July 1, 1995)

SOURCE	INVENTORY COMPLETED*	ENTERED INTO GIS
Salt-water Encroachment	1990	1994
Oil and Gas Test Wells	1984	1994
Nitrates	1995	Ongoing
UST Sites	In Progress	
Solid Waste Landfills	1993	
Hazardous Waste Sites	In Progress	
RCRA Treatment, Storage, and Disposal Facilities	1982 & In Progress	—
Hazardous Response Sites	1994	In Progress
Superfund	1993	In Progress
Non-Domestic Septic Systems	1987	—
Mines and Quarries	1985	
Waste-Water Treatment Sites	In Progress	
Waste-Water Discharge Sites (NPDES)	In Progress	
Pesticide Occurrences	In Progress	
Interstate Petroleum Product Pipelines and Tank Farms	In Progress	
UIC Sites	1995	1995
Land Application Sites	In Progress	
OTHER		
Public Water Supply Wells		
Municipal	1995	In Progress
Other	In Progress	
Wetlands	In Progress	
Significant Recharge Areas	1990	1990
Ground-water Pollution Susceptibility	1993	1993

*All inventories are essentially ongoing. That is, new facilities will be added to the current inventory on a periodic basis and data on the others updated.

- The Analysis: In Georgia, final prioritization of ground-water protection efforts is based on four mutually complimentary assessments:

  - Foremostly protecting people (e.g., protecting current and potential sources of drinking water),

  - Protecting areas especially vulnerable to ground-water pollution (e.g., recharge areas of significant aquifers, wetlands, critical wildlife habitat, etc.),

  - Preventing releases by eliminating sources (e.g., generally removal or remediation of existing sources) or requiring potential new sources to be operated according to "best management practices" (e.g., requiring companies that handle hazardous chemicals to have leak and spill protection facilities), and

  - Preventing pollution by reducing waste or by implementation of alternative, non-polluting, technologies.

Each of these assessments is filtered firstly by common definitions and approaches (described in Section 1.6) and secondly by regulatory consistency (described in Section 4.3). These filters are important as ground-water pollution sources or incidents often "cut across" programmatic lines. For example, remediation of drinking water wells polluted by petroleum products or by-products, as a minimum, would involve EPD's Drinking Water Program and UST Program (the Wellhead Protection Program and Emergency Response Program might also be involved). This means that the various programs must reach consensus regarding remediation and achieving consensus is most readily achieved when all the parties have a consistent understanding of the hydrogeologic and regulatory principles.

Upon completion of the analysis, the Director establishes ground-water protection priorities. This means that he can direct existing resources toward solving high priority problems or request additional resources such as funds, equipment, personnel, or legislation.

4.3 Internal and External Consistency

4.3.1 The Ground-Water Protection Coordinating Committee

The approach used by EPD to achieve internal regulatory consistency with regard to ground-water protection is the Ground-Water Protection Coordinating Committee. The Committee, primarily composed of EPD Program Managers, was created by the Director in 1992 and is made up of the following EPD branches, programs and outside organizations:

- The Regulatory Support Program (representing the Site Review, Water Well Standards, and Underground Injection Control Programs) and the Ground-Water Management Program (representing the Wellhead Protection Program and the Georgia Ground-Water Monitoring Network) of the Geologic Survey Branch,
- The Drinking Water and Water Resources Management Programs of the Water Resources Branch,
- The Industrial Waste Water, Municipal Engineering, and Water Quality Control Programs of the Water Protection Branch,
- The Emergency Response Program of the Program Coordination Branch,
- The Solid Waste Management and Underground Storage Tank Programs of the Land Protection Branch,
- The Hazardous Waste Management Branch,
- The Environmental Health Section of the Department of Human Resources,
- The Entomology and Pesticides Division of the Department of Agriculture,
- The Pollution Prevention Assistance Division of the Department of Natural Resources,
- The Department of Community Affairs,
- The U.S. Department of Agriculture, Natural Resource Conservation Service,

- The University of Georgia Cooperative Extension Service, and
- The Region IV EPA Office of Ground-Water Protection.

The Committee, which is still in a formative mode, meets approximately twice yearly (in July after draft EPA grants are submitted and in December/January before the General Assembly comes into session). The Committee is chaired by the Regulatory Support Program Manager of the Geologic Survey. This person also has managerial responsibility for implementing Georgia's CGSWPP. The Committee focuses protection expertise on Georgia's ground-water priorities and is charged with disseminating information to the members on the following:

- New regulatory initiatives at both the state and federal level (rules, regulations, statutes, etc.),
- Innovative ground-water assessment, remediation and prevention technologies and case-histories,
- Ground-water conditions in Georgia (e.g., effects of droughts, pollution incidents, new hydrogeologic studies, monitoring data, etc.),
- Pollution events from sources not fitting the regulatory framework or from unknown sources to insure that no event goes uninvestigated,
- New permits including unusual permitting stipulations, and
- Implementation of Georgia's CSGWPP.

Each year, in the first week of the State fiscal year (beginning in 1996) [FY 1997], the Committee will prepare a short report to the Director of EPD recommending changes in EPD policy of ground-water statutes. The above will be achieved utilizing an EPD associate trained at Total Quality Management (TQM) facilitator. EPD believes that using a formal TQM process will enhance the Committee's ability to objectively focus on relevant issues rather than merely being a "discussion group". Further formal minutes of each meeting will be distributed to the Director and the Branch Chiefs.

4.3.2 Other Relevant Federal Agencies

EPD's approach for developing consistency with federal agencies having ground-water protection responsibilities is achieved through regular consultations. For example, since 1979 EPD has held quarterly meetings with the USGS to discuss ground-water issues relevant to Georgia. In a similar light, EPD associates consult with their EPA counterparts at bi-annual State Directors' Meetings. On an "as needed" basis (but generally about once a year), EPD consults with the U.S. Department of Agriculture (mainly the Natural Resource Conservation Service and the Forest Service), the Department of Interior (the Minerals Management Service, the U.S. Fish and Wildlife Service, and the Park Service), the Department of Energy (on issues of both high-level and low-level radioactive waste management), the Department of Defense (the Corps of Engineers for wetlands management, river basin planning, and ground and surface water interactions, and military installations for remediation of polluted facilities), the Nuclear Regulatory Commission, and the Agency for Toxic Substances and Disease Registry. EPD is also a member of the Region IV State-Federal Ground Water Steering Committee, which was set up by EPA to develop a common approach to ground-water problems between federal agencies in the Region.

4.4 The Ground-Water Management Plan

4.4.1 General

Georgia's ground-water management plan consists of three principal elements, protection of ground-water quality, management of ground-water quantity, and monitoring of ground-water quality and quantity. Each of these elements is discussed in detail below.

The basic mechanisms that Georgia will use to manage its ground-water resources will be EPD's environmental permit system, enforcement capabilities and educational activities, local ordinances to comply with recharge area protection

criteria (rules) promulgated under the Georgia Planning Act, wellhead protection and vulnerability assessments, licensing water well contractors and registering ground-water professionals. As previously mentioned earlier, EPD is the Georgia agency having lead responsibility for administering and enforcing water-quality laws. Through its permits, EPD can permit, deny, modify, or revoke withdrawals and discharges as well as other activities, such as mines and landfills, so that the ground-water regime can be protected. If pollution occurs because of a violation of permit conditions, EPD may invoke civil penalties or seek criminal penalties so that compliance can be achieved. Recharge area protection, wellhead protection, and vulnerability assessment are preventative programs. The former is designed to protect the vulnerable recharge areas of significant drinking water aquifers whereas the latter two are designed to protect public drinking water wells. Private drinking water wells are protected by licensing of water well contractors and enforcing the well construction and siting standards of the Water Well Standards Act. Moreover, only professional engineers and professional geologists can submit ground-water assessments/analysis to EPD.

4.4.2 Protection of Ground-Water Quality

Georgia faces three options in selecting overall ground-water quality goals. These are:

- **Non-degradation.** Ground-water resources are maintained at their present levels of quality or improved.

- **Limited Degradation.** Aquifers are allowed to degrade to a specified level designed to protect health or both health and welfare.

- **Anti-degradation.** Ground-water resources are prevented from deteriorating significantly, preserving them for present and future users. Selecting this goal means that aquifers are protected to a variable degree according to their value and vulnerability as well as to their

existing quality, current use, and potential for future use.[6]

Georgia is protecting its ground-water resources by pursuing the goal of **Anti-degradation**. EPD has implemented the goal of anti-degradation (by preventing ground-water pollution) through its regulatory programs. EPD considers that it is incumbent on the owner and operator of a regulated facility or activity to clearly demonstrate to EPD that ground water will be or is being adequately protected before EPD will issue a permit or otherwise consider the site to be in compliance with the Water Quality Control Act or other relevant laws or rules. EPD uses its permit and regulatory powers to ensure ground-water protection, especially in significant ground-water recharge areas and wellhead protection areas, by requiring proper siting, construction, and/or operation of the following:

- Public and private drinking water wells,[7]
- Irrigation and industrial wells,
- Injection wells of all types (except those associated with lateral drain lines, which are regulated by DHR),
- Oil and gas wells (and, although there is none currently, oil and gas production),
- Solid waste landfills,
- Hazardous waste treatment, storage and disposal facilities,
- Municipal and industrial land application systems for the treatment of wastewater and wastewater sludges,

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[6]The concept of protecting ground water to varying degrees, depending on the characteristics of the resource, is accepted by EPA and has been implemented in several EPA programs.

[7]Permits are not required for domestic wells; however, the Water Well Standards Act, which is administered by EPD, contains domestic well siting criteria.

- Municipal and industrial discharges to streams and rivers,
- Storage, concentration, or burial of radioactive waste,
- Underground storage tanks,
- Mines and quarries, and
- Petroleum pipelines.

EPD will attempt to detect and mitigate existing ground-water quality problems. To achieve this, EPD will continue to monitor aquifers in areas suspected to be susceptible to pollution (e.g., recharge areas). Where appropriate, EPD will modify permits so that existing ground-water pollution can be mitigated. Examples of mitigation activities include proper closure of landfills, decontaminating shallow aquifers, reducing pumpage in areas susceptible to salt-water contamination, requiring removal of leaking underground tanks, closure and decontamination of hazardous waste sites, proper plugging of abandoned wells, and so forth.

EPD acts as the administrative agency for the Water Well Standards Advisory Council in the licensing of water-well contractors. In this capacity, the Director may order the cessation of drilling of improper wells or borings and the confiscation of equipment of unlicensed contractors. EPD and the Water Well Standards Advisory Council have established procedures for siting, drilling, grouting, casing, and plugging of water wells, monitoring wells, dewatering wells, and engineering and geologic boreholes.

EPD has a Memorandum of Understanding with the Georgia Department of Agriculture which provides that EPD will have regulatory responsibility for any incidents of ground-water pollution from pesticides and that the Department of Agriculture will report any incidents of pollution of which it is aware to EPD. EPD has a similar Memorandum of Understanding with the Department of Human Resources which states that EPD will have regulatory responsibility for remediating

any incidents of pollution resulting from the use of non-domestic septic systems for disposal of chemicals and that the Department of Human Resources will report any such pollution incidents of which it is aware to EPD.[8]

EPD developed environmental criteria for the protection of significant ground-water recharge areas as authorized by the Georgia Planning Act (Appendix B). These criteria are to be incorporated into land use plans developed by local governments under the oversight of the Department of Community Affairs.

EPD also works with professional boards, such as those for engineers and geologists, to develop standards for professional consulting work. Such standards are particularly useful where there are activities that do not require permits but, nevertheless, may affect the ground-water regime.

Perhaps the most effective method of protecting ground-water quality is public education on the consequences of ground-water pollution. EPD, through the Geologic Survey's publications series, is continually publishing documents describing the ground and surface waters of Georgia and their characteristics. In addition, DNR and EPD produce video tapes focusing on current environmental issues such as hazardous waste, wellhead protection, and so forth. EPD also works with agencies such as the Farm Bureau and the Cooperative Extension Service of the University of Georgia College of Agricultural and Environmental Sciences so that farmers understand what effect irrigation might have on overall ground-water supply. Similarly, EPD transfers information developed by the Extension Service and others regarding fertilizer, pesticide, and herbicide application techniques so that farmers will understand how these substances may enter and pollute the ground-water regime. EPD intends to increase its educational outreach through greater cooperation with the above mentioned agencies and other

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[8]The Department of Human Resources, through its Environmental Health Program, is responsible for the proper siting of domestic and new domestic septic system sites; in some counties, the Environmental Health Program also permits domestic wells.

interested parties. Further educational activities are called for in EPD's current Strategic Plan (see Appendix F); these include creating a task force to examine environmental education outside of formal school programs; preparing and distributing a directory of all EPD technical assistance and educational documents; and preparing annual summaries of Georgia's environmental quality.

Because the State's environmental resources belong to all Georgians, EPD actively encourages citizen participation in the development of rules and regulations, management plans, and major decisions. Public meetings, hearings, conferences, seminars, and news releases help assure the active involvement of as many citizens as possible.

4.4.3 Management of Ground-Water Quantity

EPD regulates all withdrawals of ground water exceeding 100,000 gallons per day through a permit system. Before a new withdrawal permit is issued, there must be a demonstrable resource of ground water available to sustain the requested withdrawal on a permanent basis. In other words, the withdrawals are allocated so that water is available for future generations. EPD does not issue new withdrawal permits for those aquifers where local withdrawals may exceed recharge (e.g., the Clayton Aquifer in southwestern Georgia) or where the aquifer is threatened by salt water (e.g., the Floridan aquifer at Brunswick). In other areas, where there are large "cones of depression," new withdrawals may be limited or even prohibited.

In the same light, EPD works with local governments and federal agencies such as the U.S. Army Corps of Engineers to develop comprehensive Water Management Plans in areas of high water demand. Such plans have already been prepared for metropolitan Atlanta and Savannah as well as other areas of the State. The Comprehensive Plans address matters such as water conservation, alternate sources of water supply, ultimate available resource of water, waste treatment and disposal, well spacing, and so forth. The Comprehensive Plans, in short, will serve

as the technical base for ground-water use permit issuance or permit modification.

At times of high water demand, particularly during summer droughts, EPD has the authority to enforce water conservation. These water conservation measures (on file with the Water Resources Branch of EPD) could range from simple educational public notices to curtailment of industrial water use. In Camden, Chatham, Dougherty, Glynn, and Richmond Counties, EPD can enforce water conservation measures whenever water levels within the aquifers fall below certain levels. Moreover, all public water systems in Georgia are required to have water conservation plans that can be invoked during emergency water shortages.

4.4.4 Monitoring of Ground-Water Quality and Quantity

EPD monitors ground-water quantity (water level measurements or aquifer monitoring) and ground-water quality. Aquifer monitoring is performed jointly by the Geologic Survey Branch and the USGS. This monitoring involves approximately 1500 wells in which measurements of the potentiometric surface are made at periodic intervals. Maps made from these measurements show ground-water flow directions, gradients, and velocities.

EPD's ground-water quality monitoring program is four-tiered:

- Tier I: The Georgia Ground-Water Monitoring Network is designed to evaluate the general character of the ambient quality of ground water within the State. The Georgia Ground-Water Monitoring Network is described in Section 5.0 and Appendix E.

- Tier II: Sampling of public drinking water wells as part of Safe Drinking Water Program (approximately 4000 wells). This program provides data on the actual quality of ground water being used by the Georgia public.

- Tier III: Special studies that are performed to address specific issues. These studies vary with time but allow EPD to obtain information regarding relevant water quality issues. Some recent examples of such studies include a survey of aldicarb and EDB in shallow wells (65 wells) of southwest Georgia and a survey of nitrate in approximately 5000 private wells statewide.

- Tier IV: Sampling of ground water at environmental facilities such as municipal solid waste landfills, RCRA facilities, land disposal facilities, sludge disposal facilities, etc., are part of compliance monitoring or enforcement activities. The actual number of these types of wells is several thousand and is continually increasing. For example, every solid waste landfill in Georgia is required to have an approved ground-water monitoring plan.

Synthesis of data from the above four tiers of assessments provides EPD with a large and comprehensive state-wide data base on ground-water quality. It is important to note that, in monitoring wells at Tier IV facilities, water which does not meet drinking water standards may occasionally be detected and is even to be expected. For the most part, such occurrences are localized to the immediate vicinity of the facility and the State's drinking water reserves are not compromised. For example, a monitoring well immediately adjacent to a wastewater spray irrigation facility might indicate relatively high total dissolved solids levels. At a greater distance from the spray irrigation field, however, significant dilution would have taken place and the dissolved solids level would be rendered innocuous. It is the responsibility of the permitting Branch to evaluate facilities surveillance data, maintain files, and make a determination whether or not drinking water supplies are being endangered.

The Geologic Survey collects ground-water information from other Branches and serves as a repository for ground-water information in Georgia. Thus, anyone (public or private) that seeks ground-water information should consult with the Georgia Geologic Survey to identify what data are available or where to obtain such data. The Geologic Survey also can identify which program within EPD has the original source of the information.

4.5 Classifications and Standards

Any management plan based on the philosophy of artificially classifying ground water is technically inappropriate for Georgia. Georgia's aquifers grade into

one another, leak into one another, vary naturally with respect to quality over short distances and behave differently at different times of the year or during different cycles of pumping. In other words, the natural and man-induced variables are almost limitless. Nevertheless, Georgia's naturally occurring ground waters can be grouped into three broad categories:

- Ground water generally suitable for human consumption,
- Ground water locally contaminated with natural mineral constituents (e.g., iron, manganese, barium, TDS, radioactivity, etc.), and
- Saline ground water (i.e., salty ground water occurs naturally at varying depths throughout most of the Coastal Plain. These salty ground waters are so deeply buried that they are rarely encountered during normal well drilling).

By far, the bulk of Georgia's ground water, accessible by standard drilling methods, is generally suitable for human consumption.

As a general policy, EPD expects that all ground waters within the State do not exceed MCLs for man-made chemicals adopted by EPD under the State's Safe Drinking Water Act (Appendix D). The most recent version of the Georgia Rules for Safe Drinking Water contains the complete list of current MCLs. EPD also manages the ground-water resource to prevent the spread of areas of natural contamination or contamination by natural constituents caused by heavy ground-water use.

Where EPD has discretionary authority in its regulatory programs, instances of ground-water pollution in proximity to public and private sources of drinking water may be remediated so that the ground water migrating offsite from a particular facility does not exceed federal and state MCLs for Safe Drinking Water or, if polluted ground water reaches a nearby stream, it does not cause that stream to

exceed Georgia in-stream water quality standards.[9]

Enforcement orders routinely require that the vertical and horizontal extent of ground-water contamination, including concentration limits, be established at property boundaries. With the foregoing in mind, the State (mainly EPD, but possibly DOA if pesticides are involved) would:

- Use MCLs as "reference points" to gauge the severity of pollution and to determine appropriate regulatory steps. Reaching the MCL would be considered a failure of prevention. Detection of a percentage of the MCL in ground-water monitoring would be used to trigger a hydrogeological study. If the study suggests that pollution of ground water is or could become significant, then the State would implement additional action (e.g., restricting or banning the use of a pesticide) to avoid reaching the MCL.

- Establish the MCL as the minimum cleanup level in remediation programs but allow less stringent alternative cleanup levels on a case-by-case basis depending on such factors as likelihood of potential use, risks, cost, technological practicality, and negative environmental factors (e.g., dewatering of aquifers).

4.6 Pollution Prevention

Significant ground-water pollution may occur as a result of accidental spills of pollutants; improper treatment, storage, use, disposal, or handling of materials containing polluting chemicals; and unintended migration of pollutants from an approved disposal or treatment site. However, it does need to be remembered that some small scale releases of pollutants result from a wide variety of everyday

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[9]There may be some situations involving a pollutant moving offsite (e.g., a TDS plume from a sanitary landfill) for which EPD has discretionary authority but for which there is no MCL. Where this is the case, the need for and the level of ground-water remediation would be decided on a case-by-case basis, placing particular emphasis on protecting domestic and public drinking water sources. In addition, EPD also considers relative risk when requiring remediation of polluted ground water; EPD may waive MCL requirements in low risk areas not proximal to public and private sources of drinking water.

activities. Septic tanks and applications of nitrogen from commercial fertilizer and organic wastes such as animal manures, for example, may result in some nitrates reaching the water-table. Similarly, many motor vehicles, especially those that are several years old, leak small quantities of motor oil, transmission fluid, radiator coolant, and so forth. Such practices or equipment, when performed or maintained in a prudent manner, typically release pollutants at such low rates and such low concentrations that the earth's natural assimilative capabilities (e.g., biodegradation, dilution, filtration, attenuation, etc.) reduce pollutants to innocuous levels.

The most effective method for preventing ground-water pollution from accidental spills is to avoid spills altogether. Doing this requires a commitment from the owner/operator/permittee to operate their facility in a manner so that the potential for spills is minimized. This commitment may involve the installation of spill containment structures at the facility. In the event that a spill were to occur at a facility or during transportation, ground-water pollution can be minimized by a well-trained and highly motivated Emergency Response Team that can oversee the immediate implementation of an effective emergency clean-up plan.

Improper treatment, storage, use, disposal, and handling of materials containing polluting chemicals have the greatest potential for polluting ground water. There are two keys that will help prevent the above from occurring. The first and primary key is for owners/operators/permittees to conduct their operations in an environmentally sound manner. The second key is for EPD to maintain appropriate oversight of regulated facilities (through site inspections) so that there is a reasonable assurance that ground water is being adequately protected. To illustrate this concept, a landfill that was properly designed for solid waste probably would be ineffectual for handling liquid waste. In this case, it would be the permittee's responsibility for keeping liquids out of the landfill. EPD, in turn, through periodic inspections, would be in a position to determine if liquids were being placed in the landfill. If this turned out to be the case, depending on the

severity of the situation, EPD could require clean-up, require additional monitoring, require installation of engineered control measures, seek civil or criminal penalties, or revoke permits. **EPD considers revocation of permits to be reasonable and appropriate for those holders of environmental permits who willfully or continuously contribute to ground-water pollution.**

The management tools used by EPD to insure that effective site inspections are being performed are as follows:

- The five Regional Offices of the Program Coordination Branch handle compliance monitoring and inspection for specified facilities, complaint investigations, technical assistance, and necessary enforcement to bring faulty operations into compliance. The procedures for site monitoring for all Regional Offices are described in the Division's Regional Operation Plan dated December 1, 1981.

- Effective monitoring at some sites, such as technically complex waste-water treatment facilities, hazardous waste facilities, or large mines, requires the technical expertise of highly trained professionals. Operations/sites that are inspected at the EPD program level include: Sludge disposal, hazardous waste facilities, complex municipal and industrial waste-water treatment, injection wells, complex mined-land reclamation, and complex solid waste landfills.

Leakage or migration of at least small amounts of pollution from an unlined solid waste or hazardous waste disposal site, septic system, or land application system is to be expected. Lined disposal sites and underground storage tanks may leak accidentally. To protect ground water, EPD requires extensive monitoring of ground and surface water or leak detection systems at such sites. For example, all solid waste landfills were required to have approved monitoring plans in place by October 1, 1994, and must be monitored for up to 30 years after closure. Monitoring plans are reviewed by EPD geologists to insure proper design for the site hydrogeology. EPD requires operators to sample and analyze water from the monitoring wells and surface sampling points at specified intervals. The Land Protection Branch reviews monitoring data and determines when MCLs are likely

to be exceeded at site boundaries. In such a case, remediation or proper closure of the facility may be required.

Local and regional hydrogeologic conditions affect ground-water pollution susceptibility as well as the level of remediation effort. More stringent ground-water protection and remediation measures are required in sensitive areas such as significant ground-water recharge areas.

In addition to the above, the Pollution Prevention Assistance Division (P^2AD) has been established within DNR. The P^2AD mission is to develop programs and activities to facilitate reduction of pollution at the source, and instill a pollution prevention ethic in Georgia's businesses and citizens. P^2AD was created as a non-regulatory organization designed to coordinate all of the state's pollution prevention efforts aimed at air and water pollution, industrial wasted, and hazardous or toxic materials. P^2AD offers a variety of programs to assist Georgia's citizens in industries in improving efficiency by preventing waste. Staff engineers conduct on-site pollution prevention assessments, and also assist companies in setting up internal corporate pollution prevention programs. P^2AD sponsors workshops and training courses that facilitate the transfer of pollution prevention information. A clearinghouse/library containing periodicals and technical documents relating to pollution prevention is available to the public. The Division also sponsors a matching grant program to demonstrate the feasibility of various pollution prevention options, or to prepare education programs. Additionally, the Division seeks to leverage existing expertise and maximize the use of public and private resources outside DNR to achieve its mission. This is particularly evident in P^2AD's applied pollution prevention research efforts with university and industry partners. P^2AD also promotes pollution prevention in the agricultural sector through various programs with the University of Georgia and the Cooperative Extension Service. The Strategic Plan for the P^2AD also is provided in Appendix F.

P^2AD has offered general pollution prevention training to EPD associates in order to acquaint them with general pollution prevention principles in an effort to

encourage pollution prevention alternatives at sites that they inspect. In addition, EPD associates can refer companies to P²AD for assistance in analyzing and finding pollution prevention options.

4.7 MANAGEMENT OF GROUND-WATER DATA

EPD has a comprehensive ground-water data management program, which includes the collection, laboratory analysis, storage, record keeping, retrieval, and analysis of ground-water data. These data are available to EPA, other federal, state, and local governments (and their consultants), and to private citizens. EPD uses ground-water data in water resource planning, enforcement activities, trend analysis, permitting, and educational activities.

Relevant files and data are maintained by the respective programs (e.g., the UST Program would serve as the repository for all UST ground-water related data), often utilizing readily available commercial software or nationally-recognized ground-water data management systems such as STORET. Ground-water data may come from EPD sampling programs, consultants, company reports, permit reports, or scientific studies. These files, which typically are project, site, or operation specific, contain a great deal of valuable information that can be used as part of other environmental protection efforts. Therefore, since 1980, the Geologic Survey Branch periodically reviews the ground-water data bases and files of other Branches so that the Survey can assist others in obtaining relevant ground-water data.[10]

All EPD programs are electronically linked through the Division's LAN; thus ground-water data can be readily transmitted among the programs and regional offices. Also through Internet, EPD can electronically transmit and receive ground-water data from others.

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[10]General ground-water data can be accessed by random searches of national data bases; facility ground-water data is accessed by contact with the relevant program, with assistance by the Geologic Survey Branch.

Some examples of how ground-water data are used in EPD's decision making include:

- Water quality and water level monitoring were used by EPD to develop a ground-water flow model for the Upper Floridan Aquifer of coastal Georgia. The model, in turn, is being used by EPD as part of its Coastal Ground-water Monitoring Strategy to predict whether new ground-water withdrawals could accelerate salt-water encroachment.

- EPD's Hazardous Waste Program uses both site and aquifer monitoring data extensively to develop remediation plans as well as evaluate the effectiveness of remediation.

- EPD uses ground-water monitoring data at land application sites to evaluate the effectiveness of and, if necessary adjust, application rates.

5.0 GEORGIA GROUND-WATER MONITORING NETWORK

In the late 1970's and continuing into 1990's, a number of ground-water monitoring wells were drilled in Georgia by EPD and the USGS. These wells, many of which are equipped with continuous water-level recorders, were completed in specific geologic horizons (i.e., aquifers). In addition, there are numerous public water systems and industrial wells (and a few springs) also withdrawing water from specific geologic horizons and, thus, are suitable for monitoring purposes. These wells (and springs) form the Georgia Ground-Water Monitoring Network (i.e. Tier I monitoring). As new wells are drilled and existing ones abandoned, the Network will, by necessity, be continuously expanded and/or modified. Wells for inclusion in the Network are carefully selected to be representative of ambient water quality in an aquifer and the wells are not located near known point sources of pollution.

When the Monitoring Network was first initiated in 1984, emphasis was placed on sampling those aquifers that were being most heavily used as sources of drinking water. After several years, sufficient baseline data were established for many of the confined (and somewhat deeper) aquifers and the sampling frequency was reduced. As previously mentioned, aquifer mapping by EPD has demonstrated that it is the State's significant recharge areas that are most susceptible to pollution. Therefore, beginning in 1988, the Network expanded to include more unconfined (and shallower) wells in recharge areas.

The general locations of the Network's monitoring sites are shown in Appendix E. A list of each monitoring well (or spring) with identification of the completion zone(s) (i.e., aquifer) is also in Appendix E. Maps at 1:24,000 scale, showing monitoring well sites, are on file at the Georgia Geologic Survey. "As-built" construction diagrams also are available for most of the Network wells.

Wells (and springs) in the Georgia Ground-Water Monitoring Network will be sampled at least every three years for chemical analysis. Wells in recharge areas are generally sampled annually.

The water-quality sampling program for the Georgia Ground-Water

Monitoring Network is not designed to substitute for facilities (Tier IV) monitoring. Rather, Monitoring Network wells will be tested for those pollutants considered to have some potential for entering the aquifer system in the general vicinity of the monitoring location.

Monitoring wells were located in proximity to recharge areas where appropriate and feasible. For example, Figure E-10 (Appendix E) shows Network monitoring wells for the Floridan aquifer system. It is apparent that many of the wells are in the Dougherty Plain and the upper Coastal Plain area. On the other hand, coastal Georgia, where the Floridan aquifer is deeply buried, has fewer monitoring wells. The relative concentration of monitoring wells in recharge areas is appropriate as it is in those areas that the aquifer is most vulnerable to pollutants. Where an aquifer is deeply buried and, perhaps, separated from the surface by an impermeable confining layer, pollution from surface sources is unlikely and monitoring wells need not be so concentrated. Moreover, it is not appropriate to perform similar chemical analyses at all locations. Water-quality programs should be designed to assess those potential problems that an aquifer is **most** likely to encounter. The following tables present an appropriate schedule of analyses:

- Table 5-1. Water-quality analyses to be performed at all Network monitoring locations,
- Table 5-2. Water-quality analyses to be performed at Network monitoring locations in the Cumberland Plateau, Valley and Ridge, Blue Ridge and Piedmont Provinces.
- Table 5-3. Water-quality analyses to be performed at Network monitoring locations in the Coastal Plain Province.

Monitoring data are compiled and analyzed by the Geologic Survey Branch. Any adverse trends or conditions are reported to the Director of EPD by the State Geologist as soon as they are recognized. Recommendations for correcting any problems also are provided.

TABLE 5-1. Water quality analyses to be performed at all Network monitoring locations.

(1) ICP-AAS Metals Screen
(2) Nitrite and Nitrate (as N)
(3) Chloride
(4) Fluoride
(5) Sulfate (as SO_4)
(6) Dissolved Oxygen
(7) pH
(8) Specific Conductivity

Metals Screen

Ag, Al, As, Au, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Sr, Ti, Tl, V, Y, Zn, Zr

TABLE 5-2. Water quality analyses to be performed at Network monitoring locations in the Valley and Ridge, Blue Ridge, and Piedmont Provinces.

VOC Scan (Screen #10) On Wells

GWN-VR 1	GWN-VR 7	GWN-P 7
GWN-VR 2	GWN-VR 8	GWN-P 8
GWN-VR 3	GWN-VR 9	GWN-P 10
GWN-BR 1	GWN-VR 4	GWN-BR 2
GWN-P 13	GWN-VR 5	GWN-P 2
GWN-P 15	GWN-P 4	GWN-VR 6
GWN-P 5	GWN-P 16	GWN-P 17*

Screen #10

Volatile organic compounds would be analyzed by purge-and-trap followed by a Mass Spectrometer Screen.
* Pesticide Screens 1,2,4 and 5 are also performed at this location.

TABLE 5-3. Water quality analyses to be performed at Network monitoring locations in the Coastal Plain Province.

Mercury

GWN-K 5
GWN-K 17

Aniline, Creosotes and Phenols (Screens #8 and 9)

GWN-K 5
GWN-K 17
GWN-MI 2
GWN-PA27

Ethylene Dibromide (Screen #7 is now included as part of screen #10)

GWN-PA24
GWN-PA25
GWN-PA54

Herbicides/Insecticides (Screens #1,2,4 & 5) and VOC Scan (Screen #10)

GWN-J 1 (Screens #1, 2,4 & 5)
GWN-J 2 (Screens #1,2,4,5 & 10)
GWN-J 3 (Screens #1,2,4,5 & 10)
GWN-J 4 (Screens #1,2,4 & 5)
GWN-J 5 (Screens #1,2,4,5 & 10)
GWN-J 6 (Screens #1,2,4,5 & 10)
GWN-J 7 (Screens #1,2,4 & 5)
GWN-J 8 (Screens #1,2 & 4)
GWN-K 1 (Screens #2 & 4)
GWN-K 2 (Screens #2, 4 & 10)
GWN-K 3 (Screens #2,4 & 10)
GWN-K 5 (Screens #2,4 & 10)
GWN-K 6 (Screen #10)
GWN-K 7 (Screens #2 & 4)
GWN-K 8 (Screen #10)
GWN-K10A (Screens #2, 4 & 10)
GWN-K11A (Screens #2, 4 & 10)
GWN-K 12 (Screens #1,2,4,5 & 10)
GWN-K 16 (Screens #2,4 & 10)
GWN-K 17 (Screens #1,2,4,5 & 10)
GWN-CT 2 (Screens #1,2,4 & 5)
GWN-CT 3 (Screen #10)
GWN-CT 5 (Screens #1,2,4,5 & 10)
GWN-MI 1 (Screens #1,2,4, 5 & 10)
GWN-MI 2 (Screens #1,2,4 5 & 10)
GWN-MI 5 (Screens #1,2 & 4)
GWN-MI 6 (Screens #1,2 & 4)
GWN-MI 7 (Screens #1,2 & 4)
GWN-MI 8 (Screens #1,2,4 & 5)
GWN-MI 9 (Screens #1,2 & 4)
GWN-MI10 (Screens #1, 2, 4, & 5)
GWN-MI13 (Screens #1, 2,4, & 10)
GWN-MI15 (Screens #1,2,4,&5)
GWN-PA24 (Screens #1,2,4,5 & 10)
GWN-PA25 (Screens #1,2,4,5 & 10)
GWN-PA26 (Screens #1,2,4,5 & 10)
GWN-PA27 (Screens #1,2,4,5 & 10)
GWN-PA46 (Screens #1,2,4,5&10)
GWN-PA49 (Screens #1,2,4&5)
GWN-PA50 (Screens #1,2,4&5)

TABLE 5-3 Continued. Water quality analyses to be performed at Network monitoring locations in the Coastal Plain Province.

GWN-K 18 (Screens #2,4, 5 & 10)
GWN-K 19 (Screens #2,4 & 10)
GWN-CT 7 (Screens #1,2,4 & 5)
GWN-CT 8 (Screens #1,2,4,5 & 10)
GWN-CL 2 (Screen #4)
GWN-CL 4 (Screens #1,2,4,5 & 10)
GWN-CL 5 (Screens #2,4 & 10)
GWN-CL 6 (Screen #10)
GWN-CL 8 (Screens #2,4 & 10)
GWN-CL 9 (Screens #1,2,4,5 & 10)
GWN-PD 2 (Screen #10)
GWN-PD 4 (Screen #10)
GWN-PA 5 (Screen # 10)
GWN-PA 6 (Screen # 10)
GWN-PA 7 (Screen # 10)
GWN-PA 8 (Screen # 10)
GWN-PA 9C (Screen # 10)
GWN-PA11 (Screen # 10)
GWN-PA12 (Screen # 10)
GWN-PA43A (Screens#1,2,4,5&10)
GWN-PA51 (Screens #1,2,4 & 5)
GWN-PA52 (Screens #1,2,4 & 5)
GWN-PA53 (Screen #1,2 & 4)
GWN-PA54 (Screen #2, 4 & 10)
GWN-PA55 (Screen #1,2,4 & 5)
GWN-PA13 (Screen # 10)
GWN-PA14 (Screen # 10)
GWN-PA15 (Screen # 10)
GWN-PA18 (Screen # 10)
GWN-PA19 (Screen # 10)
GWN-PA20 (Screen #10)
GWN-PA28 (Screen # 10)
GWN-PA29 (Screen # 10)
GWN-PA32 (Screen # 10)
GWN-PA33A (Screen # 10)
GWN-PA39 (Screen #10)
GWN-PA40 (Screen #10)
GWN-PA44 (Screen #10)
GWN-PA45A (Screen #10)

Screen #1
The following compounds can be extracted by a base-neutral extraction and screened by GC/N-P:

Disyton (Disulfonton)
Methyl Parathion
Azodrin (Monocrotophos)
Guthion (Azinphos methyl)
Ethoprop (Mocap)
Dasanit (Fensulfothion)
Ethyl Parathion
Vernam
Metribuzin (Lexone) (Sencor)
Malathion
Mevinphos (Phosdrin)
Dimethoate
Phorate (Thimet)
Alachlor (Lasso)

TABLE 5-3 Continued. Water quality analyses to be performed at Network monitoring locations in the Coastal Plain Province.

Screen #1 Continued

Diazinon (Spectricide)	Metolachlor (Dual)
Chloropyrifos (Dursban)	DCPA (Dacthal)
Fonofos (Dyfonate)	Atrazine
Sutan (Butylate)	Simazine (Princep)
Demeton-o (Systox)	Cyanazine (Bladex)
Terbufos (Counter)	Isopropalin (Paarlan)
Fluchloralin (Basalin)	Napropamide (Devrinol)
Pendimethalin (Prowl)	Pebulate (Tillam)
Profluralin (Tolban)	Eptam (EPTC)
Trifluralin (Treflan)	

Screen #2
The following compounds can be extracted by a base-neutral extraction and screened by GC/ECD:

Toxaphene	Lindane
Dicofol (Kelthane)	Endrin
Permethrin (Pounce)	Methoxychlor
PCB's	

Screen #4
Compounds extracted by an acid extraction, derivatized and screened by GC/ECD:

2,4-D	Trichlorfon (Dylox)
Acifluorfen	Chloramben (Amiben)
Silvex	Dinoseb (DNBP)

Screen #5
Compounds extracted by base-neutral extraction.

Part A -	Derivatized (sulfone) and analyzed by GC/FPD: Temik (Aldicarb)
Part B -	Derivatized (oxime) and analyzed by GC/FPD: Methomyl (Lannate)

TABLE 5-3 Continued. Water quality analyses to be performed at Network monitoring locations in the Coastal Plain Province.

Part C -	Derivatized and analyzed by GC/ECD: Carbaryl Carbofuran
Part D -	Analyzed by LC/UV: Fluometuron Linuron Diuron Monuron

Screen #7 is now included as part of Screen #10
Ethylene Dibromide is analyzed by purge-and-trap along with VOC analyses.

Screens #8 and #9
Creosote derived from coal tar contains predominately polynuclear aromatics (#8: base-neutral extractable), while that derived from wood has a large percentage of substituted phenols, (#9: acid extractable). Aniline is a base-neutral extractable. GC/MS is the instrument of choice for these analyses.

Screen #10
Volatile organic compounds would be analyzed by purge-and-trap followed by a Mass Spectrometer Screen.

APPENDIX A

ASSESSMENT OF GEORGIA'S ACHIEVEMENT OF A COMPREHENSIVE STATE GROUND-WATER PROTECTION PLAN

In Appendix A, EPD assesses its accomplishments in achieving the six Strategic Activities and the various Adequacy Criteria proposed by EPA in its Final Guidance Document for CSGWPP submittals by the States. In this assessment, EPD demonstrates that it has already achieved the EPA Adequacy Criteria for a "Core" CSGWPP and many of the Adequacy Criteria for a "Fully-Integrated" CSGWPP.

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STRATEGIC ACTIVITY 1

ESTABLISHING A GROUND-WATER PROTECTION GOAL TO GUIDE ALL RELEVANT PROGRAMS IN THE STATE

FULLY-INTEGRATED ADEQUACY CRITERIA:

(1) A State ground-water protection goal is established through adequate public participation.

Adequacy Criterion 1 has been fully met.

The foundation of Georgia's ground-water protection goal is in the Georgia Water Quality Control Act (O.C.G.A. 12-5-20, *et seq.*). The development of Georgia's goal is discussed in Section 1.2. In that portion of the Act dealing with declaration of policy and legislative intent, the Act reads:

> "The people of the State of Georgia are dependent upon the rivers, streams, lakes, and sub-surface waters of the state for public and private water supply and for agricultural, industrial, and recreational uses. It is therefore declared to be the policy of the State of Georgia that the water resources of the state shall be utilized prudently for the maximum benefit of the people, in order to restore and maintain a reasonable degree of purity in the waters of the state and an adequate supply of such waters, and to require where necessary reasonable usage of the waters of the state and reasonable treatment of sewage, industrial wastes, and other wastes prior to their discharge into such waters. To achieve this end, the government of the state shall assume responsibility for the quality and quantity of such water resources and the establishment and maintenance of a water quality and water quantity control program adequate for present needs and designed to care for the future needs of the state, provided that nothing in this article shall be construed to waive the immunity of the state for any purpose."

The Act, its amendments, and Rules promulgated thereunder, empower the Director of EPD to enforce its provisions. [Note: the Georgia Administrative Procedures Act (O.C.G.A. 50-13-1, *et seq.*) requires that all rules promulgated under the Water Quality Control Act utilize the public participation process]. The Act specifically addresses present and future uses of water, conservation of fish, game, and aquatic life, water quality standards, interagency and interstate agreements, public participation, and protection of human health. Moreover, since 1964, when the Act was passed by the Georgia General Assembly, Georgia courts have interpreted the term "sub-surface waters" to mean "ground water." All other statutes dealing with ground water can be considered as derivatives of the of the Water Quality Control

Act.

Georgia's ground-water protection goal, as written in Section 1.2, is a succinctly phrased version of the aforementioned legislative intent of the Water Quality Control Act and was established by the Director of EPD in 1983 in the form of a guidance memorandum for the direction of the State's first ground-water management plan. Georgia's goal was written in a manner consistent with that of the National Governors' Association. Since 1983, Georgia's ground-water protection goal has been clearly defined in a number of published documents as well as in DNR's long term strategic plans. The goal also was discussed at a series of public meetings and hearings held throughout the State in 1989 as part of rule promulgation for the rules to protect significant ground-water recharge areas. The goal was again described at several public meetings in 1990-1992 that were held to provide input into wellhead protection rules. The goal has remained constant since 1983, has received public support and has been incorporated in EPD's many permits.

Georgia's Ground-Water Protection Goal is:

> "It shall be Georgia's goal to protect human health and environmental health by preventing and mitigating significant ground-water pollution. To do this, Georgia will assess, protect and, where practical, enhance the quality of ground-waters to the levels necessary for current and projected future uses and for the public health and significant ecological systems."

(2) The State's ground-water protection goal is:

— **No less protective than EPA's overall ground-water protection goal of preventing adverse effects to human health and the environment and protecting the environmental integrity of the nation's ground-water resources.**

— **Integrated with its other water quality and environmental goals.**

Adequacy Criterion 2 has been fully met.

EPD's goal for the protection of ground water has three key components:

- Prevention of pollution or contamination whenever possible.
- Prevention of pollution or contamination based on the relative vulnerability of the resource, and where necessary the ground water's use and value.

- Remediation based on relative use and value of ground water.

Georgia's ground-water protection goal (see Section 1.2) is completely consistent with that of EPA and has very similar components. Protection of human health, protection of the environment, and preventing and mitigating pollution are specifically addressed.

Georgia's ground-water protection goal is based on protecting the overall resource rather than just remediating single sources of contamination/pollution. EPD places emphasis on preventing pollution and protecting aquifers so that high quality ground water will be available to future generations of Georgians. Georgia will achieve this goal through a policy of anti-degradation; this means that ground-water resources are prevented from deteriorating significantly, preserving them for the future. [Note: EPA is on record as accepting anti-degradation policies.]

Georgia's comprehensive ground-water program is quite large and involves, to varying degrees, twenty-one separate statutes administered by EPD, two statutes administered by the Georgia Department of Agriculture, one statute administered by the Georgia Department of Human Resources, one statute administered by the Georgia Department of Community Affairs, and several administrative statutes affecting all agencies (see Table 1-1). A Ground-Water Protection Coordinating Committee has been established by EPD to be able to assure interbranch and interagency coordination of ground-water issues. Region IV personnel also participate in Committee meetings, which generally are scheduled on a twice-yearly basis. The Coordinating Committee is described in Section 4.3.1.

(3) The State's ground-water protection goal guides all federal, State and local ground-water related programs operating within the State which address potential sources of contamination, including federally-unregulated sources.

Adequacy Criterion 3 has been met, for at least one key ground-water related program.

Georgia currently has primacy for all federally delegated environmental programs relevant to ground water. None of these have been subdelegated to local governments. With only the exceptions mentioned in Section 1.3, Georgia's ground-water protection activities fall within EPD and are required by the Director to follow the State's established ground-water protection goal. The Georgia Department of Agriculture regulates pesticide applications and the Department of Human Resources regulates on-site sewage management systems. EPD has developed (and has provided to EPA) formal Memoranda of Understanding with

each of these two agencies. These Memoranda of Understanding are consistent with Georgia's ground-water protection goal. The Georgia Department of Community Affairs assists local governments in incorporating Recharge Area Protection Criteria into land-use ordinances. Recharge Area Protection Criteria were developed by EPD and are consistent with Georgia's ground-water protection goal. Moreover, the Georgia Environmental Policy Act (O.C.G.A. 12-16-1, *et seq.*) of 1991 requires state agencies to consult with one another regarding ground-water protection efforts (see Section 1.3 for a description of the Act).

The State also has a number of unique statutes that allow it to address potential sources of pollution/contamination, including federally unregulated sources. Some examples of these include:

- Through the Georgia Ground-Water Use Act, EPD is limiting withdrawals in the Upper Floridan Aquifer in the coastal region to prevent salt-water encroachment.

- Through the Water Well Standards Act, EPD encourages owners of abandoned wells to plug such wells in an environmentally sound manner to prevent them from becoming pathways for pollutants to enter the ground-water regime. [Note: At unregulated facilities, the burden of plugging an abandoned well is on the owner. EPD's role is limited to "declaring" a well to be abandoned; and encouraging the owner to plug the well. At regulated facilities EPD can require plugging of an abandoned well, consistent with the Water Well Standards Act.]

- Through the Georgia Water Quality Control Act, EPD currently is pursuing enforcement/clean-up actions for ground-water pollution associated with several non-domestic septic systems and leaking interstate petroleum pipelines.

EPD's comprehensive statutory authority has long been recognized at the federal level. For example, in describing State ground-water programs in their 1986 National Summary of Ground-Water Quality, the USGS writes:

> "Through comprehensive laws and regulatory activities, the GEPD (sic) has significant control programs to prevent ground-water contamination and to require remedial action in the few situations where contamination exists."

Interestingly, of all the EPA Region IV states, the word "comprehensive" was only used to describe Georgia's ground-water management program.

Some examples of how Georgia's goal guides a key State ground-water related programs (such as the Safe Drinking Water Program) include:

- EPD requested the City of Albany to assess the impact of a proposed new well field on Flint River cold-water springs, which are critical habitat (e.g., ecological system) for striped bass.

- EPD is currently developing a Coastal Ground-Water Management Strategy to protect current and future users of the Upper Floridan Aquifer from salt-water intrusion.

- As a result of Flint River flood waters (associated with Hurricane Alberto in July, 1994) entering the Upper Floridan Aquifer, EPD performed over 6,000 analyses of domestic wells for bacteria. Because the sampling program demonstrated that the aquifer had been locally contaminated, EPD issued health advisories, which provided recommendations for protecting drinking water as well as for decontaminating wells.

ADDITIONAL FACTORS TO BE CONSIDERED

(1) **The State is encouraged to incorporate water supply goals and objectives, including support of valuable ecological systems and other beneficial uses, into its ground-water protection goal.**

Additional Factor 1 has been fully met.

EPD interprets this factor to deal with ground-water withdrawals and surface water-ground water interactions. Ground-water withdrawals in excess of 100,000 gallons per day are regulated by EPD under the Ground-Water Use Act. Such regulation is in accordance with Georgia's ground-water protection goal. As part of the permit evaluation process, protection of ecological systems and other beneficial uses are assessed. Recent examples of these types of analyses include evaluation of sinkhole inducement in the vicinity of quarry dewatering operations and municipal wells fields in karstic regions, wetland dewatering in the vicinity of municipal water supply wells, and protection of the previously mentioned cold-water springs (e.g., striped bass habitat) in the vicinity of a proposed large well field in southwest Georgia and blind cave fish habitat in the vicinity of a proposed municipal well in northwest Georgia.

In August, 1994, the Director of EPD, the Branch Chief of the Water Resources Branch and the State Geologist issued a Memorandum of Clarification requiring all

EPD Branches and requesting the Georgia Department of Agriculture, the Georgia Department of Human Resources, and the Georgia Department of Community Affairs to protect future users of ground-water as part of their respective programs. A copy of this Memorandum of Clarification has been provided to Region IV of EPA. The Memorandum of Clarification defines Georgia's ground-water protection goal. Each agency and each Branch, however, has the discretion to interpret the goal to meet their strategic mission. The Geologic Survey Branch of EPD, in turn, is available to provide hydrogeological assistance and some overview so that Georgia's ground-water protection goal can be consistently applied throughout the State.

STRATEGIC ACTIVITY 2

ESTABLISHING PRIORITIES, BASED ON CHARACTERIZATION OF THE RESOURCE, IDENTIFICATION OF SOURCES OF CONTAMINATION, AND PROGRAMMATIC NEEDS, TO DIRECT ALL RELEVANT PROGRAMS AND ACTIVITIES IN THE STATE TOWARD THE MOST EFFICIENT AND EFFECTIVE MEANS OF ACHIEVING THE STATE'S GROUND-WATER PROTECTION GOAL

FULLY-INTEGRATING CRITERIA:

(1) The State has established basic definitions and approaches for a coherent priority-setting process and is applying them in a consistent manner across all federal, State, and local ground-water programs operating within the State.

Adequacy Criterion 1 has been met to the level required of a "core" CSGWPP.

EPD has implemented the processes described in Criterion 1 in Georgia's ground-water protection programs. These processes are fully described under other sections, as follows:

- Definitions and Approaches: (Section 1.6)
- Priority Setting Process: (Section 4.2)
- Consistency: (Sections 4.1 and 4.3)

Some examples of the above in key ground-water related programs include:

- Technical terms such as "aquifer", "well", "ground water" are defined consistently in all promulgated rules (i.e., the term "aquifer" has the same meaning for the Safe Drinking Water Program and the UST Program).
- The Ground-Water Pollution Susceptibility Map is used (a) by the Water Protection Branch to assess sites for land application of wastewater and wastewater sludges; (b) by the Hazardous Waste Management Branch to prioritize sites, (c) by the UST Program of the Land Protection Branch to determine remediation; and (d) the local governments to establish lot sizes for domestic septic systems.

- All monitoring wells for all regulated sites must be constructed under the direction of a professional engineer or professional geologist registered to practice in Georgia.

(2) A State's ground-water priority-setting process is based on sufficient consideration of varying ground-water characteristics.

Adequacy Criterion 2 has been fully met.

For almost 100 years, the Geologic Survey Branch of EPD (or one of its predecessors) has been mapping and describing the characteristics of Georgia's ground-water resources. For almost the same length of time, the USGS, as part of its cooperative programs with the State or local governments also has performed assessments of the State's ground water. These characteristics are described in numerous published and unpublished technical documents. The technical documents, in turn, serve as the basis for establishing priorities, determining remediation methods, and making siting decisions. One of the published studies, The Ground-Water Pollution Susceptibility Map of Georgia (Hydrologic Atlas 20, 1992), serves as the foundation for much of EPD's priority setting. This map was constructed using EPD's GIS following the EPA approved DRASTIC methodology for determining relative susceptibility or vulnerability of shallow ground water to man-made pollution. This map is available in digital format at 1:100,000 scale and can be accessed by users of GIS software on small computers for site evaluations. Thus EPD can quickly assess the relative susceptibility of any site to ground-water pollution. For example, in an area mapped as being a significant ground-water recharge area and having high pollution susceptibility, conservative engineering design would be required for facilities such as municipal solid waste landfills, land application of treated waste water, agriculture waste impoundments, and so forth. As mentioned in (1) above, these maps currently being used by EPD's Hazardous Site Inventory Program and Underground Storage Tank Program to prioritize sites for remedial action, and by the Municipal Waste-water Program to assess sites.

Since 1980, the Geologic Survey has published eighty-six technical documents (through July 1, 1994) dealing with ground water, as follows: (Note: many documents address multiple issues):

- Intrinsic sensitivity, hydrogeological regimes and flow patterns (recharge/discharge parameters) and local hydrogeological setting: 62 have been completed and 5 are in progress.

- Quantity and potential yield: 14 have been completed and 3 are in progress.

- Ambient and/or background ground-water quality as determined by monitoring: 24 have been completed and 3 are in progress.

- Current use: 36 have been completed and 7 are in progress.

- Reasonably expected future use based on demographics, land use, remoteness, quality, and availability of alternative water supplies: 2 have been completed and 1 is in progress.

- The interactions and potential contamination impacts between surface and ground water and the value of ground-water quality to the maintenance of ecosystem integrity: 9 have been completed and 2 are in progress.

- Inter-jurisdictional characteristics: 6 have been completed.

These eighty-six technical documents, along with other documents published by the USGS, the NRCS, EPA, and scientific societies, serve as technical references for developing hydrogeologic interpretations.* Site specific information also is required by EPD to be collected as part of environmental permitting or ground-water remediation projects. A technical file of these materials is maintained in the Geologic Survey Branch of EPD. While studies are ongoing, the data represented by existing reports and files are sufficient for the State to implement a fully integrating CSGWPP.

(3) The State has sufficient contamination source inventories and assessments to support its process for identifying all significant potential (including federally-unregulated sources) and consistently determine its ground water protection priorities based on the relative threats of these sources to the resource.

Adequacy Criterion 3 has been met to the level required of a "core" CSGWPP.

As discussed in that portion of Section 4.2 dealing with the information, the State of Georgia has an ongoing systematic and comprehensive program of identifying the existence, location and relative magnitude/risks of pollution and contamination

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*Technical documents dealing with ground water are sold for a nominal fee by the Geologic Survey. The primary customers of such documents would be EPD Branches, EPA, industry, as well as federal, state and local governments (including their consultants).

threats to ground-water quality and quantity. EPD's various programs dealing with ground water are capable of (a) identifying specific land use activities or industrial practices that pose threats to ground water, (b) locating geographic areas where such threats or sources are likely to occur, and (c) identifying specific sites, facilities, or practices that pose a threat to public health and/or the environment. Moreover, EPD's inventories address pollution and contamination sources that are regulated (either at the State or federal level) or unregulated. These inventories are maintained in computerized data bases in the responsible programs and as map coverages in the EPD GIS. The status of various EPD pollution source inventories is listed in Table 4-1 of Section 4. Once, an inventory completes final QA approval, it will be revised at least once every five years. EPD's quality assurance method for inventories (or data bases) are consistent with federal documentation standards.

Some examples of the above include:

- In 1994, nitrates, exceeding drinking water standards, were detected in a public drinking water well near Albany. EPD's inventories of regulated facilities (sludge application sites), when compared to inventories of non-regulated activities (agricultural lands) demonstrated that the agricultural lands were a more likely source than the sludge application sites .

- In 1993, beryllium was detected in a monitoring well at a sanitary landfill (regulated facility). Comparison of this site with geochemical maps of beryllium in soils and mines (unregulated facilities) leads EPD to believe that the landfill is the source of the detected beryllium.

EPD uses a seven-fold approach to identify potential sources of pollutants to ground water: (a) wellhead protection plan inventories, (b) integration of geographic (mainly land-use) and environmental GIS databases, (c) categorization of product/waste streams, (d) results of ambient and facilities monitoring, (e) citizen complaints and EPD inspections, (f) characterization of disposal methodologies, and (g) precautionary follow-up on out-of-state pollution incidents. Specific field studies, however, are necessary to differentiate between potential sources and actual sources.

(4) The State has sufficient technical capabilities to support its priority-setting process and determinations.

Adequacy Criterion 4 has been fully met.

Personnel: In general, EPD associates, dealing with ground water, are technically trained in geology, engineering, chemistry, and/or environmental science. Many have advanced degrees. Associates are encouraged to obtain professional registration and/or certification. EPD has recently established and constructed a formal training center and hired a full time training coordinator.* In general, all EPD associates are expected to take about 40 hours of training per year to improve or expand their professional skills. An associate's specific training plan, however, is developed in consultation with the individual's supervisor and is to be consistent with EPD needs.

GIS Facilities: EPD, in cooperation with the USGS, has a comprehensive GIS laboratory at the Georgia Institute of Technology. Both EPD and USGS GIS experts are expanding upon and developing new environmental data bases, many of which deal with ground water. Presently, EPD's environmental GIS is one of the largest and most comprehensive in the country. Four EPD professional associates and one student assistant are utilizing 4 UNIX-based work stations and a large electrostatic printer to produce GIS maps from the environmental data bases. The multi-gigabyte data bases are maintained on several hard drives connected through a file server which is accessible to several work stations and personal computers in addition to EPD's. Currently EPD has over a dozen hand held GPS receiving units. Also EPD has access to base station data from the Department of Community Affairs and the U.S. Forest Service and differentially corrects all GPS data to 5 meter or greater accuracy before entering locational data into the GIS.

Drilling and Downhole Logging Equipment: EPD currently owns four drilling rigs (a Failing 1500 mud rotary rig with coring capability; a Failing 1250 mud rotary rig, a Mobile Drill hollow stem auger rig and a Giddings solid stem auger rig). With these drilling rigs, EPD has the capability to assess ground-water pollution incidents throughout the State. EPD also has the capability of downhole geophysical logging of wells. Furthermore, EPD owns a variety of pumps, generators and bailers to sample wells.

Ground-Water Models: Through its Joint-Funding Agreement with the USGS, EPD maintains several regional ground-water flow models. EPD also has established a PC-based ground-water modeling center at the offices of the Geologic Survey Branch. A variety of flow and contaminant models are available for site evaluations.

*EPD's training center is located at the Tradeport Office Park in Atlanta. The facility occupies approximately 1,000 square feet and is fully equipped with computers and audiovisual aides. Two full-time employees coordinate training. EPD's capital investment in the facility is approximately $125,000; annual operating costs are about $25,000. In addition, about $15,000 is budgeted annually on outside trainers.

Outside Expertise: EPD has access to the scientists of the USGS through its ongoing Joint-Funding Agreement. In addition, EPD commonly contracts with university professors to provide special expertise or perform specialized studies. For example, in the last two years, a Georgia State University professor was contracted to provide training in hydrogeology to EPD associates and to carry out a study of ground-water geochemistry in Burke County, a professor from Georgia Southern University has completed a study of nitrates in shallow wells of Georgia's farm belt, a member of the faculty of Gainesville College is providing GPS data for non-municipal public water supply wells and a University of Georgia professor has been contracted with to provide GPS locational data on municipal water wells and to carry out tracer studies in karstic areas for wellhead protection.

Laboratories: EPD has constructed a comprehensive integrated laboratory staffed with nearly a hundred associates at the Georgia Institute of Technology. This laboratory is capable of analyzing water samples, using a variety of instruments, at analytical limits adequate to measure compliance with promulgated MCLs. All analysis performed at EPD's laboratories are in accordance with published protocols and quality assurance procedures. The Georgia Department of Agriculture has established an analytical laboratory for pesticides analysis. Since mid-1993, DOA performs all pesticides analyses for EPD's Ground-Water Management Program, including samples from specialized pesticide monitoring networks.

Information Management: EPD's Mission Statement for information management is:

> Collect, create, and deliver data and information management that enables EPD and Georgia's citizens to make the decisions needed that will protect and enhance Georgia's Natural Resources. Implement an information management system that empowers EPD's associates to make timely, accurate, and complete decisions to meet EPD's mission. Convey information to the public about the quality of Georgia's environment that is easily understood and that Georgia's citizens will notice and care about.

To achieve this mission, almost all EPD professional associates in all Branches are assigned a personal computer for their own use. Utilizing common commercial software programs, EPD associates develop ground-water and other data bases in common and consistent formats, which are distributed to associates in other Branches through EPD's LAN or to outside parties through the INTERNET.

(5) The State has formally adopted measures of ground-water protection (e.g., performance standards, quality standards, reference points, etc.), which are sufficient to support consistent program priority setting and the measurement of progress.

Adequacy Criterion 5 has been met to the level required of a "core" CSGWPP.

As discussed in Section 4.5, EPD expects that all ground waters within the State, exclusive of those naturally contaminated with mineral constituents such as salt, do not exceed Maximum Contaminant Level's (MCLs) promulgated by EPA and adopted by EPD under the State's Safe Drinking Water Act (Appendix D). The most current version of the Rules for Safe Drinking Water should be consulted for the drinking water standards adopted by EPD.

Georgia will adopt ground-water standards as policy by having the Board of Natural Resources approve this plan after EPA accepts this plan as a "Core" CSGWPP.

(6) Protecting public water supplies is among the State's highest priorities and controlling sources in wellhead protection and recharge areas and basins of drinking water aquifers is a priority.

Adequacy Criterion 6 has been fully met.

Protecting people is Georgia's foremost ground-water protection priority (refer to Section 4.2). EPD, since 1986, has had a recharge area protection program. All of the State's significant ground-water recharge areas have been mapped and identified (Hydrologic Atlas 18, 1989). In 1989, the State developed recharge area planning criteria as part of the Georgia Planning Act (Appendix B). This Act requires local governments to develop land-use ordinances to protect significant recharge areas. Georgia's Wellhead Protection Program was approved by EPA in 1992. Wellhead Protection Rules were promulgated effective July 1, 1993 (Appendix C). Currently, EPD is actively developing wellhead protection plans for Georgia municipalities utilizing ground water.

(7) The State is sufficiently coordinating its ground-water protection priorities with its surface water quality and other priorities.

Adequacy Criterion 7 has been fully met.

The Water Protection Branch, which is the EPD Branch having primary responsibility for protecting water quality in Georgia's lakes, rivers, and streams, participates in the Ground-Water Protection Coordinating Committee. Currently all land application sites for waste water and waste water sludge are reviewed by

hydrogeologists of the Geologic Survey Branch.* If appropriate, ground-water protection stipulations are made part of permits.

In addition, as part of the NPDES permitting process, ground and surface water interactions are evaluated, particularly in areas of extensive irrigation wells (Note: in some areas of the Coastal Plain, irrigation pumpage could reduce base flow to streams and consequently reduce stream flow and waste assimilation capacity). Moreover, since 1991, EPD's non-point source management program has contained a ground-water component. Under the ground-water component, EPD has carried out a comprehensive examination of non-point source nitrate in ground-water by sampling over 5,000 shallow domestic wells statewide. During FY 1994, the program sampled nitrate in base flow of streams in counties with high livestock production.

With regards to other EPD priorities, site evaluation reports and ground-water monitoring plans are reviewed by each Branch's hydrogeologists. Geologists for the Hazardous Waste Branch carry out hydrogeologic evaluations of hazardous waste sites and evaluate corrective action plans. Similarly, Corrective Action Plans submitted to the Underground Storage Tank Program are reviewed by that Program's geologists. These geologists also utilize the specialized knowledge of other EPD geologists and the USGS when necessary. The Geologic Survey Branch, in turn, serves as a technical advisor to the Water Resources Branch for maintaining regional ground-water flow models (in conjunction with the USGS) and for site specific evaluations related to issuing permits for ground-water use. Relevant programs of the aforementioned EPD Branches participate on the Ground-Water Protection Coordinating Committee.

(8) State priorities sufficiently incorporate and support a process of ongoing review and improvement of the six Strategic Activities of the State's CSGWPP.

Adequacy Criterion 8 has been fully met.

As discussed in Section 1.4, EPD, on an annual basis, compares its ground-water protection priorities with those of EPA. If appropriate and prudent, EPD would change or modify its priorities to be consistent with those of EPA. The Ground-Water Protection Coordinating Committee reviews the consistent application of the principles contained in Georgia's CSGWPP on at least twice yearly basis and makes recommendations to the Director regarding needed improvements.

*This review typically takes into consideration maps of significant ground-water recharge areas and of ground-water pollution susceptibility.

ADDITIONAL FACTORS TO BE CONSIDERED

(1) For stability, the State is encouraged to make its priorities long-term in nature and change them only in the face of compelling new information or needs.

Additional Factor 1 has been fully met.

Similar to EPA, EPD believes that priorities, while continually assessed and perhaps "find-tuned" should be long term. In this light, EPD's ground-water protection goal is "word-for-word" the same as when it was first developed in 1983. Similarly, the ground-water protection priorities that were specifically identified and published in DNR's 1990-1991 Five-Year Plan continue to be EPD's priorities for 1995-1996. These are:

- Reduce or eliminate any source of chemicals in the environment to levels below those established for air, surface water, ground water, community water systems, and solid waste management facilities.
- Continue a comprehensive control program for non-point sources of water pollution.
- Continue the State's Comprehensive Ground-Water Management Program to manage ground-water availability and to protect and improve ground-water quality.

Some of the Five-Year Plan's ground-water related objectives that have been completed include:

- Development of a fully operational GIS
- Implementation of Recharge Area Protection Rules
- Completion of a numeric flow model of the Clayton-Claiborne Aquifer System
- Development of a State Underground Storage Tank Fund.

DNR and EPD's current Strategic Plan (Appendix F) contains several new priority ground-water related initiatives; including preparing annual summaries of the quality of Georgia's ground water, improving the efficiency of the UST Program, developing a Coastal Ground Water Management Strategy, continued implementation of a state-funded Hazardous Site Remediation Program, and so forth.

(2) The State is encouraged to include in its ground water characterization effort:

— detailed mapping and assessment to address the State's highest priority needs at an appropriate scale as determined by a coordinated State effort;

Additional Factor 2 has been fully met.

EPD has had and continues to have extensive aquifer mapping projects, either performed independently or jointly with the USGS. Since 1980, eighty-six separate hydrogeological investigations have been completed. Another seven are in progress utilizing State funds either fully or partially. EPD anticipates that ground-water characterization will continue indefinitely into the future.

Computerized GIS maps of the State's recharge areas and pollution susceptibility are available at 1:100,000 and other scales. Any particular environmental site undergoing evaluation can be plotted on these maps, either on screen by the computer or in hard copy, and the location of the site in respect to recharge areas or pollution susceptibility visually determined. Computers also can provide lists of facilities in each category of land area under review. The GIS coordinates accumulation of inventories of regulated and unregulated potential pollution sources.

— a comprehensive well inventory that includes private and municipal production wells, monitoring wells, and injection wells;

EPD maintains inventories of public water supply wells, industrial and agricultural wells withdrawing more than 100,000 gallons of water per day, injection wells, and monitoring wells at solid waste landfills and at some land application and hazardous waste sites. The majority of these are GIS inventories. The USGS Water Resources Division, Georgia District, also maintains an inventory of wells including selected private wells. EPD also has had the USGS expand its inventory of private wells in counties where EPD is carrying out aquifer evaluations.

— a system for utilizing and integrating State and federal (e.g., USGS, USDA-NRCS) ground water assessment and mapping programs.

EPD associates, since 1979, have held quarterly meetings with their counterparts in the Georgia District of the USGS to discuss ground water assessments. Also each year, the State Geologist participates in NRCS's priority setting meetings so that USDA initiatives are consistent with those of EPD.

One of the most important results of synthesizing of state and federal assessments was the realization that Georgia's most significant ground-water quality problem is salt-water intrusion and that widespread conservation efforts would be needed to resolve the problem.

(3) The State is encouraged to have its formally adopted measures of ground-water protection include an integrated set of direct measures such as MCL's, State water quality standards, and indirect measures such as BMPs, technology standards, siting criteria, and construction standards.

Additional Factor 3 has been fully met.

See Adequacy Criteria #5 above and Section 4.5.

(4) The State is encouraged to consider deployment of new and alternative technologies for improved pollution prevention as a policy.

Additional Factor 4 has been fully met.

As discussed in Section 4.6, the Pollution Prevention Assistance Division (P^2AD) was established within DNR in October, 1993. The mission of P^2AD is to develop and promote pollution prevention activities in the State. P^2AD, working closely with the University System, retired engineers, and other government agencies to utilize existing resources, provides both technical and financial assistance to Georgia industries. The Division's non-regulatory programs include: On-site assessments, training, industry-specific workshops, grants, and a pollution prevention information clearinghouse. P^2AD has offered general pollution prevention training to EPD associates in order to acquaint them with general pollution prevention principles in an effort to encourage pollution prevention alternatives at sites that they inspect. In addition, EPD associates can refer companies to P^2AD for assistance in analyzing and finding pollution prevention options.

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STRATEGIC ACTIVITY 3

DEFINING AUTHORITIES, ROLES, RESPONSIBILITIES, RESOURCES, AND COORDINATING MECHANISMS ACROSS RELEVANT FEDERAL, STATE, AND LOCAL PROGRAMS FOR ADDRESSING IDENTIFIED GROUND-WATER PROTECTION PRIORITIES

FULLY INTEGRATING ADEQUACY CRITERIA:

(1) All agencies and programs responsible for addressing the State's priorities are identified and a primary point of contact (e.g., lead agency, coordinating committee, Governor's staff, etc.) with EPA is established for development and implementation of CSGWPP's across all involved agencies.

Adequacy Criterion 1 has been fully met.

As discussed in Sections 1.3 and 4.4, the EPD is the lead agency (and the Geologic Survey is the lead Branch) for development and implementation of Georgia's CSGWPP. The Georgia Departments of Agriculture, Community Affairs, and Human Resources have minor ground-water protection roles. These latter agencies, however, cooperate with EPD. Formal Memoranda of Understanding have been developed with Agriculture and Human Resources. Community Affairs insures that environmental planning criteria developed by EPD are incorporated in the planning process by local governments. The relevant Georgia statutes dealing with ground-water protection are identified in Table 1-1. The Director of EPD established the Georgia Ground-Water Protection Coordinating Committee to coordinate ground-water protection activities between the various programs in EPD and with the three above mentioned departments. Representatives of the University of Georgia Cooperative Extension Service also serve on the Committee because of their role in public education. A representative from EPA's Region IV Ground-Water Protection Branch also attends the Committee meetings.

(2) A coordinating mechanism is operating that includes all State agencies and programs with ground-water responsibilities and all programs' expertise is brought to bear on the State's ground-water protection priorities.

Adequacy Criterion 2 has been fully met.

As mentioned above, a Ground-Water Protection Coordinating Committee has been established. The Committee, which is discussed in Section 4.3.1, includes

representatives from EPD programs involved with ground-water protection as well as the Departments of Agriculture, Community Affairs and Human Resources, the University of Georgia Cooperative Extension Service, and the USDA Natural Resource Conservation Service. EPA Region IV personnel also participate in the Coordinating Committee meetings. At present, meetings are held at least twice yearly.

(3) Sufficient legal authorities and resources are available to address the State's ground-water protection needs, requirements, and priorities under its CSGWPP.

Adequacy Criterion 3 has been fully met.

Georgia has primacy for all federally delegated ground-water protection statutes. With the exception of the federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) administered by the Georgia Department of Agriculture, these are all administered by EPD. Moreover, EPD also administers several unique statutes. For a discussion of Georgia's statutory authority and laws, refer to Section 1.3 and Table 1-1.

Resources to carry out delegated federally mandated regulatory activities comes from a combination of state appropriations, federal grants, and state fee funds. EPD has 700 employees (January 1, 1996), most with technical degrees. These resources are sufficient to fully implement requirements and priorities under Georgia's CSGWPP.

(4) Relevant federal agencies, operating within the State, are sufficiently consulted in the development and implementation of the CSGWPP.

Adequacy Criterion 4 has been fully met.

EPA participates in the Ground-Water Protection Coordinating Committee (Section 4.3.1). Quarterly meetings (since 1979) also are held between EPD and the USGS on ground-water protection activities (see Section 4.3.2). EPD on an "as-needed" basis consults with the DOA, DOD, DOE, Corps of Engineers, NRC, and USFWS (Section 4.3.2). Georgia also serves on the Region IV State-Federal Ground Water Steering Committee. Some recent examples (1993-1994), of State-federal consultations include:

- Department of Agriculture (Natural Resource Conservation Service): EPD participates in priority-setting meetings with the NRCS to give guidance. The NRCS also participates in the Ground-Water Protection Coordinating Committee.

- EPD's consultation activities with the Department of Defense involve remediation of hazardous sites and USTs located on federal property. The Director of EPD has entered into "partnering" agreements with the environmental officials of military facilities (for example, Warner Robbins AFB) whereby the two organizations would consult with one another on a regular basis on remediation issues. The primary thrust of the "partnering" agreement is to resolve remediation issues with federal defense facilities at the associate level on the basis of mutual trust, respect, and common sense.

- EPD and the Department of Energy (DOE) currently are consulting with one another over Tritium pollution of shallow ground water in Burke County, across the Savannah River from the Savannah River Site. Moreover, the Chief of EPD's Program Coordination Branch is the Governor's personal representative on DOE's State-Tribal Governments Working Group.

- EPD and the U.S. Corps of Engineers consult on a regular basis on water supply issues, particularly those that involve surface ground water interactions and interbasin transfer, which can include ground-water pumped from one river basin and transferred to another river basin. The Corps is the primary contractor for the States of Georgia, Alabama and Florida on interstate water supply issues involving the Apalachicola, Chattahoochee, and Flint (ACF) - Alabama, Coosa, and Tallapoosa (ACT) river studies.

- The Chief of the Program Coordination Branch is the official State Liaison Officer before the Nuclear Regulatory Commission on all matters relevant to the State of Georgia.

- The Chief of the Program Coordination Branch is one of the Commissioners to the Southeast Interstate Low level Radioactive Waste Compact.

- The State Geologist is a member of the Water Resources Committee of the Association of American State Geologists. This committee annually reviews federal programs and agencies dealing with ground water.

Through these contacts, federal agencies have been notified of EPD's intention to develop a CSGWPP, as well as given opportunities to comment.

(5) Neighboring States consult each other in the development and implementation of their joint and independent CSGWPPs.

Adequacy Criterion 5 has been fully met.

EPD associates have met with appropriate officials of the following adjacent States to discuss and compare their respective points-of-view regarding development and implementation of their respective CSGWPPs: Alabama (July 22, 1994), Florida (July 15, 1994) and Tennessee (July 26, 1994). Each of the meetings lasted about four hours, ground-water protection issues of mutual interest were discussed, and drafts of Georgia's CSGWPP were provided to officials of each of the aforementioned three states as well as the States of North and South Carolina.

(6) The State has established capabilities and mechanisms for inter-state coordination of ground-water protection issues.

Adequacy Criterion 6 has been fully met.

A formal Memorandum of Understanding has been developed between Georgia, Alabama, and Florida to resolve interstate ground-water issues in the Apalachicola, Chattahoochee, and Flint and the Alabama, Coosa, and Tallapoosa River Basins. Also under a formal Memorandum of Understanding, Georgia and South Carolina consult with one another on salt-water encroachment issues in the Savannah-Hilton Head area and development of an Interim Coastal Ground-water Management Strategy extending to the year 2005. Recently, EPD and the St. John's River Water Management District of Florida have entered into consultations of a wide variety of ground-water protection and management issues involving the Floridan aquifer.

(7) Local governments are sufficiently included in the development and implementation of the CSGWPP and the State is sufficiently implementing coordination, guidance, or oversight mechanisms where local governments have authorization to address ground-water related objectives and priorities.

Adequacy Criterion 7 has been fully met.

In Georgia, ground-water protection activities are the responsibilities of state agencies. Through its permitting process in state, as well as federally delegated environmental regulatory programs, EPD has the primary responsibility for protecting ground-water. Local governments must include environmental planning criteria in their local planning activities. The Department of Community Affairs has oversight of planning activities of local governments. Local governments may also participate in ground-water protection activities of unregulated potential sources by passing and enforcing wellhead protection ordinances. A number of Georgia communities have already done so.

In the implementation of Georgia's CSGWPP, EPD has coordinated its efforts with the ground-water protection efforts of local governments. At their respective annual meetings, EPD associates make presentations on CSGWPP to the Georgia Municipal Association (GMA) and to the Association of County Commissioners of Georgia (ACCG). The most recent meeting with GMA was held June 21-14, 1994, and the meeting with ACCG was held April 16-19, 1994. In addition, copies of this Circular will be provided upon final printing to GMA and ACCG.

ADDITIONAL FACTORS TO BE CONSIDERED;

(1) **The State is encouraged to adopt a coordinating mechanism that is capable of influencing the movement of human and financial resources to target joint efforts valuable to more than one State program.**

Additional Factor 1 has been fully met.

As previously mentioned, the Ground-Water Coordinating Committee is empowered to make recommendations to the Director for "improvement packages" for State appropriations and for reallocation of federally supported programmatic activities.

(2) **The State is encouraged to provide a field management presence for ground water of priority concern either by supporting local government efforts to protect ground water or establishing special districts, boards, or other similar institutional arrangements.**

Additional Factor 2 does not appear to be applicable to Georgia. Georgia, nevertheless, is evaluating the concept of decentralizing some ground-water protection activities.

EPD currently does not support the concept of regional water management or protection agencies and believes that it is counterproductive to wise ground-water management. There are two reasons for this, as follows:

- At the request of the Georgia General Assembly, the Institute of Government of the University of Georgia in 1982 made an assessment of establishing local or regional ground-water protection agencies. The Institute found that local or regional ground-water protection agencies in other states promoted inconsistencies (e.g., one district would enforce more rigorously than another district), redundant bureaucracy, and inefficiency (e.g., duplicative services and facilities). The Institute also pointed out that Georgia's hydrogeology was not compatible with local management as aquifers were large and complex and that a management activity in one community might affect a community many miles away (for example; ground-water pumpage in Brunswick affects ground-water availability in Savannah, ninety miles away).

- There is a tendency for local ground-water protection agencies to become *ad hoc* NIMBY's. In other words, the focus of the agency could be subverted to opposing locally unpopular land-use decisions under the guise of ground-water protection (e.g., opposing a new municipal solid waste landfill, opposing a new manufacturing facility, etc. on the basis of some ill-defined potential that the facility might pollute ground water). Through various statutes, the Georgia General Assembly has empowered EPD to enforce ground-water protection. EPD currently is the only agency in Georgia authorized to invoke civil and criminal penalties for ground-water pollution. This authority does not reside with local governments. Centralized enforcement of ground-water protection assures that the resource is well protected in all areas of the State. Inasmuch as ground-water pollution is relatively rare in Georgia, it is readily apparent that the State's approach to centralized management is effective.

The concept of decentralization of environmental protection activities, however, has been successfully employed in other states and there may be some facets of ground-water protection that can be administered at the local level. In this regard, the Governor's Environmental Advisory Council has suggested that EPD analyze this issue. For this reason, decentralization is one of EPD's strategic goals and identification of EPD functions so amenable has begun.

EPD has established five regional offices to improve its field presence statewide. These offices are located in Atlanta, Athens, Brunswick, Macon, and Albany. In addition, a separate district office has been established in Savannah. In case of environmental emergencies, regional office associates can respond quicker. The

regional and district associates assist Atlanta-based regulatory programs by carrying out compliance inspections and preparing any enforcement actions needed to get facilities into compliance. Because they visit local facilities with greater frequency and regularity, regional and district associates gain the confidence of permit holders and can work successfully with them in obtaining permit compliance. The regional and district offices also are often the contact point for citizen complaints for environmental problems.

(3) The State is encouraged to consider assessing fees for various activities that pose potential threats to ground water to augment funds for prevention of ground-water pollution as well as for remediation efforts.

Additional Factor 3 has been fully met.

EPD has established the following fee-funded programs to address remediation:

- The Scrap Tire Program: The State of Georgia, through the Solid Waste Management Act (O.C.G.A 12-8-20, *et seq.*), imposes a disposal fee of $1.00 on the purchase of new tires. Funds generated thereby are utilized by EPD to clean up abandoned stock piles of used tires, to provide regulatory oversight of approved used tire disposal sites, and to support and promote the development of used tire recycling. After January 1, 1995, used tires may no longer be disposed of in landfills. This ban was put into effect after the Director of EPD determined that adequate tire recycling facilities were available.

- The Georgia Underground Storage Tank Program: The Georgia Underground Storage Tank Act (O.C.G.A. 12-13-1, *et seq.*) established the Georgia Underground Storage Tank Fund (GUST Fund), which is funded by a tax on gasoline sites. A person operating an underground storage tank for motor fuel may pay a certain amount per gallon of petroleum into the trust fund as a financial assurance mechanism. If the operator's tank leaks, then the State may use GUST funds to hire consultants to develop and implement corrective action plans to clean up the petroleum products. Remediation of soil and ground-water pollution at a number of UST sites around Georgia is being carried out utilizing GUST funds.

- The Hazardous Sites Response Program: The Georgia Hazardous Site Response Act of 1992, as amended in 1994, (O.C.G.A. 12-8-93, *et seq.*) established the Hazardous Waste Trust Fund to support investigation and remediation at hazardous waste sites in Georgia (State Superfund). The fund is supported by hazardous waste management fees paid on hazardous waste generated today by Georgia businesses and industries, fees on solid waste disposed of, and fees on hazardous substances handled and reported under the federal Toxics Reporting Inventory (TRI). Additionally, penalties collected from all environmental enforcement programs (except solid waste) are deposited into this fund. In July, 1994, EPD published the Hazardous Site Inventory, a listing of 270 sites where releases of hazardous waste have been sufficiently large to require further investigation. Sites on this list, which warrant clean up after investigation, may undergo remediation funded by the fee on hazardous waste. If there is a responsible party, the State may use the fund to do the clean up and then obtain reimbursement from the responsible party.

- The Drinking Water Fee System: The Drinking Water Fee System was started in 1992 under revisions to the Rules for Safe Drinking Water. The purpose of the fee system is to help public water system owners reduce the cost and impact of new federal safe drinking water regulations that require the monitoring of their systems for a large number of inorganic and organic chemicals. These funds have been used to pay the costs of laboratory services performed by the EPD Laboratory, to contract with commercial laboratories at group rates, and to hire staff to implement other requirements of the federal regulations. This program saved public water system owners (mostly municipalities and counties) an estimated $1.1 million in laboratory costs over the first two years of operation.

- EPD collects a fee for the use of radioactive materials in Georgia. The fee funds EPD's oversight of the licensing and proper use of such materials, particularly their use in well logging, pipeline weld assessment, research, and other uses which might pollute ground-water.

- EPD collects fees for air quality control permits. Air quality regulations regarding scrubber water control also serve to protect surface and ground water.

The Governor's Environmental Advisory Council also has pointed out to EPD that "user fees" are a "fair and equitable" method of financing environmental protection activities. In other words, the user of a potentially ground-water polluting product or service should bear a larger share of the environmental costs than non-users.

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STRATEGIC ACTIVITY 4

IMPLEMENTING ALL NECESSARY EFFORTS TO ACCOMPLISH THE STATE'S GROUND-WATER PROTECTION GOAL CONSISTENT WITH THE STATE'S PRIORITIES AND SCHEDULES

FULLY-INTEGRATING ADEQUACY CRITERIA:

Prevention of Contamination

(1) Programs with measurable objectives aimed at prevention and control of contamination are being implemented to the degree sufficient for attaining the State's ground-water protection goal and addressing the priorities of the State's CSGWPP.

Adequacy Criterion 1 has been met at the level required of a "core" CSGWPP.

The following EPD ground-water prevention and control programs have defined and measurable indicators of progress:

Well Head Protection EPD has embarked on a 10 year program to develop and implement well head protection plans for the approximately 1200 municipal water supply wells in Georgia. Georgia's Well Head Protection Program began on July 1, 1993.

Georgia Hazardous Waste Sites (State Superfund Sites) Approximately 270 hazardous waste sites have been identified in Georgia that may not be eligible for cleanup under federal statutes. These are sites where reportable releases of hazardous waste have occurred. Some of these have been investigated and the pollution confirmed. Such sites are to be cleaned-up using the Hazardous Waste Trust Fund. In this way, clean ups will not be delayed by court actions over who is responsible. Other sites on the list will require investigations to confirm pollution and to design corrective action plans. Currently, EPD is in the process of prioritizing these sites.

UST Sites Several hundred leaking underground storage tanks are undergoing investigation and ground-water remediation activities in Georgia. Older types of tanks must be replaced by leak resistant tanks and all must have leak detection or monitoring systems in place since December 22, 1993. There are at least 10,000 underground storage tank sites in the state. Cleanups for sites where there is no responsible party can be handled through the UST Trust Fund.

Municipal Solid Waste Landfills EPD now requires all active municipal solid waste landfills and all such landfills that were closed after June 27, 1993, to have approved ground-water monitoring systems installed by October 1, 1994. All monitoring plans are based on site specific hydrogeologic information and receive technical review by staff geologists of the Land Protection Branch Compliance Program and the Regulatory Support Program of the Geologic Survey Branch before approval by the Land Protection Branch. In this way, EPD insures that ground water (and surface water) are adequately monitored at these sites. Monitoring data from some of the older, unlined municipal solid waste landfills, where monitoring wells have been installed, have shown leakage of pollutants. EPD is requiring these facilities to further assess the pollution to determine its extent and also if the pollution is a threat to public health and safety. Some older landfills have been sufficiently assessed to warrant placement on the list of 270 hazardous waste sites which may be cleaned up by the State Superfund.

Vulnerability Assessment EPD is in the process of issuing waivers for monitoring of public water wells if it can be demonstrated that the well is not at risk for specific pollutants. For example, deep wells in confined aquifers may receive waivers for volatile organic chemicals whereas shallow wells in the surface aquifer may be required to continue to monitor for VOCs on a regular schedule. EPD will use wellhead protection pollution source inventories to establish waivers for municipal drinking water wells. Similar vulnerability investigations are being carried out for non-municipal public water supply wells. Also certain chemicals or classes of chemicals not used in Georgia may not be required for future analysis.

Testing of Public Water Supply Wells Unless granted a monitoring waiver by EPD's Drinking Water Program, public water supply wells must be sampled on a regular schedule in an approved lab and the results supplied to EPD. Water suppliers may choose to pay fees collected from water service charges to EPD to have EPD analyze drinking water samples. The schedule of sampling varies with the type of system and risk based factors (*i.e.* number of customers served).

(2) For site-specific or area specific prevention measures, characterization and assessment of ground-water resources vulnerability and, where appropriate, the ground-water's use and value, sufficiently supports rational decision-making.

Adequacy Criterion 2 has been met at the level required of a "core" CSGWPP.

EPD's general approach to pollution prevention is discussed in Section 4.6. Moreover, EPD has prepared Circular 14 to guide consultants in preparing site specific hydrogeologic reports for landfills. Circular 14 delimits the level of ground-water characterization that EPD expects for solid waste landfill sites.

— **Definitions and approaches for ground-water characterization and vulnerability assessment are applied in a consistent manner.**

Refer to Sections 1.6, 4.1, 4.2 and 4.5 for a discussion of definitions and approaches and to Section 4.3 for a discussion of consistency.

— **Factors considered include intrinsic sensitively, geologic/hydraulic parameters, hydrogeologic settings, and potential sources of contamination; when necessary, other ground-water characteristics are considered.**

Refer to Section 3 and Adequacy Criteria 2 and 3 of Strategic Activity 2 for a discussion of EPD ground-water assessments.

— **The State has sufficient technical capabilities to support its decision-making.**

Refer to Section 1.5 and Adequacy Criterion 4 of Strategic Activity 2 for a discussion of EPD's technical (personnel and equipment) capabilities regarding ground-water protection.

(3) The State is sufficiently implementing an EPA-approved Wellhead Protection Program.

Adequacy Criteria 3 has been fully met.

EPD currently is actively implementing an EPA-approved Wellhead Protection Plan.

(4) The State is sufficiently carrying out across all programs an integrated strategy to:

— **implement a variety of prevention control measures in the absence of actual detection of contamination;**

Adequacy Criteria 4 has been met at the level required of a "core" CSGWPP.

Examples of such pollution control measures include the Wellhead Protection Program, the Recharge Area Protection Criteria, the Vulnerability Assessment Program of the Drinking Water Program, as well as the various statutes and rules, administered by EPD (Table 1-1) that require ground-water pollution prevention measures be incorporated either as part of permits or as professional practices

(e.g., well construction standards).

— **implement additional controls necessary if contamination is detected or increasing towards a concentration considered as a reference point for the State's protection goal;**

The reference points for ground-water remediation and control are the MCLs promulgated under the Georgia Safe Drinking Water Act (Appendix D - see the latest version of the Rules for Safe Drinking Water for the most up-to-date information). EPD's general procedures for dealing with detection of ground-water pollution are discussed in Section 4.5.

— **take immediate action to prevent further contamination if contamination has reached or exceeded a concentration considered as a reference point for the State's protection goal.**

Whenever ground-water pollution exceeds an MCL at the point of compliance, the responsible party must implement a remediation plan. The general characteristics of remediation are described in Section 4.5.

Remediation and Facility Siting

(5) Programs with measurable objectives aimed at remediating ground-water contamination are being implemented to the degree sufficient for attaining the State's ground-water protection goal and addressing the priorities of the State's CSGWPP.

Adequacy Criterion 5 has been fully met.

This criterion is similar to Criterion 1 above except that it addresses remediation of sites rather than ground-water pollution prevention. Firstly, all facilities/sites considered by EPD to have some potential for polluting ground water are required to have ground-water monitoring systems compatible with EPD's Ground-Water Monitoring Manual. The Manual identifies specific statistical ground-water measures to assess whether ground water has been polluted. If ground-water monitoring indicates that pollution exceeding MCLs is crossing the property boundary, then the responsible party must implement a remediation and/or risk assessment plan.

EPD requires that any remediation plan, developed by a responsible party, be based on measurable cleanup objectives. In the UST Program, for example, rules governing remediation of petroleum product pollution have variable but defined clean-up standards dependent on whether the UST in an area of lower, medium,

or higher ground-water pollution susceptibility.

In general, ground-water pollution must be delineated and remediated to drinking water standards (MCLs) at the site boundary, and ground-water discharge to surface water must not cause the surface water to exceed in stream water quality standards.* Rules for the Hazardous Site Response Program (State Superfund), on the other hand, specify reportable soil concentrations for a large number of specific pollutants and incorporate drinking water standards in MCL's for evaluating and remediating ground water.

(6) For site specific remediation measures and facility siting, characterization and assessment based on use, value, and vulnerability of the ground-water resource sufficiently support rational decision-making.

Adequacy Criterion 6 has been fully met.

— **Definitions and approaches for ground-water characterization and assessment are applied in a consistent manner.**

Refer to Section 1.6 for a discussion of Definitions and Approaches.

— **Ground-water characteristics are considered.**

Refer to Section 4.5 for a discussion of how EPD uses information on ground-water characteristics.

— **The State has sufficient technical capabilities to support its decision making.**

Refer to Section 1.5 and Adequacy Criterion 4 of Strategic Activity 2 for a discussion of the States technical abilities.

(7) Provisions are in place and are being implemented across all programs to avoid cross-media contamination during remediation activities.

Adequacy Criterion 7 has been fully met.

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*See Section 4.6 for a discussion on the use of MCL's as clean-up standards in conjunction with risk analysis.

Cross media contamination refers to situations where pollution shifts from one media type (air, water, and/or land) to another. This Criterion is intended to assure that in the cleanup of one polluted site and media, other sites and other media are not polluted. There are no documented cases of cross-media pollution occurring in Georgia as a result of EPD approved remediation activities. In this regard, EPD believes that cross-media contamination is best avoided simply by recognizing that it can occur and that there are mechanisms to prevent cross-media contamination.

ADDITIONAL FACTORS TO BE CONSIDERED

(1) The State is encouraged, as part of its efforts to address potential sources of ground-water contamination which are not federally regulated, to consider the following items:

— Certification programs for drillers, pump installers, and test samplers.

Additional Factor 1 has been fully met.

EPD administers the licensing of water well contractors in Georgia. All contractors drilling any well that produces water (public, domestic, livestock, or irrigation) must be licensed. In 1990, the Georgia General Assembly considered licensing of pump installers. However, no instances of ground-water pollution attributable to pump installers could be identified and the proposed legislation was not enacted.

Installation, sampling and abandonment of geological or engineering boreholes and monitoring wells in Georgia must be under the direction of a professional engineer (P.E.) or a professional geologist (P.G.) registered to practice in Georgia. In addition, persons contracting to install such boreholes or monitoring wells must be either licensed water well contractors or have a bond on file with DNR.

— A plan for addressing abandoned and poorly constructed wells (i.e., problem wells) that is consistent with State priorities and objectives.

The Water Well Standards Act requires that all abandoned wells, utilizing licensed water well drillers, and borings, under the direction on a P.E. or P.G., be plugged by the well owner. Whenever EPD becomes aware of any abandoned well or boring, the owner is notified and directed to plug the well. The Water Well Standards Council typically requires any licensed water well contractor that drills a defective and irreparable well to plug and abandon such a well at their expense. Between 1990 and 1994, 42 contractors performed such well abandonments. Moreover, the UIC Program has a strong program of plugging drainage wells. Since the UIC Program received primacy in 1984, EPD has plugged 37 drainage wells.

— **Legally enforceable standards for well construction, abandonment, and testing, and a compliance program that ensures that the drilling community is complying [Note: For disposal wells, these standards must be consistent with the regulatory requirements under the SDWA's Underground Injection Control (UIC) Program].**

The Georgia Water Well Standards Act, administered by the Geologic Survey Branch, has specific standards for well construction, abandonment, and testing. In 1993, the well construction standards were challenged in an Administrative Hearing by a water well contractor who had failed to meet the standards dealing with grouting and with separation from septic drain fields. The Administrative Law Judge upheld the standards, determined that the contractor had willfully violated these standards, and upheld the Water Well Standards Advisory Council's revocation of the contractor's license. Administration of the Water Well Standards Act by EPD has been aggressive. Between 1990 and 1994, EPD (acting on behalf of the Water Well Standards Advisory Council) has performed approximately 250 well inspections, called approximately $100,000.00 in bonds, and revoked three water well contractors' licenses.

Disposal wells are not permitted in Georgia. If EPD were to become aware of a disposal well, the owner/operator would be required to immediately cease such disposal and properly plug and abandon the well. The owner/operator would also be required to test for possible ground-water pollution and then remediate any pollution exceeding MCL's.

— **Regulatory and non-regulatory approaches by the State to address on-site sewage disposal as a ground-water contamination concern;**

Regulation of on-site sewage disposal (i.e., septic tank drain fields) is administered under the Georgia Health Code and the Rules for On-site Sewage Management by the Environmental Health Section of the Georgia Department of Human Resources. EPD and DHR have developed a formal Memorandum of Understanding delimiting each agency's responsibilities to protect ground water from improper on-site sewage disposal. The Significant Ground-Water Recharge Area Protection Plan and the Wellhead Protection Plan contain criteria to protect ground-water from improper on-site sewage disposal. Moreover, the Water Well Standards Act contains minimum separation distances between domestic drinking water wells and domestic septic drain fields. County Health Departments, operating under general supervision of DHR, require water well contractors to file intent to drill forms and then inspect the well site to determine if there is proper separation between the well and septic drain fields.

— **Other efforts to control sources of ground-water protection not addressed by federal statutes or regulations.**

Georgia has a number of unique statutes that address ground-water protection or pollution prevention. These are identified on Table 1-1. A Pollution Prevention Assistance Division also has been established in DNR. As mentioned under Strategic Activity 2 Additional Factor 4, this Division is empowered to prevent ground-water pollution in facilities not addressed by federal regulations.

STRATEGIC ACTIVITY 5

COORDINATING INFORMATION COLLECTION AND MANAGEMENT TO MEASURE PROGRESS, RE-EVALUATE PRIORITIES, AND SUPPORT ALL GROUND WATER-RELATED PROGRAMS

FULLY INTEGRATING ADEQUACY CRITERIA

(1) The State collects, coordinates, and manages information, including record-keeping, monitoring, and other information, within and across all programs to re-evaluate priorities, measure progress toward meeting the State's ground-water protection goal and priorities, and support all related program activities.

Adequacy Criterion 1 has been fully met.

As discussed in Section 4.7, EPD is the responsible Georgia agency gathering and managing ground-water monitoring data, and the Branches of EPD routinely share ground-water monitoring data [Note: EPD performs ground-water monitoring on behalf of the Georgia Department of Agriculture]. Moreover, when monitoring of any public water supply well indicates the presence of any pollutant exceeding an MCL, an official notification memorandum is issued by the Chief of the Water Resources Branch to notify the Chiefs of the Hazardous Waste Management Branch, the Land Protection Branch, the Program Coordination Branch, the Water Protection Branch, and the Geologic Survey Branch and request their assistance in establishing the source of the pollution. The Water Resources Branch, in turn, uses the inspection information to make decisions about protecting the water source.

The Georgia Ground-Water Monitoring Network represents an example. In this program, about 128 wells are sampled annually, in critical locations throughout the State, to establish an ambient or baseline measure of ground-water quality. Consistent sampling protocols, based on procedures developed by the USGS, are used. Laboratory measurements, utilizing blanks and dummy samples, are based on published "standard" procedures. Once laboratory data are received from the laboratory, the data are electronically entered into STORET and transmitted to EPA's National Computer Center. "Hardcopy" data are maintained in files at the offices of the Geologic Survey; after a suitable period of time, the data files are boxed and stored in an EPD warehouse. Each year, the results of this monitoring program and any recognized trends are published in a report.

(2) The State is using relevant data from local governments and other state and federal programs (i.e., Wellhead, Public Water Supply, etc.).

Adequacy Criterion 2 has been fully met.

Occasionally, EPA and the USGS sample wells and perform chemical analysis. These data are also routinely forwarded to EPD. An example of this would be the USGS's sampling wells in EPD's pesticides monitoring network; in this case, a comparison could be made between USGS and EPD sampling results. Water quality data from public water supply sources also are being used to assist in monitoring water quality in the state.

(3) The State has defined a sufficient set of data elements to facilitate efficient data sharing and cross-media analyses and provide users with consistent and comparable data, and is using them in all ground water-related programs.

Adequacy Criterion 3 has been fully met.

EPD's expectations regarding ground-water monitoring procedures, methods, sampling, and analytical protocols are described in its Manual for Ground-Water Monitoring. This manual is currently being used by the Solid Waste Management and UST Programs. A copy of this manual has been provided to EPA.

(4) The State's monitoring program scope and design reflect the State's ground-water priorities and contain sufficient QA/QC plans for data acquisition and analysis based on sound scientific protocols.

Adequacy Criterion 4 has been fully met.

Georgia has a comprehensive four-tiered ground-water monitoring program that is adequate for assessing ground-water conditions in Georgia at both regional and site level. The program is described in Sections 4.4.4 and 5 and in Appendix E. EPD's rigorous sampling and analytical QA/QC protocols are described in Section 1.6 and in the aforementioned Manual for Ground-Water Monitoring.

ADDITIONAL FACTORS TO BE CONSIDERED

(1) The State is encouraged to computerize its data bases and use geographic information systems (GIS) technology to better integrate data in a manner most useful to comprehensive ground-water decision-making.

Additional Factor 1 has been fully met.

EPD has a very large and comprehensive environmental GIS. EPD's GIS laboratory is housed on the campus of the Georgia Institute of Technology and is integrated with USGS's GIS program. In a UNIX-based work station environment augmented by CD-ROM capabilities, color electrostatic plotters, personal and laptop computers, GPS locational devices, digitizers and scanners, EPD has the ability to analyze and develop a variety of ground-water related data bases in both vector and raster formats. EPD's GIS Program has been cited by former EPA administrator Lee Thomas (1987) as a "model" program that other States should emulate. Table 4-1 is a listing of the status of GIS pollution-source inventories as of July 1, 1995.

All EPD ground-water monitoring data are maintained in computerized data bases. EPA's STORET data system has been provided with much monitoring data from EPD files.

(2) The State is encouraged to use EPA's minimum Set of Data Elements for Ground-Water Quality, which EPA programs are required to use for new ground water information systems or when modernizing old ones.

Additional Factor 2 is, in part, not applicable to Georgia. EPD's Set of Data Elements is sufficient for implementation of Georgia's CSGWPP. Therefore, Additional Factor 2 has been met.

The State Geologist participated in one of the Committees that developed EPA's Minimum Set of Data Elements for Ground-Water Quality. EPD's review of the Minimum Set of Data Elements is that it is extremely lengthy, bureaucratic, difficult, and expensive to develop. Much of the required information is not relevant to the majority of monitoring. EPD uses the STORET data base system. However, where significant ground-water pollution occurs or is considered probable, EPD would use EPA's Minimum Set.

(3) The State is encouraged to use EPA's location policy to assign latitude/longitude positions of Public Water Supplies and sources of ground-water contamination in ground water-related information systems.

Additional Factor 3 has been fully met.

EPD has entered all municipal water system wells into its GIS by latitude/longitude using GPS methods. EPD currently is entering potential ground-water pollution sites into its GIS inventory by latitude/longitude. The status of pollution source

inventories and GIS data bases is provided in Table 4-1 in Section 4. The standards for locational data obtained from differentially corrected GPS data or from topographic maps is ± 5 meters or 0.1 second of arc, suitable for a GIS at the scale of 1:24,000.

(4) The State is encouraged to participate with EPA in the development of one or more environmental indicators that will help provide a national picture of ground-water protection progress and needs. The State is encouraged to use the indicator(s), once developed, as part of its own efforts to measure progress and needs.

Additional Factor 4 has been partly met.

At the request of Administrator Browner of EPA, the Chief of the Program Coordination Branch participated in a meeting with EPA in 1994 to identify measurable environmental indicators that could be used to track environmental protection on a "long term" basis. Moreover, in 1991, one of EPD's GIS experts participated in the EPA Environmental Mapping Assessment. This assessment determined the feasibility of utilizing local data in EPA environmental mapping activities. The program particularly examined the application of local land use data or data on land use changes over time to an EPA grid system developed for nation wide assessments. In turn, EPA demonstrated how its Environmental Assessment Mapping could be used to assess proposed major changes in land use, such as a new airport for the Atlanta metropolitan area.

(5) The State is encouraged to establish and track environmental indicators to measure progress in protecting its ground-water resources.

Additional Factor 5 has been partly met.

As discussed in Section 5.0, EPD, on an annual basis, summarizes monitoring of the Georgia Ground-Water Monitoring Network including an assessment of trends for different chemical species such as nitrates. This has been ongoing since 1984, with the results published annually.

In actual fact, as mentioned earlier, Georgia's ground-water is of high quality and incidences of man-made pollution are rare. EPD continues to modify the monitoring network by reducing sampling where water quality is constant, expanding monitoring where appropriate, such as for pesticides, and by carrying out special regional or state wide sampling, such as the nitrate study. The most important application of Additional Factor 5 in Georgia is continued monitoring of salinity in coastal aquifers subject to salt-water encroachment or upconing. EPD has, in the

past, acted on salinity data showing unacceptable increases to reduce aquifer use or to allow no more increases in order to protect users. In a similar light, the USGS (since the mid-1990's), using funds from EPD and local Georgia governments, publishes an annual summary of ground-water conditions in Georgia.

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STRATEGIC ACTIVITY 6

IMPROVING PUBLIC EDUCATION AND PARTICIPATION IN ALL ASPECTS OF GROUND-WATER PROTECTION TO ACHIEVE SUPPORT OF THE STATE'S PROTECTION GOAL, PRIORITIES, AND PROGRAMS

FULLY INTEGRATING CRITERIA:

(1) Public participation in the development and implementation of a CSGWPP is equivalent to the objectives defined and employed by EPA in 40 CFR 25.

Adequacy Criterion 1 has been fully met.

The primary objectives of 40 CFR Part 25 are:

- Ensure that the public has an opportunity to understand official programs and proposed actions.
- Ensure that the government decision defining reasonably expected uses include consulting interested and affected segments of the public.
- Ensure that government action is as responsive as possible to public concerns.
- Encourage public involvement in implementing environmental laws.
- Keep the public informed about significant issues and proposed project or program changes as they arise.
- Foster a spirit of openness and mutual trust among EPA, States, and the public.
- Use all feasible means to create opportunities for public participation and to stimulate and support participation.

EPD is committed to involving the Georgia public in the development of the State's CSGWPP. Specifically, the following public participation activities took place in late 1994 and early 1995:

- Public Notification Through Press Releases: In late 1994, the Director of EPD issued a press release describing Georgia's CSGWPP including the State's ground-water protection goal and implementation policy.

- Public Meetings: In early 1995, EPD held two public meetings (one in north Georgia and one in south Georgia) describing the purpose and contents of Georgia's CSGWPP and solicited public comments and criticisms. The public meetings were publicized through the media in order to increase public awareness and attendance.

- Notification of the Professional Community: In late 1994, draft copies of this Circular were provided to and comments solicited from local governments, companies, and consultants engaged in ground-water withdrawal or ground-water remediation.

- Notification of Environmental Advocacy Organizations: In late 1994, draft copies of this Circular were provided to and comments solicited from non-profit environmental or natural resource advocacy organizations.

- Notification of Federal Agencies: In late 1994, draft copies of this Circular were provided to and comments solicited from key federal agencies such as EPA, the USGS, USF&WS, NRCS, Corps of Engineers, and so forth.

- Notification of Trade and Professional Organizations: In late 1994, draft copies of this Circular were provided to and comments solicited from trade and professional organizations such as the Georgia Drillers Association, the Georgia Ground-Water Society, the Georgia Municipal Association, the Association of Georgia County Commissioners, and so forth.

- Notification of Other State Agencies: In late 1994, draft copies of this Circular were provided to and comments solicited from the Georgia Departments of Agriculture, Community Affairs, and Human Resources.

- Notification of State Boards, Advisory Councils, and Institutes: In early 1995, draft copies of this Circular will be provided to and comments solicited from EPD's Advisory Council (described in Section 4.1), the Board of Natural Resources, and the Institutes of Environmental Policy, Ecology, and Natural Resources, and

Government of the University of Georgia.

Furthermore, as Georgia develops new ground-water protection initiatives, adoption of new rules must follow the public participation requirements of the Georgia Administrative Procedures Act. This Act requires EPD to post notices, publish draft rules, hold hearings, and evaluate comments.

(2) An active public education program exists that addresses the key issues in decisions on the goal, objectives, priorities, and progress of the State's CSGWPP.

Adequacy Criterion 2 has been partly met.

The discussion provided above under Adequacy Criterion 1 is considered sufficient to satisfy the requirement of an active public education program with respect to the development and implementation of Georgia's CSGWPP along with EPD's education initiatives identified in the strategic plan (Appendix F).

(3) The State is implementing:

- **A mechanism to provide information to those responsible for implementing ground-water protection measures; and**

- **An outreach process for making ground-water monitoring data and information available to the public.**

Adequacy Criterion 3 has been fully met.

The mechanism to provide information to those responsible for implementing ground-water protection measures is this document, which has been transmitted to all EPD programs as well as the Georgia Departments of Agriculture, Community Affairs, and Human Resources. The outreach process for disseminating ground-water monitoring data is described in Sections 4.4.4 and 5.0. Each year, the Geologic Survey Branch publishes a summary of ground-water conditions in Georgia as Circular 12. This document describes the results of the Georgia Ground-Water Monitoring Network during the previous year as well as providing information on how the general public can obtain data from all of EPD's four tiers of monitoring.

(4) The State is implementing a public education program to:

- **Enable citizens to better manage common practices and activities that contribute to ground-water contamination (e.g.,**

private well construction, septic tanks, etc.) that are not now regulated; and

— **Promote methods for protecting the ground-water supplying individual's private wells.**

Adequacy Criterion 4 has been fully met.

Both private well construction and installation of on-site sewage disposal systems are regulated in Georgia. EPD administers the Water Well Standards Act of 1991 (O.C.G.A. 12-5-120, *et seq.*) on behalf of the Water Well Standards Advisory Council. This Act has specific well construction standards for private wells to prevent wells from being conduits for pollution to enter the ground-water regime. Since 1985, Geologic Survey geologists have provided training and advice to members of the Georgia Drillers Association, a professional association of drillers, on ground-water pollution prevention. In a similar light, brochures and fact sheets describing well drilling and well construction are routinely distributed to the public and county health officials. Follow-up on well construction, including investigating complaints of shoddy workmanship and if appropriate, requiring drillers to repair or replace the well. On-site sewage management system siting and construction is administered by the Environmental Health Section of the Georgia Department of Human Resources. All persons installing septic tanks in Georgia are required to be certified by the Department of Human Resources. Construction standards are specified in the Rules for On-Site Sewage Management issued by DHR. A permit must be obtained from the County Health Department prior to installation of a septic tank; and County Health Department also insure proper separation between septic drain fields and drinking water wells. EPD and the Department of Human Resources cooperate in several ways:

- Through a Memorandum of Understanding describing each agency's responsibilities,
- Through participation in the Ground-Water Protection Coordinating Committee, and
- Through periodic ground-water pollution training sessions of local health officials.

EPD promotes the protection of private wells by enforcing well construction standards. This is done by inspecting private wells and resolving complaints regarding shoddy well construction. Approximately 50 private wells are inspected each year. In addition, EPD has assisted the University of Georgia Cooperative Extension Service with the Farm-A-Syst Program to help rural residents protect their

water supplies.

The Wellhead Protection Program for municipal drinking water wells and the vulnerability assessment of other public drinking water wells assists local citizens to better manage common practices and activities that contribute to ground-water pollution by delineating the wellhead protection area of the well (i.e. identifying the area where man-made pollution at the land surface might affect the well), by identifying potential regulated and unregulated pollution sources in that wellhead protection area, and by recommending to local governments actions they and their citizens may take to manage unregulated potential pollution sources and to prevent future pollution.

ADDITIONAL FACTORS TO BE CONSIDERED

(1) **The State is encouraged to undertake a Farm-A-Syst program in cooperation with the USDA's Extension Service, the Soil Conservation Service, and EPA.**

Additional Factor 1 has been fully met.

EPD has provided technical assistance to the University of Georgia Cooperative Extension Service in developing and promoting Georgia's Farm-A-Syst Program. EPD has provided encouragement to EPA and the Cooperative Extension Service to expand the program to include all rural residents having private water supply wells.

APPENDIX B

CRITERIA FOR PROTECTION OF GROUND-WATER RECHARGE AREAS

Developed by EPD as required by the Georgia Planning Act of 1989

391-3-16-.02 Criteria for Protection of Ground-Water Recharge Areas

(1) Background. Variable levels of recharge area protection can be based upon the State's hydrology (e.g., areas such as the Dougherty Plain where a major aquifer crops out would receive a relatively high degree of protection; whereas other areas, such as the shale hills of northwest Georgia, would receive a lower degree of protection). Recharge area protection within the significant recharge areas would be further refined, based upon the local susceptibility or vulnerability to human induced pollution (e.g., high, medium, or low). The significant recharge areas have already been identified and mapped (about 22-23% of the State). Pollution susceptibility mapping is ongoing. Existing statutes are adequate for protection the remaining recharge areas (about 77-78% of the State).

(2) Definitions:

(a) "Aquifer" means any stratum or zone of rock beneath the surface of the earth capable of containing or producing water from a well. (Note: this is the same definition as in the Ground Water Use Act.)

(b) "DRASTIC" means the standardized system for evaluating ground-water pollution potential using the hydrogeologic settings described in the U.S. Environmental Protection Agency document EPA-600/2-87-035. (Note: the DRASTIC methodology is the most widely used technique for evaluating pollution susceptibility.)

(c) "Pollution Susceptibility: means the relative vulnerability of an aquifer to being polluted from spills, discharges, leaks, impoundments, applications of chemicals, injections, and other human activities in the recharge area.

(d) "Pollution Susceptibility Maps" means maps of relative vulnerability to pollution prepared by the Department of Natural Resources, using the DRASTIC methodology. Pollution susceptibility maps categorize the land areas of the State into areas having high, medium, and low ground-water pollution potential.

(e) "Recharge Area" means any portion of the earth's surface where water infiltrates into the ground to replenish the aquifer.

(f) "Significant Recharge Area" means those areas mapped by the Department of Natural Resources in Hydrologic Atlas 18 (1989 edition). Mapping of recharge areas is based upon outcrop area, lithology, soil type and thickness, slope, density of lithologic contacts, geologic structure, the presence of karst, and potentiometric surfaces. Significant recharge areas are as follows in the various geologic provinces of Georgia:

(1) In the Valley and Ridge and in the Cumberland Plateau, significant recharge areas are outcrop areas of carbonate rock where low slope (less than 8% slope) conditions prevail). Such areas commonly are characterized by karst topography (caves and sinkholes).

(2) In the Piedmont and in the Blue Ridge, rocks have little primary porosity, with most of the ground water being stored in the overlying soils. The significant recharge areas are those with thicker soils. Field mapping indicates that thick soils in the Piedmont and Blue Ridge are characterized by a density of two or more geologic contacts per four square miles (source: 1976 1:500,000 Geologic Map of Georgia) and slopes lower than 8%.

(3) In the Coastal Plain, the most significant recharge areas are the surface outcropping of the large and extensively used drinking water aquifers (e.g., the Floridan, the Clayton, etc.) and soils having high permeability, according to the 1976 1:750,000 Soils Association Map of Georgia.

(3) The following criteria pursuant to O.G.C.A. 12-2-8 shall apply in significant recharge areas:

(a) The Department of Natural Resources shall not issue any permits for new sanitary landfills not having synthetic liners and leachate collection system.

(b) The Department of Natural Resources shall not issue any new permits for the land disposal of hazardous wastes.

(c) The Department of Natural Resources shall require all new facilities permitted or to be permitted to treat, store, or dispose of hazardous waste to perform such operations on an impermeable pad having a spill and leak collection system.

(d) New above-ground chemical or petroleum storage tanks, having a minimum volume of 660 gallons, shall have secondary containment for 110% of the volume of such tanks of 110% of the volume of the largest tank in a cluster of tanks. (Note: These figures are consistent with US EPA rules for oil pollution prevention, 40 CFR 112.1.) Such tanks used for agricultural purposes are exempt, provided they comply with all Federal requirements.

(e) New agricultural waste impoundment sites shall be lined if they are within:

(1) a high pollution susceptibility area;

(2) a medium pollution susceptibility area and exceed 15 acre-feet;

(3) a low pollution susceptibility area and exceed 50 acre-feet.

As a minimum, the liner shall be constructed of compacted clay having a thickness of one foot and a vertical hydrologic conductivity of less than 5 x 10-7 cm/sec or other criteria established by the U.S. Soil Conservation Service. (The average size of existing agricultural waste impoundments in Georgia is about 15 acre-feet; sheepsfoot rollers or pans with heavy rubber tires, which are normal equipment for most Georgia earth moving contractors, should be able to compact clay to the recommended vertical hydrologic conductivity.)

(f) New homes served by septic tank/drain field systems shall be on lots having the following minimum size limitations as identified on Table MT-1 of the Department of Human Resources' Manual for On-Site Sewage Management Systems (hereinafter "DHR Table MT-1"):

(1) 150% of the subdivision minimum lot size of DHR Table MT-1 if they are within a high pollution susceptibility area;

(2) 125% of the subdivision minimum lot size of DHR Table MT-1 if they are within a medium pollution susceptibility area; and

(3) 110% of the subdivision minimum lot size of DHR Table MT-1 of they are within a low pollution susceptibility area.

(g) New mobile home parks served by septic tank/drain field systems shall have lots or spaces having the following size limitation as identified on Table MT-2 of the Department of Human Resources' Manual for On-Site Sewage Management Systems (hereinafter "DHR Table MT-2")

(1) 150% of the subdivision minimum lot or space size of DHR Table MT-2 if they are within a high pollution susceptibility area;

(2) 125% of the subdivision minimum lot or space size of DHR Table MT-2 if they are within a medium pollution susceptibility area; and

(3) 110% of the subdivision minimum lot or space size of DHR Table MT-2 of they are within a low pollution susceptibility area.

(h) If a local government requires a larger lot size than that required by (f) above for homes or by (g) above for mobile homes, the larger lot size shall be used.

(I) Local governments at their option may exempt from the requirements of (f) or (g) any lot of record on the date of their adoption of these lot size standards.

(j) No construction may proceed on a building or mobile home to be served by a septic tank unless the county health department first approves the proposed septic tank installation as meeting the requirements of the DHR Manual and (f), (g), and (h) above.

(k) Each Regional Development Center (RDC) is responsible for considering, in its regional plan, the cumulative environmental effects of a significant number of septic tank systems being used in close proximity to each other. In so considering, the Regional Development Center shall not approve any local plans which would result in adverse environmental effects on another area. A Regional Development Center may consult with the Department of Human Resources and Department of Natural Resources for technical assistance as to appropriate densities of lots served by septic tanks in significant recharge areas.

(l) New facilities which handle hazardous materials, of types and in amounts determined by the Department of Natural Resources, shall perform their operations on impermeable surfaces having spill and leak collection systems, as prescribed by the Department of Natural Resources.

(m) The Department of Natural Resources shall require conservative design in any new permits for the spray irrigation of wastewaters or the land spreading of wastewater sludges in areas having high pollution susceptibility. This shall be accomplished by comparing the Department's CRITERIA FOR SLOW RATE LAND TREATMENT (February, 1986 or latest edition) with amendments and other technical publications to site specific information submitted by a registered professional engineer for each project.

(n) Permanent storm water infiltration basins shall not be constructed in areas having high pollution susceptibility.

(o) Exclusive of mining settling basins, new wastewater treatment basins shall have an impermeable liner in areas having high pollution susceptibility.

(4) Local governments having jurisdictional authority over all significant recharge areas shall adopt, implement, and enforce ordinances for recharge area protection at least as stringent as the standards developed by the Department of Natural Resources.

APPENDIX C

RULES FOR WELLHEAD PROTECTION

From the Georgia Rules for Safe Drinking Water, Chapter 391-3-5

Revised March, 1994

391-3-5-.40 Wellhead Protection

(1) Purpose. The following rule for wellhead protection serve to help protect wells and springs used as sources of water supply for community public water systems serving municipalities, counties, and authorities from nearby pollution sources.

(2) The Division shall develop a Wellhead Protection Plan for every well, well field or spring which is used as a source for a community public water supply serving a municipality, county, or an authority. Wellhead Protection Plans will be developed by the Division according to the schedule contained in the Georgia Wellhead Protection Plan; approved by EPA on Sept. 30, 1992. To develop the Wellhead Protection Plans for public water systems affected by this regulation, the Division shall solicit the assistance of the supplier of water and all local governments which have jurisdictions in and around the potential wellhead protection areas.

(3) Wellhead Protection Plans shall consist of five parts; namely: (a) an identification and location of a Control Zone for each well or spring; (b) an identification and location of each required Management Zone for each well or spring; (c) an inventory of potential pollution sources in the designated wellhead protection areas; (d) a management plan for potential pollution sources identified in the inventory; and (e) if available, a contingency plan submitted by the supplier to the Division describing how alternate water supplies will be provided in case the well(s) in question become polluted. The Division shall develop all individual Wellhead Protection Plans consistent with the rules.

(4) Every Wellhead Protection Area shall consist of two zones, as follows:

(a) The Control Zone: Within this zone, the owner shall control all activities so that there are minimal sources of potential pollution in the immediate vicinity of the well bore.

(b) The Management Zone: Within this zone, certain potential pollution sources are prohibited or certain activities must be performed in accordance with the rules listed below. The size and shape of the management zone will vary according to aquifer type, aquifer hydraulic conductivity, pumpage rate, hydrologic province, and proximity to recharge.

(5) All wells used as a source of public water supply for community public water systems serving municipalities, counties, or authorities shall have a control zone. The control zone shall be a circle, extending outward from the well bore 25 feet for pervious surface materials or 15 feet for impervious surface materials, such as concrete. Only those chemicals used for water treatment shall be stored in the control zone; motor fuels, oil, motor vehicles or portable equipment powered by an internal combustion engine shall not be stored in the control zone. For all new wells, auxiliary power on site fuel storage should have a spill containment system for the entire volume of fuel. It is recommended that existing wells retrofit a spill containment system or monitor auxiliary power fuel storage if at all possible. Chemicals or motorized vehicles may be used in the control zone for maintenance of the well, well house, well pump or associated plumbing. The control zone shall be protected by a chain-link fence (or equivalent) having a minimum height of 7 feet. Access to the control zone shall be only through a locking gate (or equivalent).

(6) The Division shall delineate the size and shape of the management zone of a wellhead protection area as defined below:

(a) wells determined by the Division as drawing water only from confined aquifers shall have an inner management zone extending outward from the center of the borehole for a radius of 100 feet. No outer management zone is required for such wells.

(b) wells drawing water from unconfined aquifers as determined by the Division and springs, except those determined by the Division to lie in areas of karst, shall have an inner management zone extending outward from the center of the borehole or spring head for a radius of 250 feet.

(c) wells drawing water from unconfined aquifers as determined by the Division and springs, which the Division has identified as being in areas of karst, shall have an inner management zone extending outward from the center of the borehole or spring head for a radius of 500 feet.

(d) unconfined wells which the Division has determined utilize fractured crystalline rock aquifers shall have an outer management zone determined according to the "Heath Method Curve" contained in the EPA approved Georgia Wellhead Protection Plan.

(e) unconfined aquifer wells determined by the Division as lying in karst regions and all springs shall have an outer management zone determined by hydrogeologic mapping.

(f) other wells not meeting the above criteria shall have their outer management zones determined by time of travel calculations (a minimum of a 5-year time of travel) or by volumetric calculations as appropriate.

(7) The Division shall carry out an inventory of potential pollution sources within the control zone and management zones. The inventory shall be generally consistent with the Georgia Geologic Survey's Circular 15, entitled "Guidance for Developing Wellhead Protection Plans in Georgia." Inventories shall be permanently maintained by the Division in computer data base format. Minimum information shall be the name and address of the owner, location of the well or spring, applicable permit data, the size and shape of the control and management zones, the name and address of identified potential pollution sources, name and address of the owner of the property or facility identified as a potential pollution source, and a list of chemicals or other hazardous materials and the amounts of such chemicals or hazardous materials used or stored at the site or facility. Inventories shall be carried out by the Division every 10 years.

(8) Within the inner and outer management zones of existing wells and springs, the following shall apply:

(a) The Division shall not issue any new permits for municipal solid waste landfills, industrial waste landfills or construction/demolition waste landfills.

(b) The Division shall not issue any new permits for the land disposal of hazardous wastes.

(c) The Division shall require all new facilities permitted to handle, treat, store or dispose of hazardous waste or hazardous materials to perform such operations on an impermeable pad having a spill and leak collection system.

(d) The Division shall require all new agricultural waste impoundments to have an impermeable synthetic liner.

(e) The Division shall not issue any new permits for land application of wastewater or sludge.

(f) The Division shall not issue any new permits for underground injection wells.

(g) The Division shall not issue permits for any new quarries or underground mines unless a hydrogeological investigation carried out by the applicant clearly demonstrates that operation of the quarry or mine will not pollute the well or spring or cause a reduction of ground water flow to the well or spring. Such investigation shall be performed by a professional engineer or professional geologist.

(h) The Division shall require that all new underground storage tanks installed shall meet the highest standards applicable under the Underground Storage Tank Act. All pre-existing underground storage tanks shall be required to have ground water or vapor monitoring. All abandoned underground storage tanks shall meet the requirements of section 391-3-15-.11 of the Rules for Underground Storage Tanks.

(i) The Division shall require all new wastewater treatment basins to have an impermeable synthetic liner.

(9) For new wells or springs that are to be used as a source of water supply for a community public water system serving a municipality, county, or authority the following shall apply:

(a) The Division shall not issue any permit for the addition of a new well or spring until the Division has delineated an appropriate wellhead protection area and carried out an inventory of potential pollution sources in the wellhead protection area of the proposed well or spring. The Division shall make provision for emergency situations.

(b) Once the supplier requests the Divisions approval for the construction and/or development of a new well, well field, or spring, the Division shall require the Owner to provide the Division with the exact location, intended aquifer, projected depth and expected production of the planned well(s) or springs. The Division shall then delineate a preliminary wellhead protection area and shall carry out a preliminary potential pollution source inventory. The Division shall evaluate the

potential risk to public health represented by any potential pollution sources found in the wellhead protection area for the new well or spring. The Division shall notify the owner of the Division's approval or disapproval of the site subject to the following:

(c) The Division shall not issue approval for the construction and/or development of well or spring where the following potential pollution sources are known to be present within the inner management zone:

1. underground storage tanks;

2. non-domestic septic tanks with drain fields;

3. animal feedlots, poultry enclosures, or animal enclosures (this rule shall not be construed to apply to family pets);

4. Environmental facilities permitted by the Division or other potential pollution sources identified in the inventory unless the Division has determined that there will be no releases to the ground (e.g., all releases will be to a sanitary sewer) or that such releases, if they occur, will not be a threat to public health and safety (an example of the latter might be releases from one or two domestic septic systems that may lie within the inner management zone).

(10) The Division shall notify the owner of any regulated or unregulated chemicals which the Division believes, based on the potential pollution source inventory, may be present in the control zone or management zones of new or existing individual wells, well fields or springs.

Authority O.C.G.A. §12-5-170 et. seq., as amended.

APPENDIX D
MAXIMUM CONTAMINANT LEVELS (MCLs) FOR DRINKING WATER

From the Rules for Safe Drinking Water, Chapter 391-3-5
Revised March, 1994

Notice: The Rules for Safe Drinking Water are revised periodically to incorporate new or revised MCLs promulgated by the U.S. EPA. Please consult the most recent revision of the Rules for the current MCLs.

391-3-5-.18 Primary Maximum Contaminant Levels for Drinking Water.

(1) INORGANICS - The maximum contaminant levels (MCLs) for antimony, asbestos, barium, beryllium, cadmium, chromium, mercury, nickel, selenium and thallium of this section apply to community water systems and non-transient, non-community water systems. The MCLs for fluoride and arsenic in this section apply to community water systems. The MCLs for nitrate, nitrite, and total nitrate-nitrite of this section apply to all (CWS,NTNCWS,TNCWS) public water systems.

(a) The following are the maximum contaminant levels for inorganic chemicals:

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL (MCL) (mg/l)	APPLICABLE SYSTEMS
Antimony[3]	0.006	CWS, NTNCWS
Arsenic	0.05	CWS
Asbestos	7 Million Fibers/liter longer than 10 μm	CWS, NTNCWS
Barium	2.0	CWS, NTNCWS
Beryllium[3]	0.004	CWS, NTNCWS
Cadmium	0.005	CWS, NTNCWS
Chromium	0.1	CWS, NTNCWS
Cyanide[3]	0.2	CWS, NTNCWS
Fluoride[1,2]	4.0	CWS
Lead[4]	see 391-3-5-.25 Treatment Technique	CWS, NTNCWS
Mercury	0.002	CWS, NTNCWS
Nickel[3]	0.1	CWS, NTNCWS
Nitrate	10.0 (as N)	CWS,NTNCWS,TNCWS
Nitrite	1.0 (as N)	CWS,NTNCWS,TNCWS
Total Nitrate + Nitrite	10.0 (as N)	CWS,NTNCWS,TNCWS

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL (MCL) (mg/l)	APPLICABLE SYSTEMS
Selenium	0.05	CWS,NTNCWS
Thallium[3]	0.002	CWS,NTNCWS

[1]Effective date for fluoride was October 2, 1987.
[2]Fluoride also has a secondary MCL (Section 391-3-5-.19 (2).
[3]Phase V chemicals, effective date January 17, 1994.
[4]For the purposes of ground-water investigation and remediation, EPD observes the former MCL of 0.050 mg/l for lead.

(b) At the discretion of the Director, nitrate levels not to exceed 20 mg/l may be allowed in a non-community water system if the supplier of water demonstrates to the satisfaction of the Director that:

1. such water will not be available to children under 6 months of age;

2. there will be continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure;

3. local and State public health authorities will be notified annually of nitrate levels that exceed 10 mg/l;

4. no adverse health effects shall result.

(2) ORGANIC CHEMICALS - The following maximum contaminant levels for organic contaminants apply to community water systems and non-transient, non-community water systems. Compliance with maximum contaminant levels for the following organics is to be calculated pursuant to Section 391-3-5-.22.

(a) Synthetic Organic Chemicals, Pesticides and Polychlorinated biphenyls

CONTAMINANT	MCL (mg/l)	CONTAMINANT	MCL (mg/l)
Alachlor	0.002	Pentachlorophenol	0.001
Aldicarb	Deferred	Picloram[1]	0.5
Aldicarb sulfone	Deferred	Polychlorinated biphenyls	
Aldicarb sulfoxide	Deferred	(PCBs)	0.0005
Atrazine	0.003	Simazine[1]	0.004
Benzo(a)Pyrene[1]	0.0002	Toxaphene	0.003

CONTAMINANT	MCL (mg/l)	CONTAMINANT	MCL (mg/l)
Carbofuran	0.04	2,4,5-TP (Silvex)	0.05
Chlordane	0.002	2,3,7,8-TCDD (Dioxin)[1]	3×10^{-8}
Dalapon[1]	0.2	Ethylene dibromide (EDB)	0.00005
Di(2-ethylhexyl) adipate[1]	0.4	Glyphosate[1]	0.7
Di(2-ethylhexyl) phthalate[1]	0.006	Heptachlor	0.0004
Dibromochloro-propane (DBCP)	0.0002	Heptachlor Epoxide	0.0002
Dinoseb[1]	0.007	Hexachlorobenzene[1]	0.001
Diquat[1]	0.02	Hexachlorocyclo-pentadiene[1]	0.05
2,4-D	0.07	Lindane	0.0002
Endothall[1]	0.1	Methoxychlor	0.04
Endrin	0.002	Oxamyl (Vydate)[1]	0.2

[1] Phase V chemicals, effective date January 17.1994.

(b) Volatile Organic Contaminants (VOCs)

CONTAMINANT	MCL (mg/l)	CONTAMINANT	MCL (mg/l)
Vinyl chloride	0.002	Monochlorobenzene	0.1
Benzene	0.005	o-Dichlorobenzene	0.6
Carbon tetrachloride	0.005	Styrene	0.1
1,2-Dichloroethane	0.005	Tetrachloroethylene	0.005
Trichloroethylene	0.005	Toluene	1.0
para-Dichlorobenzene	0.075	trans-1,2-Dichloro-ethylene	0.1
1,1-Dichloroethylene	0.007	Xylenes (total)	10.0
1,1,1-Trichloroethane	0.2	Dichloromethane[1]	0.005
cis-1,2-Dichloro-ethylene	0.07	1,2,4-Trichlorobenzene[1]	0.07
1,2-Dichloropropane	0.005	1,1,2-Trichloroethane[1]	0.005
Ethylbenzene	0.7		

NOTES:[1] Phase V Chemicals, effective date January 17, 1994.

(3) TURBIDITY - Treatment Technique Requirements:

(a) Effective June 29, 1993, the maximum contaminant level for turbidity is deleted and replaced by a treatment technique requirement as set forth in this Section.

(b) The treatment technique requirement for turbidity is applicable to both community water systems and non-community water systems using surface water sources or ground water sources under the direct influence of surface water in whole or in part. The treatment technique requirement for turbidity in drinking water, measured at a representative point(s) in the filtered water is:

1. 0.5 turbidity unit, in at least 95 percent of the monthly measurements except that up to one turbidity unit may be allowed if the supplier of water can demonstrate to the Division that the higher turbidity does not do any of the following:

   (i) interfere with disinfection;

   (ii) prevent maintenance of an effective disinfectant agent throughout the distribution system; or

   (iii) interfere with microbiological determinations.

2. Five turbidity units is the maximum allowable level and must not be exceeded at any time.

3. In accordance with 40 CFR 141.73, the Division may allow higher turbidity levels for slow sand filtration, diatomaceous earth filtration, or other filtration technologies.

(4) MICROBIOLOGICAL - Maximum contaminant levels (MCLs) for microbiological contaminants.

(a) The MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.

1. For a system which collects at least 40 samples per month, if no more than 5.0 percent of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL for total coliforms.

2. For a system which collects fewer than 40 samples per month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms.

(b) Any fecal coliform-positive repeat sample or E. coli-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or E. coli-positive routine sample constitutes a violation of the MCL for total coliforms. For purposes of the public notification requirements in Section 391-3-5-.32, this is a violation that may pose an acute risk to health.

(c) A public water system must determine compliance with the MCL for total coliforms in paragraphs (a) and (b) of this Section for each month in which it is required to monitor for total coliforms.

(5) RADIOACTIVITY - Maximum contaminant levels for Radium-226, Radium-228, gross alpha particle radioactivity, beta particle and photon radioactivity from man-made radionuclides in community water systems.

(a) The following are the maximum contaminant levels for Radium-226, Radium-228 and gross alpha radioactivity:

1. combined Radium-226 and Radium-228--5 pCi/l.

2. gross alpha particle activity (including Radium-226 but excluding Radon and Uranium)--15 pCi/l.

(b) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem per year.

(c) Except for the radionuclides listed in Table A, the concentration of man-made radionuclides causing 4 mrem total body or organ dose equivalents shall be calculated on the basis of a 2 liter per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure," NBS Handbook 69 as amended August, 1963, U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 millirem per year.

TABLE A. Average annual concentrations assumed for the purpose of this rule to produce a total body or organ dose of 4 millirem per year.

Radionuclide	Critical Organ	pCi per liter
Tritium	Total Body	20,000
Strontium-90	Bone Marrow	8

(6) TRIHALOMETHANES - Maximum contaminant level for trihalomethanes.

(a) The maximum contaminant level for total trihalomethanes (TTHM) in subparagraph (6)(b) of Section 391-3-5-.18 applies only to community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process. Compliance with the maximum contaminant level for total trihalomethanes is calculated pursuant to subparagraph (4)(b) of Section 391-3-5-.24.

(b) Total trihalomethanes [the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform)] 0.10 mg/l.

(7) Maximum Contaminant Level Goals (MCLG). The maximum contaminant level goals for organic contaminants, inorganic contaminants, and microbiological contaminants shall be in accordance with 40 CFR Part 141.50, 141.51, and 141.52.

Authority O.C.G.A. §12-5-170 et. seq., as amended.

391-3-5-.19 Secondary Maximum Contaminant Levels for Drinking Water. Amended.

(1) The drinking water should not contain any contaminant which will adversely affect the odor or appearance of the drinking water and consequently may cause a substantial number of the persons served by the public water system to discontinue its use or which may adversely affect the public welfare.

(2) The secondary maximum contaminant levels established below represent reasonable goals for drinking water quality:

CONTAMINANT - SECONDARY	LEVEL
Aluminum	0.05 to 0.2 mg/l.
Chloride	250 mg/l.
Color	15 color units
Copper	1.0 mg/l.
Corrosivity	Non-corrosive
Fluoride	2.0 mg/l.
Foaming Agents	0.5 mg/l.
Iron	0.3 mg/l.
Manganese (Mn)	0.05 mg/l.
Odor	3 threshold odor number
Silver	0.1 mg/l.
Sulfate	250 mg/l.
Total dissolved solids (TDS)	500 mg/l.
Zinc	5.0 mg/l.

(3) Any analyses required under this rule shall be conducted in accordance with the analytical recommendations set forth in the latest edition of "Standard Methods for the Examination of Water and Wastewater" as published by the American Public Health Association, or as such analyses may be modified by the Director.

(4) Upon written direction of the Director, the supplier shall collect drinking water samples and submit them to the Division's water laboratory or other laboratory for analyses in accordance with the schedule furnished to the supplier.

Authority O.C.G.A. §12-5-170 et. seq., as amended.

APPENDIX E

GEORGIA GROUND-WATER MONITORING NETWORK

GROUND-WATER QUALITY MONITORING IN GEORGIA

EPD's ground-water quality monitoring strategy for Georgia is four-tiered:

I. Ambient Ground-Water Quality. The Geologic Survey Branch of EPD maintains a State-wide Ground-Water Monitoring Network to evaluate ambient water quality in the ten major aquifers or aquifer systems occurring within the State. Water quality data obtained from the network are published as yearly summaries.

II. Water Quality in Public Wells. The Water Resources Branch samples public drinking-water wells as a part of the State's Safe Drinking Water Program. Data obtained under this program are kept on file at the Water Resources Branch.

III. Special Studies of Ground-Water Quality. EPD, in cases, in conjunction with other State agencies, performs special studies to address specific water quality concerns. The Geologic Survey Branch retains files of data gathered incident to such studies.

IV. Ground-Water Quality at Environmentally Sensitive Facilities. The Land Protection, Water Protection, and Hazardous Waste Management Branches direct surveillance monitoring of ground water at environmentally sensitive facilities such as municipal solid waste landfills, hazardous waste sites, sludge disposal facilities, etc. The respective branches retain files of data obtained from these activities.

Locations and other information pertaining to wells used as sampling stations for Tier I, the Ground-Water Monitoring Network, and for Tier III studies -- the Apalachicola-Chattahoochee-Flint River Basin Pesticide Monitoring Network, the Aldicarb Study, the Ground-Water Pesticide Survey of 1991, and the Ground-Water Nitrate Survey -- are provided in the following figures and tables.

TABLE E-1

GEORGIA GROUND-WATER MONITORING WELL NETWORK
VALLEY AND RIDGE AQUIFER SYSTEM

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-VR1 (County Water System #1)	Floyd	Valley & Ridge	341527-850712	Knox Group	Odd Years
GWN-VR2 (Hucheson Medical Center Cooling Well)	Catoosa	Valley & Ridge	345644 851550	Knox Group	Abandoned-Up for Replacement
GWN-VR3 (Crawfish Spring, Chickamauga)	Walker	Valley & Ridge	345214-851734	Chickamauga Group	Even Years
GWN-VR4 (American Thread Co. #2, Rossville)	Walker	Valley & Ridge	345841-851741	Knox Group	Even Years
GWN-VR5 (County Water System #4)	Chattooga	Valley & Ridge	343356-851736	Knox Group	Annual
GWN-VR6 (Chemical Prod. Corp. East Well, Cartersville)	Bartow	Valley & Ridge	340832-844708	Cambrian	Odd Years
GWN-VR7 (City of Adairsville, Lewis Spring)	Bartow	Valley & Ridge	342223-845659	Knox Group	Even Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-VR8 (City of Cedartown, Cedartown Springs)	Polk	Valley & Ridge	340052-851529	Knox Group	Odd Years
GWN-VR9 (County Water Authority #2)	Polk	Valley & Ridge	340235-851619	Knox Group	Odd Years

TABLE E-2

GEORGIA GROUND-WATER MONITORING WELL NETWORK
BLUE RIDGE AQUIFER SYSTEM

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-BR1 (Young Harris New Well)	Towns	Blue Ridge	345531-835129	Blue Ridge	Annual
GWN-BR2 (Notla Water Authority #3)	Union	Blue Ridge	345255-835904	Blue Ridge	Even Years
GWN-BR3 (City of Dawsonville, City Spring)	Dawson	Blue Ridge	342529-840600	Blue Ridge	Even Years
GWN-BR4 (City of Morganton, Old Well)	Fannin	Blue Ridge	345233-841424	Blue Ridge	Even Years

TABLE E-3

GEORGIA GROUND-WATER MONITORING WELL NETWORK
PIEDMONT AQUIFER SYSTEM

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-P1 (City of Luthersville, New Well)	Meriwether	Piedmont	331244-844438	Piedmont	Even Years
GWN-P2 (City of Riverdale, Delta Drive Well)	Clayton	Piedmont	333407-842430	Piedmont	Abandoned-Up for Replacement
GWN-P4 (Barton Brands, Inc. Well #3, Atlanta)	Fulton	Piedmont	334414-843029	Piedmont	Odd Years
GWN-P5 (City of Flowery Branch #1)	Hall	Piedmont	341106-835525	Piedmont	Even Years
GWN-P6 (City of Shiloh #1)	Harris	Piedmont	324833-843029	Piedmont	Even Years
GWN-P7 (City of Hampton #6)	Henry	Piedmont	332241-841819	Piedmont	Even Years
GWN-P8 (Wayne Poultry Co. #4, Pendergrass)	Jackson	Piedmont	341030-834034	Piedmont	Even Years
GWN-P9 (City of Gray #4)	Jones	Piedmont	330051-833244	Piedmont	Odd Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-P10 (City of Franklin Springs #4)	Franklin	Piedmont	341650-830847	Piedmont	Abandoned
GWN-P11 (City of Danielsville #2)	Madison	Piedmont	340806-831252	Piedmont	Even Years
GWN-P12 (Indian Spring)	Butts	Piedmont	331448-835519	Piedmont	Annual
GWN-P13 (Covington/ Academy Spring)	Newton	Piedmont	333544-835110	Piedmont	Annual
GWN-P14 (County Water System, Sunset Village #1)	Upson	Piedmont	325450-842542	Piedmont	Even Years
GWN-P15 (Bolton Well, Avondale Estates)	DeKalb	Piedmont	334628-841601	Piedmont	Annual
GWN-P16 (City of Mt. Airy #4)	Habersham	Piedmont	343059-833046	Piedmont	Annual
GWN-P17 (County Utilities Dept New Hillcrest Well)	Oconee	Piedmont	335151-832636	Piedmont	Annual

TABLE E-4

GEORGIA GROUND-WATER MONITORING WELL NETWORK
JACKSONIAN AQUIFER

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-J1 (Quick Well, Vidette)	Burke	Coastal Plain	330211-821458	Upper Eocene/ Jacksonian	Annual
GWN-J2 (Oakwood Village MHP #2, Waynesboro)	Burke	Coastal Plain	330800-815230	Upper Eocene/ Jacksonian	Even Years
GWN-J3 (Black Well, Canoochee)	Emanuel	Coastal Plain	324020-821053	Upper Eocene/ Jacksonian	Even Years
GWN-J4 (City of Wrightsville #4)	Johnson	Coastal Plain	324359-824316	Upper Eocene/ Jacksonian	Odd Years
GWN-J5 (City of Cochran #3)	Bleckley	Coastal Plain	322254-832141	Upper Eocene/ Jacksonian	Odd Years
GWN-J6 (City of Wrens #3)	Jefferson	Coastal Plain	331130-822356	Upper Eocene/ Jacksonian	Odd Years
GWN-J7 (Templeton Well, Keysville)	Burke	Coastal Plain	320803-841805	Upper Eocene/ Jacksonian	Even Years
GWN-J8 (Kahn Well, Stapleton)	Jefferson	Coastal Plain	330724-822704	Upper Eocene/ Jacksonian	Annual

TABLE E-5

GEORGIA GROUND-WATER MONITORING WELL NETWORK
CRETACEOUS AQUIFER SYSTEM

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-K1 (Englehard Kaolin Co.#2, Gordon)	Wilkinson	Coastal Plain	325245-832024	Cretaceous Undifferentiated	Odd Years
GWN-K2 (City of Irwinton #2)	Wilkinson	Coastal Plain	324844-831105	Cretaceous Undifferentiated	Annual
GWN-K3 (City of Sanders-ville #7B)	Washington	Coastal Plain	325858-848814	Cretaceous Undifferentiated	Odd Years
GWN-K5 (County Water System #101)	Richmond	Coastal Plain	332216-815806	Cretaceous Undifferentiated	Odd Years
GWN-K6 (Huber Corp. #6, Huber)	Twiggs	Coastal Plain	324206-833330	Cretaceous Undifferentiated	Odd Years
GWN-K7 (County Water System #4)	Jones	Coastal Plain	324229-833147	Cretaceous Undifferentiated	Odd Years
GWN-K8 (Mohasco Corp. Laurens Park Mill #4, Dublin)	Laurens	Coastal Plain	323100-825124	Cretaceous Undifferentiated	Odd Years
GWN-K9 (City of Marshallville #1)	Macon	Coastal Plain	322724-835629	Lower Cretaceous	Even Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-K10A (City of Fort Valley #5)	Peach	Coastal Plain	323309-835311	Lower Cretaceous	Odd Years
GWN-K11A (City of Warner Robins #2)	Houston	Coastal Plain	323625-833724	Cusseta-Blufftown	Annual
GWN-K12 (City of Perry, Holiday Inn Well)	Houston	Coastal Plain	322808-834457	Blufftown	Odd Years
GWN-K13 (Stewart County Omaha #1)	Stewart	Coastal Plain	320847-850046	Upper Cretaceous	Even Years
GWN-K15 (City of Georgetown #2)	Quitman	Coastal Plain	315313-850453	Upper Cretaceous	Even Years
GWN-K16 (Tenneco Packaging Co., North Well, Macon)	Bibb	Coastal Plain	324221-833859	Eutaw	Odd Years
GWN-K17 (East Burke Co., Make Up Well #2)	Burke	Coastal Plain	330847-814556	Cretaceous Undifferentiated	Even Years
GWN-K18 (City of Buena Vista #6)	Marion	Coastal Plain	321914-843041	Upper Cretaceous	Even Years
GWN-K19 (City of Hephzibah Murphy Street Well)	Richmond	Coastal Plain	331838-820556	Cretaceous Undifferentiated	Even Years

TABLE E-6

GEORGIA GROUND-WATER MONITORING WELL NETWORK
CLAYTON AQUIFER

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-CT2 (Thomas Well, Smithville)	Sumter	Coastal Plain	315525-842048	Clayton	Odd Years
GWN-CT3 (City of Dawson Crawford Street Well)	Terrell	Coastal Plain	314604-8423613	Clayton	Odd Years
GWN-CT5 (City of Cuthbert #3)	Randolph	Coastal Plain	314607-844743	Clayton	Odd Years
GWN-CT7A (St. John Well, Americus)	Sumter	Coastal Plain	320803-841805	Clayton	Annual
GWN-CT8 (Weathersby Well, Ellaville)	Schley	Coastal Plain	321202-841848	Clayton	Annual

TABLE E-7

GEORGIA GROUND-WATER MONITORING WELL NETWORK
CLAIBORNE AQUIFER

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-CL2 (City of Unadilla #3)	Dooly	Coastal Plain	321535-834436	Claiborne	Odd Years
GWN-CL4 (City of Plains #3)	Sumter	Coastal Plain	320208-842320	Claiborne	Annual
GWN-CL5 (City of Shellman #2)	Randolph	Coastal Plain	314530-843657	Claiborne	Abandoned-Up for Replacement
GWN-CL6 (Georgia Tubing Co. Well, Cedar Springs)	Early	Coastal Plain	310841-850346	Claiborne	Odd Years
GWN-CL8 (Flint River Nursery Well)	Dooly	Coastal Plain	320803-841805	Claiborne	Odd Years
GWN-CL9 (City of Newton #3)	Baker	Coastal Plain	311911-842037	Claiborne	Annual

TABLE E-8

GEORGIA GROUND-WATER MONITORING WELL NETWORK
PROVIDENCE AQUIFER

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-PD2 (City of Preston #1)	Webster	Coastal Plain	320354-843214	Providence	Odd Years
GWN-PD3 (City of Ft. Gaines #2)	Clay	Coastal Plain	313628-850314	Providence	Odd Years
GWN-PD4 (City of Americus #3)	Sumter	Coastal Plain	320345-841330	Providence &Cusseta	Abandoned-Up for Replacement

TABLE E-9

GEORGIA GROUND-WATER MONITORING WELL NETWORK
MIOCENE AQUIFER SYSTEM

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-MI1 (McMillan Well, Adel)	Cook	Coastal Plain	311227-832035	Miocene	Annual
GWN-MI2 (Boutwell Well, Hahira)	Lowndes	Coastal Plain	305923-831929	Miocene	Odd Years
GWN-MI5 (Carter Well, Baxley)	Appling	Coastal Plain	314925-821924	Miocene	Even Years
GWN-MI6 (Williams Old House Well, Nichols)	Coffee	Coastal Plain	312405-824129	Miocene	Abandoned-Up for Replacement
GWN-MI7 (Chaudoin Well, Ocilla)	Irwin	Coastal Plain	311840-832598	Miocene	Even Years
GWN-MI8A (Barry Well, Moultrie)	Colquitt	Coastal Plain	310416-834401	Miocene	Annual
GWN-MI9A (Murphy Well, Coolidge)	Thomas	Coastal Plain	305749-835244	Miocene	Annual
GWN-MI10B (Calhoun Well, Moultrie)	Colquitt	Coastal Plain	310831-834816	Miocene	Even Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-MI13 (Meeks/Taylor Well, Hiltonia)	Screven	Coastal Plain	325309-813745	Miocene	Annual
GWN-MI15 (Aldrich Well, Brooklet)	Bulloch	Coastal Plain	321857-814024	Miocene	Even Years

TABLE E-10

GEORGIA GROUND-WATER MONITORING WELL NETWORK
FLORIDAN AQUIFER SYSTEM

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-PA1 (City of Thunderbolt #1)	Chatham	Coastal Plain	320152-810302	Floridan	Even Years
GWN-PA2 (City of Savannah #6)	Chatham	Coastal Plain	312039-810548	Floridan	Even Years
GWN-PA3 (Grist Equipment Co. Well, Savannah)	Chatham	Coastal Plain	320530-810850	Floridan	Annual
GWN-PA4 (Tybee Island #1)	Chatham	Coastal Plain	320040-805032	Floridan	Even Years
GWN-PA5 (Interstate Paper Co. #2, Riceboro)	Liberty	Coastal Plain	314434-812433	Floridan	Even Years
GWN-PA6 (City of Hinesville #5)	Liberty	Coastal Plain	314756-813624	Floridan	Even Years
GWN-PA7 (City of Darien South New Well)	McIntosh	Coastal Plain	312257-812605	Floridan	Even Years
GWN-PA8 (Rayonier Well #4, Doctortown)	Wayne	Coastal Plain	313907-815004	Floridan	Even Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-PA9C (Miller Ball Park TW25, U.S.G.S., Brunswick)	Glynn	Coastal Plain	310937-812852	Floridan	Annual
GWN-PA10 (Gilman Paper Co. #11, St. Marys)	Camden	Coastal Plain	304401-813234	Floridan	Odd Years
GWN-PA11 (City of St. Marys #3)	Camden	Coastal Plain	304539-813417	Floridan	Odd Years
GWN-PA12 (City of Folkston #3)	Charlton	Coastal Plain	305026-815956	Floridan	Odd Years
GWN-PA13 (City of Waycross #3)	Ware	Coastal Plain	311242-822126	Floridan	Odd Years
GWN-PA14 (City of Statesboro #7)	Bulloch	Coastal Plain	322722-814622	Floridan	Even Years
GWN-PA15 (King Finishing Co., Fire Pump Well, Dover)	Screven	Coastal Plain	323611-814428	Floridan	Even Years
GWN-PA16 (City of Millen #1)	Jenkins	Coastal Plain	324811-815631	Floridan	Odd Years
GWN-PA17 (City of Swainsboro #7)	Emanuel	Coastal Plain	323612-821944	Floridan	Odd Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-PA18 (City of Metter #2)	Candler	Coastal Plain	322426-820342	Floridan	Odd Years
GWN-PA19 (City of Douglas #4)	Coffee	Coastal Plain	313132-825056	Floridan	Odd Years
GWN-PA20 (City of Lakeland #2)	Lanier	Coastal Plain	310208-830355	Floridan	Annual
GWN-PA21A (City of Valdosta New #4)	Lowndes	Coastal Plain	305441-831455	Floridan	Even Years
GWN-PA22 (City of Thomasville #6)	Thomas	Coastal Plain	304955-835851	Floridan	Even Years
GWN-PA23 (City of Cairo #8)	Grady	Coastal Plain	305222-841033	Floridan	Odd Years
GWN-PA24 (City of Bainbridge #1)	Decatur	Coastal Plain	305330-843413	Floridan	Even Years
GWN-PA25 (City of Donalsonville 7th Street Well)	Seminole	Coastal Plain	310205-845229	Floridan	Annual
GWN-PA26 (City of Colquitt #3)	Miller	Coastal Plain	311022-844331	Floridan	Even Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-PA27 (City of Camilla #4)	Mitchell	Coastal Plain	311323-841153	Floridan	Odd Years
GWN-PA28 (City of Moultrie #1)	Colquitt	Coastal Plain	311044-834710	Floridan	Even Years
GWN-PA29 (City of Adel #6)	Cook	Coastal Plain	310712-832559	Floridan	Even Years
GWN-PA30 (Nashville Mills #2, Nashville)	Berrien	Coastal Plain	311108-831414	Floridan	Even Years
GWN-PA31 (City of Tifton #6)	Tift	Coastal Plain	312755-832916	Floridan	Odd Years
GWN-PA32 (City of Ocilla #3)	Irwin	Coastal Plain	313627-831456	Floridan	Odd Years
GWN-PA33A (City of Fitzgerald, Well G)	Ben Hill	Coastal Plain	314300-831445	Floridan	Annual
GWN-PA34 (City of McRae #2)	Telfair	Coastal Plain	320401-825346	Floridan	Odd Years
GWN-PA35 (City of Mt. Vernon, New Well)	Montgomery	Coastal Plain	321027-823536	Floridan	Odd Years

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-PA36 (City of Vidalia #1)	Toombs	Coastal Plain	321243-812505	Floridan	Even Years
GWN-PA38 (City of Eastman #4)	Dodge	Coastal Plain	321040-830931	Floridan	Odd Years
GWN-PA39 (City of Sylvester #1)	Worth	Coastal Plain	313130-835014	Floridan	Odd Years
GWN-PA40 (Merck and Co. #8, Albany)	Dougherty	Coastal Plain	313000-847046	Floridan	Annual
GWN-PA43A (Pineland Fish Farm, Hatchery Well)	Baker	Coastal Plain	312019-841910	Floridan	Annual
GWN-PA44 (City of Sycamore #2)	Turner	Coastal Plain	314041-833819	Floridan	Odd Years
GWN-PA45A (City of Abbeville #1)	Wilcox	Coastal Plain	315932-831828	Floridan	Annual
GWN-PA46B (Wenona MHP Well, Wenona)	Crisp	Coastal Plain	315420-834449	Floridan	Annual
GWN-PA49 (Harmony Church Well, Unadilla)	Dooly	Coastal Plain	321255-834010	Floridan	Annual

Well ID Number	County	Geologic Province	Latitude Longitude	Aquifer	Monitoring Schedule
GWN-PA50 (Reynolds Well, Dudley)	Laurens	Coastal Plain	323316-830616	Floridan	Annual
GWN-PA51 (Adams Well, Camilla)	Mitchell	Coastal Plain	311613-841305	Floridan	Annual
GWN-PA52 (Simmons Well, Camilla)	Mitchell	Coastal Plain	314029-841856	Floridan	Odd Years
GWN-PA53 (Cato Well, Eldorendo)	Decatur	Coastal Plain	310040-843834	Floridan	Odd Years
GWN-PA54 Fields Well, Reynoldsville)	Seminole	Coastal Plain	305258-844640	Floridan	Opted Out-Up for Replacement
GWN-PA55 (Holland Well, Sardis)	Burke	Coastal Plain	325732-814320	Floridan	Annual

TABLE E-11

WELLS INCLUDED IN THE 1994 APALACHICOLA-CHATTAHOOCHEE-FLINT PESTICIDE MONITORING NETWORK

Note: All wells are in the Coastal Plain physiographic province.

Well ID Number	County	Latitude	Longitude	Aquifer	Monitoring Frequency	Findings
LC-1C	Sumter	320206	840847	Claiborne	4-6 weeks	ND
LC-2A	Sumter	320459	841014	Claiborne	4-6 weeks	ND
LC-3A	Sumter	320541	840915	Claiborne	4-6 weeks	
LC-4A	Sumter	320610	840516	Claiborne	dry	
LC-5B	Sumter	320414	840528	Claiborne	4-6 weeks	ND
LC-6A	Sumter	320051	840614	Claiborne	permission withdrawn	
LC-7A	Sumter	315947	840240	Claiborne	4-6 weeks	ND
LC-8A	Sumter	320001	840328	Claiborne	4-6 weeks	ND
LC-9C	Sumter	320150	835948	Claiborne	permission withdrawn	
LC-10E	Sumter	320301	840134	Claiborne	permission withdrawn	
CP-15A	Randolph	314357	843800	Claiborne	4-6 weeks	ND
CP-16B	Calhoun	313415	844752	Floridan	permission withdrawn	
CP-17A	Early	312346	845204	Floridan	permission withdrawn	
CP-18A	Miller	310552	844356	Floridan	4-6 weeks	ND
CP-19C	Seminole	305641	845420	Floridan	4-6 weeks	ND
CP-20A	Miller	310604	843519	Floridan	permission withdrawn	
CP-21A	Baker	312119	842156	Floridan	4-6 weeks	ND
CP-23B	Terrell	314858	841949	Floridan	4-6 weeks	ND
CP-22A	Terrell	314315	842015	Floridan	4-6 weeks	ND
CP-24A	Taylor	323900	840856	Floridan	4-6 weeks	ND
CP-25A	Sumter	320651	840133	Floridan	dry	
CP-26B	Sumter	320011	841215	Floridan	4-6 weeks	ND
CP-27A	Worth	315008	834710	Floridan	4-6 weeks	ND
CP-28A	Lee	314040	841102	Floridan	4-6 weeks	ND

Well ID Number	County	Latitude	Longitude	Aquifer	Monitoring Frequency	Findings
CP-29D	Dougherty	312908	841519	Floridan	4-6 weeks	ND
CP-30A	Mitchell	310913	841953	Floridan	4-6 weeks	ND
AC-31A	Miller	311113	845233	Floridan	4-6 weeks	ND
AC-32A	Miller	311412	845401	Floridan	dry	
AC-33A	Early	311550	845401	Floridan	permission withdrawn	
AC-34A	Miller	311434	845117	Floridan	4-6 weeks	ND
AC-35B	Miller	311141	845117	Floridan	4-6 weeks	ND
AC-36B	Miller	311015	845119	Floridan	4-6 weeks	ND
AC-37B	Miller	310549	844809	Floridan	permission withdrawn	
AC-38A	Miller	310727	844800	Floridan	4-6 weeks	ND
AC-39A	Miller	310813	844929	Floridan	4-6 weeks	ND
AC-40A	Miller	311442	844800	Floridan	permission withdrawn	

TABLE E-12

1989 ALDICARB-IN-GROUND-WATER SURVEY

Well ID Number	County	Physiographic Province	Latitude Longitude	Aquifer	Monitoring Schedule
ALD 01	Miller	Coastal Plain	311403-844334	Floridan	one time only
ALD 02	Miller	Coastal Plain	311338-844207	Floridan	one time only
ALD 04	Miller	Coastal Plain	311254-844110	Floridan	one time only
ALD 05	Miller	Coastal Plain	311110-843947	Floridan	one time only
ALD 06	Miller	Coastal Plain	311040-843745	Floridan	one time only
ALD 08	Miller	Coastal Plain	310848-843612	Floridan	one time only
ALD 09	Miller	Coastal Plain	310646-843507	Floridan	one time only
ALD 10	Miller	Coastal Plain	310728-843424	Floridan	one time only
ALD 11	Miller	Coastal Plain	311519-844418	Floridan	one time only
ALD 12	Early	Coastal Plain	311715-844901	Floridan	one time only
ALD 13	Early	Coastal Plain	311939-844950	Floridan	one time only

Well ID Number	County	Physiographic Province	Latitude Longitude	Aquifer	Monitoring Schedule
ALD 14	Early	Coastal Plain	312101-845127	Floridan	one time only
ALD 16	Early	Coastal Plain	312459-845748	Claiborne	one time only
ALD 17	Early	Coastal Plain	312608-845812	Claiborne	one time only
ALD 18	Early	Coastal Plain	312650-845915	Claiborne	one time only
ALD 19	Early	Coastal Plain	312750-850018	Claiborne	one time only
ALD 20	Early	Coastal Plain	312859-850106	Claiborne	one time only
ALD 21	Worth	Coastal Plain	313351-835708	Floridan	one time only
ALD 22	Worth	Coastal Plain	313455-835938	Floridan	one time only
ALD 23	Lee	Coastal Plain	313921-840509	Floridan	one time only
ALD 24	Lee	Coastal Plain	314118-840833	Floridan	one time only
ALD 25	Lee	Coastal Plain	314434-840943	Floridan	one time only
ALD 26	Lee	Coastal Plain	314444-841018	Floridan	one time only

Well ID Number	County	Physiographic Province	Latitude Longitude	Aquifer	Monitoring Schedule
ALD 27	Lee	Coastal Plain	313816-840838	Floridan	one time only
ALD 29	Lee	Coastal Plain	314145-840508	Floridan	one time only
ALD 30	Lee	Coastal Plain	314406-840629	Floridan	one time only
ALD 31	Lee	Coastal Plain	314606 841255	Floridan	one time only
ALD 32	Lee	Coastal Plain	314229-841503	Floridan	one time only
ALD 33	Sumter	Coastal Plain	315625-842247	Claiborne	one time only
ALD 34	Sumter	Coastal Plain	315516-842036	Claiborne	one time only
ALD 35	Sumter	Coastal Plain	315345-842020	Claiborne	one time only
ALD 39	Lee	Coastal Plain	314311-840541	Floridan	one time only
ALD 40	Lee	Coastal Plain	313958-841025	Floridan	one time only
ALD 42	Dooly	Coastal Plain	320643-834757	Floridan	one time only

Well ID Number	County	Physiographic Province	Latitude Longitude	Aquifer	Monitoring Schedule
ALD 44	Dooly	Coastal Plain	320348-833741	Floridan	one time only
ALD 45	Dooly	Coastal Plain	320435-834248	Floridan	one time only
ALD 47	Dooly	Coastal Plain	320427-834358	Floridan	one time only
ALD 48	Dooly	Coastal Plain	320610-834335	Floridan	one time only
ALD 49	Dooly	Coastal Plain	320508-834506	Floridan	one time only
ALD 51	Dooly	Coastal Plain	320515-835444	Floridan	one time only
ALD 53	Dooly	Coastal Plain	320627-834928	Floridan	one time only
ALD 54	Dooly	Coastal Plain	320646-836016	Floridan	one time only
ALD 55	Dooly	Coastal Plain	320851-835119	Floridan	one time only
ALD 57	Dooly	Coastal Plain	320941-835640	Claiborne	one time only
ALD 58	Dooly	Coastal Plain	321108-835609	Claiborne	one time only
ALD 60	Dooly	Coastal Plain	321040-835908	Claiborne	one time only

Well ID Number	County	Physiographic Province	Latitude Longitude	Aquifer	Monitoring Schedule
ALD 61	Dooly	Coastal Plain	320956-835535	Claiborne	one time only
ALD 62	Dooly	Coastal Plain	320348-834253	Floridan	one time only
ALD 63	Dooly	Coastal Plain	320544-834454	Floridan	one time only
ALD 64	Dooly	Coastal Plain	320549-834312	Floridan	one time only

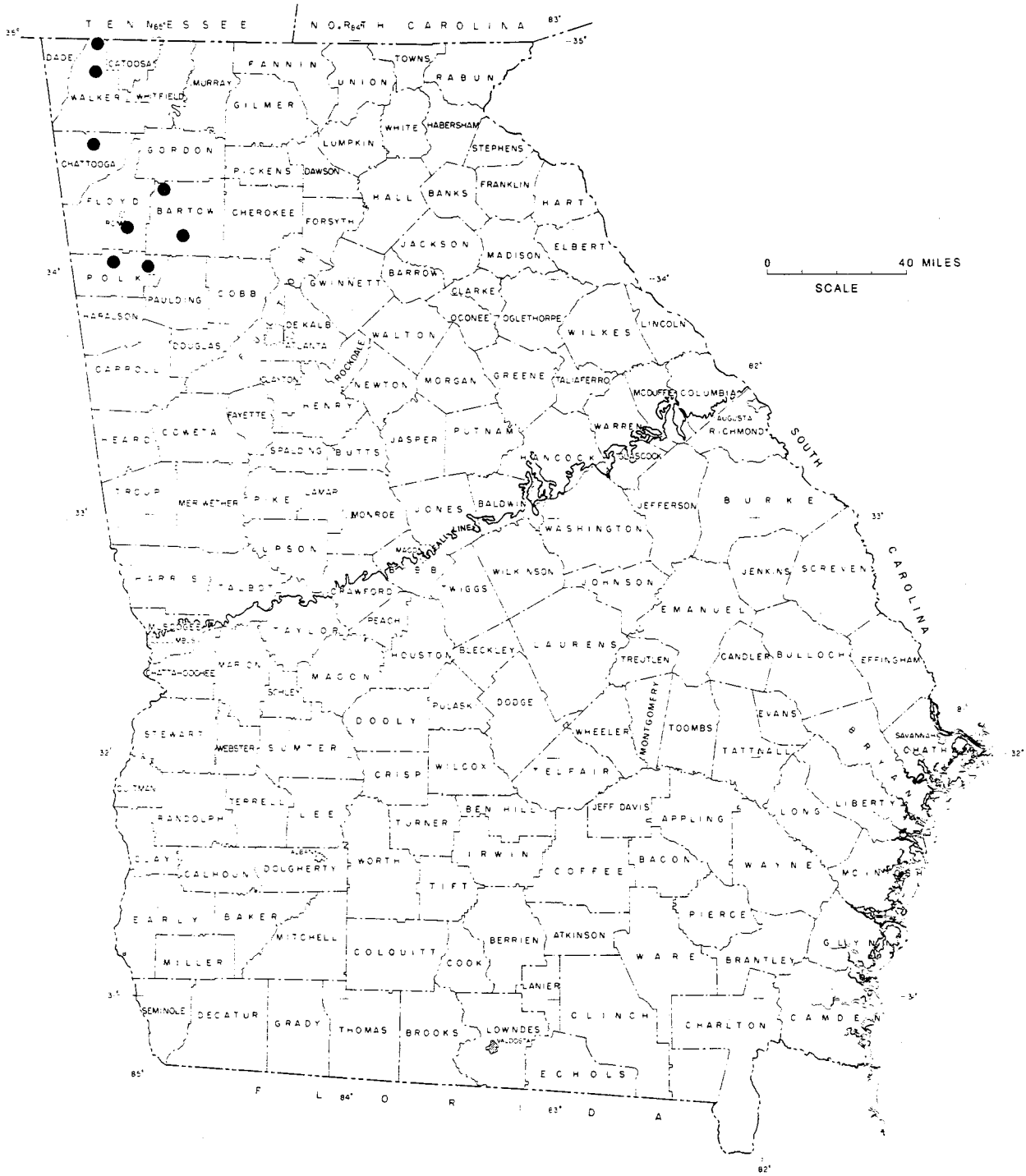


Figure E-1. Georgia monitoring network wells in the Valley and Ridge Aquifers.

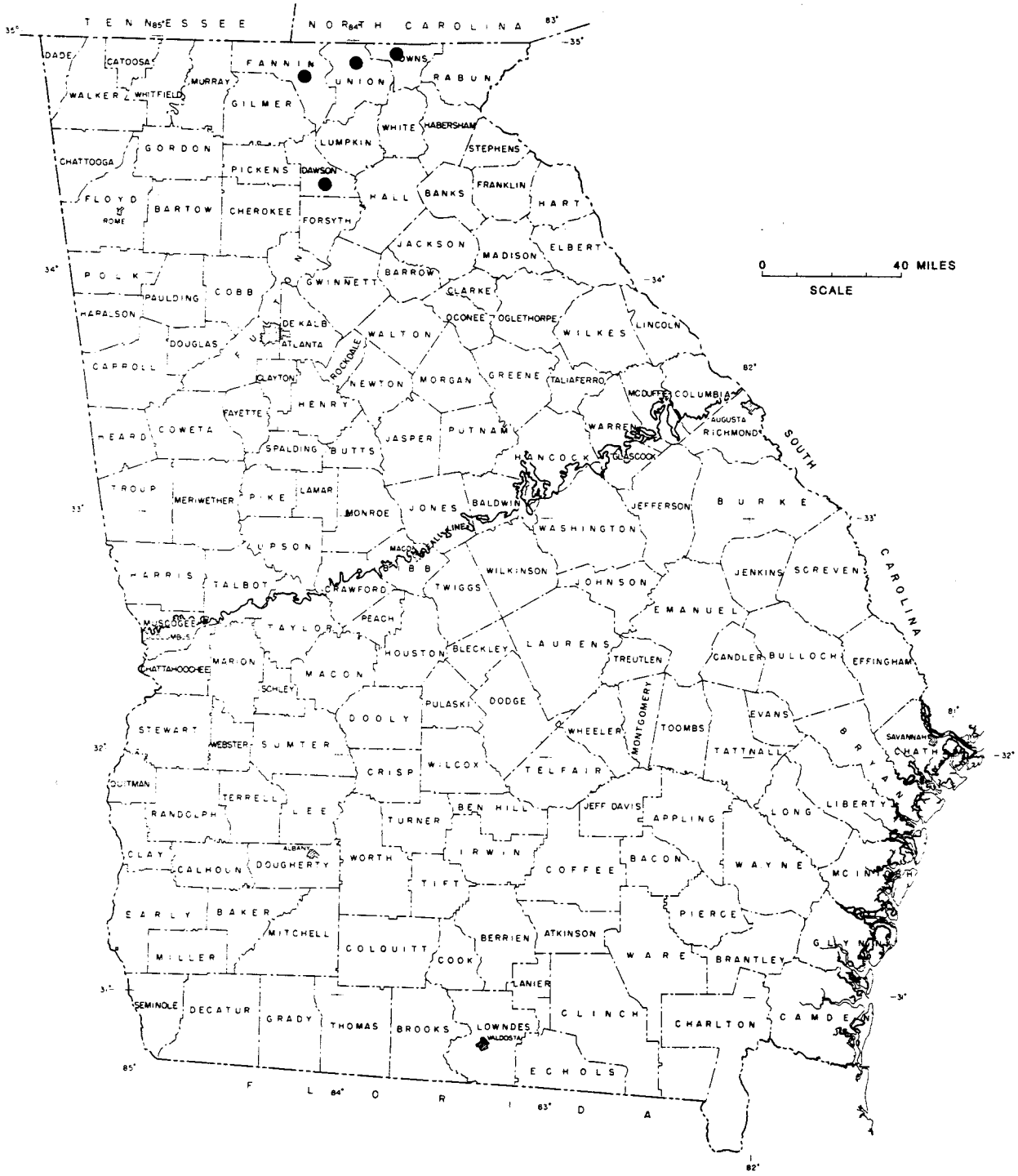


Figure E-2. Georgia monitoring network wells in the Blue Ridge Aquifers.

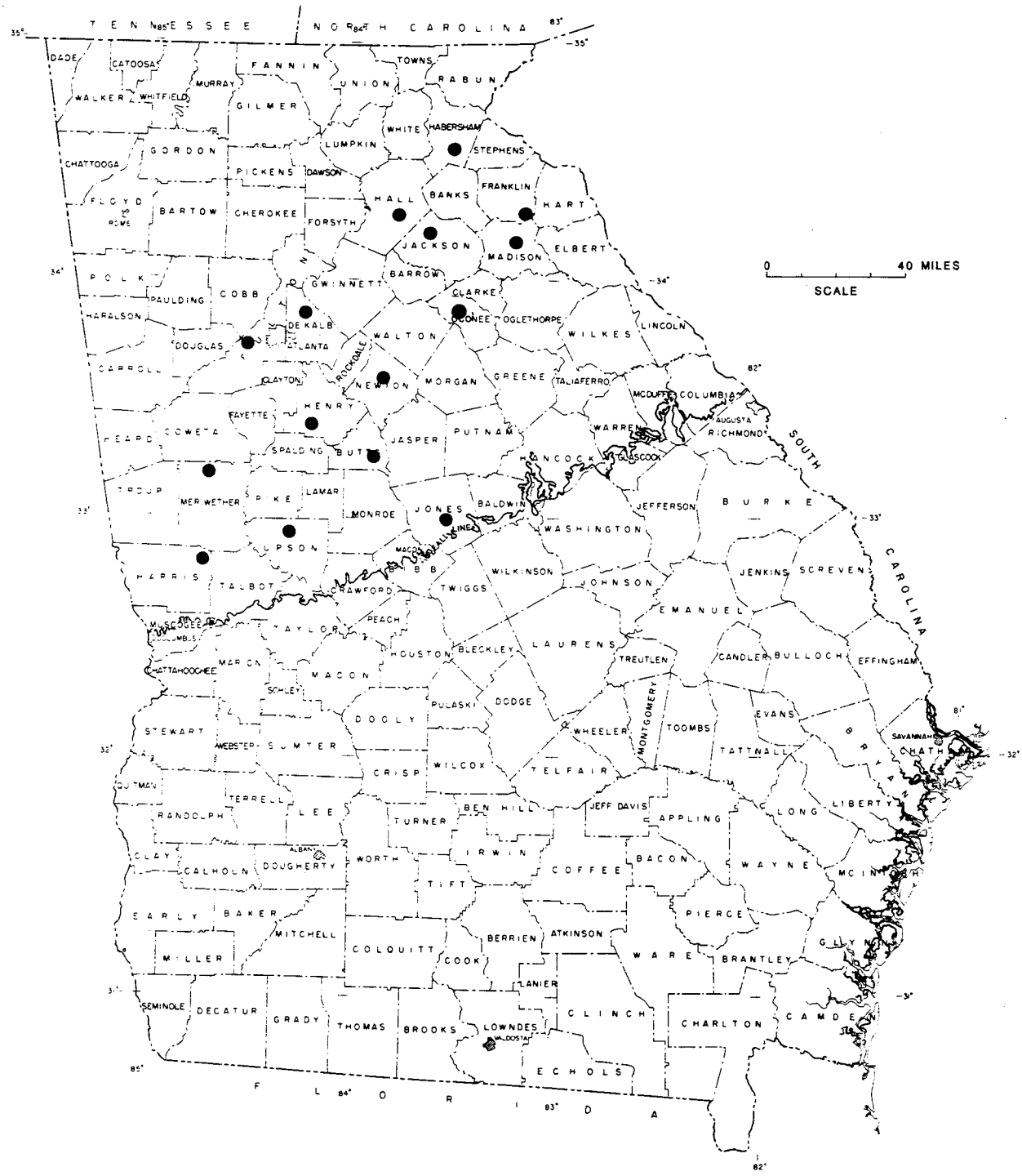


Figure E-3. Georgia monitoring network wells in the Piedmont Aquifers.

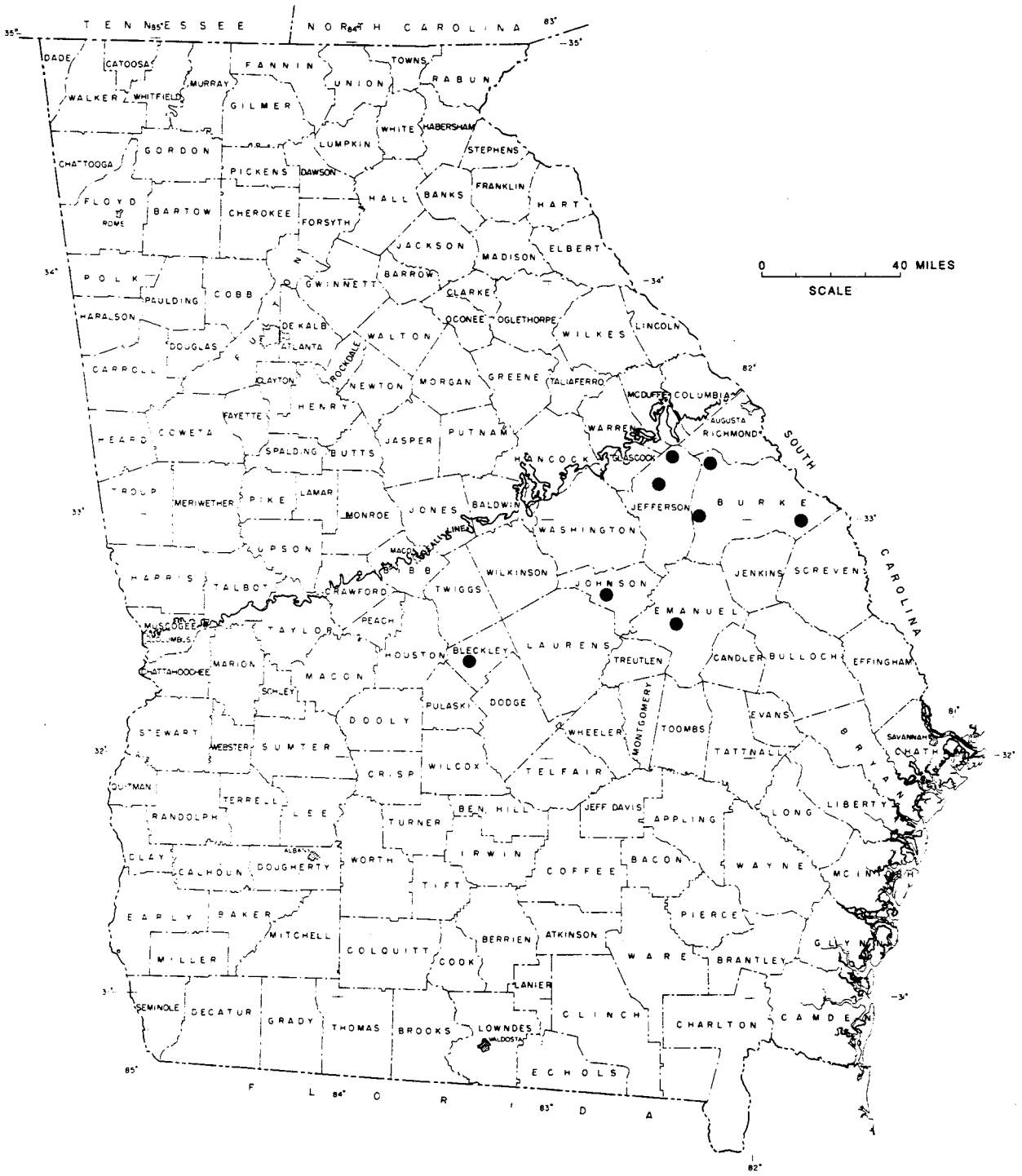


Figure E-4. Georgia monitoring network wells in the Jacksonian Aquifer.

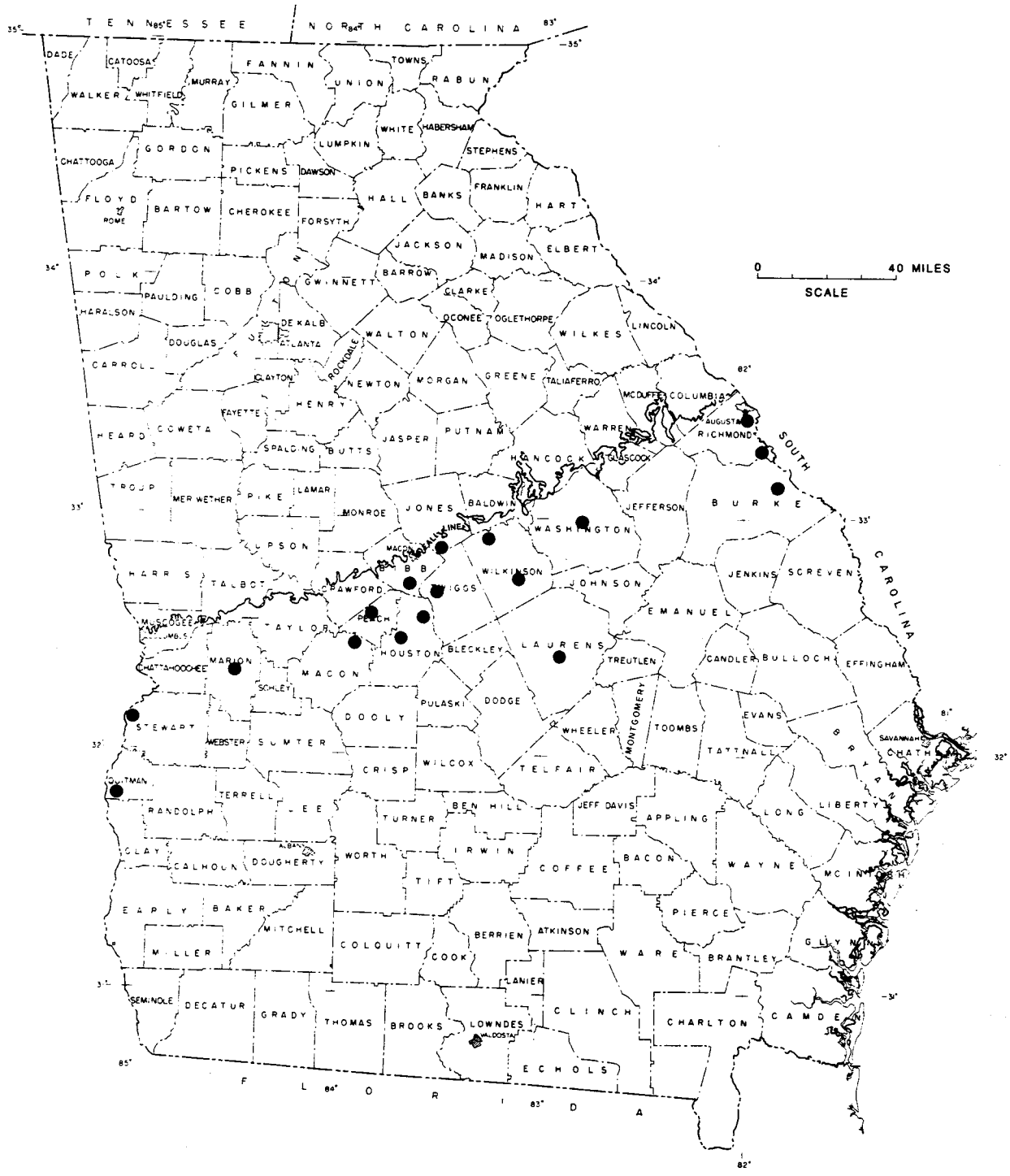


Figure E-5. Georgia monitoring network wells in the Cretaceous Aquifer System.

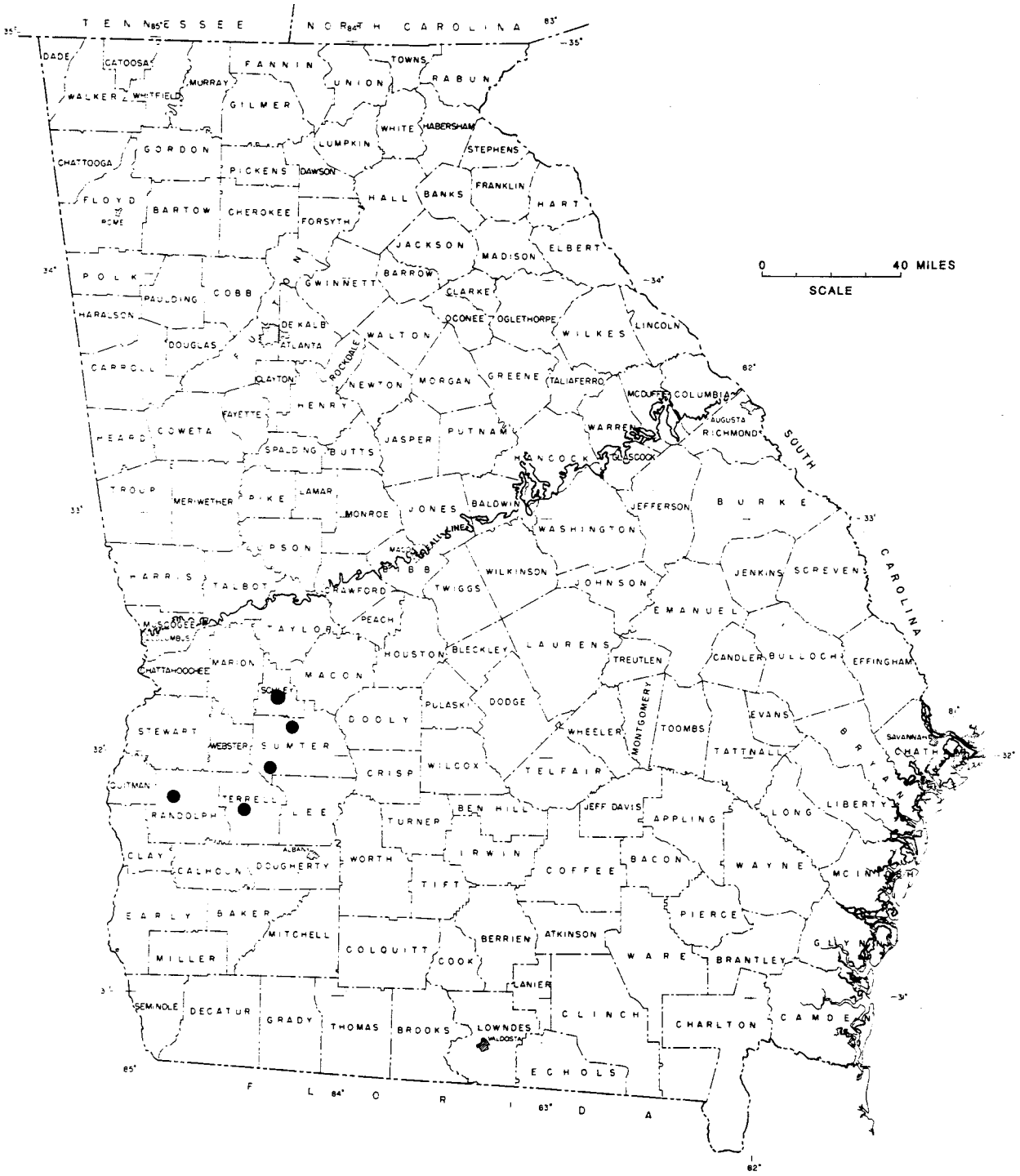


Figure E-6. Georgia monitoring network wells in the Clayton Aquifer.

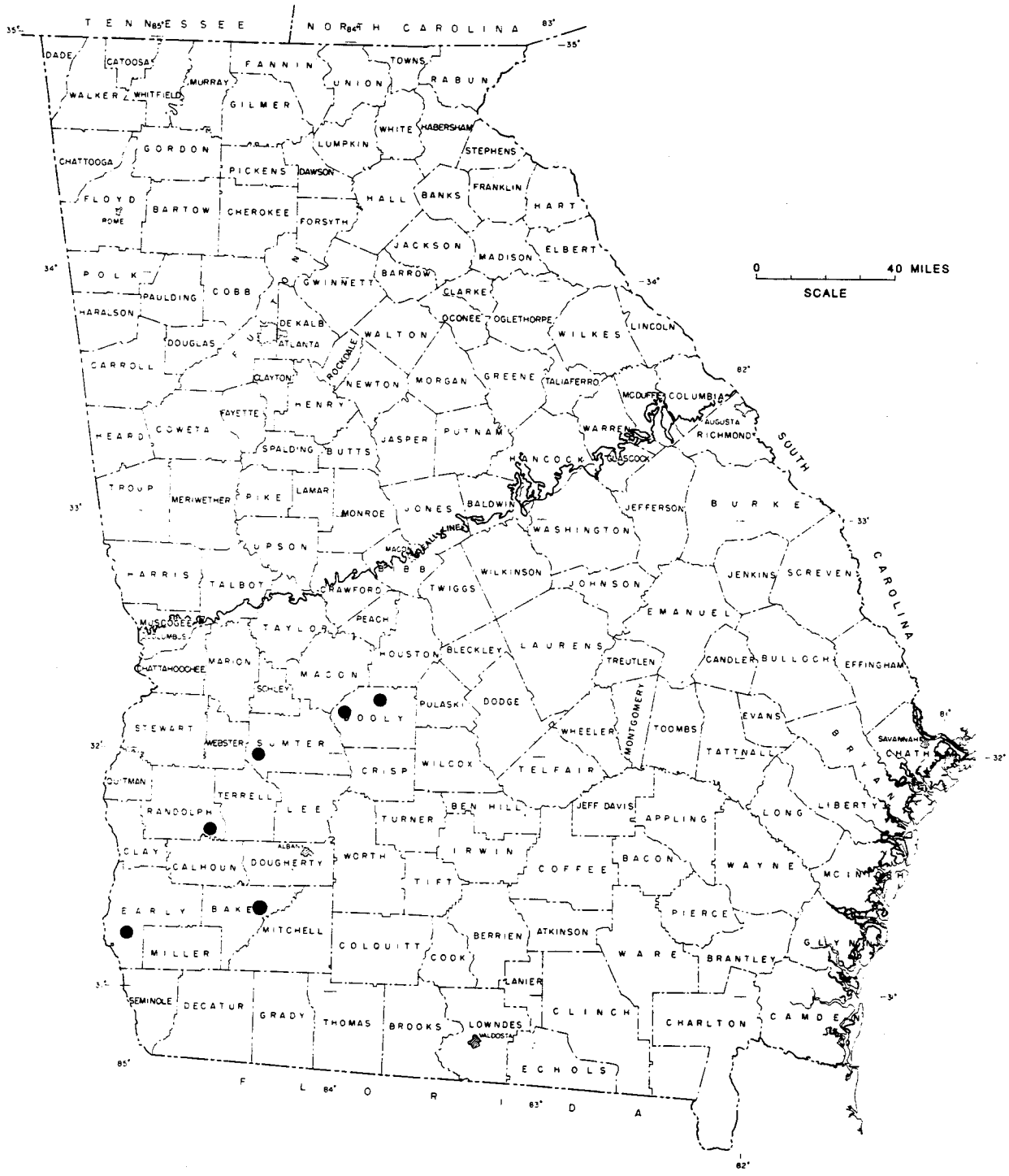


Figure E-7. Georgia monitoring network wells in the Claiborne Aquifer.

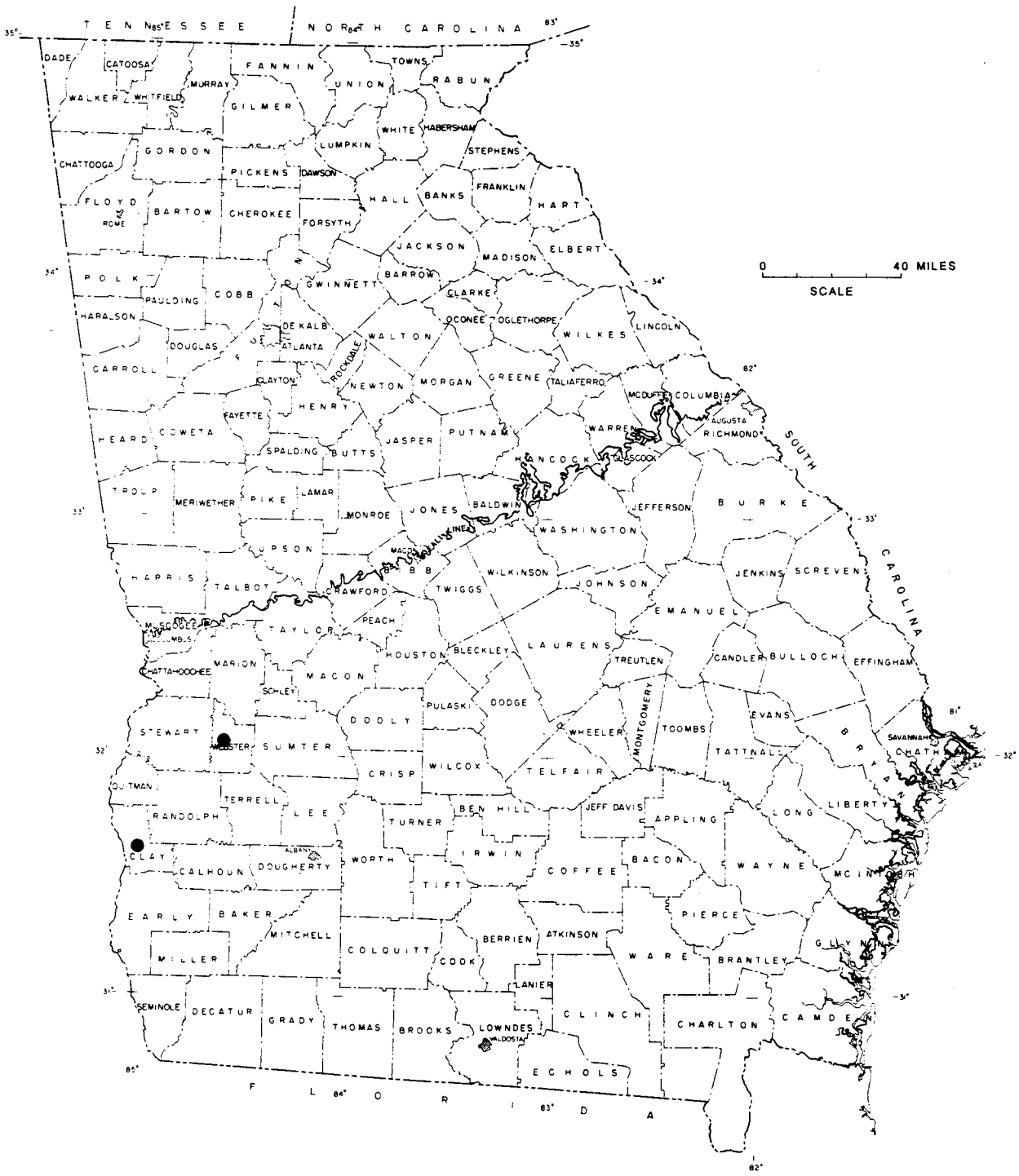


Figure E-8. Georgia monitoring network wells in the Providence Aquifer.

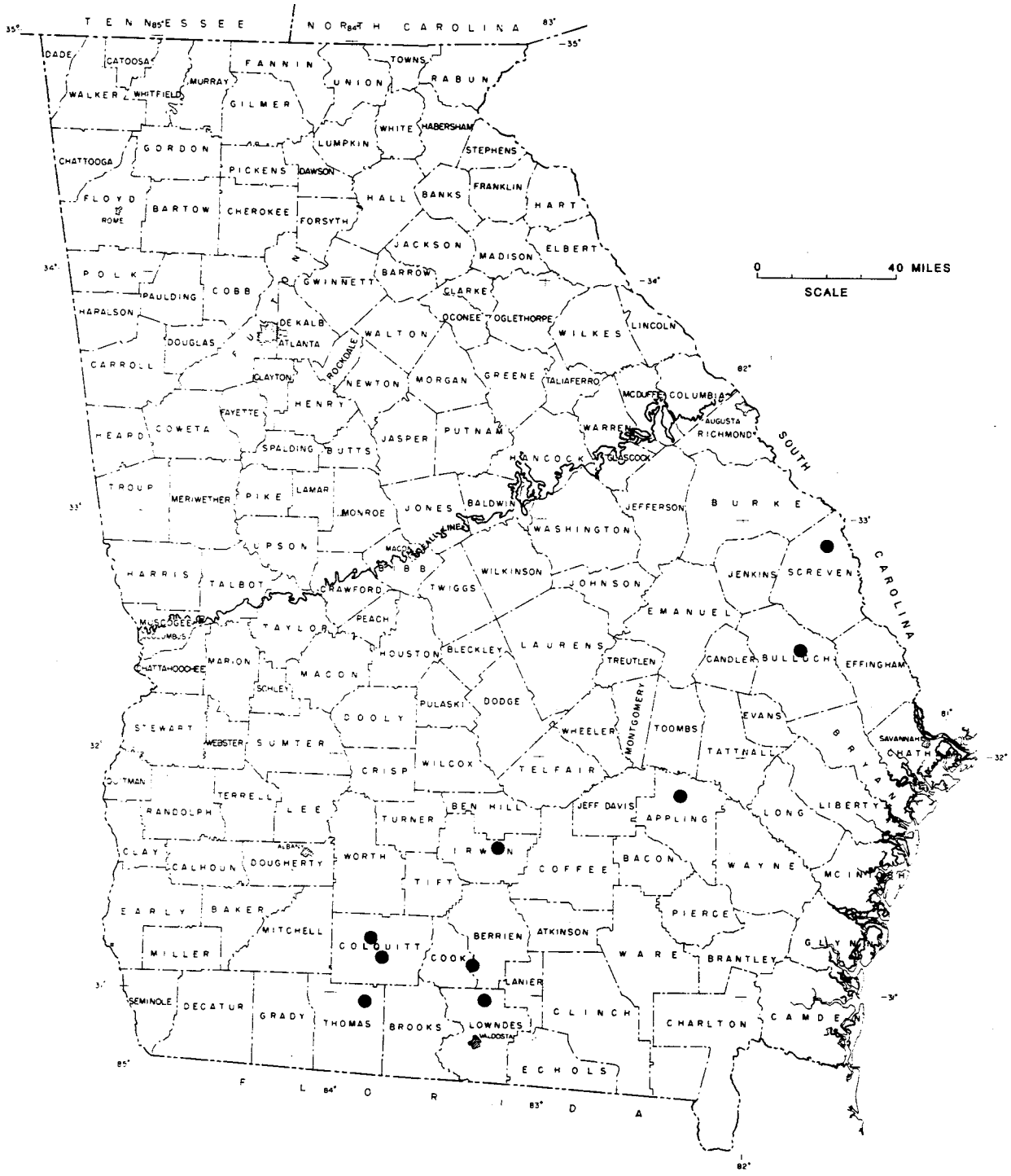


Figure E-9. Georgia monitoring network wells in the Miocene Aquifer.

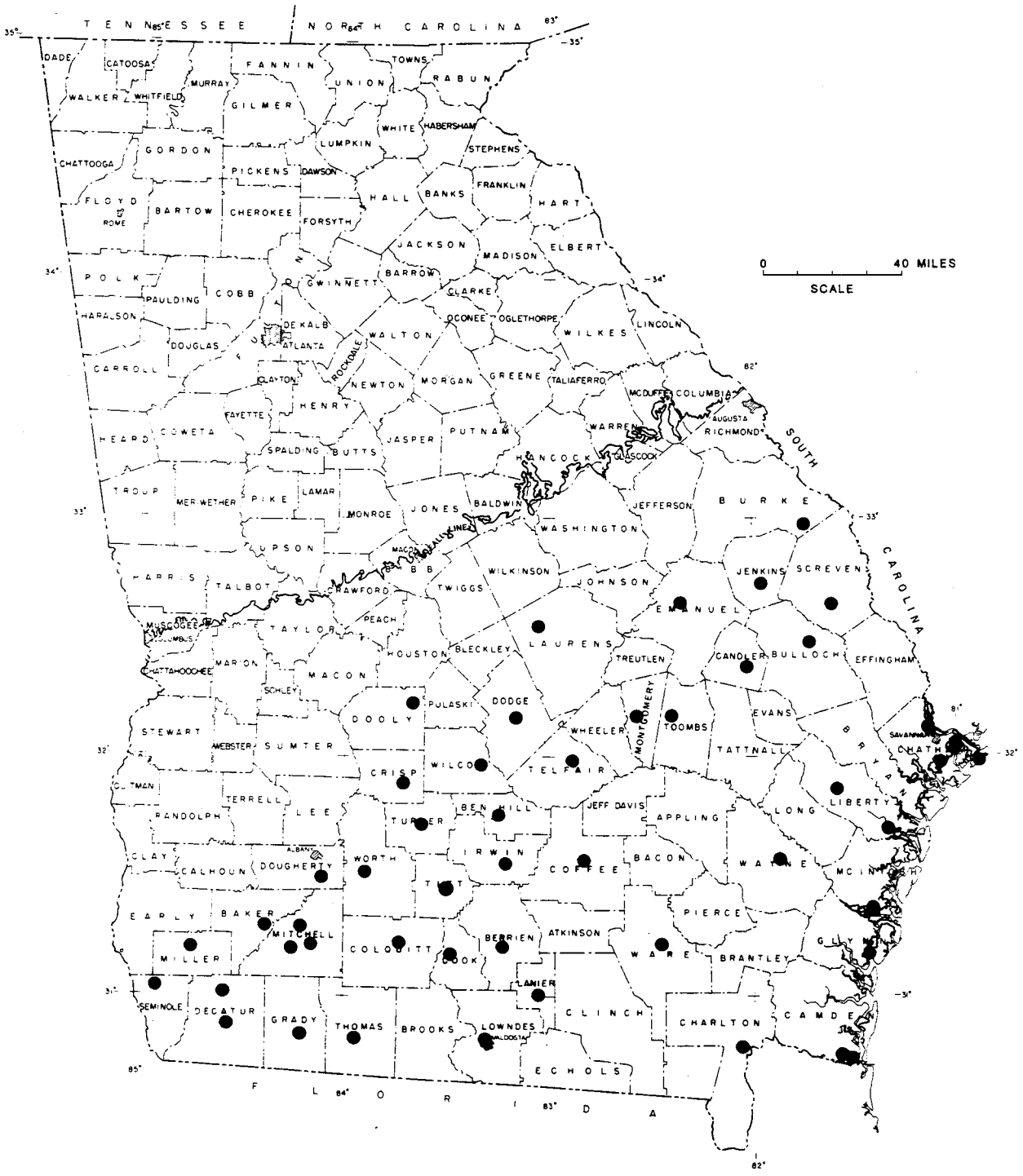


Figure E-10. Georgia monitoring network wells in the Floridan Aquifer.

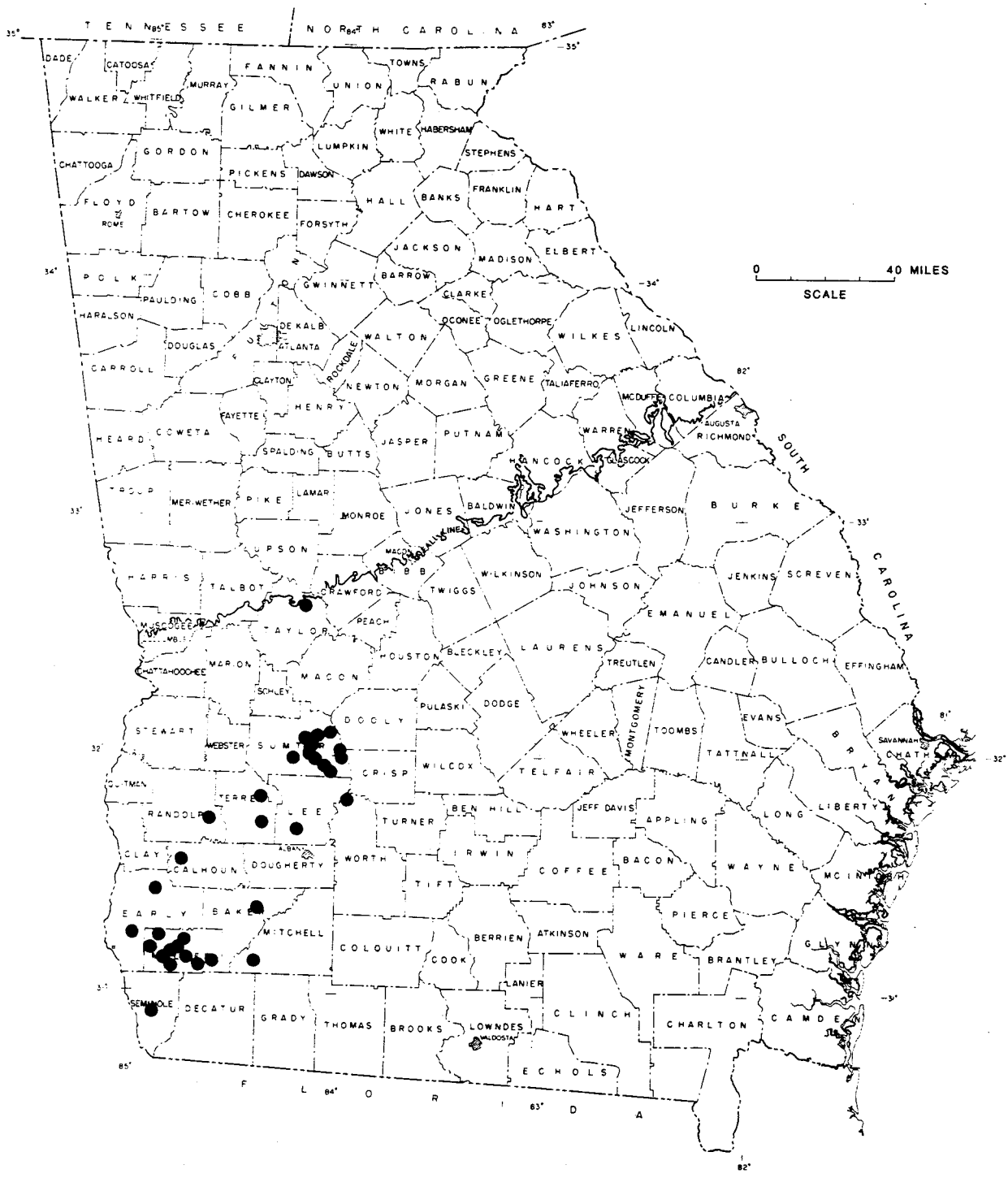


Figure E-11. Apalachicola-Chattahoochee-Flint River Basin pesticide monitoring well network for 1993-1994.

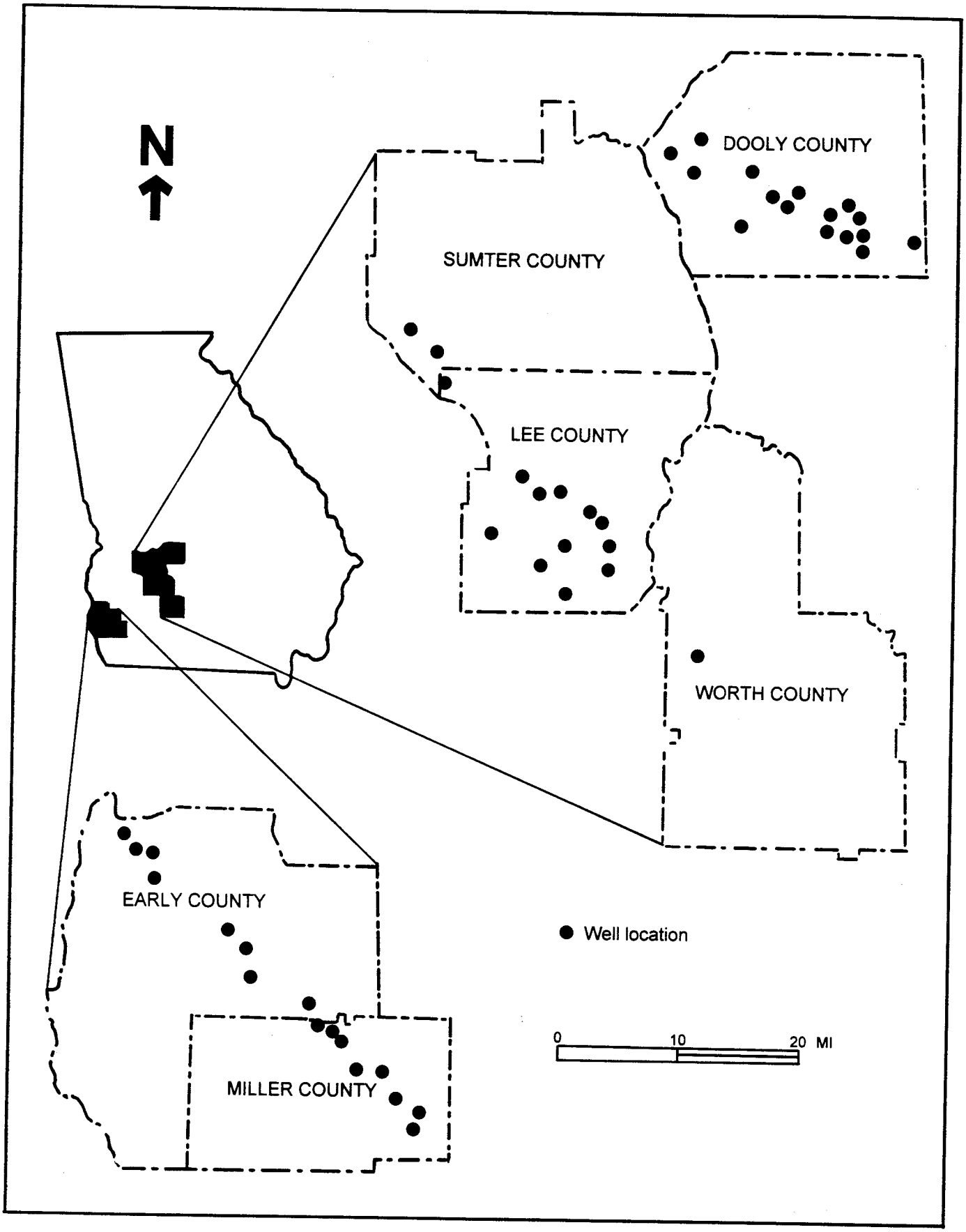


Figure E-12. Locations of wells sampled for the 1989 aldicarb-in-ground-water survey.

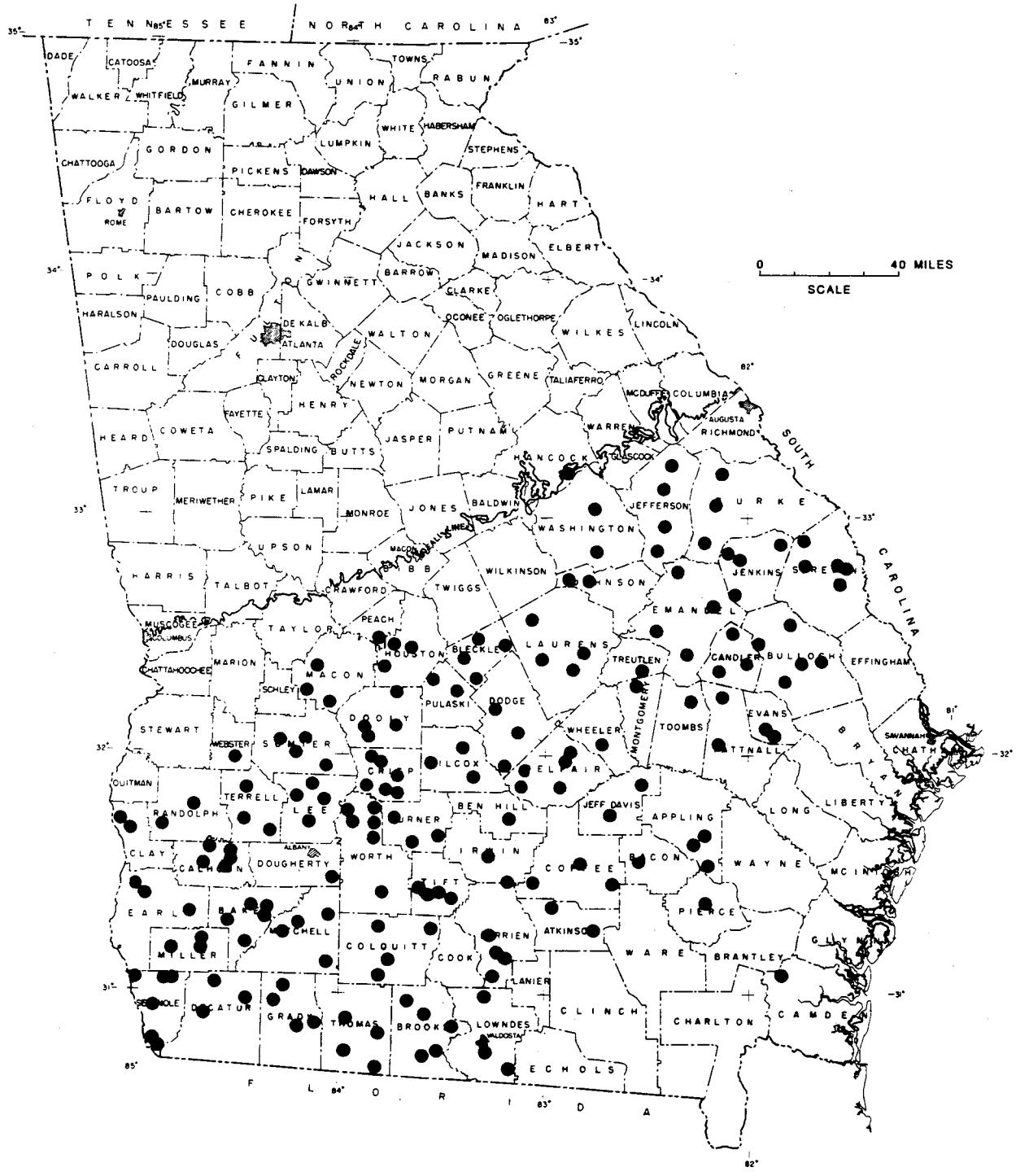


Figure E-13. Pesticide monitoring well network for 1991.

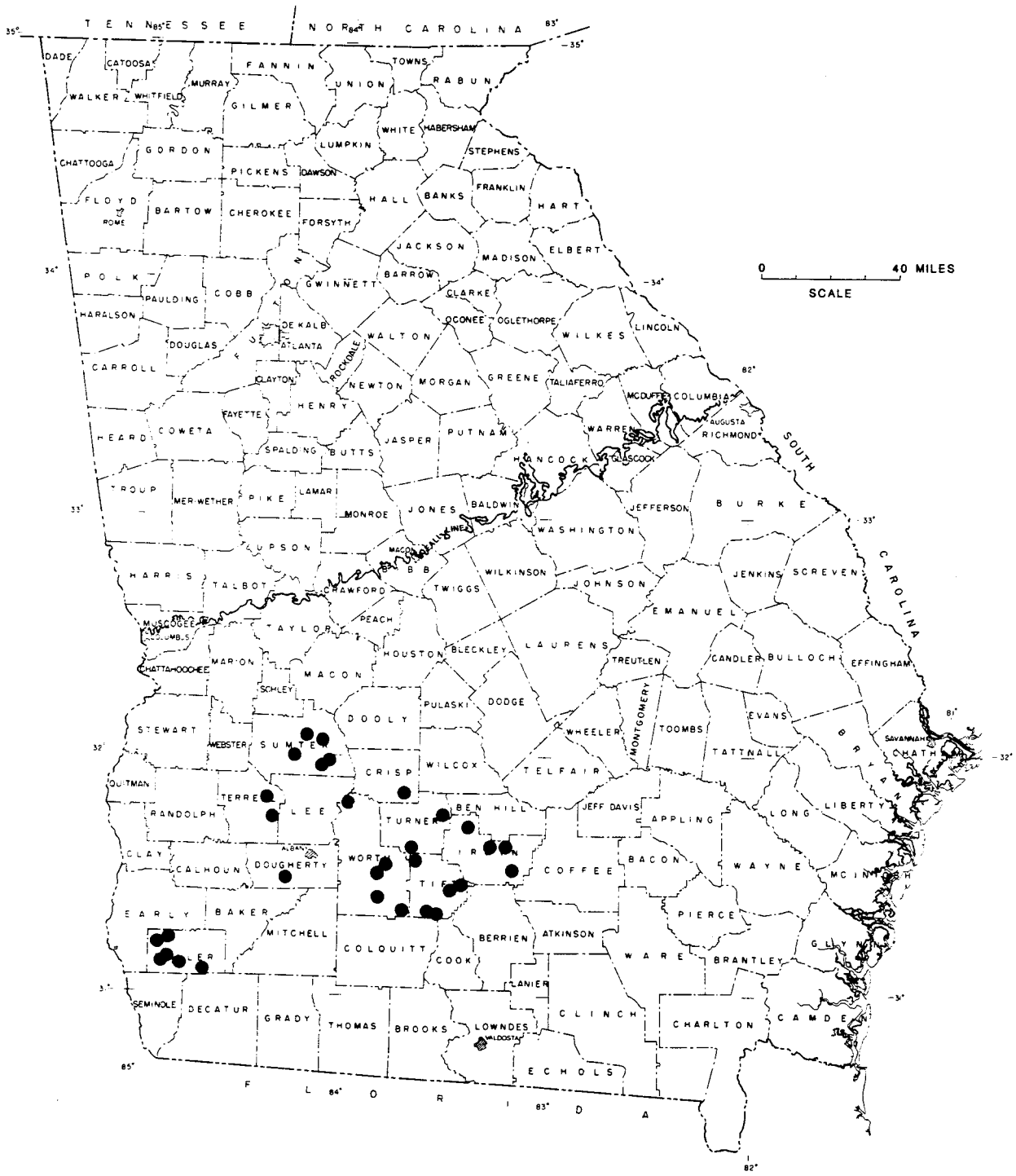


Figure E-14. Pesticide monitoring well network for 1995-1996.

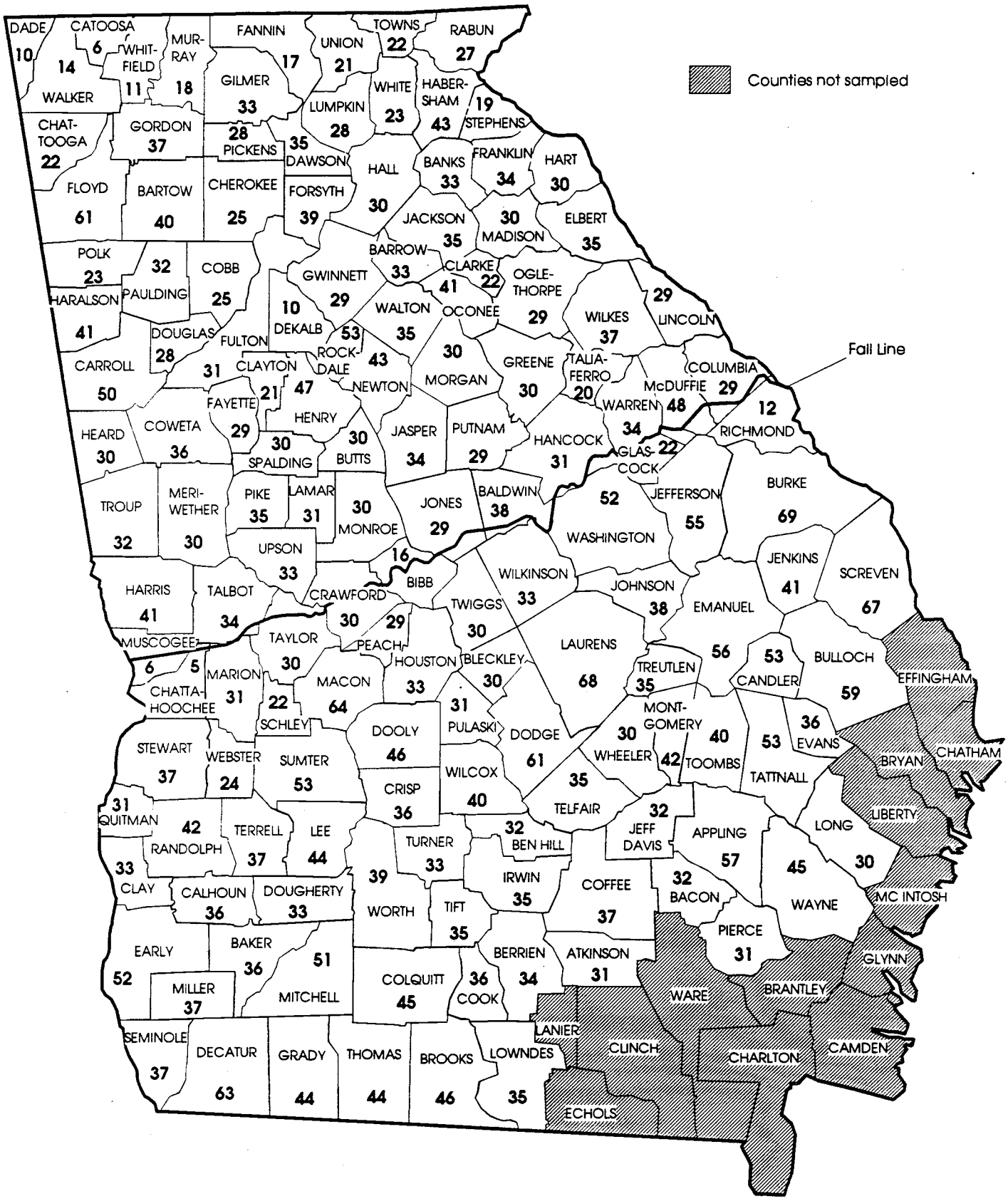
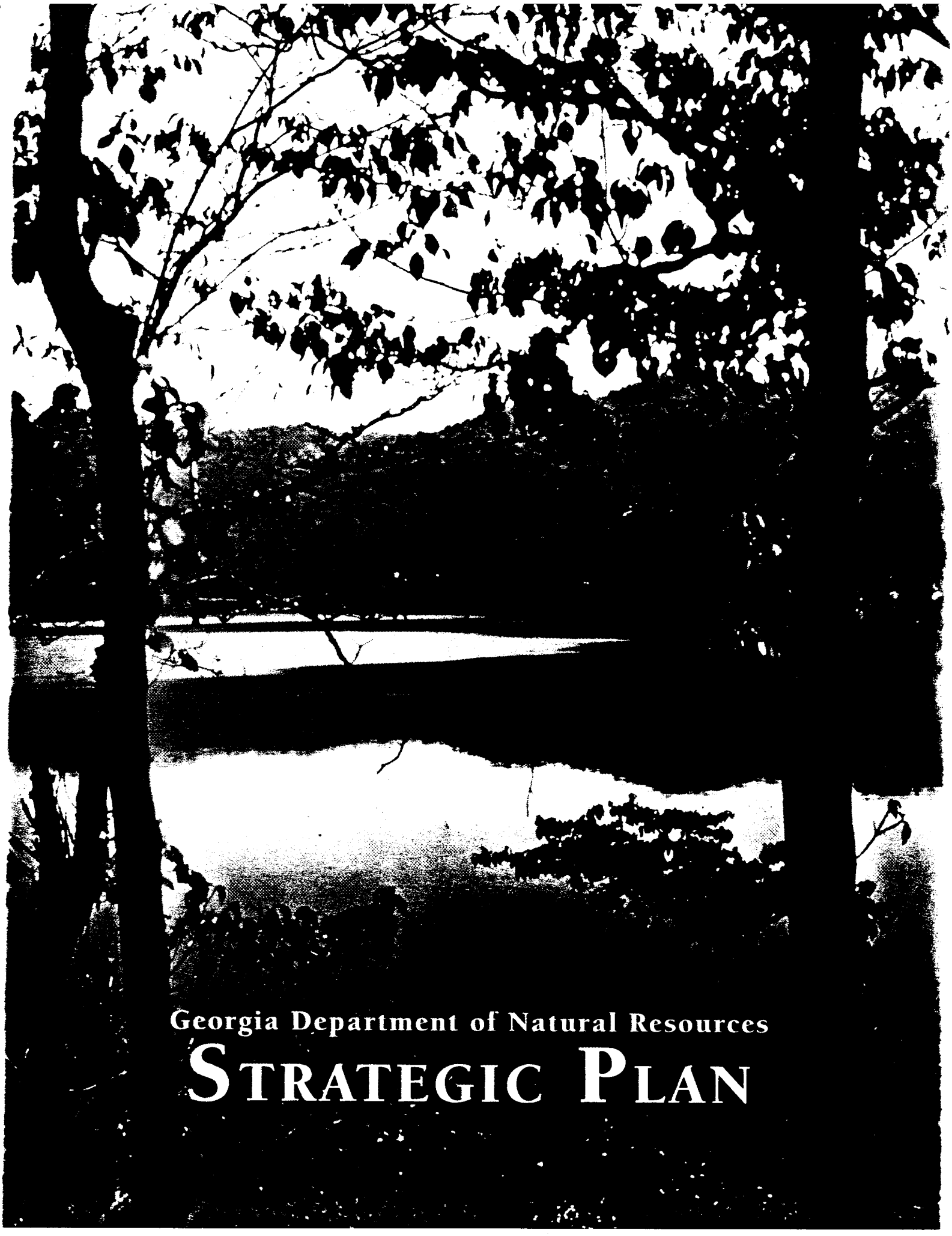


Figure E-15. Number of wells tested per county in the Ground-Water Nitrate Survey.

APPENDIX F

STRATEGIC PLAN:
Georgia Department of Natural Resources



Georgia Department of Natural Resources

STRATEGIC PLAN

Division Phone Numbers:

Commissioner's Office	404-656-3500
Environmental Protection Division	404-656-4713
Coastal Resources Division	912-264-7218
Wildlife Resources Division	770-918-6400
Pollution Prevention Assistance Division	404-651-5120
Historic Preservation Division	404-656-2840
Parks Recreation & Historic Sites Division	404-656-2770
Program Support Division	404-656-7559

For more information about this plan, call:
(404) 656-7559

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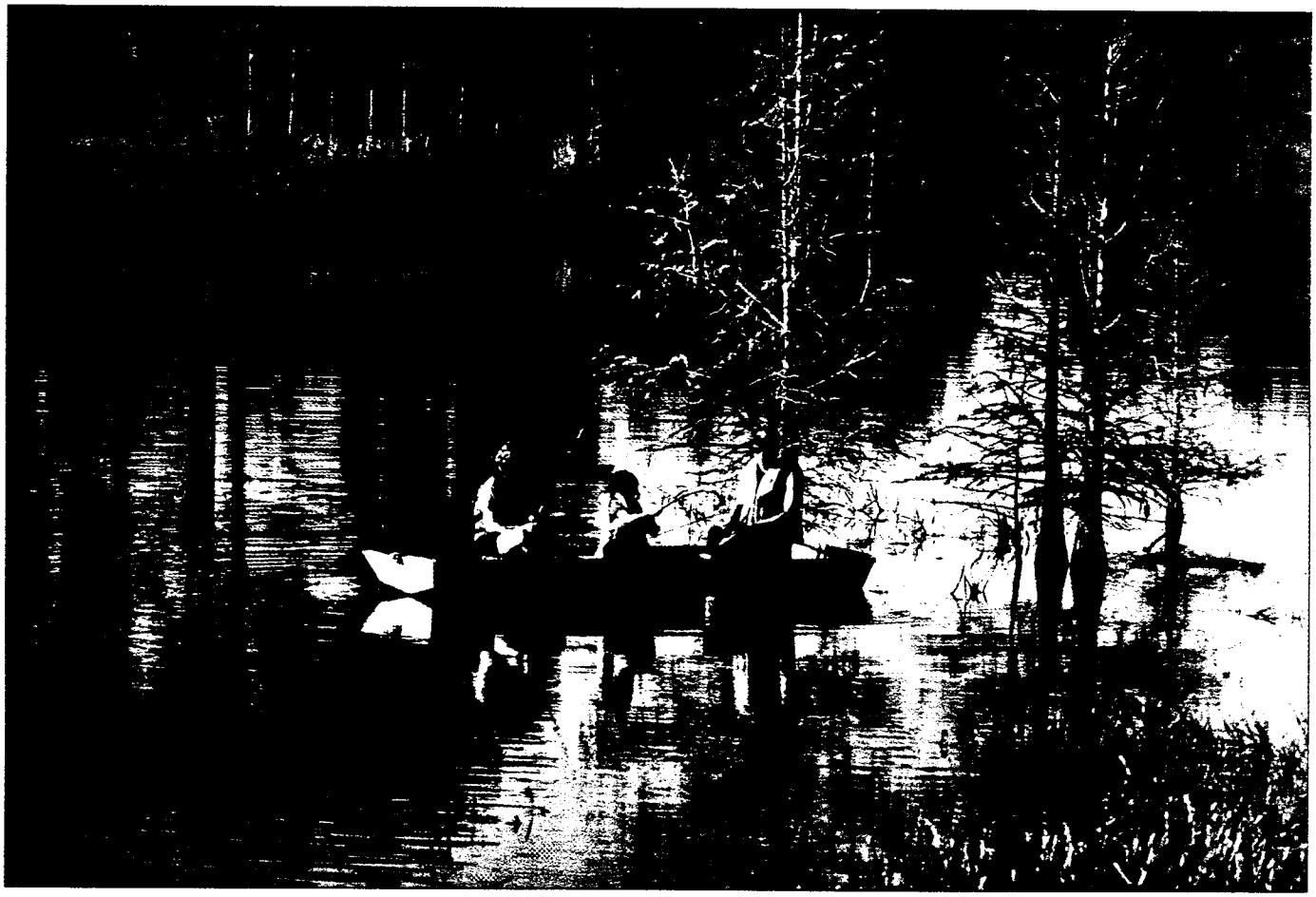

COMMISSIONER'S STATEMENT

Georgia is a state blessed with a rich abundance of natural, historic and cultural diversity. From the forested slopes and rushing streams of its mountains in the north... to the vibrant and bustling urban center of Atlanta... to the unspoiled beaches and marshes of its scenic and historic coastline. This diversity supports a wide range of needs for its seven million residents including industry, agriculture and forestry, and recreation. Balancing these needs means that we must make some hard decisions about the kind of future we want.

In the past decade, Georgia has experienced rapid population growth. A strong economic base will continue to attract large numbers of people to the state. The U.S. Census Bureau projects that Georgia's population will increase from approximately seven million people in 1994 to 7.7 million people by the year 2000. While population growth will contribute to a strong economy, this growth continues to place considerable stress on Georgia's natural, historic and cultural resources. We face increasing, and sometimes conflicting, demands on our limited water supply. We stand to lose thousands of acres of open lands that now are used for outdoor activities. We have to continue to manage the waste we are generating in ever increasing amounts. We are witnessing the continued erosion of our beaches. Another trend which affects the Strategic Plan is a changing customer base. Today's taxpayers demand superior service and are becoming increasingly intolerant of government inefficiency and waste. They expect more out of government and are less tolerant of government programs that do not produce the outcomes they expect in the time frame they want.

These are just a few of the challenges the Department of Natural Resources will face in the upcoming years. In an attempt to meet these challenges, the department has engaged in an extensive strategic planning process during the past year. This document presents the results of that process and includes a vision, a mission statement, three directions and objectives, and actions. Three fundamental assumptions guided the plan's development and will influence the way we do business in the upcoming years:

Assumption One - Georgia's Natural, Historic and Cultural Resources: The department will find improved ways of managing programs affecting Georgia's land, air, water, wildlife, parks and recreation areas, historic and coastal resources in order to balance the demands of population growth with resource protection.

Assumption Two - The People of Georgia: The department will find ways to more effectively involve citizens in decision-making processes and enable them to take a more active role in resource management.

Assumption Three - The Department of Natural Resources: The department must improve efficiency in order to meet the demands of population growth and serve a public that expects to be involved and demands improved services at a lowered cost.

I am committed to implementing this plan and I ask our associates and other stakeholders to work together to make this plan a reality.

Lonice C. Barrett

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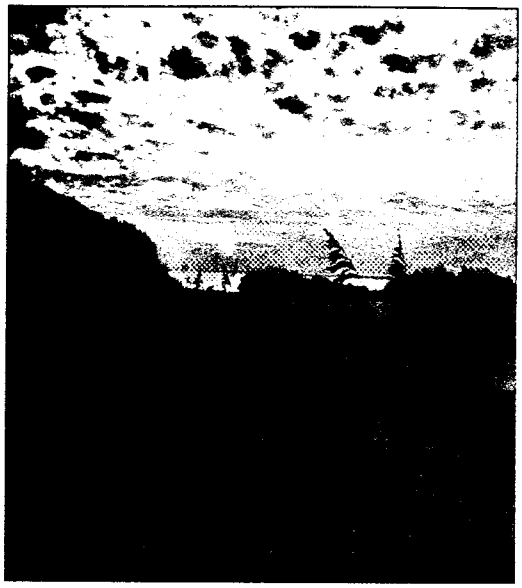
Introduction

The mission of the Georgia Department of Natural Resources is to sustain, enhance, protect and/or conserve Georgia's natural, historic and cultural resources for present and future generations. The department has seven divisions working to accomplish this mission:

Coastal Resources Division



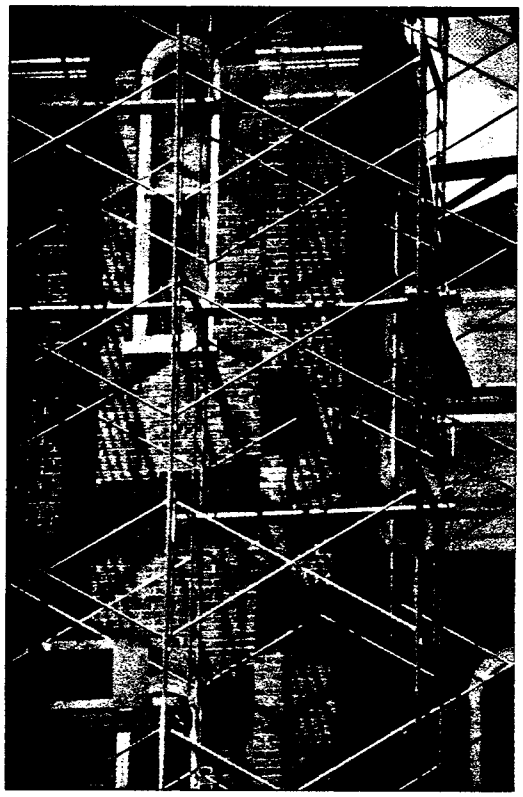
The Coastal Resources Division (CRD) has primary responsibility for managing Georgia's marshes, beaches, and marine fishery resources. Based in Brunswick, CRD administers permitting programs under the Coastal Marshlands Protection Act and Shore Protection Act; issues revocable licenses for use of state-owned water bottoms; monitors coastal water quality; and manages shellfish harvest areas. CRD conducts research; management and development activities associated with recreational and commercial fishery resources; represents Georgia on regional marine fishery boards and commissions; and builds boat ramps, artificial reefs, and fishing piers. CRD has primary responsibility for the Protection of Tidewater/Right of Passage Acts. The division employs about 50 associates and has an annual budget of about $4 million.

Environmental Protection Division

The Environmental Protection Division (EPD) protects Georgia's air, land, and water through the authority of state statutes and major parts of five federal environmental statutes. These laws regulate public and private facilities having to do with water quality; air quality; hazardous waste, water supply; solid waste management, surface mining and other areas. It issues and enforces all state permits in these areas. It has received the authority from the U.S. Environmental Protection Agency (EPA) to issue and enforce all permits required by federal laws. The ability to offer "one-stop" permit review and issuance makes the permitting process more efficient for applicants. EPD does its work with a staff of 659 budgeted positions and an annual budget which exceeds $67 million (This includes about $25 million of federal loan funds awarded to local governments for wastewater projects and about $17 million for clean up of contaminated sites).

Historic Preservation Division

The Historic Preservation Division (HPD) works in partnership with others to identify, protect and preserve historic and ar-



chaeological resources for a better Georgia. HPD administers 13 programs authorized by federal and state law including historic resource survey, nomination of properties to the National and Georgia Registers of Historic Places, grants and tax incentives, planning, review of federal and state projects for effects to historic properties, information, education and technical assistance, archaeological programs, and community preservation assistance. These programs foster historic resource stewardship, encourage neighborhood revitalization, and support community and economic development. National/ Georgia Register listings total 1,500 and include over 35,000 individual historic properties. The statewide inventory - which is not complete - includes over 71,000 historic structures and 18,000 archaeological sites. Georgia ranks in the top two or three states in the number of federal tax incentive projects reviewed each year; since 1977, $500 million in private dollars have been reinvested for the rehabilitation of historic properties through this program. Each year, HPD reviews over 1,800 federal and state funded or permitted projects, to assess their impacts on historic properties. HPD works closely with the statewide preservation network, including 42 Certified Local Governments, 34 Main Street towns, 14 Regional Development Center preservation planners, dozens of private non-profits, and the Georgia Trust, a statewide non-profit organization with over 8,000 members that is the largest of its type in the country. HPD does its work with 36 full and part-time staff and an annual budget of $2.4 million in state and federal funding.

Parks Recreation and Historic Sites Division

The Parks, Recreation and Historic Sites Division (PRHSD) operates 47 state parks and 14 historic sites on nearly 70,000 acres of state lands. Estimated public use of these facilities during FY 1994 was 15.5 million visitors. The major facilities on these sites include five lodges with restaurants and conference facilities; 321 cabins on 24 sites; 2,602 campsites on 40 parks, and six golf courses. In addition, a sixth golf course will be opened on Laura S. Walker State Park in the spring of 1996. PRHSD actively interprets natural and cultural resources to our guests through publications, displays, exhibits and programs given by staff. The Division also provides technical assistance along with state and federal grants to local governments for the acquisition and development of public recreation areas. All of these services are accomplished with 501 full-time merited employees, 372 full-time hourly employees and 250 part-time and seasonal workers. The division's annual budget exceeds $37.8 million.

Pollution Prevention Assistance Division

The Pollution Prevention Assistance Division (P^2AD) mission is to develop programs and activities to facilitate reduction of pollution at the source, and instill a pollution prevention ethic in Georgia's businesses and citizens. P^2AD was created as a non-regulatory organization designed to coordinate all of the state's pollution prevention efforts aimed at air and water pollution, industrial wastes, and hazardous or toxic materials. P^2AD offers a variety of programs to assist Georgia's citizens and industries in improving efficiency by preventing waste. Staff engineers conduct on-site pollution prevention assessments, and also assist companies in setting up internal corporate pollution prevention programs. P^2AD sponsors workshops and training courses that facilitate the transfer of pollution prevention information. A clearinghouse/library containing periodicals and technical documents relating to pollution prevention is available to the public. The Division also sponsors a matching grant program to demonstrate the feasibility of various pollution prevention options, or to prepare education programs. Additionally, the Division seeks to leverage existing expertise and maximize the use of public and private resources outside DNR to achieve its mission. This is particularly evident in P^2AD's applied pollution prevention research efforts with university and industry partners. P^2AD also promotes pollution prevention in the agricultural sector through various programs with the University of Georgia and the Cooperative Extension Service. P^2AD's staff consists of 11 full time positions and four contract positions and an annual budget of about $1.8 million.

Program Support Division

The Program Support Division (PSD) is responsible for providing administrative support to the department including payroll, accounts payable, cash management, budget monitoring, inventory control and computer support services. In addition, PSD coordinates strategic planning, program evaluations, business process improvement, total quality management and any other consultative service requested by the divisions. PSD has 50 full time associates and five part time associates.

Wildlife Resources Division

The Wildlife Resources Division (WRD) is responsible for conserving, enhancing and promoting the wise stewardship of Georgia's wildlife resources. WRD operates 73 wildlife management areas on more than one million acres, nine fish hatcheries, and ten public fishing areas. The division manages fish and wildlife populations as well as their habitats. This includes the following activities: stocking fish; enhancing and restoring populations of wildlife, including endangered species; monitoring populations of fish and wildlife, including game and nongame species; and, recommending laws and regulations concerning wildlife. The division also provides technical assistance to private landowners concerning wildlife and fisheries management; maintains more than 120 boat ramps on many of Georgia's rivers and lakes; monitors the status of wetlands statewide; and maps and maintains information on rare species and natural communities through the Georgia Natural Heritage Program. WRD also enforces all state laws and regulations on hunting, fishing, endangered species, boating, and environmental protection and strives to educate the citizens about responsible stewardship. WRD provides information on Georgia's wildlife and natural communities to the public, local governments and other agencies. WRD does its work with a staff of 509 positions and an annual budget of $34.5 million.

Vision

Georgia's natural, historic and cultural resources will be...

- better tomorrow than they are today.
- abundant, diverse, clean, well managed and protected.
- available for everyone to use and enjoy.

The people of Georgia should...

- appreciate the importance of sustaining and enhancing the state's natural, historic and cultural resources.
- take an active role in the work of the department.
- see the department as a responsive and responsible agency working to protect and conserve Georgia's natural, historic and cultural resources.
- trust and respect the department for its decisions and actions.

The Georgia Department of Natural Resources will be widely recognized as a public agency that...

- listens carefully and responds to the opinions of the people it serves.
- makes wise decisions for the common good of the people.
- uses its resources and spends tax dollars wisely.
- provides excellent customer service.
- enforces state laws fairly and vigorously.

Mission

The Mission of the Department of Natural Resources is to sustain, enhance, protect and conserve Georgia's natural, historic and cultural resources for present and future generations.

1

Direction One

Georgia's Resources

Sustain, enhance, protect and conserve Georgia's natural, historic, and cultural resources to provide continuing ecological, social and economic benefits.

Strategies

1. Enhance existing mechanisms to vigorously, yet fairly, enforce laws and regulations to protect Georgia's natural, historic, and cultural resources.
2. Enhance programs that encourage the safe and sustainable use of Georgia's natural, historic, and cultural resources.
3. Develop and implement initiatives based on an ecosystem management approach.
4. Enhance sustainable development of public and private resources within Georgia through pollution prevention and waste reduction.
5. Increase activities to supplement existing revenues to sustain Georgia's natural, historic, and cultural resources.

Objective One

Sustainable Use

Encourage sustainable uses of Georgia's natural, historic, and cultural resources which provide continuing ecological, social and economic benefits for present and future generations.

Georgia's natural, historic and cultural resources are available for public use and enjoyment. To ensure that future generations have these same privileges, the Department of Natural Resources must enact strategies which seek to balance the use of these resources with their protection. The Department will implement carefully developed management strategies to sustain our resources while continuing to foster healthy living conditions, provide recreation opportunities and contribute to a healthy economy.

Sustainable Use - Action Items

Department:

- By December 30, 1997, within the limits of available funding, purchase lands along Georgia's rivers so as to extend currently protected corridor lands or to connect currently separate tracks of protected lands.

Coastal Resources Division:

- On a continuing basis, the Director will appoint representatives to serve on interjurisdictional and interagency teams and efforts. Examples are the interjurisdictional fishery management processes which will continue during FY 96-97 and interagency efforts such as sampling associated with the LCP Superfund Site in Brunswick which will continue until the site cleanup is completed.
- CRD will continue to work with the Saltwater Advisory Committee and the Coastal Advisory Committee to seek ways to supplement existing revenue sources or develop new revenue sources to sustain coastal Georgia's vital natural resources.
- By May 1996, CRD will complete Georgia's Coastal Management Program and seek approval from Governor Miller. If approved, implementation of the program will begin in FY 97.
- By June 1, 1996, CRD will implement a plan to reduce the bycatch of unwanted fish caught during shrimp trawling operations to the DNR Board.
- By June 1997, CRD will evaluate a pilot program of P.O.S.T. certified marine biologists initiated in July 1995.

Environmental Protection Division:

- In November 1995, begin implementation of the Title V Air Permitting Program with a first priority of issuing all synthetic minor permits in 1996.
- By November 1995, ensure that all municipal solid waste landfills are in compliance with current standards or are on enforceable compliance schedules.
- By November 1995, complete the framework for a watershed management approach and river basin planning to address water quality and water supply issues. Complete the watershed plans for the Chattahoochee (including the water quality model) and Flint River Basins by December 1997, and continue the Tallapoosa, Coosa and Oconee plans into 1998.
- By January 1996, begin implementation of a State-wide Ambient Air Toxics Monitoring program and add to this network annually to fully monitor toxics state-wide by 1998.
- By January 1996, implement an EPD Hazardous Site Remediation program which will expend a minimum of $12 million annually through the use of EPD contractors.
- By January 1996, develop a draft (for public comment) of a coastal groundwater strategy to protect the Floridan Aquifer from salt-water encroachment. Complete the public involvement and begin implementing a final plan by July 1996.
- By March 1996, initiate two new placed-based environmental initiatives. Continue the Southern Appalachian Mountains Initiative thru 1996 and complete the Brunswick Initiative in 1996.
- By March 1996, develop the GIS capability to estimate population demographics at varying distances from sources of environmental releases. Use the capability to determine the risk of the populations to adverse health effects from the releases.
- Adopt water quality standards for Georgia's public lakes as follows: Walter F. George - April 1996; Jackson Lake - August 1996.
- By May 1996, develop regulations for long-term water supply planning and permitting.
- By June 1996, prepare and initiate an implementation strategy for the protection of drinking water from cryptosporidium and other related microbes.
- By July 1996, ensure that each private industry solid waste disposal facility has a design and operation plan, closure and post closure plan, groundwater monitoring, methane monitoring, and a financial responsibility mechanism.
- Complete by October 1996, the Tri-State Water Study with the States of Alabama, Florida, and the U. S. Army Corps of Engineers.
- By October 1996, complete development and begin implementation of a vehicle I/M program in the Atlanta area.
- By July 1997, complete and begin implementation of an Atlanta Area Ozone Attainment Plan in order to demonstrate attainment of the ozone ambient air standards in 1999.
- By December 1997, complete development of a Clean Fueled Fleet Program to be implemented in 1998.

Historic Preservation Division:

- Annually, through press releases, workshops, state conferences, publications and project assistance, increase the public's understanding that historic preservation is a factor in sustainable development through reuse of existing infrastructure, redevelopment of downtowns and intown neighborhoods, recycling of buildings, and reduction of landfills by reducing demolition.
- By June 30, 1996, prepare draft legislation to allow for an income tax deduction for rehabilitation of owner-occupied historic properties.

- By June 30, 1996, prepare draft legislation for a Georgia Historic and Cultural Museum Program.
- By June 30, 1996, assist the Georgia Civil War Commission in integrating its land protection goals into the overall land protection goals of DNR.
- By January 1, 1997, convene discussions with GDOT on the development of alternative highway and bridge design standards for historic areas, to protect the character of these areas for the future.
- By July 1, 1997, accelerate the rate of identification and evaluation of historic properties, by seeking outside funds, partnering with local governments and non-profits, and reallocating existing resources.
- By July 1, 1997, substantially increase the funding for the Georgia Heritage 2000 grant program, in order to meet existing needs for historic property rehabilitation, African-American heritage initiatives, and a heritage museum assistance program.

Pollution Prevention Assistance:

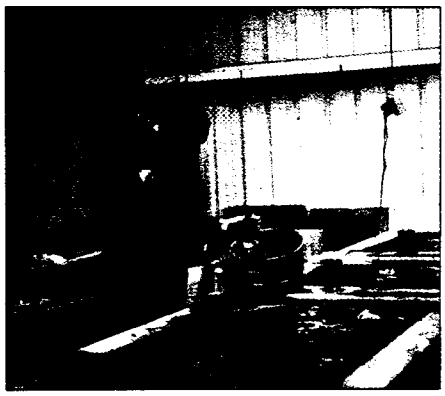
- By July 1, 1996, institutionalize the Division's coordination role within the state for providing pollution prevention assistance to businesses and others in order to improve operational efficiency of such programs.
- By July 1, 1996, institutionalize the Division's matching grant program using state funds to promote development of innovative pollution prevention programs, strategies, and technologies by industry, local governments, and others.
- By July 1, 1996, complete the transfer of the waste oil recycling program from the Environmental Protection Division (EPD).
- By January 1, 1997, develop a series of technical publications aimed at presenting "state of the art" technologies and "best in the class" solutions to pollution prevention issues identified during the manufacturing sector assessment project within Georgia.
- By July 1, 1997, broaden the on-site pollution prevention assistance program to include expanded client training opportunities, exposure to the concepts of full cost accounting and life cycle analysis, and assistance in preparing tools to establish proactive company outreach activities for the community, vendors and suppliers.

Parks Recreation and Historic Sites Division:

- By March 30, 1996, seek $500,000 funding for Recreation Assistance Fund.
- By June 30, 1997, operate three new interpretive education centers to educate the public about the natural and cultural resources at the state's parks and historic sites.
- By June 30, 1997, expand and improve at least two existing interpretive centers.

Wildlife Resources Division:

- By June 30, 1996, complete a conservation plan to resolve landowner conflicts regarding the red-cockaded woodpecker.
- Manage the Altamaha River System to favor native fish species through implementation of the flathead catfish management plan by June 30, 1996.
- By June 30, 1996, design a Wildlife Conservation vehicle tag and marketing plan to raise funds for the Nongame-Endangered Wildlife Program; have Wildlife Conservation vehicle tags available for sale to the public by January 1, 1997.
- Advocate passage of the Fish and Wildlife Diversity Funding Initiative in Congress; by June 30, 1996, achieve support of the majority of Georgia's congressional delegation for this initiative.
- By June 30, 1996, improve hunter and boating safety by rigorously enforcing fluorescent orange, hunting under the influence and boating under the influence laws by making a minimum of 1,250 violator contacts regarding these laws during FY 1996.
- Complete the first year neotropical bird management plan by June 30, 1996; and complete the second year plan by June 30, 1997.
- Obtain names and addresses of all migratory bird hunters in Georgia by March 31, 1997, to comply with federal Harvest Information Program.
- By June 30, 1997, add 800 element occurrence records to, and maintain, the Georgia Natural Heritage databases on rare species and natural communities.
- By June 30, 1997, complete the initial boundaries layer of the state lands GIS databases, and evaluate GIS and GAP analyses for division use in best management of wildlife resources for public and private lands.



1

Direction One

Georgia's Resources

Sustain, enhance, protect and conserve Georgia's natural, historic, and cultural resources to provide continuing ecological, social and economic benefits.

Strategies

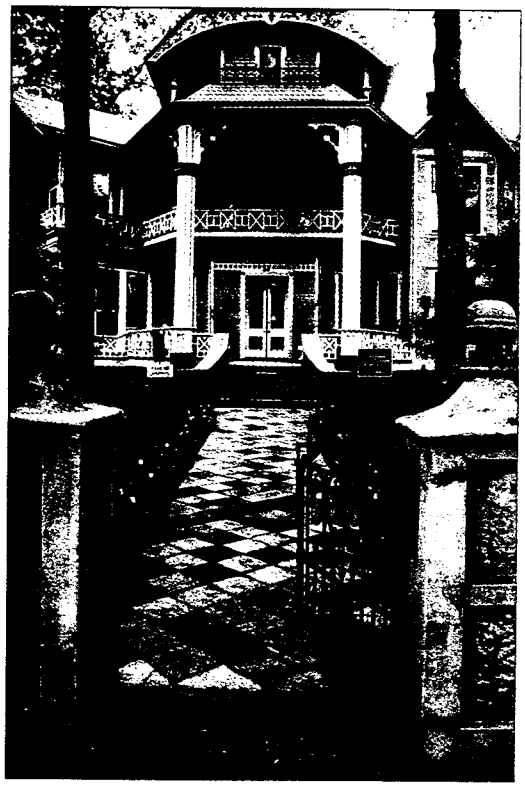
1. Identify and acquire Georgia's natural, historic, and cultural resources for which State ownership is needed and appropriate.
2. Develop and implement standards and guidelines to protect and/or conserve the natural, historic, and cultural resources on DNR properties.
3. Develop and implement maintenance schedules to meet needs of facility expansion and property acquisitions.
4. Upgrade DNR structures and facilities for accessibility.

Objective Two

DNR Properties and Facilities

Acquire, or otherwise protect, Georgia's natural, historic and cultural resources in need of protection. Manage and maintain all DNR-operated lands and facilities in a manner that preserves their functional integrity, while providing opportunities for economic growth.

The Department of Natural Resources has a dual responsibility to provide safe recreational areas for public use and enjoyment while protecting the natural, historic and cultural resources found on these areas. In order to meet these responsibilities, the Department will continue to acquire or take other steps to protect sensitive lands and historic properties throughout the state. The Department will continue to manage all of our lands in a manner which conserves the resources found there. Finally, where appropriate, the Department will continue to build and/or maintain facilities which provide safe recreational opportunities for everyone.



DNR Properties and Facilities - Action Items

Department:

- By June 30, 1996, have the following barrier islands placed under DNR's jurisdiction, and develop and implement rules to protect the important colonial waterbird habitat they contain: Egg Island Bar, Pelican Spit, Satilla River Marsh Island, St. Catherines Island Bar and Williamson Island.

  By June 30, 1996, complete Preservation 2000 land acquisition program.

Coastal Resources Division:

- According to an established schedule beginning in fall 1995, CRD will perform inspections of field research gear, facilities, boat ramps, piers, and artificial reef buoys under CRD's control to repair, upgrade, replace or expand as required.
- On a continuous basis, CRD will evaluate handicapped accessibility and remove barriers to all facilities and structures.
- By May 1997, CRD will execute a memorandum of understanding with other state agencies which will ensure coordinated management of resources in Georgia's 11 county coastal management boundary according to the policies in Georgia's coastal management program.
- By June 1, 1996, CRD will complete an evaluation of privatization of offshore buoy maintenance and artificial reef construction programs.

Historic Preservation Division:

- By December 31, 1996 provide to DNR Divisions training and information to ensure that historic and cultural properties owned by DNR are maintained and treated according to currently accepted laws and standards.

Parks and Historic Sites Division:

- By June 30, 1996, update the listing of in holdings and edge holdings for park and historic sites.
- By October 30, 1996, prioritize the listing of in holdings and edge holdings for acquisition/donation.
- By June 30, 1997, complete 10 General Development Plans to guide new facility construction and renovations based on the plans.

Wildlife Resources Division:

- By June 30, 1996, complete the forest management plan for all state-owned lands which the Division manages.
- By December 31, 1996, complete the Americans with Disabilities Act transition plan for access to divisional facilities and services.
- By June 30, 1997, complete rare plant species and natural plant community surveys and reports on 15 (total) wildlife management areas and public fishing areas.

2

Direction Two

The People of Georgia

Work in partnership with all Georgians to resolve problems and promote responsible stewardship of Georgia's natural, historic and cultural resources.

Strategies

1. Increase partnerships with other organizations including: local, state, and federal governments; the academic community; and conservation organizations.
2. Increase partnerships with *private sector* organizations.
3. Increase partnerships with *individual citizens.*

Objective One

Partnerships

Develop alliances with governmental and non-governmental organizations and individuals to strengthen the Department's ability to achieve its vision and mission.

The Department of Natural Resources is committed to maintaining our high standards of public service and resource protection. One approach to maintain service levels is to develop strong partnerships with other government entities, non-profit organizations, corporations and individual volunteers. The Department of Natural Resources is committed to developing new partnerships and maintaining existing ones in order to continue conserving Georgia's natural, historic and cultural resources and serving our customers.

Partnerships - Action Items

Coastal Resources Division:

- By March 1996, CRD will complete a cooperative study with the U.S. Army Corps of Engineers to evaluate the impacts of dredging on adjacent waters in and around St. Simons Sound.
- By August 1, 1996, CRD will complete a joint pilot sounds mapping study with Skidaway Institute of Oceanography.
- By August 1996, CRD will finish a cooperative agreement with The Nature Conservancy to help protect and preserve the Altamaha River biosphere watershed.
- By June 30, 1997, a controlled access plan for the blue crab fishing industry will be completed.

Environmental Protection Division:

- Continue the partnerships initiated in 1995 through the Small Business Assistance Program for Air Quality issues.
- By January 1996, finalize a Memorandum of Agreement with the Environmental Health Section of the Department of Human Resources for coordination and assistance on: Emergency Response, Safety of Open Waters for Recreation, Health Safety of Hazardous Sites, Risk Communication and overall health/environmental impact studies.
- By March 1996, start two four-month industrial sector compliance partnership initiatives, and identify additional compliance partnership initiatives by September, 1996 to be implemented by November, 1996.

Historic Preservation Division:

- By June 30, 1996, work with HUD, GHFA and DCA to create an Interagency Task Force on Affordable Housing and Community Conservation, and begin implementation of steps to help communities better use historic resources.
- By December 31, 1996, work with the African American Historic Preservation Committee and Network to implement the "Georgia African American Historic Preservation Strategic Plan 2000."
- By December 31, 1996, develop agreements with local governments and RDC's —where warranted— to delegate to them Section 106 review in appropriate situations.
- By July 1, 1997, expand the Regional Historic Preservation Planning program to provide statewide coverage and full-time preservation services.

Pollution Prevention Assistance:

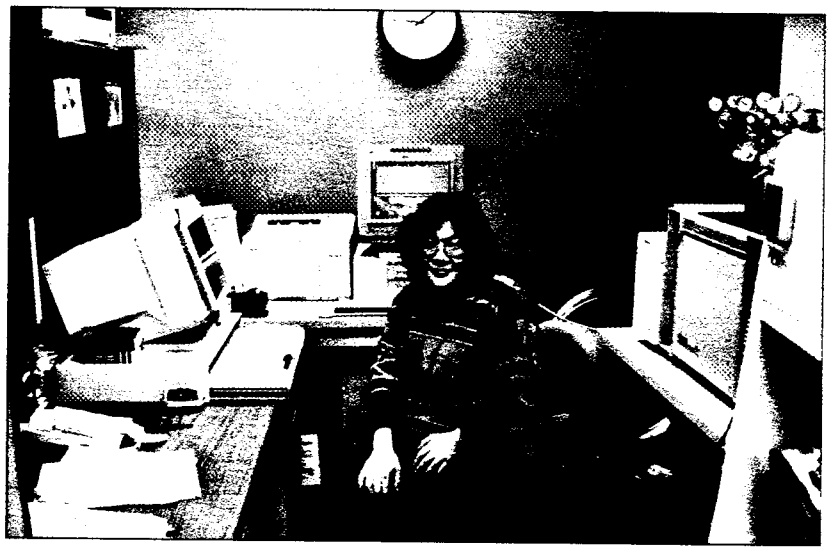
- By January 1, 1996, establish a partnership with the City of Atlanta and Clark Atlanta University to develop a model local government program to address some environmental justice issues through pollution prevention.
- By February 1, 1996, establish a formal agreement with the Southeast Environmental Resource Alliance (SERA) to facilitate the transfer of technologies developed by the U.S. Department of Energy at the Savannah River Plant to the commercial sector in Georgia, and use its resources to assist the Division to achieve its mission.
- By February 1, 1996, establish a formal agreement with the Economic Development Institute (EDI) at Georgia Tech to incorporate pollution prevention assistance into their regional industrial extension program in order to assist the Division in achieving its mission.
- By July 1, 1996, prepare a plan to assist local governments in addressing priority household hazardous waste prevention and management issues identified by the Household Hazardous Waste Work Group.
- By October 1, 1996, complete evaluation of local government interest in developing local pollution prevention programs or activities.
- By July 1, 1997, institutionalize the agricultural pollution prevention pilot program funded by the Division through the Agricultural Extension Service at the University of Georgia.
- By July 1, 1997, develop a program to institutionalize pollution prevention and energy efficiency within all state agencies.

Parks and Historic Sites Division:

- By June 30, 1996, develop a management agreement for the possible second party management of primitive camping lodges similar to the walk-in lodge at Amicalola Falls State Park.
- By June 30, 1996, assemble in-house task force to examine the Division's resale items policies.
- By October 30, 1996, contract with private vendors to repair and maintain the state's historic markers.
- By March 31, 1997, initiate a volunteer recruitment program that matches volunteer skills with the individual volunteer needs of each site.
- By June 30, 1997, develop one additional nonprofit partnership similar to the North Georgia Heritage Association.

Wildlife Resources Division:

- By January 1, 1996, execute 50-year lease agreements with Georgia Power Company to allow the Department to operate as wildlife management areas 13,000 acres of Georgia Power Company's property at four locations.
- By June 1, 1996, execute an agreement by which Oglethorpe Power Company will provide financial support for the Department to operate Rocky Mountain Public Fishing Area.
- By June 30, 1996, implement changes in the Turn In Poachers (TIP) Program which will increase by 50% its use by citizens to report violations.



2

Direction Two

The People of Georgia

Work in partnership with all Georgians to resolve problems and promote responsible stewardship of Georgia's natural, historic, and cultural resources.

Strategies

1. Establish public involvement procedures to proactively seek input into the Department's policy and decision-making process.
2. Effectively use information technology to improve public access to information and services.
3. Expand access to DNR resources, facilities, programs, and services for traditional and non-traditional user groups.

Objective Two

Public Involvement

Give the public convenient access to public facilities, programs, and information for which the Department is responsible, and make decisions in a manner which citizens perceive to be fair.

Georgia's citizens are our state's most valuable resource. The Department of Natural Resources recognizes that we cannot fulfill our mission without the support of Georgians. The Department will strive to involve citizens in planning and decision making. Advisory committees, focus groups and other avenues for meaningful and constructive participation will become more prevalent in the future. In addition, the Department will take steps to make sure that all citizens have easy access to information and services.

Public Involvement - Action Items

Department:

- By June 30, 1996, develop and test a Departmental World Wide Web Home Page to improve access to information and services. By June 30, 1997, make DNR Home Page available to the public on the World Wide Web.

Coastal Resources Division:

- Existing relationships with citizen advisory committees (Saltwater Advisory Committee, Coastal Advisory Committee, Coastal Fisheries Advisory Committee, Blue Crab and Shrimp Issues Subcommittees, Turtle Excluder Device Subcommittee) will be continued.
- By March 30, 1996, CRD will seek consensus from the Coastal Advisory Committee for approval of the Coastal Management Plan.
- By April 1996, CRD, in conjunction with WRD, will seek partnership with and input from individual citizens to further reduce sea turtle mortalities.
- By January 1997, working in concert with industry advisors, CRD will identify additional management measures to restore blue crab stocks.
- By June 1997, a 1-800 telephone line to access saltwater sportfish information will be established.

Environmental Protection Division:

- By January 1996, complete a Division-wide Strategic Plan for information and data management, including mechanisms for improved public access to information.
- By September 1996, secure a fully staffed and operational Customer Assistance Program which will perform public involvement functions including: a 1-800 information and access phone service, an electronic bulletin board, preparation of an annual environmental report, preparation of a quarterly newsletter, and other outreach programs.

Historic Preservation Division:

- Develop an annual HPD action plan, according to federal requirements, based on public input and formal consultation with preservationists, user groups, local governments, and the general public.
- Annually seek input from groups not traditionally involved in preservation — including Native Americans, African American, and physically challenged populations — in the development of priorities, funding, criteria, and historic resource programs of HPD.
- By June 30, 1997, initiate development of a DNR/HPD Geographic Information System (GIS) for historic and archeological resources, to promote easy access by local governments, RDCs, and others to historic resource data and HPD program information.

Pollution Prevention Assistance:

- By July 1, 1996, expand the current public involvement program (consisting of surveys, focus groups, work groups, and public comment techniques) to address issues in all manufacturing sectors, service sectors, the agricultural arena, and on household hazardous waste prevention and management.
- By July 1, 1996, expand the pilot program using the Internet to provide electronic access to the Division's pollution prevention information center.

Parks and Historic Sites Division:

- By April 1, 1997, make at least 80% of all state park and historic sites office/visitor centers accessible to people with disabilities by removing architectural barriers.
- By June 30, 1997, update the Division's American Disabilities Act Transition Plan to evaluate progress made in making programs and facilities accessible.
- By August 31, 1997, install Park Reservation Database to all parks to increase efficiency of the Reservation Resource System.

Wildlife Resources Division:

- By April 1, 1996, have sportsman's license and archery/firearms combination license available for sale to Georgia hunters and anglers.
- By April 1, 1996, implement telephone license sales using the 1-800-ASK-FISH system.
- By June 30, 1997, obtain state funding for the architectural design of the education complex at the Charlie Elliott Wildlife Center.

2

Direction Two

The People of Georgia

Work in partnership with all Georgians to resolve problems and promote responsible stewardship of Georgia's natural, historic, and cultural resources.

Strategies

1. Increase efforts to educate and inform the *general public* about Georgia's natural, historic, and cultural resources and encourage wise use of these resources.
2. Increase efforts to educate and inform *school children and educators* about Georgia's natural, historic and cultural resources and encourage wise use of these resources.
3. Increase efforts to educate and inform *industry* of Georgia's natural, historic, and cultural resources, and to encourage wise use of these resources.
4. Increase efforts to inform *Georgia's state and national legislators* about Georgia's natural, historic and cultural resources and DNR's programs and activities.

Objective Three

Education and Advocacy

Promote public education about the values and vulnerabilities of Georgia's natural, historic and cultural resources and strongly advocate the conservation and wise stewardship of these resources.

The Department of Natural Resources is dependent on the citizens of Georgia to help fulfill our mission. Strategies for conserving our natural, historic and cultural resources increasingly rely on voluntary or incentive-based actions. These solutions place more responsibility in the hands of the average citizen for conserving our natural, historic and cultural resources. The Department recognizes this and is committed to providing Georgians of all ages with appropriate educational opportunities which will assist them in making wise decisions regarding our state's resources.

Education and Advocacy - Action Items

Department:

- In 1996 & 1997, conduct a legislative forum and participate in the new legislature briefing at University of Georgia's Carl Vincent Institute of Government.
- By April 1, 1996, develop a comprehensive communication plan.

Coastal Resources Division:

- CRD will participate in one GPTV feature story in FY 96 and two in FY 97. Beginning in FY 97, CRD will include regular features on responsible resource use on its Home Page.
- In FY 96, CRD will establish at least one Partner-In-Education Program.
- During October 1996, CRD will host "CoastFest" to inform the public about Georgia's coastal resources. By January 1996, CRD will request federal funds to sponsor further CoastFests with the Georgia Conservancy.

Environmental Protection Division:

- By November 1995, establish a task force to examine environmental education outside of formal school programs. The task force shall complete its work by November 1996.
- By April 1996, prepare and distribute a directory of all EPD guidance, technical assistance and education documents as well as all rules and statutes. Establish and implement a process for easy public access to these documents.
- By December 1996, and annually thereafter, prepare and issue a summary report on the environmental quality of Georgia's air, water, and land, and on the progress toward addressing Georgia's environmental issues.

Historic Preservation Division:

- Continually cultivate media contacts on various preservation-related topics, and send regular story ideas and press releases to them at least bimonthly.
- By June 30, 1996, expand legislators' understanding of HPD program and needs through sponsorship of annual targeted tours and meetings with key members of the Legislature during the DNR budget development process.
- By June 30, 1996, prepare draft legislation for a Georgia Historic and Cultural Museum Program.

Pollution Prevention Assistance:

- Beginning January 1, 1996, annually conduct at least three workshops designed to address specific pollution prevention issues. These workshops may range from technical to management concerns.
- By July 1, 1996, establish a formal multi-tiered certification program to recognize companies that have internalized pollution prevention into their business planning, and have made substantial reductions in waste generation.
- By July 1, 1996, establish an annual governor's award for excellence in pollution prevention by industry, government, and others that have made a significant contribution to the reduction of pollution at the source within the state.
- By December 1, 1996, establish a formal outreach program designed to foster a pollution prevention ethic by homeowners and business within Georgia.
- By July 1, 1997, develop a program designed to instill a pollution prevention ethic in students at all levels within the state educational system.

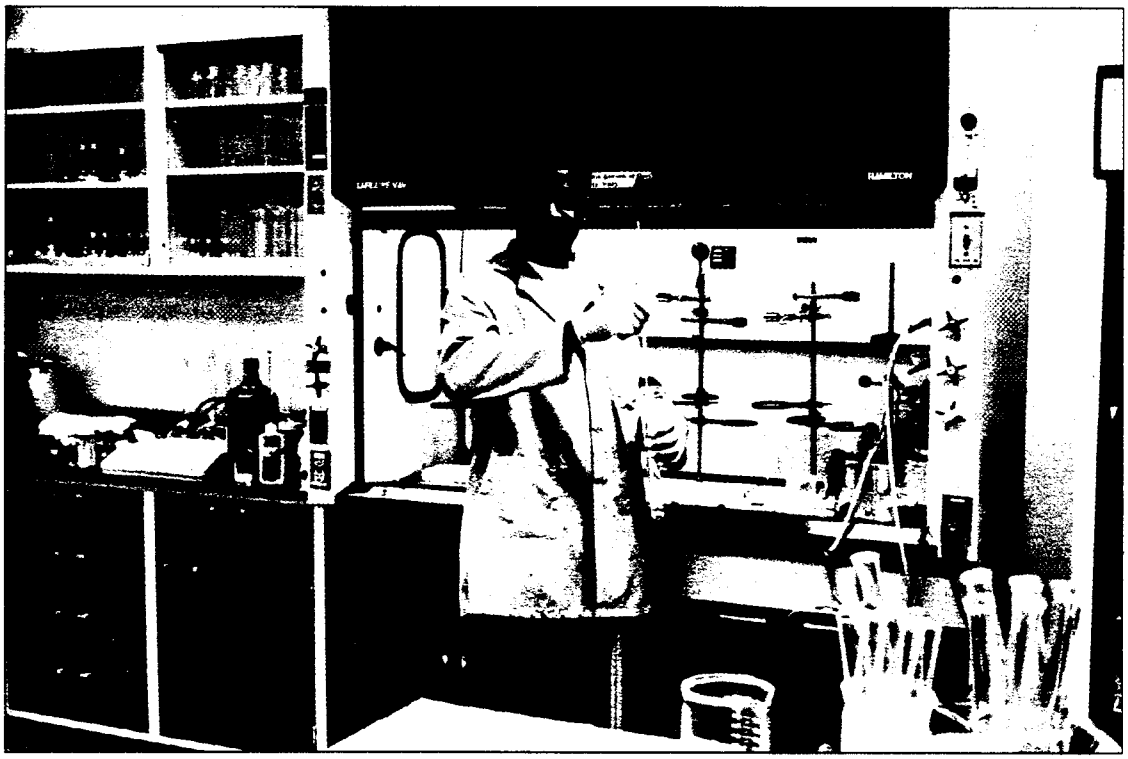
Parks and Historic Sites Division:

- By March 31, 1996, develop a school resource brochure to inform school teachers about the environmental, cultural, historical and natural resource programs and videos available within the PRHS system.

Wildlife Resources Division:

- By June 30, annually reach agreement with local school systems to open one new cooperative educational center comparable to the one at Armuchee Game Management Office.
- By January 1, 1996, complete the division's educational plan, including goals and objectives for directing the division's educational efforts.
- By June 30, 1996, educate at least 17,000 students about wildlife and natural resource issues through the Charlie Elliott Wildlife Center Discovery Area and Wildlife Outreach Program.
- Administer grant program jointly with the Georgia Department of Education to establish outdoor classrooms at schools across the state: award $10,000 by June 30, 1996.
- By June 30, 1996, arrange for officers from the Law Enforcement Section to visit 75% of all Georgia elementary schools to perform educational programs.
- By June 30, 1996, modify and improve hunter education program with goal of annually training at least 20,000 students in hunting safety.

- By June 30, 1996, improve aquatic education by hosting at least 150 educational tours for school groups at hatcheries and public fishing areas and by conducting or providing support for 130 Kids Fishing Events
- By June 30, 1996, produce a *Guide to Georgia's Protected Wildlife* and *A Guide to Protected Plants* in Georgia and distribute both publications to all public schools and libraries in the state.
- By June 30, 1997, complete a research project to determine participation in hunting activity by hunter safety course graduates.
- By June 30, 1997, improve aquatic education by hosting at least 165 educational tours for school groups at hatcheries and public fishing areas and by conducting or providing support for 200 Kids Fishing Events.



3

Direction Three

The Department of Natural Resources

Enhance the ability of the Department to carry out its mission by maintaining a skilled workforce motivated by a commitment to efficiency and quality in managing the resources of the state and serving the customer.

Strategies

1. Develop formal structures to institutionalize the principles of Total Quality Management in the Department.
2. Train all DNR associates in the principles of Total Quality Management.
3. Develop and use performance measures to track and improve program effectiveness.
4. Decentralize administrative processes and operations to ensure that decisions are made at the lowest possible level and that services are close to the customers.

Objective One

Total Quality Management

Encourage in all associates a dedication to customer service, and continually improve the efficiency and effectiveness of DNR operations.

Citizens justifiably expect a great deal of service from government in return for their tax dollars. Public expectations are increasing faster than are the supplies of money and people required to provide these services. While expectations are increasing, the public is increasingly unwilling to pay for services they perceive as unnecessary or poorly managed. In order to meet these challenges, the Department is committed to efficiency through continuous improvement and increased focus on customer service. In the future, the principles of Total Quality Management will be evident in everything we do.

Total Quality Management - Action Items

Department:

- In FY 1996 and FY 1997, use DNR's Strategic Plan and Division Action Plans to develop performance measures and to assign specific responsibilities to associates.
- By June 30, 1997, develop and implement a departmental training program to train DNR associates in the principles of Total Quality Management. Divisions will provide additional training on an as needed basis.

Coastal Resources Division:

- By March 30, 1996, CRD will have completed a review of internal accounting processes and will have installed whatever system is determined to best meet CRD's accounting needs.

Environmental Protection Division:

- By April 1996, complete an evaluation of additional decentralization of EPD operations on a regional basis.
- By April 1996, complete EPD's first phase of privatization by awarding a contract for Atlanta Vehicle I/M Overview and by completing feasibility studies for the Asbestos, Underground Storage Tank and Fee Collection Programs.
- By July 1996, implement new administration and efficiency procedures (including privatization) in the Underground Storage Tank Program.
- By September 1996, develop and submit to EPA a Performance Partnership Agreement which consolidates EPD's various environmental program plans into one comprehensive plan, and submit a Performance Partnership Grant application to EPA which consolidates all EPA program grants into one environmental program grant. The Performance Partnership Agreement will include environmental performance measures.

Historic Preservation Division:

- Continue to form and empower teams of HPD associates to evaluate programs and processes, to identify barriers to and opportunities for improving efficiency and timeliness, and to make decisions and act upon them.
- By December 31, 1996, put in place an annual formal evaluation of the Georgia Historic Preservation Plan and action plan, and make the evaluation results available to the public.

Pollution Prevention Assistance:

- By January 1, 1996, initiate a formal quarterly program review to identify and resolve problems and issues on specific program activities.
- By January 1, 1997 evaluate effectiveness of P²AD's programs in meeting industries' needs.

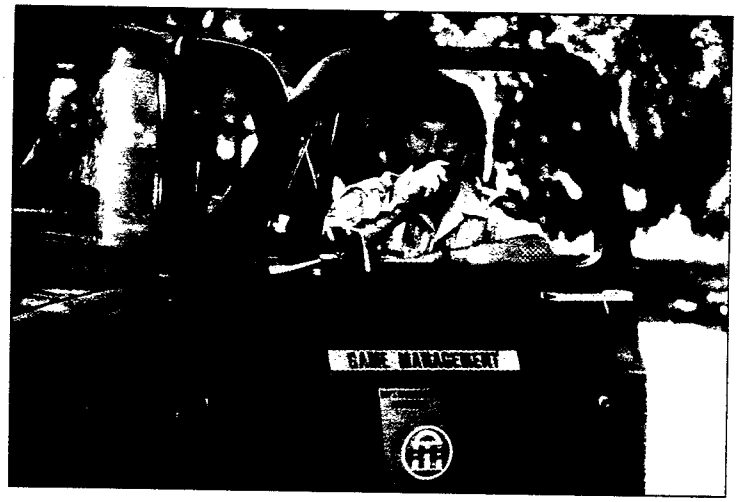
Parks Recreation and Historic Sites Division:

- By June 30, 1996, develop a parks and historic sites visitor comment card to assess the Division's commitment to teamwork and customer service. Use this card as an evaluation tool.
- By March 30, 1996, provide disability awareness training for all associates to promote an understanding of our disabled customers.
- By June 30, 1996, develop an employee incentive reward program that rewards associates for their commitment to the Division's Total Quality Management program

Program Support Division:

- By January 1996, establish a cross divisional team and complete new contract routing procedures. End date March 1996.
- By January 1996, complete revisions to the Property Control System to drop out items under $1,000 and complete development of procedures and recommend system for controlling non PROPS items. End date March 1996.
- Between February and March 1996, establish a cross divisional team (Division directors and/or one or two levels below) to establish a time table for the preparation, review and completion of the FY 1998 budget request, in conjunction with the integration of the Strategic Planning process.
- By March 1996, complete review of how best to decentralize the budget revisions process on an "as requested" basis. Budget revisions include all budget changes that do not require OPB approval.
- By March 1996, complete the revision of all budget request form/ procedures from Symphony to WordPerfect (for the FY-98 budget request process).
- By March 1996, begin request to Department of Administrative Services to increase our delegated purchasing authority and revise procurement procedures accordingly. End date 1996.

- By May 1996, establish a cross divisional team and complete recommendation, by October 1996, for a new vehicle accounting system to replace the current system.
- By July 1996, establish a cross divisional team and begin evaluation of new state credit card the Department of Administrative Services expects to have available. End date December 1996.
- By July 1996, establish a cross divisional team and begin implementation of State Purchasing Information Network. End date December 1996.
- In the first quarter of FY 1996 and FY 1997, the audit unit supervisor will meet with all section chiefs and above to discuss audit needs and trends.
- By December 1996, begin to convert Annual Operating Budget forms from Symphony to WordPerfect. End date February 1997.



Wildlife Resources Division:

- By September 1, 1996, the division-wide license team will complete a consultant's analysis and evaluation of the hunting and fishing license issuance process, to determine what changes are necessary to achieve better and more cost-effective service to the public, and determine what changes in laws, rules and regulations are required to affect the changes which the surveys and consultant's study indicate are desirable.
- By September 30, 1996, complete a study of the boat registration process to determine the feasibility of improving customer service by decentralizing/privatizing all or part of the process contingent on a computer upgrade being funded.

3

Direction Three

The Department of Natural Resources

Enhance the ability of the Department to carry out its mission by maintaining a skilled workforce motivated by a commitment to efficiency and quality in managing the resources of the state and serving the customer.

Strategies

1. Develop and implement innovative hiring practices to recruit a qualified, motivated and diverse work force.
2. Inform all DNR associates of Departmental activities, policies, and procedures.
3. Train appropriate DNR associates in the concepts of sustainable development, ecosystem management and pollution prevention.
4. Provide and encourage professional development opportunities for DNR associates.
5. Explore options to alleviate crowded working conditions (e.g. expanded work space, telecommuting, etc.)
6. Maximize the use of information technology to ensure that all associates have the information they need, when they need it and in the form they need it in.

Objective Two

Workforce and Workplace

Enhance the Department's professional workforce, and provide all DNR associates with the training, work environment and tools needed to perform their jobs efficiently and effectively.

The Department of Natural Resources' greatest asset is our associates. Without their continuing commitment, we would be unable to meet the demands of the future. The Department of Natural Resources is committed to our associates and will make every effort to provide them with the optimum training and development, equipment and working environment needed to do their jobs.

Workforce and Workplace - Action Items

Department:

- In FY 1996 and FY 1997 implement Georgia Gain in accordance with Merit System policies and deadlines.
- By January 31, 1996, develop an information technology plan.
- By February 20, 1996, develop an internal operations plan to address staff needs and to establish policies and for schedules and alternate work sites during the Olympic Games. Divisions will do additional planning as needed.
- By April 30, 1996, develop an orientation program for new associates and managers. Divisions will continue to provide additional orientation as needed.
- By April 30, 1996, implement changes to improve the hiring process. Changes may include: advertisement of employment opportunities on the Internet, automated phone system for applicants, internal applicant database, and new funding and on the job training to recruit female and minority applicants.

Coastal Resources Division:

- By November 1996, CRD will establish a pilot northern regional office. Pilot services will include marsh and shore permitting and revocable licenses activities.

Environmental Protection Division:

- By December 1995, provide the "Management Tool Kit" training to all EPD managers.
- By January 1996, develop and implement a pilot program for cross training EPD managers.

Historic Preservation Division:

- By June 30, 1997, develop a professional development program plan for all HPD staff — for consideration by all DNR divisions — that includes the following:
- Linkage to the University System, providing low-cost courses and training to state employees.
- Advanced public policy training for top-level managers and program associates.
- On-site and off-site training.
- Funding to support professional development of every HPD employee on an annual basis.
- Formal orientation of all new associates that covers all divisions and responsibilities of DNR.
- Cross-training of associates.

Pollution Prevention Assistance:

- By January 1, 1996, develop a formal program for leadership and professional development.
- By July 1, 1996, establish a formal policy for staff participation in professional organizations.
- By January 1, 1996, explore telecommuting capabilities for the Division.

Parks Recreation and Historic Sites Division:

- By March 30, 1996, assemble an interdepartment Utilities Task Force to develop recommendations for energy efficiency and conservation of DNR associate residences and DNR facilities.
- By December 31, 1996, establish a utilities task force to establish standards for energy efficient retrofitting and new construction of site residences.

Program Support Division:

- In the third quarter of FY 1996, the audit unit will offer a workshop on internal controls to all work units. This workshop will be repeated every third year.

Wildlife Resources Division:

- Reinstate the wildlife associate scholarship at Abraham Baldwin Agricultural College in Tifton.
- Complete e-mail installation at all WRD district and regional offices by June 30, 1996.
- By June 30, 1997, develop mechanism for continuing education in technical aspects of wildlife management for wildlife biologists and wildlife technicians.

Strategic Planning Process

The following four-step process was undertaken to develop the Strategic Plan:

1. *Trends Analysis and Data Collection*: DNR formed a Departmental team to identify trends in natural, cultural and historic resource management. This team also conducted a customer and stakeholder analysis. This information was summarized in a written report that was used as a decision making tool throughout the planning process.

2. *Formulation of Vision and Mission*: DNR Division Directors and the Commissioner (Executive Committee) participated in a series of meetings to identify the Department's vision and mission. A facilitator from the University of Georgia's Institute of Community and Area Development (*ICAD*) planned and facilitated these meetings.

3. *Directions, Objectives and Strategies*: DNR formed a Strategic Planning Coordination Team to identify directions, objectives and strategies to help achieve the vision. This team included one member from each of the operating divisions. Team meetings were facilitated by *ICAD*.

4. *Action Plans*: Each division identified actions their division will carry out to accomplish the strategic plan. In addition, the Strategic Planning Coordination Team identified cross-divisional actions that will be taken. Action plans are based on input from division associates and the public.

The following steps will be taken to monitor implementation and update the plan as needed:

1. *Semi-Annual Updates*: Division Directors will meet twice a year to update the Commissioner on the implementation of the Strategic Plan and Division Action Plans. A written report summarizing these updates will be available upon request.

2. *Next Strategic Planning Cycle*: The next strategic planning cycle will begin in May of 1997.

3. The Strategic Planning Coordination Team will review and update the Strategic Plan as needed. In addition, all divisions will update action items for fiscal years 1998 and 1999.

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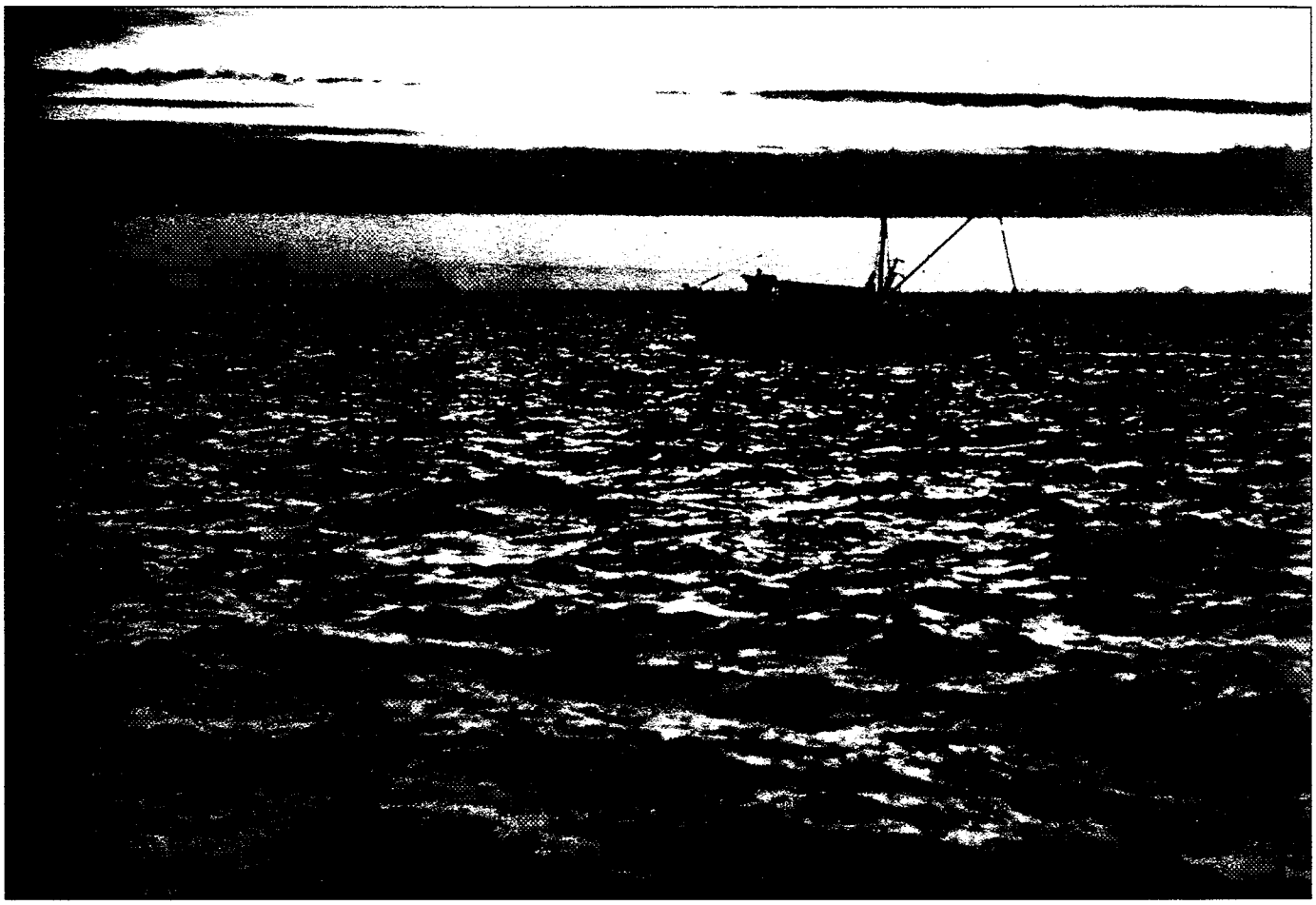

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