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**GEORGIA**  
***NONPOINT SOURCE MANAGEMENT PROGRAM***



**GEORGIA DEPARTMENT OF NATURAL RESOURCES**  
**ENVIRONMENTAL PROTECTION DIVISION**

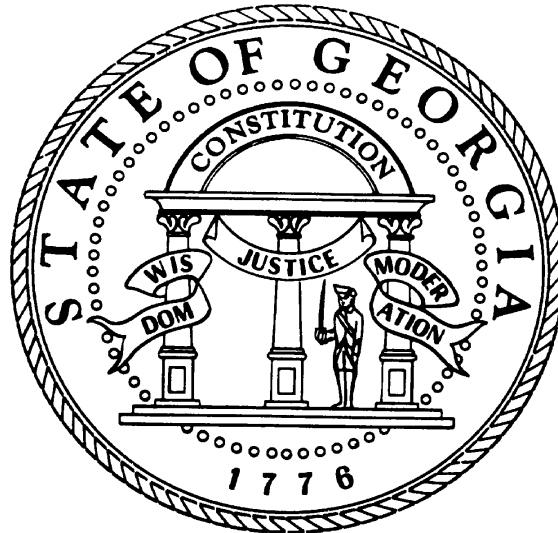
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# **GEORGIA NONPOINT SOURCE MANAGEMENT PROGRAM FFY 2000 UPDATE**

Prepared by the Georgia Department of Natural Resources  
Environmental Protection Division  
Water Protection Branch

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Cover page features the art of Emily Newdow, Druid Hills High School, Atlanta  
National Finalist in the 2000 International River of Words Poetry and Art Contest

Coordinated in Georgia by Project WET (Water Education for Teachers) Program

## EXECUTIVE SUMMARY

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

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

The control of dominant point source problems has allowed the Georgia Environmental Protection Division to place increasing emphasis on the prevention, control and abatement of nonpoint sources of pollution. This revision of the State's *Nonpoint Source Management Program* presents stakeholders with exciting opportunities to solve the remaining nonpoint source pollution problems as well as to sustain good water quality.

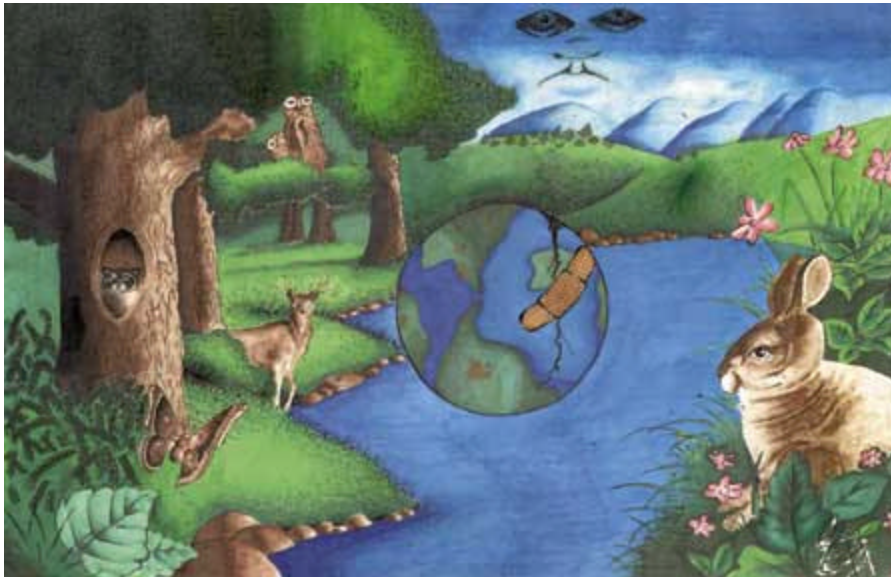
Georgia's initial *Nonpoint Source Assessment Report* and *Nonpoint Source Management Program* were completed in compliance with the Clean Water Act of 1987 and approved by the U.S. Environmental Protection Agency in January 1990. The biennial reports, *Water Quality in Georgia*, as required by Section 305(b) of Public Law 92-500, serve as the current process for updating the *Nonpoint Source Assessment Report*.

The *Nonpoint Source Management Program* combines regulatory and non-regulatory approaches, in cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, nonprofit organizations and individual citizens. This document represents a revision of the State's *Nonpoint Source Management Program*. The revision is intended to meet the requirements for funding under Section 319(b) of the Clean Water Act and to delineate short- and long-term goals and implementation strategies. Just as important, it is also designed to be an information resource for the wide range of stakeholders across the State who are involved in the prevention, control and abatement of nonpoint sources of pollution. It has been developed as an inventory of the full breadth of nonpoint source management (*regulatory* and *non-regulatory*) in Georgia, including activities which are currently underway or planned for the time period FFY00 through FFY04.

The State's *Nonpoint Source Management Program* focuses on the comprehensive categories of nonpoint sources of pollution identified by the U.S.

Environmental Protection Agency: *Agriculture, Silviculture, Construction, Urban Runoff, Resource Extraction, Land Disposal, Hydrologic/Habitat Modification and Other Nonpoint Sources*. The Georgia Environmental Protection Division solicited participation from State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, and nonprofit organizations with significant programs directed towards nonpoint source management.

The *Nonpoint Source Management Program* comprehensively describes a framework for stakeholder coordination and cooperation and serves to implement a strategy for employing effective management measures and programs to control nonpoint source pollution statewide. Further, it incorporates the nine key elements that are delineated in the *National Section 319 Program Guidance*. Through the use of a framework that addresses these key elements, Georgia will continue to have an effective *Nonpoint Source Management Program* that is designed to achieve and maintain beneficial uses of water.



***Heal the World*, Eon Justin Hatter, Avondale High School, Avondale Estates  
National Grand Prize Winner, 2000 International River of Words Poetry and Art Contest**

**Coordinated in Georgia by Project WET (Water Education for Teachers) Program**

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## INTRODUCTION

This revision of the State's *Nonpoint Source Management Program* was developed through a consultative process, incorporating input from a wide range of stakeholders involved in nonpoint source management activities throughout the State: local, regional, State and Federal agencies, as well as private, non-governmental organizations. This process encouraged intergovernmental resource sharing and increased stakeholder involvement. This revision of the State's *Nonpoint Source Management Program* established new partnerships and strengthened existing partnerships in the development and implementation of nonpoint source strategies.

The Georgia Environmental Protection Division (GAEPD) is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and groundwater. Consequently, the GAEPD has been designated as the administering or lead agency for implementing the State's *Nonpoint Source Management Program*. Regulatory responsibilities include establishing water quality use classifications and standards, assessing and reporting on water quality conditions, issuing point source discharge permits, issuing surface and groundwater withdrawal permits, and regulating land-disturbing activities. These regulatory programs are complemented by non-regulatory programs, including the Section 319(h) Nonpoint Source Implementation Grant Program, Clean Water State Revolving Fund, Georgia Project WET (Water Education for Teachers) Program, Georgia Adopt-A-Stream Program and the Georgia Water Management Campaign.

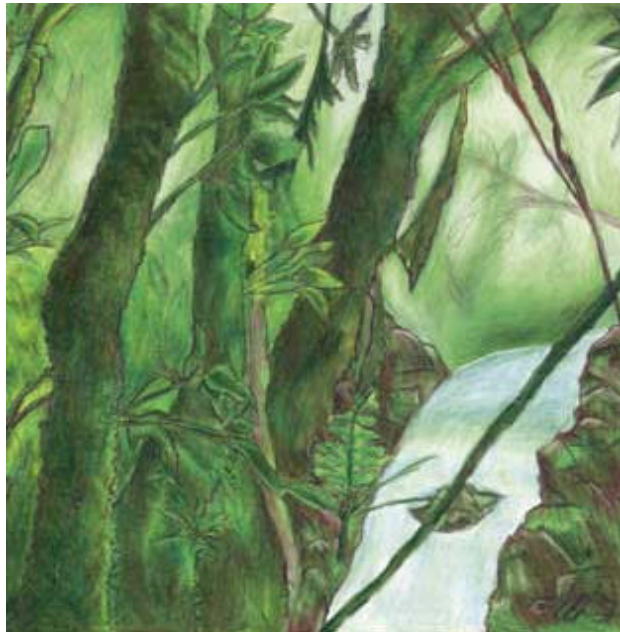
State agencies are essential partners in efforts to implement the State's *Nonpoint Source Management Program* and include the Coastal Resources Division, Pollution Prevention Assistance Division and Wildlife Resource Division within the Georgia Department of Natural Resources; Department of Community Affairs; Department of Human Resources Division of Public Health; and the Georgia Environmental Facilities Authority. The Coastal Resources Division is the lead agency in the development and implementation of the State's *Coastal Nonpoint Source Management Program*.

The Georgia Soil and Water Conservation Commission (GSWCC) has been designated by the GAEPD as the lead agency for implementing the agricultural component of the State's *Nonpoint Source Management Program*. Similarly, the Georgia Forestry Commission (GFC) has been designated by the GAEPD as the lead agency for implementing the silvicultural component of the State's *Nonpoint Source Management Program*. In addition, a Memorandum of Understanding between the U.S. Forest Service, GFC and the GAEPD, identifies the responsibilities of the participating agencies in implementing the State's *Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forest. Numerous State and Federal agencies and private, non-governmental organizations which continue to cooperate with the GAEPD, GSWCC and the GFC include: USDA Natural Resources Conservation Service, Georgia Farm Bureau, Georgia Forestry Association, Georgia Agribusiness Council, University of Georgia and the Georgia Department of Agriculture. Existing non-regulatory programs established for agriculture and silviculture have proven to be viable.

As with other activities, the State's *Nonpoint Source Management Program* will be implemented in conjunction with the State's River Basin Management Planning process. Local governments, regional development centers, private non-governmental organizations and the general public have a critical role in developing and implementing nonpoint source management strategies. The State is expanding its role in facilitation and support of local and regional nonpoint source management activities.

***Mission Statement***

We help provide Georgia's citizens clean air, clean water, healthy lives and productive land by assuring compliance with environmental laws and by assisting others to do their part for a better environment.



***Water*, Erick Brown , Avondale High School, Avondale Estates  
National Finalists, 2000 International River of Words Poetry and Art Contest**

Coordinated in Georgia by Project WET (Water Education for Teachers) Program

***Vision Statement***

Water and air throughout Georgia are clean,  
all is productive, all citizens and native species  
are safe from environmental harm.

Governments, businesses and individuals faithfully  
exceed the requirements of environmental laws.

All citizens understand the environment

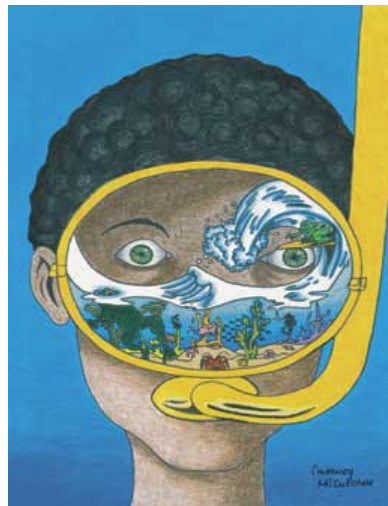
and do their part to improve it.

As Georgia grows, its land, air and water resources are managed carefully for sustained prosperity.

GAEPD's staff are motivated and empowered to use skill, common sense and fairness to protect, sustain and be stewards of Georgia's environment.

GAEPD's workforce is strategically located to maximize effectiveness and to involve communities in sustaining a high quality environment.

GAEPD helps assure that growth is managed in ways that sustain air, water and land resources.



***Submerged in the Wonder*, Courtney McCutchen, Avondale High School, Avondale Estates  
National Finalists, 2000 International River of Words Poetry and Art Contest**

**Coordinated in Georgia by Project WET (Water Education for Teachers) Program**

## **KEY PROGRAM ELEMENTS**

### **Overview**

By the year 2010, the USEPA anticipates that all states will fully implement *Nonpoint Source Management Programs* that have been designed to protect, maintain, and restore the chemical, physical, and biological integrity of the Nation's surface and ground waters. To help states to achieve this vision, the USEPA developed the following nine key program elements of successful *Nonpoint Source Management Programs*:

**(1) *The State program contains explicit short-and long-term goals, objectives, and strategies to protect surface and ground water.***

*Short-Term Goals -*

- (1) In order to encourage and support cooperative partnerships between layers of governments, private non-governmental organizations and the general public, the GAEPD will establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.
- (2) Develop Total Maximum Daily Loads for an additional 736 water quality violations delineated on the Section 303(d) list by FFY04.
- (3) All NPDES permits will require a wasteload allocation, watershed assessment and TMDL, if applicable, by FFY04.
- (4) Develop and/or update River Basin Management Plans for all 14 major river basins in Georgia by FFY00.
- (5) Establish biological criteria (i.e., numerical scoring system) for wadable streams in Georgia by FFY04.
- (6) Develop and implement *Coastal Nonpoint Source Management Program* for Georgia by FFY01.
- (7) As provided for under the Georgia Water Quality Control Act, finalize rules for animal feeding operations by FFY01.
- (8) Conduct biennial Silvicultural BMP Compliance Surveys and update Silvicultural Nonpoint Source Management Program, as appropriate, in FFY00, FFY02 and FFY04.
- (9) Expand Georgia Groundwater Monitoring Network to include monitoring of agricultural pesticides statewide by FFY01.

- (10) Develop and implement *Final Coastal Management Strategy* to protect Upper Floridan aquifer from saltwater intrusion.
- (11) Prepare biennial report, Water Quality in Georgia, as required by Sections 303(d), 305(b) and 319(a) of the Federal Clean Water Act in FFY00, FFY02 and FFY04.

*Long-Term Goals*

- (1) Develop and facilitate the implementation of Total Maximum Daily Loads for all Section 303(d) listed watersheds, as resources allow, by FFY15.
- (2) Identify watersheds where nonpoint source pollution is causing impairment and restore designated uses for all Section 305(b) listed watersheds, as resources allow, by FFY15.
- (3) Implement management measures specified in Section 6217 of the Coastal Zone Act Reauthorization Amendments, as resources allow, by FFY15.
- (4) As provided for under the Georgia Water Quality Control Act, all animal feeding operations will develop and implement Comprehensive Nutrient Management Plans by FFY09.
- (5) Achieve 100% compliance of implementation of recommended best management practices for silviculture in Georgia by FFY15.
- (6) Continue implementation of *Comprehensive State Groundwater Protection Program* to address nonpoint source pollution.

***(2) The State strengthens its working partnerships and linkages with appropriate State, interstate, Tribal, regional and local entities (including conservation districts), private sector groups, citizens groups, and Federal agencies.***

This revision of the State's *Nonpoint Source Management Program* was developed through a consultative process, incorporating input from a wide range of stakeholders involved in nonpoint source management activities throughout the State. Effective nonpoint source pollution management requires cooperative partnerships between layers of government, private non-governmental organizations and the general public. Nonpoint source pollution management in Georgia has continued to evolve - in order to encourage and support these partnerships, the GAEPD will establish a Statewide Nonpoint Source Management Task Force by December 2002.

The Georgia Environmental Protection Division (GAEPD) is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and groundwater. Consequently, the GAEPD has been designated as the administering or lead agency for implementing the State's *Nonpoint Source Management Program*. Regulatory responsibilities include establishing water quality use classifications and standards, assessing and reporting on water quality conditions, issuing point source discharge permits, issuing surface and groundwater withdrawal permits, and regulating land-disturbing activities. These regulatory programs are complemented by non-regulatory programs, including the Section 319(h) Nonpoint Source Implementation Grant Program, Clean Water State Revolving Fund, Georgia Project WET (Water Education for Teachers) Program, Georgia Adopt-A-Stream Program and the Georgia Water Management Campaign.

State agencies are essential partners in efforts to implement the State's *Nonpoint Source Management Program* and include the Coastal Resources Division, Pollution Prevention Assistance Division and Wildlife Resource Division within the Georgia Department of Natural Resource; Department of Community Affairs; Department of Human Resources Division of Public Health; and the Georgia Environmental Facilities Authority. The Coastal Resources Division is the lead agency in the development and implementation of the State's *Coastal Nonpoint Source Management Program*.

The Georgia Soil and Water Conservation Commission (GSWCC) has been designated by the GAEPD as the lead agency for implementing the agricultural component of the State's *Nonpoint Source Management Program*. Similarly, the Georgia Forestry Commission (GFC) has been designated by the GAEPD as the lead agency for implementing the silvicultural component of the State's *Nonpoint Source Management Program*. In addition, a Memorandum of Understanding between the U.S. Forest Service, GFC and the GAEPD, identifies the responsibilities of the participating agencies in implementing the State's *Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forest. Numerous State and Federal agencies and private, non-governmental organizations continuing to cooperate with the GAEPD, GSWCC and the GFC include: USDA Natural Resources Conservation Service, Georgia Farm Bureau, Georgia Forestry Association, Georgia Agribusiness Council, University of Georgia and the Georgia Department of Agriculture. Existing non-regulatory programs established for agriculture and silviculture have proven to be viable.

As with other activities, the State's *Nonpoint Source Management Program* will be implemented in conjunction with the State's River Basin Management Planning process. State law requires that GAEPD appoint at least seven citizens and a chairperson to a local advisory committee to provide advice and counsel during the River Basin Management Planning process. In addition, to the local advisory committees, river basin stakeholders will be encouraged to participate in developing

and implementing the river basin management plans.

This revision of the State's *Nonpoint Source Management Program* established new partnerships and strengthened existing partnerships in the development and implementation of nonpoint source strategies.

**(3) *The State uses a balanced approach that emphasizes both statewide nonpoint source programs and on the on-the-ground management of individual watersheds where waters are impaired or threatened.***

The *Unified Watershed Assessment* for Georgia was developed by the GAEPD, the Natural Resources Conservation Service and the Georgia Soil and Water Conservation Commission, working with other Federal, State, local and private stakeholders. The *Clean Water Action Plan* required the State to work with the appropriate agencies, organizations and the public to identify Category I watershed most in need of restoration and to develop Watershed Restoration Action Strategies for these Category I watersheds. In accordance with the *Unified Watershed Assessment* framework, the State finalized the Watershed Restoration Action Strategies in October 1999.

The USGS 8-digit hydrological cataloging unit served as the common scale for reporting the results of the State's *Unified Watershed Assessment* of the 52 watersheds. Seventeen watersheds have been identified as Watershed Restoration Priorities. In an effort to further address natural resource management concerns within each of the 17 Category I watersheds, 17 sub-watersheds have been identified as priorities for available funding.

River Basin Management Planning (RBMP) provides the structure used by the GAEPD to implement water protection programs. More specifically, RBMP is the overall programmatic framework in which the GAEPD will monitor and assess the impacts of nonpoint source pollution and develop nonpoint source management strategies. River basin management plans will be prepared for each of the 14 major river basins in the State. The plans will address surface and groundwater quality issues as well as water supply, enhancing the State's capacity for comprehensive, integrated regulatory and non-regulatory management of water resources. State law requires that each plan include a description of the river basin, identification of local governments, land use inventories and statement of plan goals. The plans will also describe environmental stressors in the river basins, assess water quality and water quantity concerns, and outline the implementation strategies and measures necessary to accomplish the plans' goals.

Over the next five years, prioritization of waters impacted or threatened by nonpoint source pollution will be refined through the monitoring and assessment component of the River Basin Management Planning process. As the River Basin

Management Planning process is fully implemented, prioritization of waters to be monitored and assessed will shift from a statewide to a river basin basis. Geographic targeting methods will then be used to provide an objective approach to prioritizing issues and watersheds, as well as targeting resources cost-effectively to address priority issues. During the five-year cycle revision of individual river basin management plans, waters in each river basin will be prioritized for monitoring and assessment by *degree of impairment*.

**(4) *The State program abates known water quality impairments from nonpoint source pollution and prevents significant threats to water quality from present and future activities.***

The control of dominant point source problems has allowed the Georgia Environmental Protection Division to place increasing emphasis on the prevention, control and abatement of nonpoint sources of pollution. This revision of the State's *Nonpoint Source Management Program* presents stakeholders with exciting opportunities to solve the remaining nonpoint source pollution problems as well as to sustain good water quality.

The *Nonpoint Source Management Program* combines regulatory and non-regulatory approaches, in cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, private non-governmental organizations and individual citizens. This document represents a revision of the State's *Nonpoint Source Management Program*.

The State's *Nonpoint Source Management Program* focuses on the comprehensive categories of nonpoint sources of pollution identified by the U.S. Environmental Protection Agency: *Agriculture, Silviculture, Construction, Urban Runoff, Resource Extraction, Land Disposal, Hydrologic/Habitat Modification and Other Nonpoint Sources*. The State's *Nonpoint Source Management Program* comprehensively describes the framework for stakeholder coordination and serves to implement a strategy for employing effective management measures and programs to control nonpoint source pollution statewide.

**(5) *The State program identifies waters and their watersheds impaired by nonpoint source pollution and identifies important impaired waters that are threatened or otherwise at risk. Further, the State establishes a process to aggressively address these identified waters by conducting more detailed watershed assessments and developing watershed implementation plans, and then by implementing the plans.***

The biennial reports, *Water Quality in Georgia* - as required by Section 305(b)



of the Federal Clean Water Act, serve as the current process for updating the *Nonpoint Source Assessment Report*. Current nonpoint source pollution impacts are presented in the most recent report, *Water Quality in Georgia 1996-1997*. This document should be consulted as the revised *Nonpoint Source Assessment Report* accompanying this revision of the *Georgia Nonpoint Source Management Program*.

For this revision of Georgia's *Nonpoint Source Management Program*, priority will be given to projects which implement the nonpoint source components of TMDLs that have been approved under Section 303(d) of the Clean Water Act, and develop or implement the nonpoint source components of Watershed Restoration Action Strategies to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are partially or not supporting designated or beneficial used due to nonpoint sources of pollution.

Over the next five years, prioritization of waters impacted or threatened by nonpoint source pollution will be refined through the monitoring and assessment components of Georgia's comprehensive River Basin Management Planning process. As the River Basin Management Planning process is fully implemented, prioritization of waters to be monitored and assessed will shift from a statewide to a river basin basis. During the five-year cycle revision of the individual river basin management plans, waters within each river basin will be prioritized for monitoring and assessment by *degree of impairment*.

In addition, special provisions have been established which require local governments to conduct watershed assessments prior to receiving an environmental permit from the State that facilitates growth and development, such as a wastewater permit or a water withdrawal permit.

The watershed assessment must address the entire service area managed by the local authority and include the following information: identification of and relative contribution of point and nonpoint sources of pollution; identification of measurable environmental and programmatic goals; and identification of pollution controls and natural restoration measures required to achieve clean water and other natural resource goals.

**(6) *The State reviews, upgrades, and implements all program components required by Section 319 of the Clean Water Act, and establishes a flexible, targeted, and iterative approach to achieve and maintain beneficial uses of water as expeditiously as practicable.***

The State's *Nonpoint Source Management Program* combines regulatory and non-regulatory approaches, in cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, business and industry, private non-governmental organizations and individual citizens. This

revision delineates the short- and long-term goals and implementation strategies. Just as important, it is also designed to be an informative resource for the wide range of stakeholders across the State who are involved in the prevention, control and abatement of nonpoint sources of pollution.

Traditional nonpoint source control mechanisms in Georgia include voluntary and technical assistance programs that emphasize voluntary best management practices - especially in agriculture and silviculture. Georgia, even though leading with non-regulatory strategies, has recourse to enforcement tools for some nonpoint sources pollution problems. While enforcement mechanisms are not the primary instrument used to address nonpoint source pollution, they are increasingly used to complement other mechanisms.

***(7) The State identifies Federal lands and activities which are not managed consistently with State Nonpoint Source Management Program objectives. Where appropriate, the State seek USEPA assistance to help resolve issues.***

In accordance with Section 319(b)(2)(F), the State reviews Federal financial assistance programs and Federal development projects for their effect on water quality and consistency with the *Georgia Nonpoint Source Management Program*. The State of Georgia has a Federal consistency review process pursuant to Executive Order 12372. Proposals for Federally assisted projects are distributed to the Georgia State Clearinghouse and subsequently forwarded to the appropriate State agency for review and comment in accordance with the State's project notification and review system. Where appropriate, the State will seek USEPA assistance to help resolve issues.

Federal agencies and the GAEPD continue to coordinate efforts through established partnerships - most frequently with the U.S. Department of Agriculture, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Forest Service and the U.S. Geologic Survey. For example, the Memorandum of Understanding (MOU) between the U.S. Forest Service (USFS), the Georgia Forestry Commission and the GAEPD identifies the responsibilities and activities of the participating agencies in implementing the *Georgia Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forests.

***(8) The State manages and implements its Nonpoint Source Management Program efficiently and effectively, including necessary financial management.***

The GAEPD will continue to enter and update all Section 319(h) Grant data in the GICS Grant Reports and Tracking System (GRTS) in accordance with national and

regional guidance. All mandated elements (including project and task level data) are entered within 90 days of the grant award and are updated on April 30 and October 31 of each year until the grant is closed.

In accordance with 40 CFR Part 31, §31.50 Closeout, the GAEPD will continue to submit all financial, performance and other reports required as a condition of the grant within 90 after the expiration of the grant:

Section 319(h) FFY99 Grant	C9994458-99-0	Expiration - 09/30/05
Section 319(h) FFY98 Grant	C9994458-98-0	Expiration - 09/30/04
Section 319(h) FFY97 Grant	C9994458-97-1	Expiration - 09/30/03
Section 319(h) FFY96 Grant	C9994760-96-1	Expiration - 09/30/02
Section 319(h) FFY95 Grant	C9994760-95-1	Expiration - 09/30/01
Section 319(h) FFY94 Grant	C9994458-94-2	Expiration - 09/30/00
Section 319(h) FFY93 Grant	C9994362-93-2	<b>Final FSR - 08/16/00</b>
Section 319(h) FFY92 Grant	C9994079-92-3	<b>Final FSR - 12/23/99</b>
Section 319(h) FFY91 Grant	C9004971-91-3	<b>Final FSR - 07/30/99</b>
Section 319(h) FFY90 Grant	C9004759-90-4	<b>Final FSR - 12/16/96</b>

**(9) The State periodically reviews and evaluates its Nonpoint Source Management Program using environmental and functional measures of success, and revises its nonpoint source assessment and its management program at least every five years.**

Georgia's initial *Nonpoint Source Assessment Report* and *Nonpoint Source Management Program* were completed in compliance with Section 319(a) and Section 319(b) of the Clean Water Act and approved by the USEPA in January 1990. The biennial reports, *Water Quality in Georgia*, as required by Section 305(b) of the Clean Water Act, serve as the current process for updating the *Nonpoint Source Assessment Report*. Current nonpoint source pollution impacts are presented in the most recent report, *Water Quality in Georgia 1996-1997*. This document should be consulted as the revised nonpoint source assessment report accompanying this revision of the *Georgia Nonpoint Source Management Program*.

River Basin Management Planning is the overall programmatic framework in which the State will monitor and assess the impacts of nonpoint source pollution and develop and implement nonpoint source management strategies. The State's major river basins provide the geographical framework and focus for the River Basin Management Planning process.

River basin management plans will be prepared for each of the 14 major river basins in the State. The plans will address surface and groundwater quality issues

as well as water supply, enhancing the State's capacity for comprehensive, integrated regulatory and non-regulatory management of water resources. During the five-year cycle revision of the river basin management plans, waters in each river basin will be prioritized for monitoring and assessment by *degree of impairment*. As the River Basin Management Planning process is fully implemented, prioritization of waters to be monitored and assessed will shift from a statewide to a river basin strategy. Geographic targeting methods will then be used to provide an objective approach to prioritizing issues and watersheds, as well as targeting resources cost-effectively to address priority issues. The five-year cycle revision of river basin management plans will be coordinated with the development and implementation of Total Maximum Daily Loads and with NPDES permitting schedules.

The NRCS, in cooperation with the GSWCC, will generate geo-referenced agricultural databases using current digital orthophotography to support River Basin Management Planning and the development and implementation of Total Maximum Daily Loads. These databases will be used to determine agricultural nonpoint source pollution impacts and to evaluate the effectiveness of *resource management systems* and *best management practices*. The results from this assessment will be used to update and revised the Agricultural Nonpoint Source Management Program. This database will also be used by the USDA NRCS State Technical Committee to establish conservation priority areas for funding under the 1996 Farm Bill.

In 1998, the GFC initiated a standardized survey of BMP implementation, streams habitats and turbidity levels for selected harvested plots. Statewide and regional BMP implementation rates by ownership (i.e., industrial, private non-industrial, public lands) will be determined and compared with the results from the previous Statewide BMP Compliance Survey. The results from the biennial Statewide BMP Compliance Surveys will be used to update and revise the Silviculture Nonpoint Source Management Program and to target educational and outreach efforts.

In accordance with Section 319(h)(11), Reporting and Other Requirements, the GAEPD submit an annual report to the USEPA concerning its progress in meeting the *Nonpoint Source Management Program* milestones, reductions in nonpoint source pollution and improvements in water quality (*to the extent that appropriate information is available*).

## **STRATEGIES**

### **Overview**

#### ***River Basin Management Planning***

In 1992, Georgia adopted a River Basin Management Planning approach to watershed protection (O.C.G.A. §12-5-520). This approach provides a tool for assessment and prioritization of water resource issues, development of solutions, and identification of cooperative actions to reduce pollution and enhance aquatic habitat. River Basin Management Planning is designed to build comprehensive water management, with water supply and water quality issues integrated in river basin management plans. The program will therefore frame Georgia's water protection programs, including the State's *Nonpoint Source Management Program*.

River Basin Management Planning (RBMP) provides the structure used by the GAEPD to implement water protection programs. More specifically, RBMP is the overall programmatic framework in which the GAEPD will monitor and assess the impacts of nonpoint source pollution and develop nonpoint source management strategies. Specific program objectives include providing opportunities for intergovernmental resource sharing; improving spatial detail of water quality assessments through increased monitoring coverage within river basins; increasing basic knowledge of watersheds as well as cumulative impacts within a watershed; and improving implementation of nonpoint source management strategies through increased stakeholder involvement.

River basin management plans will be prepared for each of the 14 major river basins in the State. The plans will address surface and groundwater quality issues as well as water supply, enhancing the State's capacity for comprehensive, integrated regulatory and non-regulatory management of water resources. State law requires that each plan include a description of the river basin, identification of local governments, land use inventories and statement of plan goals. The plans will also describe environmental stressors in the river basins, assess water quality and water quantity concerns, and outline the implementation strategies and measures necessary to accomplish the plans' goals.

To facilitate the RBMP initiative, the 14 major river basins have been arranged into five river basin groups. River Basin Management Planning was initiated in the first five river basins, the Chattahoochee, Flint, Coosa, Tallapoosa and Oconee River Basins, in FFY94. The Chattahoochee and Flint River Basin management plans were completed and adopted by the Georgia Department of Natural Resources Board in FFY98. The Coosa, Tallapoosa and Oconee River Basin management plans were completed and adopted by the Georgia Department of Natural Resources Board in FFY99.

**RIVER BASIN MANAGEMENT PLANNING SCHEDULE**

River Basins/Groups	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Chattahoochee																
Flint																
Coosa																
Tallapoosa																
Tennessee																
Savannah																
Ogeechee																
Ocklockonee																
Suwannee																
Satilla																
Saint Marys																
Oconee																
Ocmulgee																
Altamaha																

River Basin Cycle
  Monitoring Period
  Implementation Period

River Basin Management Planning was initiated in the remaining nine river basins, the Savannah, Ogeechee, Ochlockonee, Suwannee, Satilla, St. Marys, Ocmulgee, Altamaha and Tennessee River Basins, in FFY99 and FFY00. The second iteration of River Basin Management Planning for the Chattahoochee, Flint and Oconee River Basins was initiated in FFY00.

Over the next five years, prioritization of waters impacted or threatened by nonpoint source pollution will be refined through the monitoring and assessment component of the River Basin Management Planning process. As the River Basin Management Planning process is fully implemented, prioritization of waters to be monitored and assessed will shift from a statewide to a river basin basis. Geographic targeting methods will then be used to provide an objective approach to prioritizing issues and watersheds, as well as targeting resources cost-effectively to address priority issues. During the five-year cycle revision of individual river basin management plans, waters in each river basin will be prioritized for monitoring and assessment by *degree of impairment*.

The State's major river basins provide the geographical framework and focus for the River Basin Management Planning process; however, a consistent and standard

system of watershed units is needed to provide the organizational elements required within each major river basin. This watershed unit system will provide the framework for River Basin Management Planning activities (e.g., nonpoint source data management and geographic information systems). An interagency project coordinated by the GAEPD and the U.S. Geologic Survey (USGS) was initiated in FFY98 to standardize watershed unit systems in Georgia to the 14-digit hydrologic unit equivalents.

Specific products of this project will include a standardized watershed unit system within the current USGS hydrologic units for use by multiple agencies and GIS coverages of the watershed unit system in ARCINFO and ARCVIEW export formats by FFY01.

The GAEPD Geologic Survey Branch initiated a project to complete a *Nonpoint Source Base Flow Protection GIS Database* for each of the major river basins in Georgia by FFY00. The GIS databases will contain a variety of coverages which provide access to jurisdictional, geographical and environmental data useful in identifying and prioritizing issues, establishing strategic monitoring and assessment plans, and developing nonpoint source management strategies. The information collected for each of the major river basins will aid in facilitating the River Basin Management Planning process and implementing the State's *Nonpoint Source Management Program* and *Comprehensive Groundwater Protection Plan*.

The coverages and maps will form the cornerstone of each of the river basin management plans as they serve to present information to local citizens and stakeholders in a readily understandable format. Each GIS database will contain a full documentation package which will include data sources, scales, quality assurance project plans and potential limits. The documentation packages will be completed in accordance with the Federal Geographic Data Committee's 1994 publication, *Content Standards for Digital Geospatial Metadata*.

#### ***Goals of River Basin Management Planning in Georgia:***

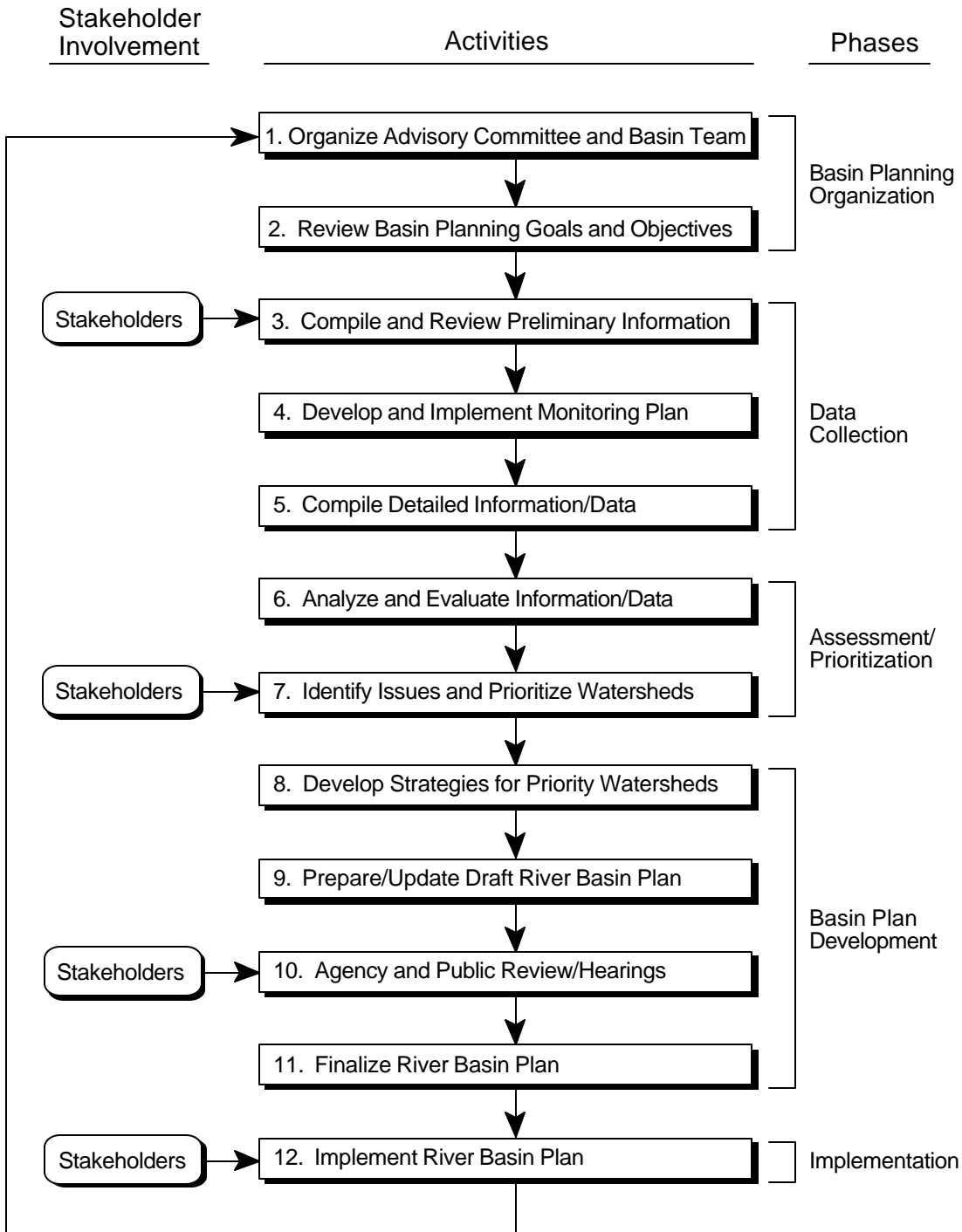
- Meet or exceed local, State and Federal laws, rules and regulations, and to be consistent with other applicable programs.
- Identify existing and future water quality issues, emphasizing nonpoint sources of pollution.
- Propose water quality improvement practices encouraging local involvement to reduce pollution, and monitor and protect water quality.
- Involve all interested citizens and appropriate organizations in plan development and implementation.

- Coordinate with local and regional planning activities.
- Facilitate local, State and Federal activities to monitor and protect water quality.
- Identify existing and potential water availability problems and coordinate development of alternatives.
- Provide for education of the general public on matters involving the environmental and ecological concerns specific to each river basin.
- Provide for improving aquatic habitat and exploring the feasibility of reestablishing native species of fish.
- Provide for restoring and protecting wildlife habitat.
- Provide for recreational benefits.
- Identify and protect flood prone areas within each river basin, and encourage local and State compliance with Federal flood plain management guidelines.

The River Basin Management Planning schedule establishes a long-term process involving detailed reassessment of each river basin on a five-year rotating basis. The cycle is intended to provide for updated assessments, priorities and management strategies for individual river basins every five years. During the first iteration of River Basin Management Planning, resources have been dedicated to making programmatic changes, building the required infrastructure, cataloging current management activities and establishing coordination with a range of agencies and organizations. The second iteration, as well as those following, will provide opportunities to review issues which were not fully addressed during the first cycle, to identify new priority issues, and to develop improved strategies for managing water quality and quantity. The five year reassessment cycle will be coordinated with NPDES permitting and with development of Total Maximum Daily Loads.



## RIVER BASIN MANAGEMENT PLANNING CYCLE



Federal, State and local governments and agencies have a major role in all water resource protection and enhancement programs in Georgia. Consequently, creating and supporting governmental partnerships is one of the guiding principles of River Basin Management Planning. The GAEPD Water Resources Branch is leading the effort to develop water quantity management strategies, including source protection for public water supplies, while the GAEPD Water Protection Branch is leading the effort to develop water quality management strategies.

The Georgia Forestry Commission (GFC) has been an integral partner with the GAEPD, committed to protect and maintain the integrity and quality of the State's waters. As part of the Georgia Forestry Commission's ongoing administration of the State's *Nonpoint Source Management Program*, it is acting as the lead silvicultural agency coordinating and contributing to the State's River Basin Management Planning process. Following the GAEPD schedule of River Basin Management Planning, the GFC provides resource data and trend data on commercial forestry activities, acreage and ownership and BMP compliance rates. The GFC will continue to work in coordination with GAEPD to implement the RBMP process in each of the State's 14 major river basins.

Georgia's Agriculture Nonpoint Source Management Program is implemented through a statewide non-regulatory approach. This statewide non-regulatory approach uses cooperative partnerships with various agencies and a variety of activities and programs. Agencies that form the basis of the partnership include the GSWCC (designated lead agency), SWCD, NRCS, UGACAES, CES, FSA, GFC and the GDA. These agencies work closely with Georgia agricultural commodity commissions and organizations, producer groups and support industries to prevent and solve problems. The State's RBMP process is enhanced by these partnerships and the coordinated effort to identify priority waters and to target nonpoint source management activities. As with other activities, the agricultural portion of the State's *Nonpoint Source Management Program* will be implemented in conjunction with the RBMP process. The GSWCC and NRCS are working to merge the planning processes adopted by the GAEPD so that the agricultural's community's involvement will be evident in every step of the RBMP process. Assessment of priority water and agricultural nonpoint source impacts will be a continuing process.

Public participation and stakeholder involvement is an important aspect of River Basin Management Planning. State law requires that GAEPD appoint at least seven citizens and a chairperson to a *local advisory committee* to provide advice and counsel during the development of the river basin management plans. In addition to the local advisory committees, river basin stakeholders will be encouraged to participate in developing and implementing the river basin management plans.

### ***Unified Watershed Assessment***

The *Clean Water Action Plan* presents a broad vision of watershed protection in which traditional clean water and human health objectives are integrated with new cooperative approaches to restoring and protecting water quality. The *Clean Water Action Plan* requires Federal, State, tribal and local governments to work with stakeholders and interested citizens to identify watersheds with the most critical water problems and to work together to focus resources and implement effective strategies to solve these problems. The *Unified Watershed Assessment* is the framework intended to help states bring together a broad array of information on water quality and resources and to identify watersheds where restoration activities could be most effectively targeted.

The *Unified Watershed Assessment* for Georgia was developed by the GAEPD, the Natural Resources Conservation Service and the Georgia Soil and Water Conservation Commission, working with other Federal, State, local and private stakeholders. The *Clean Water Action Plan* required the State to work with the appropriate agencies, organizations and the public to identify Category I watershed most in need of restoration and to develop Watershed Restoration Action Strategies for these Category I watersheds. In accordance with the *Unified Watershed Assessment* framework, the State finalized the Watershed Restoration Action Strategies in October 1999.

The USGS 8-digit hydrological cataloging unit served as the common scale for reporting the results of the State's *Unified Watershed Assessment* of the 52 watersheds. Seventeen watersheds have been identified as Watershed Restoration Priorities. In an effort to further address natural resource management concerns within each of the 17 Category I watersheds, 17 sub-watersheds have been identified as priorities for available funding.

### ***Total Maximum Daily Loads***

Appendix A of *Water Quality in Georgia 1996-1997* is a comprehensive list which incorporates the information required by several sections of the Federal Clean Water Act. Different sections of the Federal CWA require states to assess water quality (i.e., Section 305(b)) and to document waters impacted by nonpoint source pollution (i.e., Section 319(a)). The Federal CWA also requires states to list waters which do not meet water quality standards and for which there are no ongoing activities to foster standard attainment (i.e., Section 303(d)).

In Appendix A of *Water Quality in Georgia 1996-1997*, waters listed as not fully supporting designated uses are active Section 305(b) waters. The Section 303(d) list excludes Section 305(b) waters where (1) actions have been taken and compliance with water quality standards achieved or (2) enforceable Federal, State, or local requirements will lead to attainment of water quality standards.

Total Maximum Daily Loads will be developed for the water quality criteria

violated (e.g., fecal coliform, dissolved oxygen, metals) for all waterbodies on the Section 303(d) list. A Total Maximum Daily Load (TMDL) is calculation of the maximum amount of pollutant that a waterbody can receive and still meet water quality standards. It is the sum of the allowable loads of a single pollutant from all contributing *point* and *nonpoint sources*, and includes a margin of safety and consideration of seasonal variations.

*Fecal Coliform* Total Maximum Daily Loads were established in FFY99 for 101 waterbodies delineated on the Section 303(d) list in the Chattahoochee, Coosa, Flint, Ocmulgee, Oconee, Ogeechee, Satilla, Savannah, Suwannee, Tallapoosa and Tennessee River Basins. In addition, *Fish Consumption Guidelines* Total Maximum Daily Loads were established 15 lake segments in Lakes Goat Rock, High Falls, Jackson, Allatoona, Harding, Hartwell, Oliver, Seminole, Walter F. George and West Point.

The River Basin Management Planning process provides the framework and schedule for developing Total Maximum Daily Loads in each of the State's five major river basin groups. Currently, Total Maximum Daily Loads must be developed for an additional 736 water quality criteria violations delineated on the Section 303(d) list:

### ***TMDL Development Schedule***

<b><u>River Basin Group</u></b>	<b><u>Completion Date</u></b>
(1) <i>St. Marys, Satilla, Suwannee, and Ochlockonee</i> - 38	FFY00
(2) <i>Ocmulgee, Oconee and Altamaha</i> - 263	FFY01
(3) <i>Chattahoochee and Flint</i> - 271	FFY02
(4) <i>Coosa, Tallapoosa and Tennessee</i> - 109	FFY03
(5) <i>Savannah and Ogeechee</i> - 55	FFY04

The State's River Basin Management Planning process, in conjunction with the *Unified Watershed Assessment* framework, will result in a more focused effort to develop and implement Total Maximum Daily Loads. Funding (e.g., Section 319(h) Grants, CWSRF) priority will be given to project proposals which implement the nonpoint source components of TMDL that have been approved under Section 303(d) of the CWA; develop and/or implement the nonpoint source components of Watershed Restoration Action Strategies; implement actions to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are partially or not supporting designated or beneficial use due to nonpoint sources of pollution; and are located within watersheds identified in the *Unified Watershed Assessment* at Category I watersheds.

The GAEPD Permitting, Compliance and Enforcement Program will begin issuing NPDES permits concurrently within a major river basin group beginning with 531 permits in the Chattahoochee and Flint River Basins by December 2003:

***NPDES Permitting Schedule***

<b><u>River Basin Group</u></b>	<b><u>Completion Date</u></b>
(1) <i>St. Marys, Satilla, Suwannee, and Ochlockonee - 250</i>	<i>FFY07</i>
(2) <i>Ocmulgee, Oconee and Altamaha - 349</i>	<i>FFY08</i>
(3) <i>Chattahoochee and Flint - 531</i>	<i>FFY04</i>
(4) <i>Coosa, Tallapoosa and Tennessee - 345</i>	<i>FFY05</i>
(5) <i>Savannah and Ogeechee - 325</i>	<i>FFY06</i>

The National Pollutant Discharge Elimination System (NPDES) permitting program will consider wasteload allocation and TMDL issues as appropriate for each discharge. Through December 2003 the GAEPD Permitting, Compliance and Enforcement Program will revise and reissue or revoke NPDES permits with *point* source discharges to waterbodies identified on the current Section 303(d) list within 18 months of the date of when the TMDL has been finalized. After December 2003, a wasteload allocation and TMDL, if applicable, must be completed before a NPDES will be issued.

In addition, special provisions have been established which require local governments to conduct watershed assessments prior to receiving an environmental permit from the State that facilitates growth and development, such as a wastewater permit or a water withdrawal permit.

The watershed assessment must address the entire service area managed by the local authority and include the following information: identification of and relative contribution of point and nonpoint sources of pollution; identification of measurable environmental and programmatic goals; and identification of pollution controls and natural restoration measures required to achieve clean water and other natural resource goals.

### **Short-Term Goals**

- (1) In order to encourage and support cooperative partnerships between layers of governments, private non-governmental organizations and the general public, the GAEPD will establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.
- (2) Develop Total Maximum Daily Loads for an additional 736 water quality violations delineated on the Section 303(d) list by FFY04.
- (3) All NPDES permits will require a wasteload allocation, watershed assessment and TMDL, if applicable, by FFY04.
- (4) Develop and/or update River Basin Management Plans for all 14 major river basins in Georgia by FFY00.
- (5) Establish biological criteria (i.e., numerical scoring system) for wadable streams in Georgia by FFY04.
- (6) Develop and implement *Coastal Nonpoint Source Management Program* for Georgia by FFY01.
- (7) As provided for under the Georgia Water Quality Control Act, finalize rules for animal feeding operations by FFY01.
- (8) Conduct biennial Silvicultural BMP Compliance Surveys and update Silvicultural Nonpoint Source Management Program, as appropriate, in FFY00, FFY02 and FFY04.
- (9) Expand Georgia Groundwater Monitoring Network to include monitoring of agricultural pesticides statewide by FFY01.
- (10) Develop and implement *Final Coastal Management Strategy* to protect Upper Floridan aquifer from saltwater intrusion.
- (11) Prepare biennial report, Water Quality in Georgia, as required by Sections 303(d), 305(b) and 319(a) of the Federal Clean Water Act in FFY00, FFY02 and FFY04.

### **Long-Term Goals**

- (1) Develop and facilitate the implementation of Total Maximum Daily Loads for all Section 303(d) listed watersheds, as resources allow, by FFY15.
- (2) Identify watersheds where nonpoint source pollution is causing impairment and restore designated uses for all Section 305(b) listed watersheds, as resources allow, by FFY15.
- (3) Implement management measures specified in Section 6217 of the Coastal Zone Act Reauthorization Amendments, as resources allow, by FFY15.
- (4) As provided for under the Georgia Water Quality Control Act, all animal feeding operations will develop and implement Comprehensive Nutrient Management Plans by FFY09.
- (5) Achieve 100% compliance of implementation of recommended best management practices for silviculture in Georgia by FFY15.
- (6) Continue implementation of *Comprehensive State Groundwater Protection Program* to address nonpoint source pollution.

## **SUPPORTING PROGRAMS AND ACTIVITIES**

### **Overview**

#### **Section 319(h) Nonpoint Source Implementation Grant**

Under Section 319(h) of the Clean Water Act, the U. S. Environmental Protection Agency (USEPA) awards a Nonpoint Source Implementation Grant to the Georgia Environmental Protection Division (GAEPD) to fund eligible projects which support the implementation of the *Georgia Nonpoint Source Management Program*. Section 319(h) Grant funds for the prevention, control and/or abatement of nonpoint sources of pollution are made available annually to public agencies in Georgia (e.g., cities, counties, local authorities operating local government delivery programs, regional development centers, local school systems, State colleges and universities, and State agencies).

With funding from Section 319(h) FFY90 - FFY99 Grants, the GAEPD has awarded over \$18,800,000 in grant funds to State agencies, local and regional governments, Resource Conservation and Development Councils, State colleges and universities to fund eligible projects supporting the *Georgia Nonpoint Source Management Program*.

In FFY00, the State will receive \$2,310,800 in baseline grant funds to implement watershed and statewide projects and an additional \$2,310,800 in incremental grant funds to implement Watershed Restoration Action Strategies in areas identified by the State's *Unified Watershed Assessment* (UWA) as being most in "need of restoration." These areas, referred to as Category I - Watershed in Need of Restoration, are those watersheds that "do not meet, or face imminent threats of not meeting, clean water and other natural resource goals."

Unified Watershed Assessments were intended to help states bring together a broad array of information on water quality and resource conditions to identify watersheds where restoration activities could be most effectively targeted. The *Clean Water Action Plan* required states to work with the appropriate agencies, organizations and the public to identify Category I watersheds most "in need of restoration" and to develop Watershed Restoration Action Strategies for these Category I watersheds. The *Unified Watershed Assessment* for Georgia was developed by the GAEPD, the Natural Resources Conservation Service, and the Georgia Soil and Water Conservation Commission, working with other interested Federal, State, local and private stakeholders. In accordance with the *Unified Watershed Assessment* framework, the State finalized the Watershed Restoration Action Strategies in October 1999.

The USGS 8-digit hydrological cataloging unit served as the common scale for reporting the results of the State's *Unified Watershed Assessment* and to help target



<b>CATEGORY I - WATERSHED</b> <i>(Priority Sub-Watershed)</i>	<b>USGS CATALOGING UNIT</b>
<b>Tugalo River</b> <i>(Stekoa Creek)</i>	<b>03060102</b>
<b>Broad River</b> <i>(North and Middle Forks Broad River)</i>	<b>03060104</b>
<b>Lower Savannah River</b> <i>(Ebenezer Creek)</i>	<b>03060109</b>
<b>Upper Oconee River</b> <i>(Little River)</i>	<b>03070101</b>
<b>Upper Ocmulgee River</b> <i>(Big Sandy Creek)</i>	<b>03070103</b>
<b>Ocmulgee River</b> <i>(Sandy Run Creek - Shellstone Creek)</i>	<b>03070104</b>
<b>Satilla River</b> <i>(Hog Creek)</i>	<b>03070201</b>
<b>Alapaha River</b> <i>(Alapaha River - Willacoochee River)</i>	<b>03110202</b>
<b>Upper Ochlockonee River</b> <i>(Tired Creek)</i>	<b>03120002</b>
<b>Upper Chattahoochee River</b> <i>(Lake Lanier Tributaries)</i>	<b>03130001</b>
<b>Upper Middle Chattahoochee River</b> <i>(Dog Creek)</i>	<b>03130002</b>
<b>Upper Flint River</b> <i>(Potato Creek)</i>	<b>03130005</b>
<b>Conasauga River</b> <i>(Middle Conasauga River)</i>	<b>03150101</b>
<b>Coosawatee River</b> <i>(Pine Log Creek)</i>	<b>03150102</b>
<b>Oostanaula River</b> <i>(Armuchee Creek)</i>	<b>03150103</b>
<b>Etowah River</b> <i>(Little River)</i>	<b>03150104</b>
<b>Tallapoosa River</b> <i>(Buffalo Creek)</i>	<b>03150108</b>

resources. Seventeen watersheds have been identified as Watershed Restoration Priorities for Section 319(h) Grant funding. In an effort to further address natural resource management concerns within each of the 17 Category I watersheds, 17 sub-watersheds have been identified as priorities for Section 319(h) Grant funding.

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

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

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

Priority is given to project proposals which implement the nonpoint source components of TMDLs that have been approved under Section 303(d) of the Clean Water Act; develop and/or implement the nonpoint source components of Watershed Restoration Action Strategies; implement actions to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are partially or not supporting designated or beneficial uses due to nonpoint sources of pollution; and are located within watersheds identified in the *Unified Watershed Assessment* as Category I watersheds.

Watershed Restoration Action Strategies for each watershed should include the following elements:

- (1) Identification of measurable environmental and programmatic goals;
- (2) Identification of and relative contribution of nonpoint sources of pollution;
- (3) Implementation of nonpoint source pollution controls and natural restoration measures to achieve clean water and other natural resource goals;
- (4) Schedule for implementation of needed restoration measures and identification of appropriate lead agencies to oversee implementation, maintenance, monitoring and evaluation;
- (5) Implementation of TMDLs for nonpoint source pollutants exceeding State water quality standards;
- (6) Implementation of source water assessment and protection programs;
- (7) Needed monitoring and evaluation to assess the progress towards achieving environmental and programmatic goals;
- (8) Funding plans to support the implementation and maintenance of needed restoration measures;
- (9) Process for cross-agency (Federal, State, interstate, tribal and local) coordination to help implement Watershed Restoration Action Strategies and a process for public involvement.

In addition, priority is given to project proposals which encompass or support a watershed management approach and result in measurable improvements in water quality. A watershed management approach is a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. This strategy has a premise that many water quality and ecosystem problems are best solved at the watershed level rather than at the individual water body or discharger level. Major features of watershed management approach are: targeting priority problems, promoting a high level of stakeholder involvement, integrated solutions that make use of the expertise and authority multiple agencies, and measuring success through monitoring and other data gathering.

Nonpoint source pollution is the greatest source water quality problems in Georgia today. The *Clean Water Action Plan* presents the State with exciting opportunities to focus our efforts and enhance our resources to solve these

remaining water quality problems as well as to sustain good water quality. The application of increased Section 319(h) Grant funds to focus on solving our highest priority problems will enable the State to make great strides in our efforts to achieve our water quality goals.

### ***Clean Water State Revolving Fund***

The State, through the Clean Water State Revolving Fund, provides loans for projects addressing high-priority water quality needs. Although traditionally used to build or improve wastewater treatment plants, loans have been used increasingly for other point and nonpoint source management activities, including (1) agricultural, rural and urban runoff; (2) estuary improvement projects; (3) wet weather flow control, including stormwater and combined sewer overflows; (4) alternative wastewater treatment technologies; and (5) landfills and riparian buffers.

The Federal Clean Water Act requires that an *Intended Use Plan* (IUP) be submitted as part of the State's Clean Water State Revolving Fund (CWSRF) application package to the USEPA. The IUP delineates the State's prioritization and distribution of monies in the CWSRF. An *Integrated Priority Ranking System* prioritizing nonpoint source management activities for loans from the CWSRF was revised in FFY00. Priority is given to projects proposals which implement the nonpoint source components of TMDLs that have been approved under Section 303(d) of the Clean Water Act; develop and/or implement the nonpoint source components of Watershed Restoration Action Strategies; implement actions to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are partially or not supporting designated or beneficial uses due to nonpoint sources of pollution; and are located within watersheds identified in the *Unified Watershed Assessment* as Category I watersheds.

### ***Coastal Nonpoint Source Management Program***

The Federal Coastal Zone Management Act of 1972 encourages states to develop and implement *Coastal Zone Management Programs*. State programs which have been approved for consistency with the Federal program are eligible for Federal financial assistance. State programs must provide standards for addressing protection of natural resources, fish, and wildlife; managing coastal development; and providing public access to the coast for recreational purposes. Coastal management decisions are to include public and local government participation. The Federal government is responsible for assuring that Federal activities, including harbor projects, fisheries management plans, or any Federally financed construction project, conform to the State program. States with approved plans may reject Federal permits for activities that are inconsistent with the State's *Coastal Zone Management Program*.

Development of Georgia's *Coastal Zone Management Program* was initiated in

1992. The State's *Coastal Zone Management Program* was approved by the National Oceanographic and Atmospheric Administration in January 1998. Georgia's coastal zone comprises an eleven-county area including Brantley, Bryan, Camden, McIntosh, Charlton, Chatham, Effingham, Wayne, Glynn, Liberty, and Long Counties. The mission of the State's *Coastal Zone Management Program* is to balance economic development in Georgia's coastal area with the preservation of natural, environmental, historic, archaeological, and recreational coastal resources for the benefit of Georgia's present and future generations. The Coastal Resources Division (CRD) of the Georgia Department of Natural Resources is the lead agency in development and implementation of this program.

With an approved *Coastal Zone Management Program*, Georgia is eligible to receive funding under the Federal Coastal Zone Management Act for the purpose of program implementation and administration. The Coastal Resources Division will continue to award approximately 60% of Georgia's allocation as Coastal Incentive Grants. This grant program is designed to allow coastal issues to be defined and addressed at the local level. Eligible grant recipients include county and municipal governments, State agencies, and educational and research institutions.

The objective of the FFY98 Coastal Incentive Grant was to promote the application of existing information to improve coastal water related resources. Over \$500,000 was awarded in FFY98 and approximately \$700,000 will be available annually for subsequent years. The Coastal Incentive Grant is a permanent budget component of the State's *Coastal Zone Management Program*.

Section 6217 of the 1990 Federal Coastal Zone Management Act Reauthorization Amendments requires states with approved *Coastal Zone Management Programs* to address nonpoint source pollution impacting or threatening coastal waters. The purpose of Section 6217 is to strengthen the links between Federal and State coastal zone management and water quality management programs and to enhance State and local efforts to manage land use activities that degrade coastal waters and habitats.

Under Section 6217, CRD is required to develop and implement a *Coastal Nonpoint Source Management Program* in coordination with other State and local water quality management programs. State *Coastal Nonpoint Source Management Programs* must provide for identification of land uses and critical coastal areas, management measures to be used in these areas, technical assistance provisions, public participation opportunities and administrative coordination. *Coastal Nonpoint Source Management Programs* must include enforceable policies and mechanisms that are necessary to assure implementation. If these *Coastal Nonpoint Source Management Programs* are not approved, coastal zone management and water quality management program funds can be withheld.

Georgia's *Coastal Nonpoint Source Management Program* was developed in

coordination with the GAEPD River Basin Management Planning process and the *Georgia Nonpoint Source Management Program*. Georgia's *Coastal Nonpoint Source Management Program* was submitted to NOAA and USEPA for review in December 1999. Conditional approval of the State's *Coastal Nonpoint Source Management Program* is expected by December 2000.

The Coastal Resources Division is responsible for coordinating all matters that affect the coastal area of the State - including monitoring, enforcement, education and development of best management practices. CRD provides technical assistance to the GAEPD on coastal resource issues (e.g., significant water withdrawal proposals, potential impacts to endangered fish species). With the *Coastal Ark*, the CRD has expanded its education and outreach capabilities. The *Coastal Ark* is a bus that travels the coast providing educational resources and technical assistance to the general public, local and regional governments, school systems, and businesses about coastal environmental issues.

Georgia's *Coastal Nonpoint Source Management Program* is a separate program from the State's *Nonpoint Source Management Program*. However, the GAEPD is an active participant in the *Coastal Nonpoint Source Management Program*, retaining all regulatory authority as prescribed by Georgia law. The GAEPD continues to provide guidance and technical assistance in the development and implementation of the *Coastal Nonpoint Source Management Program*. Specifically, the GAEPD is assisting the CRD in the following activities: (1) identification of land uses which may cause or contribute to the degradation of coastal water, including natural, episodic and unpermitted sources, (2) prioritization of critical coastal areas as described in the *Coastal Zone Management Program* and *Coastal Regional Development Plan*, (3) evaluation of USEPA-mandated management measures related to land use impacts required to achieve and maintain water quality standards and designated uses, and (4) coordination of other nonpoint source management efforts.

### ***Nonpoint Source Monitoring and Assessment - Surface Waters***

Current nonpoint source pollution impacts are presented in the most recent Section 305(b) report, *Water Quality in Georgia 1996-1997*. This document should be consulted as the revised nonpoint source assessment report accompanying this revision of the *Georgia Nonpoint Source Management Program*.

Appendix A of *Water Quality in Georgia 1996-1997* lists waters which have been assessed for compliance with designated uses. Data sources included GAEPD monitoring data for rivers and streams (trend data and intensive survey data), major lakes project data, toxic substances stream monitoring project data, aquatic biomonitoring project data, and coastal monitoring project data. The assessment also included data from other State and Federal agencies, local governments,

Partially Supporting Designated Uses/Not Supporting Designated Uses (Water Quality in Georgia 1996 -1997)		
Point and Nonpoint Source Categories	Impairment of Streams and Rivers - Miles	
	Major	Minor
Industrial - Point Source	93	0
Industrial - Nonpoint Source	262	0
Municipal - Point Source	481	11
Municipal - Nonpoint Source	7	0
Combined Sewer Overflows	237	0
<b>Agriculture</b>	48	0
<b>Silviculture</b>	3	0
<b>Urban Runoff</b>	1,788	22
<b>Land Disposal</b>	3	0
<b>Resource Extraction</b>	14	0
<b>Hydrologic/Habitat Modification</b>	50	0
<b>Other Nonpoint Sources</b>	109	0
<b>Unknown Nonpoint Sources</b>	2,165	27
Point and Nonpoint Source Categories	Impairment of Lakes and Reservoirs - Acres	
	Major	Minor
Industrial - Point Source	650	0
Industrial - Nonpoint Source	55,950	0
Municipal - Point Source	0	3,000
Municipal - Nonpoint Source	0	0
<b>Urban Runoff</b>	115,902	225
<b>Unknown Nonpoint Sources</b>	212,487	0
Point and Nonpoint Source Categories	Impairment of Estuaries - Square Miles	
	Major	Minor
Industrial - Point Source	134	0
Industrial - Nonpoint Source	71	0
Municipal - Point Source	44	70
Municipal - Nonpoint Source	0	0
<b>Urban Runoff</b>	36	66
<b>Unknown Nonpoint Sources</b>	6	240

Georgia is rich in surface water resources - 70,150 miles of streams and rivers, 425,582 acres of public lakes and reservoirs and 854 square miles of estuaries. Over 5,300 miles of stream and rivers assessed did not support, or

only partially supported, their designated uses. However, it is important to note that less than 8,600 miles of the 70,150 miles of streams and rivers were assessed. Assessments are based on current water quality monitoring or evaluation (i.e., location information and/or professional judgement). Resources are not adequate to assess all streams and rivers.



contracted Clean Lakes projects, and reports from utility companies. Appendix A of *Water Quality in Georgia 1996-1997* includes information on rivers, streams, lakes and estuaries, with the assessed waters placed in three categories: waters supporting designated uses, waters partially supporting designated uses, and waters not supporting designated uses.

Waterbodies were placed in the *partially supporting designated uses* category if (1) the chemical data (dissolved oxygen, pH and temperature) indicated a violation of a water quality standard in 11% - 25% of the samples collected or (2) a fish consumption guideline was in place for the waterbody. The *partially supporting designated uses* category also includes stream reaches based on predicted concentrations of metals at low streamflow (7Q10) in excess of State standards as opposed to actual measurements on a stream segment.

Generally, a waterbody was placed in the *not supporting designated uses* category if (1) the chemical data (dissolved oxygen, pH and temperature) indicated a violation of a water quality standard in greater than 25% of the samples collected, (2) a fish consumption ban was in place for the waterbody, or (3) acute or chronic toxicity tests documented or predicted toxicity at low streamflow (7Q10) due to a municipal or industrial discharge to the stream.

Appendix A of *Water Quality in Georgia 1996-1997* is a comprehensive list which incorporates the information required by several sections of the Federal Clean Water Act. Different sections of the Federal CWA require states to assess water quality, (i.e., Section 305(b)) and to document waters impacted by nonpoint source pollution (i.e., Section 319(a)). The Federal CWA also requires states to list waters which do not meet water quality standards and for which there are no ongoing activities to foster standard attainment (i.e., Section 303(d)).

In Appendix A of *Water Quality in Georgia 1996-1997*, waters listed as not fully supporting designated uses are active Section 305(b) waters. The Section 303(d) list excludes Section 305(b) waters where (1) actions have been taken and compliance with water quality standards achieved or (2) enforceable Federal, State, or local requirements will lead to attainment of water quality standards.

For each of the waterbodies which do not fully support designated uses, Appendix A of *Water Quality in Georgia 1996-1997* indicates potential causes which contribute to nonsupport of water quality standards or designated uses. Potential point sources include industrial facilities, residual from industrial sources, marinas and municipal facilities. Potential nonpoint sources include agriculture, silviculture, urban runoff, land disposal, resource extraction, hydrologic/habitat modification and other nonpoint sources.

The areas potentially impacted by point and nonpoint sources of pollution have

been delineated. These results support the conclusion that, while the impact of point sources has been greatly reduced in the past 25 years, nonpoint sources of pollution still contribute significantly to the impairment of Georgia's waterbodies. The most important issues include violations of water quality standards for fecal coliform bacteria, associated with both urban runoff and agriculture; violations of water quality standards for metals associated with urban runoff; erosion and sedimentation, variously associated with construction, agriculture, and silviculture, leading to degradation of aquatic habitats; and excess loading of nutrients, derived from urban runoff and agriculture.

For this revision of Georgia's *Nonpoint Source Management Program*, priority will be given to projects which implement the nonpoint source components of TMDLs that have been approved under Section 303(d) of the Clean Water Act, and develop or implement the nonpoint source components of Watershed Restoration Action Strategies to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are partially or not supporting designated or beneficial use due to nonpoint sources of pollution.

Over the next five years, prioritization of waters impacted or threatened by nonpoint source pollution will be refined through the monitoring and assessment components of Georgia's comprehensive River Basin Management Planning process. As the River Basin Management Planning process is fully implemented, prioritization of waters to be monitored and assessed will shift from a statewide to a river basin basis. During the five-year cycle revision of the individual river basin management plans, waters within each river basin will be prioritized for monitoring and assessment by *degree of impairment*.

When fully implemented, assessment and prioritization through the River Basin Management Planning process will be enhanced by expansion of biological monitoring as an integrative measure of adverse impacts on biota and of net impacts on waterbodies. In FFY98, the GAEPD began long-term project to develop biological criteria for wadable streams and rivers in the State. The initial step was to develop a useful, general-purpose, geographical framework that categorized large sections of Georgia into logical units of similar geology, physiography, soils, vegetation, land use/ land cover, and water quality. The key output of this project was to refine the Level III ecoregions into Level IV ecoregions. This approach has been used by several states, and is being developed for use in other states, to meet present and future requirements of the USEPA Water Quality Standards Regulation in the development of biological criteria.

In FFY01, the GAEPD in cooperation with Columbus State University will assess baseline biological and chemical conditions in each of the Level IV ecoregions in Georgia. This assessment requires collecting and analyzing chemical and biological water quality samples at least impacted sites that are representative of Level IV ecoregions across the State. Data collected from the reference sites will be used

to establish ecoregion-specific biological criteria that are representative and attainable.

In the future, a numerical scoring system (i.e., biological criteria for macroinvertebrates) will be established based on the reference conditions. A system for applying the biological criteria to evaluate the health of other streams and rivers in Georgia will be developed by FFY04. Biological criteria will have a profound influence on the processes for the determination of nonpoint sources of pollution. Information collected at reference sites will provide an effective tool for sorting proportional impacts in nonpoint source pollution studies, for assessing the effect of various best management practices, and for managing areas to preserve biological diversity. This project has fostered interstate cooperation in selecting and sampling reference sites in shared ecoregions. Those states include Alabama, Florida, North Carolina, South Carolina and Tennessee.

### ***Nonpoint Source Monitoring and Assessment - Groundwaters***

Groundwaters of the State are generally of good to excellent quality and incidents of groundwater pollution or contamination are rare. Georgia is fortunate in that most of the State's major drinking water aquifers are confined (i.e., protected by an overlying layer of low hydraulic conductivity). Of the thousands of municipal and community wells in Georgia, only a few have experienced water quality problems that required that they be abandoned. The GAEPD, nevertheless, recognizes that groundwater is susceptible to slow degradation that may occur as a result of human activities at the land surface.

Groundwater is particularly susceptible to pollution from surface sources in recharge areas. In addition, shallow aquifers discharge directly into surface waterbodies such as streams, rivers and lakes. If the groundwater discharged at the surface has been impacted by point or nonpoint sources of pollution, local surface waters in turn are susceptible to pollution. Thus, recharge areas and shallow aquifer discharge areas are in need of special protection to maintain water quality.

The Georgia Groundwater Monitoring Network allows GAEPD to identify groundwater quality trends before they become a significant problem. Groundwater monitoring performed to date shows no evidence of widespread groundwater pollution in Georgia. While there have been numerous small plumes of contaminants in the surficial aquifer, few cases of groundwater pollution of drinking water aquifers have been documented in Georgia, and there is no known significant portion of the population at risk from any point or nonpoint sources of pollution. Sources of the small plumes in the surficial aquifer include leaking underground storage tanks, former disposal sites and unlined landfills.

The most extensive contamination of Georgia's aquifers is from naturally

occurring mineral salts (i.e., high total dissolved solids). This contamination is limited to areas along the coast where intensive use of groundwater has resulted in lower quality water, either from the ocean or from lower parts of the aquifer, moving into the Upper Floridan aquifer. Naturally occurring mineral salts also occur in south central Georgia and in northwest Georgia. The GAEPD is using its regulatory authority to limit additional withdrawals of groundwater in these areas and thus prevent additional encroachment. Monitoring results have also indicated slight increases in nitrate concentration in the recharge areas of some Coastal Plain aquifers since 1984 and in some shallow wells in Dougherty County. To further assess nitrate/nitrite from nonpoint sources, the GAEPD sampled over 5000 shallow domestic drinking water wells for nitrate/nitrite between 1991 and 1996. Results indicate that water from 97% of the wells has less than five ppm nitrate as N, well below the maximum contaminant level (MCL) of 10 ppm. Water from less than 1% of the wells exceeded the MCL value. This assessment indicates that, aside from some localized contamination like that in Dougherty County, nitrates are not a significant contributor to groundwater pollution across Georgia.

Other relatively minor sources of pollution and contamination in Georgia, listed in order of decreasing significance are leaking underground storage tanks, naturally occurring elements such as iron and manganese, naturally occurring radioactive elements, hazardous waste sites, and septic tanks. Some pollution sources common in other states tend to be rare or nonexistent in Georgia.

For groundwater in Georgia, the greatest water quality threat is additional salt water encroachment. This threat is primarily restricted to areas located along the coast, specifically in Chatham, Glynn and Camden Counties. As described above, intensive use of groundwater in the 24 coastal counties has caused some groundwater containing high levels of dissolved solids to enter freshwater aquifers either vertically or laterally. The GAEPD is currently implementing an *Interim Coastal Management Strategy* to protect water quality in the Upper Floridan aquifer from further impacts.

Other than the threat of naturally-occurring dissolved solids, no particular source of pollution is known to be widespread or to represent a significant threat to groundwater quality in the State. Nonetheless, GAEPD will continue to expand and modify its groundwater monitoring network to assess specific concerns. For example, monitoring of agricultural pesticides will begin in FFY01 to identify any developing threats to shallow groundwater. This ongoing assessment will be broadened over the next five years to include a wider sample survey of wells. The objective is to achieve a better environmental scan of potential agricultural pesticide impacts. The GAEPD Geologic Survey Branch expects to sample several hundred to a couple of thousand wells over the next five years. The data collected will provide information on the susceptibility of aquifers to nonpoint source pollution from agricultural practices. The results of this assessment will be used by the GAEPD as part of its long term groundwater monitoring and by the Georgia Department of

Agriculture for the continued development and implementation of the *State Pesticide Management Plan*.

In FFY05, the GAEPD Geologic Survey Branch will prepare a final report enumerating the results of this assessment. This report will be composed of descriptive text as well as graphical presentation of the data. The GAEPD Geologic Survey Branch will create a digital database that will include the location, depth (if known), analytical results, and field parameters for each well sampled. In addition, the report will delineate the number of individual farm site assessments and actions taken as a direct result of this assessment.

As described above, the State's groundwater is most susceptible to pollution in the significant recharge areas of its aquifers. To facilitate protection of these areas, they have been mapped in the GAEPD Geologic Survey Branch *Hydrologic Atlas 18*. The GAEPD Geologic Survey Branch has also prepared *Hydrologic Atlas 20*, delineating susceptibility to groundwater pollution for the surficial aquifer. During FFY00, the GAEPD Geologic Survey Branch will complete a *Nonpoint Source Base Flow Protection GIS Database* for each of the major river basins in Georgia.

### ***Geographic Information Systems***

The State's major river basins provide the geographical framework and focus for the River Basin Management Planning process; however, a consistent and standard system of watershed units is needed to provide the organizational elements required within each major river basin. This watershed unit system will provide the framework for River Basin Management Planning activities (e.g., nonpoint source management and geographic information systems). An interagency project coordinated by the GAEPD and the U.S. Geological Survey (USGS) was initiated in FFY98 to standardize watershed unit systems in Georgia to the 14-digit hydrologic unit equivalents.

Specific products of this project will include a standardized watershed unit system within the current USGS hydrologic units for use by multiple agencies and GIS coverages of the watershed unit system in ARC/INFO and ARCVIEW export formats by FFY01.

The GAEPD Geologic Survey Branch initiated a project to complete a *Nonpoint Source Base Flow Protection GIS Database* for each of the major river basins in Georgia by FFY00. The GIS databases will contain a variety of coverages which provide access to jurisdictional, geographical and environmental data useful in identifying and prioritizing issues, establishing strategic monitoring and assessment plans, and developing nonpoint source management strategies. The information collected for each of the major river basins will aid in facilitating the River Basin Management Planning process and implementing the *Georgia Nonpoint Source*

### *Management Program.*

The coverages and maps will form the cornerstone of each of the river basin management plans as they serve to present information to local citizens and stakeholders in a readily understandable format. Each GIS database will contain a full documentation package which will include data sources, scales, quality assurance project plans and potential limits. The documentation packages will be completed in accordance with the Federal Geographic Data Committee's 1994 publication, *Content Standards for Digital Geospatial Metadata*.

### ***Ribotyping - Fecal Coliform Bacteria***

The *Rules and Regulations for Water Quality Control* established a fecal coliform criteria of a geometric mean of 200 organisms per 100 ml for all waters of the State during the recreational season (May - October). Although the standard is based on a geometric mean, most of the data for Georgia is based on once per month sampling as resources are available to conduct sampling and analysis four times per month. For the purpose of the report, *Water Quality in Georgia 1996-1997*, the USEPA recommended the review criterion of 400 organisms per 100 ml to evaluate once per month sample results during the recreational season.

For waters classified as drinking water supplies, fishing or coastal fishing, the maximum criteria are 400 cfu/100 ml (May - October) and 4,000 cfu/100 ml (November - April). For waters classified as recreation, the maximum criterion is 400 cfu/100 ml for the entire year. Reports from local and state governments, including Georgia, have documented violations of the fecal coliform criteria in waterbodies in urban and agricultural areas - *but also in waterbodies in isolated areas, such as national forests*.

Fecal coliforms normally inhabit the intestinal tracts of warm-blooded animals, *including wildlife*, and the presence of fecal coliforms in soil or water is a good indicator that the soil or water was contaminated by bacterial pathogens. However, prior to developing and implementing Total Maximum Daily Loads to address fecal coliform bacteria, it would be judicious to identify the source of the fecal coliform bacteria (i.e., human, domesticated animals or wildlife).

One of the most vexing problems in isolating fecal coliforms from water samples is not knowing the host origin of the bacteria. One method to identify the host origin of a bacterium is to observe the bacterium's various *phenotypic markers*. However, the problems with using phenotypic markers include the lack of reproducibility and discriminatory power. Another method, *genotyping*, offers increased reproducibility and discriminatory power. Genotyping methods include chromosomal DNA

Partially Supporting Designated Uses/Not Supporting Designated Uses (Water Quality in Georgia 1996 -1997)		
Criterion Violated	Impairment of Streams and Rivers - Miles	
	Major	Minor
Fish Guidance	754	1,149
Toxicity	44	203
Pesticides	89	0
Priority Organics	1	8
Metals	305	1,444
Ammonia	0	0
pH	1	18
Dissolved Oxygen	158	336
Thermal Modification	0	23
<b>Pathogens</b>	1,265	1,456
Biota Impacted	609	138
Other Inorganics	0	6
Criterion Violated	Impairment of Lakes and Reservoirs - Acres	
	Major	Minor
Fish Guidance	234,772	89,287
Toxicity	0	0
Pesticides	0	0
Priority Organics	0	0
Metals	4,257	186,358
pH	3,328	700
Dissolved Oxygen	45	0
Thermal Modification	650	0
<b>Pathogens</b>	194	20,083
Point and Nonpoint Source Categories	Impairment of Estuaries - Square Miles	
	Major	Minor
Priority Organics	0	2
Metals	0	2
Dissolved Oxygen	0	95
<b>Pathogens</b>	302	97

restriction analysis, plasmid typing, pulsed field gel electrophoresis, polymerase chain reaction, and *ribotyping*. In *ribotyping*, the DNA is isolated from the bacterium and cut with a special enzyme that recognizes certain DNA sequences (i.e., restriction enzyme) - discriminating among subspecies of a bacterium based on its DNA.

The University of Georgia has initiated a *ribotyping* study of the fecal coliform, *Escherichia coli*. There is sound scientific evidence that specific strains of *Escherichia coli* are associated with different host species. Currently, only four university research teams are identifying the host origin of environmental isolates of *Escherichia coli* - University of Washington, Virginia Tech, University of Florida and the University of Georgia. Several reports indicate that *ribotyping* can identify the host origins of many *Escherichia coli* isolates. The University of Georgia will obtain 2,000 *Escherichia coli* isolates in FYY00 from along the Chattahoochee River and from the Piedmont, Coastal Plain and the Coast of Georgia to create a database (i.e., host origin library) and to determine the degrees of geographic and temporal separation.

### ***Nonpoint Source Education and Outreach***

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

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

In October 1996, the GAEPD selected Project WET (Water Education for Teachers) curriculum as the most appropriate water science and nonpoint source education curriculum for the State. The Project WET curriculum is an interdisciplinary water science and education curriculum that can be integrated into the existing education curriculum of a school, museum, university pre-service class, or a community organization. The goals of the Georgia Project WET Program are



to facilitate and to promote awareness, appreciation, knowledge and stewardship of water resources through the development and dissemination of classroom (K-12) ready teaching aids.

The success of the Georgia Project WET Program has been phenomenal. Since 1997, several Project WET facilitator training workshops have been successfully completed in Athens, Atlanta, Dahlonega, Macon, Savannah and Warner Robbins with over 140 Project WET facilitators trained statewide. In addition, over 115 Project WET educator workshops have completed in Georgia with more than 2,500 formal and non-formal educators implementing the Project WET curriculum statewide with a substantial number of students.

The Georgia Project WET Program has been nationally recognized as a model program for its training strengths and techniques - specifically, the use of the arts in environmental education. The Georgia Project WET Program in conjunction with the International Rivers Network offers educators in Georgia the opportunity to participate in the *River of Words*, an international poetry and art contest for student (K-12). This contest provides students with the opportunity to explore their own watersheds and to learn their "ecological" addresses through poetry and art. National winners are selected by the former U.S. Poet Laureate, Robert Hass, and the International Children's Art Museum. Annually, only eight students are selected as national grand prize winners to be honored at the Library of Congress in Washington, DC. Since 1997, five students from Georgia have been recognized as national grand prize winners and an additional 30 students from Georgia have been national finalists and merit winners.

The Georgia Adopt-A-Stream Program is a citizen monitoring and stream protection program with two staff positions in the GAEPD and four Regional Training Centers. Established in 1996, the Regional Training Centers are a network of college-based training centers located in Columbus, Milledgeville, Savannah and Valdosta, Georgia. This network of training centers allows the Georgia Adopt-A-Stream Program to be accessible to all areas of the State. The Regional Training Centers ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control.

Stakeholder involvement and stewardship are essential to implementing Georgia's River Basin Management Planning approach to water resource management. The Georgia Adopt-A-Stream Program objectives support the RBMP strategies for stakeholder involvement and stewardship: (1) increase individual's awareness of how they contribute to nonpoint source pollution problems, (2) generate local support for nonpoint source management through public involvement and monitoring of water bodies, and (3) provide educational resources and technical assistance for addressing nonpoint source pollution problems statewide.

Currently, more than 7,000 volunteers participate in 200 individual and 26

community sponsored Adopt-A-Stream Programs. Volunteers conduct clean-ups, stabilize streambanks, monitor streams using biological and chemical methods, and evaluate habitats and watersheds. These activities lead to a greater awareness of water quality and nonpoint source pollution, active cooperation between the public and local governments in protecting water resources, and the collection of basic water quality data. The Georgia Adopt-A-Stream Program focuses on what individuals and communities can do to protect Georgia's water resources from nonpoint sources of pollution.

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

In addition, the Georgia Adopt-A-Stream Program organizes the annual Georgia River Clean-Up Week - *Rivers Alive!* with over 7,000 volunteers cleaning up rivers, creeks, canals, lakes and ponds in over 100 locations statewide.

The Georgia Water Management Campaign (GWMC) has been established to enhance local governments' ability to manage and to protect water resources by translating water management policies into local government decision making capabilities, guidance and technical assistance. The Georgia Water Management Campaign is the result of three-part contract between the GAEPD, GEFA, and the Association County Commissioners of Georgia (ACCG). The campaign is endorsed by the Georgia Municipal Association, Georgia Rural Water Association and the Georgia Water and Pollution Control Association.

The GWMC promotes stakeholder involvement in the development and implementation of local watershed management initiatives. To accomplish its mission, the GWMC sponsors an annual Georgia Water Resources Leadership Summit to provide a "bottom up" and "top down" understanding of issues affecting the management and protection of water resources in Georgia. In addition, several outreach tools, such as public service announcements and videos, are being developed for local governments.

Outreach and technical assistance, including citizen monitoring, lay the groundwork for behavioral changes and are often a pre-requisite for effective implementation of comprehensive watershed management programs. State-level educational programs are supplemented by a number of other nonpoint source

education initiatives, initiated by local governments, educational agencies, and private, nonprofit organizations.

## **ENFORCEABLE MECHANISMS**

### **Overview**

Pollution of our nation's waters is a continuing problem despite nearly thirty years of regulatory attention and funding. The largest remaining obstacle is *nonpoint source* pollution. The Federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) permitting program regulates discharges of pollutants from *point sources*, which includes wastewater discharges from pipes, outlets and other discrete conveyances, and stormwater discharges from industrial facilities, municipal sewer systems and construction sites of five acres or more. But the NPDES permitting program does not address *nonpoint source* pollution which transports sediment, nutrients, bacteria, metals, pesticides, organic compounds and other forms of pollution into the nation's rivers, lakes, estuaries and wetlands.

While enforceable mechanisms are not the primary instrument used to address nonpoint source pollution in Georgia, they are increasingly used to complement other mechanisms. Traditional nonpoint source control mechanisms in Georgia include voluntary and technical assistance programs that emphasize voluntary best management practices - especially in agriculture and silviculture. Georgia, even though leading with other strategies, has recourse to enforcement tools for some nonpoint source pollution problems.

### **Georgia Water Quality Control Act**

The Georgia Water Quality Control Act requires that the water quality standards for Georgia are not violated and provides civil and criminal enforcement sanctions for water quality violations. The Act is used primarily to address agricultural and silvicultural nonpoint source activities where there is a serious violation of water quality standards and the agency responsible for voluntary BMP implementation and technical assistance cannot secure compliance. Therefore, in situations where the GSWCC and/or the GFC cannot secure satisfactory compliance, the case is turned over to the GAEPD for enforcement action as provided for under the Georgia Water Quality Control Act.

Agricultural operations fall under the Georgia Water Quality Control Act which sets water quality standards that may not be violated by agricultural nonpoint sources of pollution. Currently, only land application systems and concentrated animal feeding operations (CAFO) require permits under the Georgia Water Quality Control Act. The Georgia Department of Natural Resources Board recently promulgated rules on permits for swine feeding operations with over 300 animal units. The rules allow no discharge from the swine feeding operation into surface waters of the State. By October 2001, the owners or operators of existing swine operations will be required to submit a comprehensive nutrient management plan to

the GAEPD. Any failure to comply with any condition of the regulation will be deemed a violation of the Georgia Water Quality Control Act and may be punishable in accordance with the penalties provided for in the Act. New rules for non-swine feeding operations will be reviewed by the Georgia Department of Natural Resources Board and finalized in December 2000.

Under the Georgia Water Quality Control Act, general permits are required for all land application systems (LAS), including agricultural systems for spreading animal waste, municipal systems for spreading treated wastewater, and industrial systems for spreading treated wastewater. A general permit can be issued for all facilities in a specific geographic area or to a specific category of LAS facilities. Violations are generally handled by the GSWCC. However, if there is a fish kill or public health hazard associated with the violation, then the GAEPD will consider enforcement action.

Complaints about actual or potential water quality impacts from commercial forestry activities are referred to the Georgia Forestry Commission (GFC). Complaints from citizens are common, particularly in counties with growing populations where landowners are living closer to commercial forestry operations. After notifying the forest owner, the GFC District Water Quality Coordinator will conduct a field inspection to determine if best management practices were followed, if the potential for water quality problems exists, and who was responsible for the activities (e.g., site preparation or timber harvesting). If problems do exist, the GFC will work with the responsible parties until the problems are corrected. In situations where the GFC cannot get satisfactory compliance, the case is turned over the GAEPD for enforcement action under the Georgia Water Quality Control Act.

### ***Erosion and Sedimentation Act***

The Erosion and Sedimentation Act provides a mechanism for controlling erosion and sedimentation from land-disturbing activities. The Act establishes a permitting process for land-disturbing activities, with some exceptions. To receive a permit, an applicant must submit an erosion and sedimentation control plan which incorporates specific conservation and engineering best management practices.

In much of the State, local governments have adopted erosion and sedimentation ordinances and have been given the authority to issue and enforce permits for land-disturbing activities. In areas where a local government has not been certified as an issuing authority, the GAEPD is responsible for permitting, inspection and enforcement under the Act.

The Erosion and Sedimentation Act applies land-disturbing activities statewide. Land-disturbing activities are defined as any activity which may result in soil erosion and the movement of sediments into State waters or onto lands of the State.

Examples include clearing, grading, excavating or filling of land. The following activities are unconditionally exempt from the provisions of the Act: surface mining; granite quarrying; minor land-disturbing activities, such as home gardens and landscaping; agricultural and silvicultural operations; and any project carried out under the technical supervision of the NRCS.

Other activities are partially exempt from the provisions of the Act. For these activities, permits are not required prior to land-disturbing activities; however, specific best management practices must be implemented. Partially exempt activities include: construction of single-family residences which are not part of a platted subdivision; construction or maintenance of roads by the State or local governments; and land-disturbing activities conducted by public utilities.

Activities on sites of one and one-tenth acres or less are exempt from both permitting and BMP requirements, unless these activities occur 200 feet of lakes or perennial streams, in which landowners must prevent sediment from moving beyond the property boundaries. However, local governments which have been certified as issuing authorities have the option of not exempting land-disturbing activities on small sites.

Local governments, with oversight by the GAEPD and the Soil and Water Conservation Districts, are primarily responsible for implementing the Erosion and Sedimentation Act. State law directs local governments to enact erosion and sedimentation ordinances. These ordinances are reviewed by the GAEPD and, if consistent with State law, the local government is granted the authority to issue permits for land-disturbing activities. Approximately 132 counties and 240 municipalities have been certified as local issuing authorities. Where local ordinances have not been adopted or certified, the GAEPD is responsible for permitting, inspection and enforcement under the Act.

Reports of suspected violations of the Erosion and Sedimentation Act are made to the agency that issued the permit. In cases with a local issuing authority, if the violation continues, the complaint is then referred to the appropriate Soil and Water Conservation District. If the situation remains unresolved, the complaint is then referred to the GAEPD for enforcement action under the Erosion and Sedimentation Act. Enforcement may consist of administrative orders, injunctions and civil penalties. Civil penalties for non-certified counties and municipalities are authorized up to \$2,500 per day. Permit revocation, suspension, modification and bond forfeiture constitute additional enforcement sanctions.

### ***Georgia Surface Mining Act***

The Georgia Surface Mining Act requires a permit from the GAEPD for surface mining operations. The Act applies to surface mining activities statewide. Surface

mining is defined as any activity or process for the removal of minerals, ores or other solid matter. Tunnels, shafts and dimension stone quarries are not considered to be surface mining. Minerals include sand, clay, stone, gravel, phosphate and other rocks and ore of commercial value found in natural deposits on or in the earth. The Act covers dredging of sand as well as other surface mining activities. The GAEPD has the authority to enforce violations of the permit, including water quality and discharge violations.

An application for a surface mining permit must be accompanied by a Mined Land Use Plan consistent with the land use in the area of the mine. The plan must specify activities for control of erosion and sedimentation and disposal of refuse, as well as provisions for reclamation of the affected land. In addition to a Mined Land Use Plan, a surety bond for land reclamation activities must be filed with the GAEPD. Site operation, objectives of the Mined Land Use Plan, and estimated cost factors for completion of the Mined Land Use Plan are subject to review and evaluation by the GAEPD at least every five years. Following the review, bonding amounts will be adjusted, as required, to ensure adequate funding for site reclamation.

This permitting program is administered by the GAEPD Land Protection Branch under both the Georgia Surface Mining Act and the Georgia Water Quality Control Act. The GAEPD Land Protection Branch enforces the Georgia Surface Mining Act with fines of \$1,000 per violation and \$500 for each day of violation thereafter for minor or one-time violations, and the Georgia Water Quality Control Act with higher penalties for major or continuing violations.

### ***Watershed Assessments***

Special provisions have been established which require local governments to conduct watershed assessments prior to receiving an environmental permit from the State that facilitates growth and development, such as a wastewater permit or a water withdrawal permit.

The watershed assessment must address the entire service area managed by the local authority and include the following information: identification of and relative contribution of point and nonpoint sources of pollution; identification of measurable environmental and programmatic goals; and identification of pollution controls and natural restoration measures required to achieve clean water and other natural resource goals.

### ***River Corridor Management***

River corridor protection plans are to be incorporated in local comprehensive plans prepared under the Georgia Planning Act of 1989. As mandated by Part V of

the Georgia Planning Act and the Mountain and Corridor Act, the comprehensive plans must include the identification and protection of natural and historic resources. This rule establishes minimum requirements for water supply watersheds, groundwater recharge areas, wetlands, river corridors and mountains. These minimum requirements are known as the *Part V Minimum Planning Standards*.

In water supply watersheds with areas greater than 100 square miles, corridors of all tributary streams within seven miles of the water supply reservoir must have restricted stream buffer zones, percent impervious areas, set backs and septic tanks location limitations. In water supply watersheds with areas less than 100 square miles, criteria exist for stream buffer zones, percent impervious areas and set backs for all tributary streams within seven miles of the water supply reservoir and between the seven mile radius and the remaining watershed area.

In order for a comprehensive plan to meet the requirements of the *Part V Minimum Planning Standards*, the comprehensive plan must identify all environmental sensitive areas and the applicable criteria. Failure to adopt and implement an acceptable comprehensive plan could lead to the loss of certified local government status and ineligibility for State grant and loan programs. In addition, the GAEPD requires that the permittee develop appropriate water supply protection plans for new or modified water withdrawal permits.

The River Corridor Protection Act establishes corridors along major rivers as critical natural resource areas and directs the Georgia Department of Natural Resources to establish minimum criteria for their protection. Requirements under the Act are intended to decrease nonpoint source impacts on surface water. Protected rivers are defined as any perennial river or watercourse with an average annual flow of at least 400 cubic feet per second (e.g., Altamaha, Chattahoochee, Coosa, Flint, Ochlockonee, Ocmulgee, Oconee, Ogeechee, Satilla, Savannah, St. Marys and Suwannee Rivers). The minimum standards require that each local government which contains a protected river corridor in its boundaries develop a river corridor protection plan which will maintain the integrity of a 100 foot buffer area on either side of the river.

While most local governments with protected rivers in their jurisdictions have completed plans which meet the State's minimum standards, some have gone beyond the standards by designating longer river segments and/or wider corridors in their protection plans. In Irwin County, the only watercourse that meets the State's definition on a protected river is a segment of the Alapaha River. In their comprehensive plan, however, Irwin County has designated protected corridors along the full length of the Alapaha River and along other major rivers and creeks in the County (i.e., Satilla River, Willacoochee River and Reedy Creek). In addition, the protected corridors are wider than specified in the minimum standards, ranging from 500 to 1,000 feet from the stream channel. Similar provisions have been incorporated in the comprehensive plans for Cook, Echols, Lanier and Turner



Counties.

The Regional Development Centers provide technical assistance to local governments on river corridor protection. As part of this effort, the Chattahoochee-Flint RDC has developed a model ordinance for river corridor protection and will be working with local governments in the region to promote its adoption. In addition, the DCA reviews work plans detailing implementation of local comprehensive plans. Over the next five years, DCA will direct local governments which have not already done so to adopt ordinances implementing their river corridor protection plans.

Special provisions have been established to manage the Chattahoochee River in the metropolitan Atlanta area. The Metropolitan River Protection Act (MRPA) was enacted in 1973 in recognition of the value of the Chattahoochee River as a natural resource and its vulnerability to impacts from nonpoint sources of pollution. The MRPA directed the Atlanta Regional Commission (ARC) to develop and adopt a Chattahoochee Corridor Plan establishing criteria to minimize the adverse impacts of development of land along the river. The MRPA and the Chattahoochee Corridor Plan require that all development, clearing and other land-disturbing activity within the protected corridor be reviewed and approved before the activity is initiated.

The MRPA provides for the protection of a corridor within 2000 feet of the Chattahoochee River between Buford Dam and Peachtree Creek. The MRPA was amended in 1998 to extend the protection corridor downstream to the southern end of the Atlanta region. New development must be reviewed by ARC for compliance with the MRPA and approved by the local government. Participating local governments include: Cobb, Gwinnett, Forsyth and Fulton Counties and the Cities of Atlanta, Berkeley Lake, Duluth, Roswell, Sugar Hill and Suwanee.

The Act was amended in 1983 to require the adoption of tributary buffer ordinances by local governments which are outside the corridor but have tributaries to the corridor portion of the Chattahoochee River. Under this amendment, tributary buffer ordinances are required in the following jurisdictions: DeKalb County and the Cities of Alpharetta, Buford, Cumming, Marietta, Norcross, Rest Haven and Smyrna.

All development, clearing or other land-disturbing activities within the corridor must be reviewed and approved for consistency with the Chattahoochee Corridor Plan before any activity can begin. The Chattahoochee Corridor Plan established three sets of standards: vulnerability standards which specify the amount of land disturbance and impervious surface allowed on individual pieces of land, floodplain standards, and buffer zone standards which establish minimum buffers on the river and certain tributaries.

The Chattahoochee Corridor Plan establishes six vulnerability categories based on the following natural factors and their susceptibility to development impacts:

vegetation, soil erodibility, hydrology, slope, aspect and bedrock geology. Vulnerability categories limit development by restricting the percentage of an area that can be disturbed and the percentage that can be converted to impervious surfaces.

The floodplain standards require balancing of cut and fill in the river's 100-year floodplain so that there is not reduction in flood storage. Obstruction of flood flow is also restricted in this area. In the 500-year floodplain building height is limited to 35 feet above the original grade.

Buffer zone standards for the corridor require undisturbed, natural vegetative buffers within 50 feet of the Chattahoochee River and prohibit all impervious surfaces within 150 feet of the river. Natural vegetative buffers are also required within 35 feet of designated tributaries.

With Section 319(h) Grant funds, the ARC and cooperating agencies will document the existing conditions and violations of the riverfront of the Chattahoochee River corridor between Buford Dam and Peachtree Creek in a photographic survey. The documentation will include identification of all visible intrusions into the undisturbed vegetative buffer (50 feet) and the impervious surface set back (150-foot) required under the standards of the Chattahoochee Corridor Plan as authorized by the MRPA.

Enforcement will be carried out through the local governments along the river that are responsible for enforcement actions against violation under the MRPA. The surveys will be delivered to the local governments and ARC will meet with each to discuss the violations (if any) and their proposed enforcement strategies. By December 2000, a survey report will be developed for each of the following local governments: Cobb, Fulton and Gwinnett Counties and the Cities of Atlanta, Roswell and Duluth. The survey documents and materials will also be used to develop educational programs for local governments and citizens on the importance of buffers in the Chattahoochee River corridor and how enforcement of buffer requirements protects water quality and controls surface runoff.

### ***Coastal Marshlands Protection Act***

The Coastal Marshlands Protection Act establishes State regulation of tidal wetlands. The Coastal Marshlands Protection Act affects over 700,000 acres, including all marshlands within the estuarine area of the State. The estuarine area is defined as all tidally-influenced waters, marshes, and marshlands lying below a tide-elevation of 5.6 feet above mean tide level. Coastal or salt marshes are defined by the presence of specified vegetation, intertidal areas, mud flats and tidal water bottoms. Erecting structures, dredging or filling marsh areas require a permit as directed by the Coastal Marshland Protection Act. Structures which require a permit

include marinas, community docks, boat ramps, industrial dock facilities and piers. Private-use recreational docks which do not obstruct tidal flow are exempt from the Coastal Marshland Protection Act. However, these docks must obtain a revocable license for use of State-owned tidal water bottoms and U.S. Army Corps of Engineer permit.

Agricultural and silvicultural activities which directly alter lands and/or vegetation with the jurisdictional areas of the Coastal Marshland Protection Act require a permit. Exemptions from the Act include the activities of the Georgia Department of Transportation, public utilities, and Federal and State agencies responsible for maintaining navigation of rivers and harbors. Private dredging of channels and harbors requires a permit.

The Coastal Resources Division (CRD) utilizes an application form which meets the requirements of related permitting programs: Section 404 of the Federal Clean Water Act, revocable license for State-owned tidal water bottoms, and the State certification of non-degradation of water quality as required Section 401 of the Federal Clean Water Act. The following information is required for a Coastal Marshland Protection Act permit: an application form, site plan or survey, landfill and/or hazardous site determination letter, zoning letter, soil and erosion control letter, copy deed of plat, adjoining landowner notices, and other applicable leases, licenses or certifications.

Coastal Marshland Protection Act provides for both civil and criminal penalties for violations. Criminal penalties are established as a misdemeanor - maximum penalty of \$1,000 fine and/or up to 12 months imprisonment. Civil penalties includes fines not exceed \$10,000 for each violation and \$10,000 for each such violation continues, as well as liability for expenses incurred by the State during any restoration activity.

### ***Federal Consistency Review***

Section 319(b)(2)(F) of the Clean Water Act requires that the *Georgia Nonpoint Source Management Program* identify Federal financial assistance programs and Federal development projects which the States reviews for their effect on water quality and consistency with the *Georgia Nonpoint Source Management Program*. The State of Georgia has a Federal consistency review process pursuant to Executive Order 12372. Proposals for Federally assisted projects are distributed to the Georgia State Clearinghouse and subsequently forwarded to the appropriate State agency for review and comment in accordance with the State's project notification and review system.

Federal agencies and the GAEPD continue to coordinate efforts through established partnerships - most frequently with the U.S. Department of Agriculture,

U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Forest Service and the U.S. Geologic Survey. The Memorandum of Understanding (MOU) between the U.S. Forest Service (USFS), the Georgia Forestry Commission and the GAEPD identifies the responsibilities and activities of the participating agencies in implementing the *Georgia Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forests. In addition, both Federal and State agencies participate in the USDA NRCS State Technical Committee to develop programs to implement the agricultural component of the *Georgia Nonpoint Source Management Program*. Pertinent Federal program reviewed by the State pursuant to Section 319(b)(2)(F) for consistency with the *Georgia Nonpoint Source Management Program* include:

U.S. Department of Agriculture

- Agricultural Conservation Project (ACP)
- Conservation Reserve Program (CRP)
- Conservation Reserve Enhancement Program (CREP)
- Environmental Quality Incentive Program (EQIP)
- Wildlife Habitat Incentive Program (WHIP)
- Wetland Reserve Program (WRP)

U.S. Fish and Wildlife Service

- Endangered Species Conservation

U.S. Forest Service

- Forestry Incentive Program (FIP)

U.S. Army Corps of Engineers

- Section 404 of the Federal Clean Water Act
- Section 10 of the Federal Rivers and Harbor Act

## **PARTNERSHIPS**

This revision of the State's *Nonpoint Source Management Program* was developed through a consultative process, incorporating input from a wide range of stakeholders involved in nonpoint source management activities throughout the State - local, regional, State and Federal agencies, as well as private, non-governmental organizations. This process encouraged intergovernmental resource sharing and increased stakeholder involvement. This revision of the State's *Nonpoint Source Management Program* established new partnerships and strengthened existing partnerships in the development and implementation of nonpoint source strategies.

The Georgia Environmental Protection Division (GAEPD) is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and groundwater. Consequently, the GAEPD has been designated as the administering or lead agency for implementing the State's *Nonpoint Source Management Program*. Regulatory responsibilities include establishing water quality use classifications and standards, assessing and reporting on water quality conditions, issuing point source discharge permits, issuing surface and groundwater withdrawal permits, and regulating land-disturbing activities. These regulatory programs are complemented by non-regulatory programs, including the Section 319(h) Nonpoint Source Implementation Grant Program, Clean Water State Revolving Fund, Georgia Project WET (Water Education for Teachers) Program, Georgia Adopt-A-Stream Program and the Georgia Water Management Campaign.

State agencies are essential partners in efforts to implement the State's *Nonpoint Source Management Program* and include the Coastal Resources Division, Pollution Prevention Assistance Division and Wildlife Resource Division within the Georgia Department of Natural Resources; Department of Community Affairs; Department of Human Resources Division of Public Health; and the Georgia Environmental Facilities Authority. The Coastal Resources Division is the lead agency in the development and implementation of the State's *Coastal Nonpoint Source Management Program*.

The Georgia Soil and Water Conservation Commission (GSWCC) has been designated by the GAEPD as the lead agency for implementing the agricultural component of the State's *Nonpoint Source Management Program*. Similarly, the Georgia Forestry Commission (GFC) has been designated by the GAEPD as the lead agency for implementing the silvicultural component of the State's *Nonpoint Source Management Program*. In addition, a Memorandum of Understanding between the U.S. Forest Service, GFC and the GAEPD, identifies the responsibilities of the participating agencies in implementing the State's *Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forest. Numerous State and Federal agencies and private, non-governmental organizations continuing to cooperate with the GAEPD, GSWCC and the GFC include: USDA Natural Resources Conservation Service, Georgia Farm

Bureau, Georgia Forestry Association, Georgia Agribusiness Council, University of Georgia and the Georgia Department of Agriculture. Existing non-regulatory programs established for agriculture and silviculture have proven to be viable.

As with other activities, the State's *Nonpoint Source Management Program* will be implemented in conjunction with the State's River Basin Management Planning process. Local governments, regional development centers, private non-governmental organizations and the general public have a critical role in developing and implementing nonpoint source management strategies. The State is expanding its role in facilitation and support of local and regional nonpoint source management activities.

The 1990 report, *We All Live Downstream*, established the direction of nonpoint source management in Georgia. The report emphasized the importance of cooperative partnerships and building relationships between the units of governments responsible for *land* and *water* quality management. The report recognized two major impediments to effective nonpoint source management in Georgia. The first is the division between statutory responsibilities for management of water quality, granted to the GAEPD, and local government's constitutional responsibility for management of the land activities which affect water quality. The second impediment is the diffuse nature of nonpoint source pollution and the variety of activities which may contribute to nonpoint source pollution. Effective nonpoint source pollution management requires cooperative partnerships between layers of government, private non-governmental organizations and the general public.

Since the publication of *We All Live Downstream*, nonpoint source pollution management in Georgia has continued to evolve. In order to encourage and support cooperative partnerships between layers of government, private non-governmental organizations and the general public, the GAEPD will establish a Statewide Nonpoint Source Management Task Force by December 2002.

## **AGRICULTURE**

### **Overview**

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

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

The statewide non-regulatory approach uses cooperative partnerships with various agencies and a variety of activities and programs. Agencies that form the basis of the partnership include the GSWCC (designated lead agency administering the Agriculture Nonpoint Source Management Program), SWCD, NRCS, UGACAES, CES, FSA, GFC and the GDA. These agencies work closely with Georgia agricultural commodity commissions and organizations such as the GFBB, GAC, RC&D Councils, Cattleman's Association, Milk Producers, Pork Producers Association, Poultry Federation, Goldkist, Georgia Conservancy, and GWF as well

as other producer groups and agriculture support industries to prevent and solve water quality problems. In addition to the agriculture agencies and interest groups, a working partnership with individual land users is the cornerstone of soil and water conservation in Georgia.

The cooperating agencies have specific functions and directions. All have an information, education, and public participation component to support their objective to improve and maintain water quality. Of the agriculture agencies, only the GDA has enforcement authority. The GSWCC works with GAEPD, the enforcement agency for the Georgia Water Quality Control Act, to resolve agricultural water quality complaints, where appropriate. The UGACAES and NRCS produce and distribute numerous brochures and fact sheets dealing with agriculture best management practices and water quality. A cooperative effort between UGACAES and P<sup>2</sup>AD is providing pollution prevention information, education and technical assistance to the farmer and “green industry” professionals to reduce nonpoint source pollution as a result of fertilizer and pesticide use.

A cooperative agreement between GAEPD, GSWCC, and NRCS dealing with water quality relating to confined animal feeding operations was revised in July 1990 and will be updated in 2001. Over the past six years significant progress has been made in the area of animal waste management. Considerable technical and financial resources have been directed toward water quality education and the installation of BMPs such as animal waste lagoons, waste storage structures, composting facilities, nutrient utilization, heavy use area stabilization, and livestock exclusion. Since 1990, the number of facilities covered by this agreement has increased. Each agency has continued to fulfill its respective role in handling large and small animal feeding operations.

The GSWCC and cooperating agencies conduct the statewide non-regulatory program to promote the voluntary adoption of BMPs. Some of the various information media include: conservation handbooks on animal waste management, erosion control, and streambank protection; slide and video presentations on BMPs; and an agriculture BMPs’ booklet. In addition, the GSWCC continues to support procurement of no-till planting equipment for local Soil and Water Conservation Districts throughout the State. This equipment, and operators for it, are made available to farmers who wish to employ no-till cultivation techniques (a specific BMP) for a reasonable cost.

The Agricultural Water Management Coordinating Committee (AWMCC) has reviewed published BMPs including 114 practices on which NRCS has set standards and specifications. These practices have been assessed for their ability to protect surface water quality and, when applicable, groundwater quality. AWMCC recommends support for 61 specific BMPs in *Protecting Water Quality with Best Management Practices for Agriculture* and 15 BMPs in *Agricultural Best*



*Management Practices for Protecting Water Quality in Georgia.* The AWMCC further recommends that demonstration projects not be restricted to these BMPs but to include demonstrate new and innovative BMPs with a potential to reduce nonpoint source pollution. Some of the most effective BMPs have resulted from farmers and conservation technicians implementing an idea they felt would work. Many times these attempts are the first iteration of research.

The 1996 Farm Bill contains conservation provisions that will have far reaching impacts on the protection of water quality from nonpoint source pollution in Georgia. The conservation provisions seek to improve the flexibility and efficiency of existing programs by diversifying agency participation in the delivery of conservation programs that protect water quality and related natural resources.

In the past, most conservation programs within the USDA have traditionally been administered by the Agricultural Stabilization and Conservation Service, now known as the Farm Service Agency (FSA). The NRCS, along with the SWCDs, provide technical assistance to FSA by working with landowners on the implementation of conservation measures. To date, conservation planning assistance through this partnership has devised conservation plans for 15,125,485 acres, or 45% of the 33.5 million acres of privately owned land in Georgia. Additionally, there are over 184,000 acres of land receiving flood prevention benefits from the installation of 351 floodwater retarding structures. Furthermore, there have been numerous animal waste management systems installed on dairy, poultry, swine, and other livestock operations, thereby greatly reducing the amount of nutrients delivered to State waters. These traditional partnerships have been good for Georgia's natural resources.

Conservation programs for which NRCS now retains program leadership include the existing Forestry Incentive Program (FIP) and Wetland Reserve Program (WRP); along with newly created programs that include the Environmental Quality Incentives Program (EQIP) which encompasses the old Agricultural Conservation Program and Water Quality Incentives Program; the Wildlife Habitats Incentives Program (WHIP); and the Farmland Protection Program. FSA maintains program leadership for the Conservation Reserve Program (CRP) and the Agricultural Market Transition Program. Collectively these programs, described more fully in the section on the 1996 Farm Bill Program, will continue to have a significant and positive impact on Georgia's natural resources.

The conservation program delivery process initiated by the Bill will cause a number of positive events to occur at the local, state, regional, and national levels. In the past, much of the focus has been placed on conservation programs. The Bill describes a new program delivery process that focuses first and foremost on resource concerns and considers conservation programs as tools with which to address the identified concerns. Multiple agencies, therefore, can take advantage of their common goals to protect and improve the natural resources of this State.

New programs in the Bill seek to address high priority environmental protection goals through the cooperative work of Federal, State, and local agencies, as well as an active State Technical Committee. This cooperative effort will continue to identify and set resource concern priorities thereby establishing Georgia's agricultural priority environmental protection goals. Applying common goals to address resource concerns in many of Georgia's geographic settings, which vary greatly, will encourage multiple agencies to find common solutions to resource impairment.

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

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

In addition, the Bill contains an exciting new requirement for agencies within the USDA to develop new relationships with non-traditional partners. For example, WHIP will create new opportunities for NRCS, USFWS, Georgia Wildlife Resource Division, Partners in Flight, and other groups to work cooperatively in identifying areas where wildlife resource concerns exist and then develop solutions to address those resource concerns. These new partnerships will serve to further enhance resource protection and restoration.

Georgia's RBMP process will be enhanced by these new partnerships and the coordinated effort to select priority resource concerns. As with other activities, the agricultural portion of the State's *Nonpoint Source Management Program* will be implemented in conjunction with the RBMP process. The GSWCC and NRCS are working to merge the planning process adopted by the GAEPD so that the agriculture community's involvement will be evident in every step of the RBMP process. Assessment of priority waters and agricultural nonpoint source impacts will be a continuing process, as described more fully in subsequent sections of this chapter.

Georgia's agriculture community has come a long way in reducing nonpoint source pollution to the State's waters over the past twenty years. This has been

accomplished primarily through a voluntary program, supported with institutional mechanisms and programs catalyzing progress. However, a long way is not far enough. Much needs to be accomplished by agriculture and the rural community in order to assist in achieving designated uses of Georgia's waters.

The *Georgia Nonpoint Source Assessment Report, December 1989* indicated that major adverse impacts to State waters from agriculture or in rural environments included: elevated solids concentrations and turbidity, increases in sand habitats, elevated fecal coliform densities, and high nutrient loadings. However, the report concluded that monitoring data from agricultural watersheds was not sufficient to evaluate agriculture's contribution to water quality problems. A list of waters potentially impacted by agricultural nonpoint source pollution is delineated in the *Georgia Watershed Agricultural Nonpoint Source Pollution Assessment, Cooperative River Basin Study, August 1993*.

This assessment presented a methodology that compared potential agricultural loadings on 549 NRCS designated watersheds within Georgia. The report concluded that 92 watersheds were priorities, a majority of which are within the Chattahoochee, Coosa and Altamaha River Basins. This listing has been incorporated into the Section 305(b) Report, *Water Quality in Georgia 1994 - 1995*.

Maintaining or improving water quality from nonpoint sources is possible only through the cooperation of a wide variety of State and Federal agencies, agricultural and environmental organizations, and land owners. The major agriculture management agencies and organizations are discussed in the following paragraphs.

Created in 1937 by an Act of the Georgia Legislature, the Georgia Soil and Water Conservation Commission has been designated as the lead agency for agricultural nonpoint source management in the State. The GSWCC develops nonpoint source management programs and conducts educational activities to promote conservation and protection of land and water devoted to agricultural uses. Primary functions of the GSWCC include guidance and assistance to the Soil and Water Conservation Districts and to provide oversight of the Erosion and Sedimentation Act.

Georgia's 40 Soil and Water Conservation Districts (SWCD) cover all 159 counties; each district comprises one to nine counties. They are governed by boards of supervisors of local citizens who are interested in conserving natural resources and willing to volunteer their time to that purpose. The local Soil and Water Conservation Districts and NRCS provide technical assistance to local producers to plan and establish needed soil and water conservation practices. Supervisors also sponsor informative and educational programs and field days to encourage and demonstrate new or innovative conservation practices for landowners and citizens. Some local SWCD own specialized equipment (e.g., no-till drills, planters, grass spriggers, hydroseeders, and mulch blowers) that is available for the installation of certain conservation practices.

The Natural Resource Conservation Service (NRCS), formerly the Soil Conservation Service, cooperates with the Federal, State, and local units of government to provide financial and technical assistance to landowners, cooperators, producers, and special interest groups. Standards and specifications regarding conservation practices, animal waste management systems, grazing activities, plant materials, and others are developed and upgraded by a staff of engineers, agronomists, biologists, soil scientists and plant material specialists. These practices are installed through an established network of county offices capable of overseeing demonstration projects, Section 319(h) Grant projects, Agricultural Conservation Programs (e.g., Environmental Quality Incentives Program, Wildlife Habitat Improvement Program, Wetland Reserve Program), and a number of other funding vehicles. NRCS convenes a State Technical Committee to oversee and administer activities related to the 1996 Farm Bill, and also provides planning assistance to GAEPD in River Basin Management Planning and TMDL development and implementation.

The Resource Conservation and Development Councils (RC&D) are groups of local citizens that encourage economic development, as well as the wise conservation of natural and human resources. The RC&D are locally organized within geographic regions served by the USDA. The 1962 Food and Agriculture Act established the RC&D Council Program with USDA employees called coordinators assigned to help each RC&D. Currently, there are 11 RC&D Councils covering 123 of the 159 counties in Georgia.

The Georgia Environmental Protection Division plays an active role in agricultural nonpoint source management programs. The GAEPD works closely with the major agricultural agencies to implement the State's *Nonpoint Source Management Program* and River Basin Management Planning process. The GAEPD is responsible for administering and enforcing the Erosion and Sedimentation Act and, hence, works with GSWCC to coordinate agriculture's association with this regulation. The GAEPD Water Resources Branch and GAEPD Geologic Survey Branch (also known as the Georgia Geologic Survey) participate in the administration and coordination of the Benchmark Farms Program to quantify groundwater withdrawal for agricultural irrigation. These branches also join forces to monitor and assess impacts to groundwater from agricultural nutrients and pesticides.

The University of Georgia College of Agricultural and Environmental Sciences (UGACAES) faculty, county cooperative extension agents, and technical specialists provide services in several key areas relating to agricultural impacts on water quality. These areas include: classroom instruction, basic and applied research, consultative assistance and information on nonpoint source impacts on water quality, application of Geographic Information Systems (GIS) and hydrologic

modeling for the assessment of current and future water quality and quantity issues, and consultative assistance to agricultural clients with issues such as development of waste management systems and nutrient management plans. As well, the UGACAES participates on a variety of state committees such as the EQIP State Technical Committee for the ranking of priority watersheds. The UGACAES is actively involved in monitoring water quality in streams and groundwater impacted by agriculture activities. The UGACAES publishes the *Georgia Pest Control Handbook* which lists approved pesticides, application rates, and methods. Extension agents located in county offices are knowledgeable about a wide variety of water quality topics and have informational material on a wide range of subjects. County agents provide laboratory analyses of water, forage, and animal wastes to determine levels of various nutrients, agrichemicals, and metals. County offices also handle registration of water permits used for irrigation of agriculture crops.

The Farm Service Agency (FSA), formerly the Agricultural Stabilization and Conservation Service, is the lead agency in the administration of the Conservation Reserve Program (CRP). The CRP is a voluntary program that offers annual rental payments, incentive payments, and cost-share assistance to establish approved cover on eligible cropland. The Commodity Credit Corporation (CCC) makes assistance available in an amount equal to no more than 50 percent of the participant's cost in establishing approved practices. The duration of contracts is between 10 and 15 years. Annual rental payments and cost-share assistance for establishing eligible practices are approved by the County FSA Offices.

The Georgia Forestry Commission (GFC) provides technical information and assistance relating to forestry practices such as reforestation, forest stewardship management, urban forest management, harvesting, marketing, utilization, incentive programs, forest water quality, and the general promotion of forestry through information and educational efforts. Services include the development of forest stewardship management plans, timber marking, loan or rental of certain forestry equipment, pre-suppression environmental firebreak plowing and sales of urban and forest tree seedlings. The GFC and the agriculture community have some conservation practices in common and share some projects, particularly those on the watershed level.

The Georgia Department of Agriculture (GDA) enforces both State and Federal law regarding pesticide use, application, and registration in Georgia. The GDA maintains an extensive program to protect groundwater from pesticide contamination. The Pesticide Monitoring Network is a collaborative project with the GAEPD in which water samples are obtained from wells throughout the State. The samples are analyzed by the GDA for pesticides and/or pesticide metabolites. The GDA facilitates voluntary pesticide disposal collections. It also responds to and takes enforcement action on complaints, most of which are connected with misapplication of defoliant on landscape plants or farm pond fish kills resulting from aerial application of chemicals. In addition, the GDA conducts routine on-site

inspections of irrigation/chemigation systems throughout the State for check valves and back flow prevention devices for protection of groundwater.

The USDA Southeast Watershed Research Laboratory Agricultural Research Service (SEWRL) develops the scientific understanding and associated technologies of watershed systems essential to maintaining or enhancing the environmental and natural resource base required for a viable, sustainable, and productive agricultural economy. SEWRL, one of six national watershed research labs, focuses primarily on the Coastal Plain region of the southeastern United States, a region with low-gradient drainage systems and near-stream riparian areas. Specific objectives are to develop: conceptual understanding of physical, chemical, and biological processes that impact natural resource and environmental systems; methodologies to direct optimal use of soil and water resources in the production of quality food and fiber while maintaining short- and long-term productivity requirements, ecosystem stability, and environmental quality; and models and information based systems to guide responsible management decisions for action and regulatory agencies at field, farm, and watershed scales. The current research agenda of SEWRL has a triangular paradigm: riparian ecosystems, hydrologic processes, and agrichemical science including animal waste programs. Supporting all three efforts are modeling and systems analysis; SEWRL has generated the GLEAMS model for water quality, the CREAMS model for pesticides transport, and the REMM model for riparian ecosystem management strategies that simulates physical and biological processes in riparian areas. SEWRL focuses on technology transfer to dairy, swine, and alligator producers.

The J. Phil Campbell, Senior, Natural Resource Conservation Center, USDA Agricultural Research Service (ARS) develops systems to increase agricultural production efficiency, to maintain environmental quality (soil, water, and atmosphere), and to meet sustainable long-term, global needs for agricultural production. ARS conducts research in the following areas: agricultural production techniques designed to improve yields, agricultural conservation techniques designed to maintain a resource base, and the impacts of agricultural operations on natural resources designed to promote sustainability. ARS seeks to improve the transfer of technology through the network of players in the agriculture community and cooperates with a network of scientific societies to identify emerging issues. ARS is a participant on the State Technical Committee and responds to the needs and goals identified by local groups by developing technical tools and research agendas.

The National Environmentally Sound Production Agriculture Laboratory (NESPAL) is a research facility of UGACAES dedicated to the development of environmentally and economically sound agricultural production systems. NESPAL is guided by an advisory board made up of diverse individuals who share a common commitment to the environment. Members of the advisory board represent farmers,

environmentalist, consumers, educators, agricultural support industries, food processors, food affiliated businesses, and regulatory agencies. NESPAL's directives include: improving water and soil quality and water use efficiency and integrating buffer systems into farms for pollution control; developing alternative pest management strategies and practices that reduce dependence on pesticides; encouraging farm diversity and profitability through further development of innovative enterprise combinations, including rotational farming systems; and creating methods to use agricultural by-products as resources. To meet its broad-based goals NESPAL integrates a wide range of research disciplines into a cohesive unit. Among NESPAL's core researchers are animal scientists, microbiologists, crop and soil scientists, horticulturalists, ecologists, plant pathologists, engineers, entomologists, and mass communications professionals.

The Pollution Prevention Assistance Division (P<sup>2</sup>AD) of the Georgia Department of Natural Resources develops programs and activities to facilitate reduction of pollution at the source and to instill a pollution prevention ethic that is consistent with the protection of human health and the environment. Since agriculture is a leading industry in Georgia and a source of many different types of pollution, it is imperative that P<sup>2</sup>AD promotes the incorporation of pollution prevention concepts in the agriculture community. This is accomplished through the partial support of a pollution prevention coordinator housed with the UGACAES and funding for technical assistance and an applied research program for pollution prevention in agriculture with the CES. The coordinator has been conducting agriculture pollution prevention activities since 1993. The first major effort was the analysis of current practices in the agriculture industry involving identification of waste streams, opportunities for implementation of BMPs, and impediments or gaps for reducing pollution in crop and animal production. This effort led to two reports, *Pollution Prevention in Agricultural Crop Production* and *Pollution Prevention in Agricultural Livestock Production*. By working with the extension service, P<sup>2</sup>AD has taken advantage of the existing network of county agents and State specialists, the widespread acceptance of the extension service with the agricultural community, and the outstanding research facilities of the UGACAES.

The Georgia Farm Bureau Federation (GFBF) is a grassroots, non-governmental organization representing farmers. Its primary goal is to be a united voice in the legislative arena, to promote farm markets, and to provide leadership and assistance to Georgia's agricultural community. The GFBF has offices in all 159 counties, represents between 40,000 to 50,000 farmers, and maintains nearly 300,000 associate members, mostly insurance customers. Members work together through a policy development process to analyze problems and formulate action plans to achieve educational improvement, economic opportunity, and social advancement. The GFBF promotes many of the agriculture nonpoint source management programs and supports agencies that are program providers. GFBF provides insurance for farmers as well as reduced prices for common farming equipment such as fence wire, real estate, and forestry services.

The Georgia Agribusiness Council (GAC) is a membership trade association which provides a forum for the agriculture industry to share views, develop understanding, and work on issues of common concern. It represents the agribusiness industry in the legislative arena; provides economic services to members; promotes agribusiness development; builds coalitions within the agriculture community; educates the public about agribusiness issues; and promotes agricultural education through elementary, secondary, college, and adult programs.

The Georgia Station Research and Education Garden (GSREG), affiliated with the UGA College of Agricultural and Environmental Sciences, is located in Griffin. Currently, the scientists associated with the GSREG conduct the foremost research in the Southeast in sustainable urban agriculture strategies. GSREG provides demonstration areas and educational programs using strategies which include integrated pest management, biological pest control, proper fertilization, organic fertility options, irrigation methods, water conservation, and best management practices. When properly combined, these strategies form the basis of integrated plant health care that promotes sound management practices and reduces pesticides and fertilizers in nonpoint source pollution. The transfer of information and technology to the “green industry” and the general public is accomplished through direct access to research areas and hands-on training programs, both formal and informal. In addition, a database has been established to store research information that will be made available through the Internet. The Georgia Station Research and Education Garden connects scientists with the general public and reduces the time it takes for pure research to reach the citizens of the State.

### ***Agriculture Nonpoint Source Management Program***

The AWMCC contends that a non-regulatory approach to soil and water conservation will continue to produce substantial water quality benefits in Georgia. In support of this, the GSWCC implements the Agriculture Nonpoint Source Management Program to promote statewide voluntary agriculture nonpoint source management activities. The AWMCC cooperating agencies, furthermore, conduct a statewide voluntary conservation program to promote nonpoint source management activities through the Agriculture Resource Management System (RMS) framework. While *best management practices* is a term used for activities and techniques that maintain or improve water quality, the term *resource management systems* is used by agriculture agencies in Georgia to identify the combination of conservation practices and management systems that, when implemented, permit sustained uses of natural resources.

Agriculture agencies promote the use of RMS for water quality management; however, not all agricultural situations call for implementation of the entire system.



The AWMCC, therefore, promotes the voluntary adoption of specific agriculture *best management practices* as well as *resource management systems*. The AWMCC further supports the development and implementation of new initiatives.

The GSWCC will continue to implement the statewide Agricultural Nonpoint Source Management Program in cooperation with the GAEPD. The GSWCC plans and conducts the agricultural component of the State's *Nonpoint Source Management Program* and assists GAEPD in the resolution of agricultural nonpoint source complaints.

The GSWCC provides the agriculture community with information on the use and installation of BMPs and educational materials about animal waste management, erosion and sedimentation control, and streambank protection. Furthermore, the GSWCC collects data and generates computer databases on land use, animal units, and implementation of agriculture BMPs to identify priority water quality concerns. Georgia's voluntary agriculture conservation program will continue to promote effective adoption of BMPs by directing State and Federal resources toward priority geographic areas, watersheds, and resource concerns.

The voluntary agriculture conservation program conducted by the GSWCC will be continued to be enhanced with appropriate adjustments made in response to recommendations from the agriculture community. Priority will be given to resource management systems that address confined animal feeding operations, restore and preserve near stream vegetation, and encompass a watershed management approach.

The Piedmont Lagoon Maintenance and Waste Utilization Project is an example of a total RMS in which innovative BMPs were developed and implemented on a dairy farm in Greene County. There are approximately 200 dairies and a significant number of poultry and hog farms located on tributaries to Lake Oconee and Lake Sinclair. Eutrophication was evident at several locations where streams merge with the lakes. The following BMPs were installed at the demonstration site: heavy use area, waste storage structure with a solids separator, irrigation pump, irrigation pipeline, and irrigation system. A nutrient management plan was developed and utilization of nutrients from confined animal operations reduced the amount of commercial fertilizers needed for forage production. The GSWCC conducted field days at the dairy farm to demonstrate the proper utilization and management of nutrients from animal waste.

The Upper Chattahoochee River Dairy Waste Management Project is another demonstration of a total RMS. The site is a dairy farm located in the Lake Lanier watershed above Buford Dam in the Upper Chattahoochee River Basin. Most farms in the area have installed BMPs; however, none of the operations had installed a total RMS. This demonstration project served as a model for other producers to observe BMPs needed to control, prevent, and/or abate nonpoint source pollution common

to the area. In order to reduce turbidity, suspended solids, nutrient loading and pathogens in streams, the following BMPs were installed on the total RMS farm: water and sediment control basin, heavy use area, waste utilization, nutrient management, irrigation pipeline, animal waste storage structure, fencing, and critical area planting. In addition, the GSWCC investigated methods of providing animal waste lagoon pump-out equipment at an affordable cost to encourage proper lagoon maintenance and nutrient management. Lagoon pump-out demonstrations were held in the surrounding counties. The GSWCC conducted field days at the dairy farm to demonstrate the proper utilization and management of animal waste nutrients.

The Agricultural Nonpoint Source Management Program will continue to implement agricultural BMP demonstration projects with a focus on education, training, technical and financial assistance, and development and implementation of new techniques through research. Priority will be given to projects which implement Watershed Restoration Action Strategies in areas identified by the State's Unified Watershed Assessment as being *"in need of restoration."*

Benefits have accrued as a result of technical assistance provided to landowners and cooperators in support of voluntary installation of BMPs. Producers see on-farm benefits such as higher yields, improved water quality, and increased efficiency when BMPs are properly installed and managed. However, most water quality benefits accrue off-farm and incentive programs are needed to demonstrate the public concern for, and support of, the producer.

Since 1990, over \$5,200,000 has been dedicated to agricultural BMP demonstration projects in Georgia. In addition, NRCS has contributed over \$4,500,000 in technical assistance dollars to support these projects. In addition, the UGACAES, GSWCC, FSA, GFC, and others have also contributed significant technical assistance dollars. Over the next five years, the GSWCC, NRCS, and GAEPD plan to expand the existing agricultural BMP demonstration projects to include the following BMPs: streamside and streambank protection, filter strips, riparian forest buffer establishment, pesticide mixing, storage and containment facilities, alternative livestock water supply, heavy use area protection for livestock, and stream crossings and access areas for livestock. When applicable, demonstration sites will include the generation of nutrient and pesticide management plans. Water quality monitoring will be conducted to assess the impact of implementing BMPs. This information will be used to convey the effectiveness of current management techniques, watershed planning, installed BMPs, and cost-sharing as an incentive at multi-county field days conducted by the cooperating agencies.

The NRCS, in cooperation with the GSWCC, is planning to generate a geo-

referenced agricultural database using recently obtained digital orthophotography for the State of Georgia. This stable database will enable construction of geo-referenced GIS data layers including watersheds, soils, confined animal operations, and impaired stream segments and water bodies. The GIS data will help identify areas impacted by nonpoint source pollution and evaluate the effectiveness of *resource management systems* and *best management practices*.

### ***Riparian Corridor Restoration and Streambank Restoration***

Streambank erosion is a major problem in many areas. Protection of streams by practices such as field borders, filter strips, riparian corridor protection and treatment, and stream channel stabilization with bio-engineering procedures will be promoted through demonstration projects.

The Farm Service Agency (FSA) is the lead agency in the administration of the Conservation Reserve Program (CRP). The CRP is a voluntary program that offers annual rental payments, incentive payments, and cost-share assistance to establish approved cover on eligible croplands. The National Buffer Initiative has established a goal of 40,000 miles of conservation buffers in Georgia by FFY02. However, there are less than 550 acres currently enrolled in the Conservation Reserve Program in Georgia. With Section 319(h) Grant funding, 24 buffer demonstration sites will be established throughout the State with over 5,000 acres enrolled in the CRP by FFY04.

Restoration of functional riparian forests can also contribute significantly to the control of agricultural runoff. The SEWRL, and others, have been involved in research and demonstration of riparian forest restoration since 1991. The original 319(h) funded project demonstrated the role of a restored riparian ecosystem adjacent to intensive agricultural management as a nutrient and sediment sink. Previous studies had shown that mature riparian forests are effective at controlling NPS pollutants. It was not known, however, how long pollution control functions would take to become effective after trees are re-established on prior converted riparian wetlands.

This project restored a forested riparian wetland on a first-order stream adjacent to agricultural production that drains dairy lagoon effluent application. Specific demonstration objectives included: determining the fate of nitrogen and phosphorus moving through the restored riparian forest buffer system; determining rates of transformation processes which affect the rates of pollutant movement; comparing riparian ecosystem inputs and outputs to determine the NPS pollution reduction capacity; and determining changes in nutrient reduction capacity in the first three years of riparian forest restoration.

In conjunction with the demonstration component, a study was conducted to

understand the factors limiting the restoration process, the degree of NPS pollution control relative to mature riparian forests and the processes responsible for observed nutrient retention. The subsequent surface and sub-surface water quality sampling showed that nitrogen, phosphorus, and sediment removal was quite efficient in the first years of the riparian forest restoration.

The results of this research provided the basis for management and policy development recommendations by NRCS, USFS, USEPA, the Chesapeake Bay Program, and other Federal, state, and local agencies. Due largely to this research, management agencies have developed integrated guidelines for riparian forest buffers as a BMP to control agriculture NPS pollution in the *Agricultural Best Management Practices for Protecting Water Quality in Georgia*.

The research and demonstration components of this initial unique project were completed in 1994. Low-intensity monitoring, however, is an ongoing effort; it is supported by UGA, SEWRL, and USDA National Research Initiative (NRI) grants. Furthermore, two current research efforts, located at the same site and described below, have evolved from it.

The first is an ongoing SEWRL project which has run concurrently with the riparian forest restoration demonstration project. Its research focus, however, specifically considers water quality and nutrient leaching to determine the safe level of liquid manure application to sustain a forage production system that is under a continuous cropping system.

Current funding support comes from SARE-ACE (Sustainable Agriculture Research and Education, a USDA program, and Agriculture in Concert with the Environment, a USEPA initiative). The nutrient runoff and water quality research component is supported by an NRI grant. This project is expected to expand to include a 319(h)-funded demonstration component. Associated research on farm scale nutrient movement from field application of swine manure effluent to an adjacent buffer system is planned to begin in 2001 and continue through 2004.

The second project focuses on the effect of managed forests on NPS impacts. The Gibb's Farm study, looking at this issue, began in 1992 and is scheduled to be completed in 2000. It is a cooperative effort of the CES, the UGA Institute of Ecology, and the SEWRL. To date the research has shown that selective harvested areas are at least as effective as a mature forest in controlling nutrient and sediment movement to the stream. The managed riparian forest buffer was also effective at controlling herbicides moving from the adjacent field in surface runoff and shallow groundwater. The Gibb's Farm and the riparian forest restoration studies indicate that both restored and managed riparian forests can be effective in controlling NPS pollution from agriculture.

A previous SEWRL project, assessing riparian forest transport of herbicides (a USEPA Wetlands Research Program Grant), studied restored and managed riparian forest systems in 1992-1994. Based on the results of the effectiveness of riparian forest buffers to filter herbicides, the USDA made the installation/restoration of wetland buffers a priority implemented through incentives for farmers in the Wetland Reserve Program. A current, related SEWRL project involves assessing the range of riparian forests in the Coastal Plain. This work, begun in 1992 and scheduled to continue through 2001, is attempting to establish indicators of nitrogen processing. The UGA Institute of Ecology is cooperating on this USEPA and National Research Initiative funded riparian buffers in the Piedmont region effort.

Finally, the UGACAES plans to measure the effectiveness of forest riparian buffers in the Piedmont region which are typically very steep and often gullied systems in filtering phosphorus and nitrate. This proposed project will focus on Piedmont riparian systems adjacent to fields that have undergone long-term application of poultry litter.

### ***Precision Farming Techniques***

One way that agriculture contributes to NPS pollution is through high inputs of pesticides and commercial fertilizers. These inputs are applied uniformly on crop production fields even though the amount needed varies in different areas. The concept of precision farming involves understanding the spatial distribution of factors affecting the growth of the crop and managing this spatial variability by precisely applying fertilizer, seeds, water, and agrochemicals at varying rates as necessary for optimum yield and quality. Precision application of agrochemicals will result in more efficient utilization of resources and potentially, significant reduction in pesticide use. Precision application of irrigation water will result in more efficient utilization of water resources and, potentially, reductions in agrochemical transport through leaching and agrochemical and sediment transport through surface runoff.

NESPAL has formed a multidisciplinary precision farming team to work closely with farmers and industry to broadly evaluate precision farming technologies applicable to southeastern agriculture. The NESPAL team has identified four conditions crucial to the development of precision farming in the southeast: develop yield monitor sensors for peanuts and cotton; adapt existing agrochemical variable rate technology to precision farming in the southeast; develop sensors and establish sampling protocols for in-field and remote sensing of soil properties, pest and disease incidence, crop growth and development, and environmental parameters; and develop a GIS for information management.

Many scientist and growers feel that the environmental benefits of precision farming, alone, justify this new technology. Existing on-farm demonstration projects will show how precision farming techniques and management strategies can be used to reduce fertilizer and pesticide nonpoint source pollution. Monitoring of

surface runoff and shallow ground water leaving the on-farm demonstration sites will be used to document nonpoint source pollution reductions. The information developed from this demonstration projects will be made available to both State and Federal agencies and to growers through already established information delivery systems in 2003.

### ***Animal Waste Management and Nutrient Utilization***

The value of manure as a source of plant nutrient has been recognized for centuries. Excess application of manure, however, produces potential NPS contamination of surface and groundwater. There are a variety of activities under this program area, all designed to respond to water quality threats and impairments related to animal waste management.

The NRCS is the lead agency on large scale waste management systems. It provides assessments and recommendations for whole farm waste management systems that include hardscape structures. The NRCS has developed specifications for the various structures and set compliance standards.

The UGACAES provides waste nutrient management technical assistance and education. County extension agents assist in the calculation of nutrient budgets on a per farm basis. The primary clients for this service are poultry farmers or producers involved in Federal cost-share programs which require a nutrient management plan. The plans determine the volume of manure that can be applied to maintain environmentally sound nitrogen loadings.

The Southeastern Sustainable Animal Waste Management Workshop, sponsored by the UGACAES, featured speakers, exhibits, and tours on topics including animal waste composting, nutrient management, and related environmental issues. Development and implementation of a regularly scheduled animal waste conference is under consideration.

An expanded, statewide public information program on animal waste management is planned. It will be implemented to advise farmers of the latest appropriate waste management procedures for confined animal feeding operations. As well, it will result in the training of district conservationists and extension service personnel. Education materials on animal waste management will be distributed to all interested parties by the GSWCDs, UGACAES, and NRCS.

Animal waste lagoons provide an effective means of controlling NPS from some agricultural sources. However, installed animal waste lagoons require a significant level of maintenance in order to maintain their effectiveness. The GSWCC has implemented a demonstration project with producers to demonstrate effective

lagoon maintenance and nutrient utilization through irrigation of lagoon effluent. Cooperating organizations include the GSWCD, GA Milk Producers Association, GFBF, GA Pork Producers Association, CES, and NRCS.

Assessment of the impact of animal waste management facilities on water quality in Georgia is also planned. Feedlots, poultry houses and animal wastes are known to pollute shallow groundwater in other portions of the country. While such pollution has not been recognized as a significant problem in Georgia, GAEPD will be reassessing the matter by sampling base flow directly down gradient from large operations. Where applicable, animal waste management facilities capable of impacting surface waters will be monitored to obtain base line data. BMPs will be applied where they are needed and impact on water quality assessed.

Nutrient movement through the landscape is an emerging watershed research program. It includes grazing, crop land nutrient cycling, and nutrient transportation across crops to buffers and water resources. ARS determines the nutrient budgets of sources such as animal wastes, fertilizers, and naturally fixed nitrogen. This research area is supported by USDA funds including Sustainable Agriculture Research grants.

A current related research project traces the atmospheric emissions of swine lagoon compounds such as ammonia, nitrous oxide, methane, and carbon dioxide. This ARS research establishes compound cycling resulting from land application of lagoon water to crop and grazing lands. It follows the compound distributions into the soil and plant materials and subsequent leaching through soils to groundwater. It is funded by Federal USDA grants for Global Warming. The North Carolina Department of Environmental Health and Natural Resources is a partner in this venture.

In addition, UGACAES has been conducting specific research on nitrate leaching and phosphorus edge-of-field-losses from poultry manure applications. The nitrate leaching research involves development of recommended application rates of poultry manure to pastures and hay fields to prevent environmental impacts. The second area of study builds upon well known information that rain events occurring immediately after manure application lead to increased runoff rates of phosphorus. The UGACAES and NRCS are in the second of a three year Piedmont region study in Eatonton, Georgia. This work focuses on options to reduce insoluble phosphorus in poultry feed, including the addition of enzymes that alter solubility and the development of alternate feeding rations. These options will be provided to the poultry industry.

The Georgia Department of Natural Resources released a preliminary draft of the proposed amendments to the *Rules and Regulations for Water Quality Control, Chapter 391-3-6* in March 2000. The proposed rule (Chapter 391-3-6.21, Animal (Non-Swine) Feeding Operation Permit Requirements) will be reviewed by the

Georgia Department of Natural Resources Board and finalized in December, 2000. The proposed rule closely follows the Chapter 391-3-6.20, Swine Feeding Operation Permit Requirements, with the exception of not having a 3,000 animal unit (AU) category. The proposed rule delineates feeding operations into three categories: 301 - 1,000 AU, existing operations with more than 1,000 AU and new operations with more than 1,000 AU. All feeding operations in Georgia are required to operate without discharge of pollutants to surface water and all new feeding operations are required to have manure management systems in compliance with NARCS guidance. Feeding operations with more than 300 AU will have to develop and submit a Comprehensive Nutrient Management Plan (CAMP), train and certify an operator, and register with the GAPED.

Feeding operations with more than 1,000 AU must meet all of the above requirements and (1) install up-gradient and down-gradient wells around each irrigated field and lagoon, (2) monitor effluent and up- and down-gradient wells semi-annually, and (3) maintain two feet of freeboard in the lagoons at all times. In addition, new feeding operations with more than 1,000 AU must maintain buffers from land application areas and from lagoons and/or barns.

### ***Environmental Horticulture Integrated Pest Management***

The environmental horticulture industry includes growers, consumers, and landscape professionals. It remains one of the largest, most diverse and most rapidly growing industries in the State. Surface runoff of pesticides and fertilizers from lawns and landscapes contributes to nonpoint source pollution problems. This issue demonstrates the increasing need for the proper management of the amount, timing, and placement of chemicals and fertilizers.

Research in Integrated Pest Management (IPM) offers alternatives to conventional chemical treatments. IPM, along with the development and implementation of best management practices that optimize growing conditions, reduces potential pollution hazards of improperly applied pesticides and fertilizers in the environmental horticulture industry.

The Georgia Station Research and Education Garden (GSREG) has been working with USDA's Southern Regional IPM Program since 1996 to research and develop an IPM manual including landscape maintenance BMPs for the landscape and lawncare industry. The manual is being used in workshops and seminars at GSREG and throughout the State. As new research information becomes available, it will be incorporated into the notebook. It is expected that new sections will be included for nurseries and golf courses. Potential funding sources could include the



Horticultural Research Institute, an IPM grant, or USEPA. GSREG is seeking funding from the Pollution Prevention Incentives for States Grant (PPIS) to provide education for growers and landscape professionals based on IPM research results. The effort is co-sponsored by the Metro-Atlanta Landscape and Turf Association.

Currently, a new position funded by the Pollution Prevention Assistance Division of Georgia DNR has been added to the Georgia Station Research and Education Garden to revise the IPM manual for homeowner use. Workshops will be developed using this information. A video and fact sheets are planned for the future.

### ***Agriculture Fertilizer BMP Manual***

UGACAES is the lead agency on developing an Agriculture Fertilizer BMP manual. It will be based on a prototype from Florida. It is targeted for fertilizer dealers and will deal with various fertilizer chemicals, application rates, and application methods. The manual will be distributed through county extension offices, the GAC membership, and the Georgia Plant and Food Education Society. The manual is scheduled for publication in 2000; the project is supported by GAC and UGACAES funding.

### ***1996 Farm Bill Program***

The conservation provisions of the 1996 Farm Bill contain numerous changes that will have far reaching impacts on Georgia's participation in Federal cost-share programs related to protecting water quality from nonpoint source pollution. The NRCS works cooperatively with other Federal, State, and local agencies, as well as an active State Technical Committee, to identify and set priorities for resource concerns in Georgia.

The Bill has diversified the conservation program delivery process in Georgia and across the country. Under the Bill, states compete with one another to obtain funding for major Federal conservation programs. To provide a fair and consistent means by which states can compete, four broad parameters serve as guidelines for the submission of proposals: (1) resource concerns must be clearly identified, (2) geographic priority areas must be identified and ranked, (3) an interagency format must be used, and (4) the process must begin and end at the local level.

In response to these guidelines, NRCS has enhanced an existing State Technical Committee (STC). The STC consists of professional resource managers who represent a variety of disciplines in the soil, water, plant, and wildlife sciences. The function of the STC is to make recommendations and provide guidance on issues related to the administration of many conservation programs of the Bill. The

STC functions are advisory with no implementation or enforcement authority. A major role of the STC is to review proposals from Local Work Groups (LWG).

The Local Work Groups, also consisting of resource managers from a variety of soil, water, plant, and wildlife disciplines, are responsible for initiating the locally led conservation program delivery process. Through this process local representatives assess their natural resource conditions and needs, set goals to solve those needs, identify programs and other resources that can support the goals, develop proposals and recommendations, implement solutions, and measure their success.

The participating agencies in Georgia compete in the annual funding cycle and implement the 1996 Farm Bill programs in compliance with the following roles and procedures:

- The SWCD convene and chair Local Work Groups to conduct Conservation Needs Assessments, establish local priorities, and make program policy recommendations based on resource information along with the FSA and other partners.
- The NRCS State Conservationist, with the advice of the STC, completes the Conservation Needs Assessment, sets State priorities, and makes program policy recommendations.
- The NRCS Regional Office integrates the local and State priorities and recommendations into Regional Strategic Plans and feeds that information into the National Strategic Plan.
- With FSA concurrence, funds are allocated to regions and states based on resource needs described in National Strategic Plan.
- The NRCS State Conservationist, with the advice of the STC, determines allocations for the local level; the FSA concurs with the determination and issue allocations.
- The SWCD and NRCS conduct project administration by delivering technical assistance and approving conservation plans and the FSA approves contracts and makes payments to participants based on completion of practices identified in the contract.
- A continuous needs assessment and program improvements is conducted based on evaluation of achievements.
- The process is completed on an annual basis and re-applications are made for

eligible funds under the 1996 Farm Bill.

Through this process, priority area resource concerns in Georgia will receive technical and financial emphasis. This is an annual process; thus, resource concerns and/or priority areas must compete for funding each year, even if funding was received in previous years.

In the conservation program delivery process, the Bill encourages agencies to place an emphasis on resource concerns rather than programs. Programs within this context should be considered as tools with which to address resource concerns. With this in mind, the following is a brief summary of the new tools available through the 1996 Farm Bill as well as some of the major changes to existing tools.

The Environmental Quality Incentives Program (EQIP) is a new program which combines the previous functions of the Agricultural Conservation Program, Water Quality Incentive Program, Great Plains Conservation Program, and the Colorado River Basin Salinity Control Program. It is a voluntary conservation program for farmers and ranchers to address significant natural resource needs and objectives. It provides technical, financial and educational assistance. At least 50% of the annual \$200 million national funds, through the year 2002, is to be used for livestock-related natural resource practices and the other half for general conservation priorities.

The Bill requires the establishment of conservation priority areas, a focus on meeting water quality objectives, and a contract to carry out the conservation plan. EQIP can, however, also address significant statewide concerns that may occur outside designated priority areas. NRCS has leadership for EQIP and works with the FSA, CES, SWCD, and others to identify local priorities and recommend priority areas and program policy. The State Technical Committee ranks and selects the priority areas within Georgia each year; in 1999, 17 priority areas were selected. EQIP offers 5- to 10-year contracts that provide incentive payments and cost-share, up to 75%, for conservation practices. Total cost-share and incentive payments are limited to \$10,000 per person, per year and \$50,000 for the length of the contract. In FFY99 and FFY00, the State received over \$2,600,000 and \$2,800,000, respectively, to address significant concerns in conservation priority areas and statewide.

Incentive payments may be received at a per-acre rate for the following practices: conservation cropping sequence, conservation tillage, contour farming, crop residue use, cover and green manure crop, irrigation water management, nutrient management, pasture and hay land management, pest management, strip-cropping, wildlife habitat management, and well water testing. Eligible approved cost-share practices include: permanent vegetative cover establishment, permanent vegetative cover improvement, strip-cropping systems, terrace systems, diversions, grazing land protection, permanent vegetative cover on critical areas, irrigation water

conservation, sediment retention, erosion or water control structures, stream protection, sod waterways, agricultural waste control facilities, riparian buffer strips, agricultural composting facilities, forest tree plantations, forest tree stand improvement, permanent wildlife habitat, shallow water areas for wildlife, high residue cropping systems, special conservation practices, and source reduction of agricultural pollutants.

The Conservation Reserve Program (CRP) is a voluntary program initiated in 1986 to remove highly erodible land and sensitive croplands from production by placing them into permanent vegetation, grass, trees, and other cover for 10 to 15 years. Contract holders receive annual rental payments, incentive payments for certain activities and up to 50 percent cost-share assistance to establish approved cover on eligible cropland. Currently, there are approximately 550 acres currently enrolled in the Conservation Reserve Program in Georgia. With Section 319(h) Grant funding, 24 buffer demonstration sites will be established throughout the State with over 5,000 acres enrolled in the CRP by FFY04. CRP is administered by the Commodity Credit Corporation (CCC) through the FSA. The NRCS acts as the technical agency for CRP by calculating eligibility. In addition, the CES, forestry agencies and the SWCD provide program support.

CRP is a competitive program; offers for contracts are reviewed against eligibility criteria that establish an Environmental Benefits Index (EBI). The EBI is based on the relative environmental benefits for the land offered. EBI factors include: wildlife habitat benefits resulting from covers on contract acreage; water quality benefits from reduced erosion, runoff, and leaching; on-farm benefits of reduced erosion; likely long-term benefits beyond the contract period from certain practices such as tree plantings; air quality benefits from reduced wind erosion; benefits of enrollment in conservation priority areas where enrollment would contribute to the improvement of identified adverse water quality, wildlife habitat or air quality; and cost.

The Wetland Reserve Program (WRP) is an existing voluntary program designed to restore and protect wetlands. This program will have an enrollment cap of 975,000 acres nationwide. Program changes provide more flexibility and help landowners work toward a goal of no net loss of wetlands. The Bill requires that one-third of total program acres be enrolled in permanent easements, one-third in 30 year easements, and one-third in restoration agreements. Individuals may choose the category for their eligible land. The Bill also stipulates the following cost-share rate: 75% to 100% for permanent easements, 50% to 75% for 30-year easements, and 50% to 75% for restoration agreements. In FFY99 and FFY00, the State received approximately \$800,000 and \$1,000,000, respectively, to restore and protect wetlands statewide.

The Wildlife Habitat Incentives Program (WHIP) is a new provision that will help landowners improve wildlife habitats on private lands. The program administers \$50

million nationwide for wildlife habitat improvement. The Bill provides cost-sharing to landowners for developing habitats for upland wildlife, wetland wildlife, endangered species, fisheries, and other wildlife. The Bill also provides for consultation with the State Technical Committee on priorities, cost-share measures and habitat development projects.

The Farmland Protection Program (FPP) is new program under which the Secretary of Agriculture will join with state or local governments to purchase conservation easements. Based on voluntary participation, it only applies to land which farmers want to preserve in agriculture. The Bill calls for the protection of between 170,000 and 340,000 acres of farmland, authorizes up to \$35 million in Federal funding, and requires land to be subject to a pending offer from a state or local farmland conservation program in order to participate. The Bill also re-authorized the FIP and the Resource Conservation and Development Program.

Collectively, the programs in the Bill will bring millions of dollars to Georgia. The programs along with other Federal, State, and local programs present significant opportunities for protecting and improving Georgia's water and related resources.

### ***Agricultural Impacts - Surface Water Assessment***

This Agricultural Surface Water Assessment will focus on documented water quality problems identified on the Section 303(d) lists. A summary of agricultural activities in each watershed will be provided to support the RBMP program and to support TMDL development. These watershed summaries will include estimates of agriculture's contribution to identified water quality impairments. Recommendations for voluntary remedial actions, including specific BMPs, will also be provided. This information will be coordinated with the 1996 Farm Bill Program to increase the potential for USDA funding in high priority areas.

At the local level, initiatives like cooperative river basin studies may also be undertaken. Results from these studies can be used to support river basin planning as well as prioritize agricultural nonpoint source management activities. For example, the Lake Lanier Cooperative River Basin Study is ongoing to identify existing and potential source impacts to Lake Lanier from the Upper Chattahoochee and Chestatee rivers. This project is sponsored by the Upper Chattahoochee River Soil and Water Conservation District, Hall County Soil and Water Conservation District, and the Chestatee-Chattahoochee RC&D Council, with assistance from NRCS. Estimates of sediment, agricultural chemical, and nutrient loadings will be developed to assess NPS pollution from agricultural, forested, and other rural sources. A GIS database will be developed that delineates potential areas of NPS pollution to be used by the GSWCC Districts to prioritize technical and financial assistance.

Related research and monitoring of agriculture-associated water quality issues will support agricultural assessments the surface water for river basin management planning. Water quality in Georgia farm ponds has been monitored 20 years. Monitoring now includes 30,000 farm ponds in all 159 counties of Georgia. Farmers collect and submit water samples to UGACAES which conducts water quality analysis and maintains a database of chemical parameter trends. The ponds, mostly irrigation or recreation water sources, usually enter this program in response to a water quality problem. As a result of the analysis, the impairment is identified and a management regime is put in place to improve water quality. This program is funded as part of the UGACAES base budget.

The UGACAES also plans to develop and publish, within the next five years, a characterization of the State's watersheds based on the water quality parameters. Similar to soil surveys, this publication will spatially identify water quality issues using documented chemical parameters and serve as benchmark data to enhance the information based used by decision makers for permitting.

Three watershed-level projects are underway to assess surface water impacts and develop management guidelines. First, NRCC conducts ongoing research on how changes in agricultural practices help solve problems in watershed. Relatively minor changes on farms can greatly increase water quality within the watershed. When one looks at farms as part of a system on the watershed scale, one can quantify the inputs and outputs to that watershed.

NRCC chose two typical rural southern Piedmont streams and their associated watersheds (Greenbriar and Rose Creek watersheds) to understand how agricultural practices influence water quality under a variety of real world circumstances. Upcoming research projects will collect and analyze stream water and runoff water concentrations of nitrogen, phosphorus, and total suspended sediments at the plot, field, and watershed levels. The farmers and NRCS will document management practices. Other data that will be used to gain better understanding of the watershed include: soils, slopes, weather, landuse, initial soil nutrient levels, vegetation, and management practices. Supported by a Southern SARE grant, the work in the Greenbriar and Rose Creek watersheds is cooperative with a broad coalition, including several farmers, teachers and students, UGA research and extension, NRCS, SWCDs and others. In the last year, NRCC has obtained funding for work with a similar coalition in the larger Lake Oconee drainage. This project includes fecal coliform monitoring and is focused on developing more cost effective and scientifically defensible methods to monitor impacts of conservation practices and conservation programs, based on changes in water quality.

The second project is a multi-institutional comprehensive landscape study focused on animal production in the Southeastern Coastal Plain. The regional

concentration of animal production and processing has led to water quality problems in many parts of the U.S. Animal production (poultry, swine and dairy) is expanding rapidly in the Coastal Plain of Georgia. From a water resources perspective, Coastal Plain ecoregions range from very safe to very vulnerable to the effects of increased animal production depending upon the depth to unconfined aquifers or proximity to coastal waters. Siting and management guidelines based on environmental quality factors are necessary to integrate the increasing intensity of animal production in the Coast Plain agricultural system without sacrificing water quality.

The comprehensive landscape study is designed to provide the knowledge base necessary to lead to the development of management and siting guidelines for animal agriculture based on landscape and watershed-scale environmental quality considerations. Siting guidelines will address location of animal confinement facilities on the landscape. Management guidelines will establish application procedures for manure resources on cropland with the prospect of both providing nutrients for crop growth and enhancing soil quality.

This project, begun in 1996 and scheduled to be completed in 2001, has selected for study three large watersheds containing seven nested subwatersheds. The Tifton-Vidalia Upland (Little River Watershed), Tallahassee Red Hills (Piscicola Creek Watershed), and Dougherty Plain (Ichawaynochaway Creek Basin) are representative Coastal Plain watersheds with different hydrological regimes. Some of the watersheds have existing animal production facilities. These will be used as benchmarks of production siting with no environmental guidelines.

Specific research objectives include: assessment of the current status of voluntary and regulatory approaches to protecting environmental quality in animal agriculture and evaluation of producer acceptability to new guidelines; determination of the current water quality effects of animal-based agriculture; development of spatially distributed data sets of the watersheds and maps of the location of existing and proposed animal production and processing facilities in relation to other landscape features which affect hydrology and water quality; prediction of the effect of land use and landscape configuration changes on water quality at watershed and field scales; and development of guidelines for management of animal agriculture based on landscape scale environmental quality considerations. In addition, the project will: continue hydrologic and water quality monitoring including macroinvertebrate assessments of water quality for chemical, bacterial, and BOD parameters; conduct vegetation surveys, hydrogeomorphic assessments of wetland function, and stream habitat evaluations; and conduct a workshop/field day at the end of the project and demonstrations, tours, and presentations during the course of the project.

Participating agencies include: NESPAL, USDA, SEWRL, NRCS, CES, Jones Ecological Research Center, GADNR, Middle South GSWCD, and USGS. The

NRCS, Middle South GSWCD, and GADNR are conducting watershed scale water quality improvement activities and Section 319(h) demonstrations on Piscola Creek Watershed (Tallahassee Red Hills), while the Jones Ecological Research Center, USGS, and GADNR are leading efforts to assess water resources in the Dougherty Plain. Principal research funding is from a USDA-CSREES Special Grant to NESPAL.

Finally, a short-term project related to this research program will develop and publish swine production siting and management guidelines. In response to requests for information on locating swine production facilities in Georgia, the CES is working with a team to produce a Swine Industry Business Prospectus, including voluntary guidelines for siting and management of swine effluent lagoons based on soil suitability. These statewide guidelines, targeted primarily to new producers, will be published as an Extension Service bulletin within the upcoming year and distributed through a variety of channels.

### ***Agricultural Impacts - Groundwater Assessment***

Agricultural pesticides in shallow groundwater are assessed through an ongoing monitoring of pesticide concentrations in wells and sinkholes. Since 1993, the GAEPD Geologic Survey Branch has been cooperating with the GDA to sample a network of monitoring wells located down gradient of known agricultural fields for pesticides. In addition, the Geologic Survey Branch has sampled domestic drinking water wells, agricultural drainage wells and sinkholes in agricultural regions of the Georgia Coastal Plains for pesticides.

While the data gathered to date suggest that groundwater pollution from pesticides is not significant, the agencies recognize that additional monitoring is needed to clarify the potential impacts of agricultural pesticides on groundwater in Georgia. This ongoing program will be broadened over the next five years to include a wider sample of survey wells. The objective is to achieve a better environmental scan of potential agricultural pesticide impacts. A broader screening strategy will sample a larger number of wells over a larger area of the State for a variety of agricultural pesticides. Monitoring locations will continue to survey individual wells down gradient application sites, as well as a variety of other wells including drinking water wells.

The GAEPD Geologic Survey Branch and GDA expect to sample several hundred to a couple of thousand wells over the next five years. This phase of the program will be supported with Section 319(h) Grant funds with secondary support from GDA. The data collected from the immunoassay sampling will provide information on the susceptibility of aquifers to nonpoint source pollution from agricultural practices. The results of this project will be used by the GAEPD as part



of its long term monitoring of groundwater quality and by the GDA for the continued development and implementation of the *State Pesticide Management Plan*.

In a related initiative, the GDA has established a cooperative agreement for a four-year study with the USGS. The study will institute a refined monitoring procedure that dates materials using atmospheric chloro-floro carbons to document occurrences and trends in pesticide intrusion of groundwater.

Groundwater monitoring results to date do not indicate widespread problems with nitrate contamination. However, given continuing concern about nitrate levels in rural domestic wells in Georgia and nationwide, ongoing assessment is important. The GDA evaluates nitrate-nitrite presence in groundwater. This work is supported through a cooperative agreement with the USEPA in which Federal and State funding are shared at 50%. The NRCC is conducting parallel research into the natural process of nitrogen leaching into water resources. In this project, NRCC is studying levels of naturally occurring leaching, or losses, of nitrate from winter cover crops in an effort to immobilize nitrogen over the winter months.

Assessment of nitrate in groundwater will also continue through the University of Georgia Cooperative Extension Service's domestic well water testing program. In cooperation with GAEPD, USEPA, and USGS, the Extension Service has been testing rural wells since 1980. When nitrate contamination is found, the Cooperative Extension Service provides information on management of risk factors associated with nitrate contamination of wells, including improperly constructed wells or concentrated nitrate sources such septic tank drainfields or confined animal enclosures located too close to a well.

A localized nitrate problem has been identified in the southwest portion of the City of Albany. A 1994 survey of nitrates in 221 shallow wells found elevated nitrate levels. Nitrates can come from nonpoint sources such as natural and artificial fertilizer, feedlots, and animal enclosures. Septic tanks and application of treated wastewater and sludge are other potential sources of nitrate. A preliminary inventory by GAEPD indicated that a former feedlot may be the source of the nitrate plume. The source of the contamination, however, has not been definitely determined.

The Dougherty County Health Department, the Joseph W. Jones Ecological Research Center, and the GAEPD are working cooperatively to identify the source of this nitrate contamination. The Dougherty County Health Department is currently conducting stable isotope and age-dating studies to establish the impairment history of the suspected source and project the expected duration of nitrate pollution from the site. To determine this, total nitrogen and mineralization rates will be evaluated at both the feedlot and for soils where biosolids have been applied.

The Dougherty County Health Department intends to continue quarterly sampling

of wells in the effected community to ascertain microbial processes. The GAEPD also intends to continue monitoring activities to better characterize the nitrate plume. Finally, soil analyses and installation of more monitoring wells at different depths are planned to assess potential impacts on the Floridan aquifer.

Work on the Dougherty County nitrate contamination to date has highlighted the need to look at the broader suite of threats to groundwater in the 13-county southwest Georgia region. The Joseph W. Jones Ecological Research Center is undertaking a pilot project, in conjunction with the NRCS, GAEPD, and GADHR, to look at nonpoint source pollution and the relationship to groundwater. The project is designed to assess the suite of potential nonpoint sources in the region, including various agricultural sources and septic systems. Potential nonpoint sources and areas where there is a high likelihood of interaction between groundwater and surface water will be identified using GIS techniques. Drinking water wells in those areas will be sampled to assess connections between groundwater, wetlands, and shallow drinking water sources and to evaluate potential nonpoint source impacts. The pilot project will focus on one county to determine the feasibility of the analysis. If the pilot project works, additional funding will be sought to extend the analysis to the 13-county region.

In a related initiative, the Joseph W. Jones Ecological Research Center is working to develop nonpoint source modeling capabilities for the southwest Georgia region. The objective is to link wetland, aquifer, and traditional agricultural nonpoint source models. Researchers are working with USGS, NRCS, and NESPAL to develop modeling constructs looking at the relationship between nonpoint source impacts and center pivot pumping, feedlots, and other production practices currently in use in southwest Georgia. The agricultural model will be developed in 2000 with surface water modeling to follow. Completion of linked agriculture-surface-groundwater models is expected by 2003.

### ***Georgia Farm-A-Syst Program***

The Georgia Farm-A-Syst Program is a current information and educational program based on a national initiative that provides farmers with a voluntary means of assessing their farm and management practices for nonpoint source pollution risk. The statewide program, co-developed by UGACAES and USEPA, is supported by P<sup>2</sup>AD. The voluntary agricultural self-assessment materials are being produced to fit the needs and conditions throughout the State of Georgia.

The Georgia Farm-A-Syst Program addresses potential contamination of surface and ground water from agriculture nonpoint source pollution. The concentration of potential contaminants and intensity of activity on farms represent significant risks for nonpoint source pollution. Additionally, most farmsteads also have many pathways to the surrounding environment such as drinking water and irrigation wells, abandoned wells, and often surface water in the form of rivers, streams, and ponds. The self-assessments and corresponding fact sheets lead toward action plans that encourage farmers to take steps to prevent nonpoint source pollution. In addition to providing educational information on the benefits and cost effectiveness of corrective or preventive measures, the documents also provide local contacts for additional technical and financial assistance.

A total of 22 assessment worksheets fully evaluate potential nonpoint source pollution risks. Individual assessment worksheets can serve as a stand-alone publication or together they can be distributed as part of a Total Farm Plan Package. The first six assessment worksheets that have been developed include: Well Condition/Water Quality, Pesticide Storage and Handling, Petroleum Storage and Handling, Dairy Production, Managing Pest on Cropland and Pastures, and Irrigation and Drainage. The remaining worksheets that are under development include: Hazardous Materials Storage, Handling and Waste Disposal, Household Waste Water, Management of Layers, Management of Broilers, Management of Swine, Management of Beef, Fertilizer Storage and Handling, Management of Croplands and Pastures, Managing Fertility on Croplands and Pastures, Management of Forest Lands, Management of Orchards and Groves, Site Evaluation, Overall Assessment, Composting Poultry Mortalities, and Improving Drinking Water for the Rural Resident.

Many different types of pollution prevention technologies will be explored in the information and action plan portions of the assessments. These include the use of BMPs; production, planning, and sequencing; process or equipment modification; raw material substitution or elimination; waste segregation and separation; and closed loop recycling.

After conducting the self-assessment, participants will be asked to complete a survey on the usefulness of the program materials and the merits and impediments of the program. This data will be used to modify the existing worksheets and assess the benefits of the program. A final version will then be produced and made available for statewide use through county extension offices where assistance on how to complete the assessment will be provided. Staff from NRCS, as well as farm organizations and other interested agencies, will also be trained in use of assessment worksheets and will distribute the materials.

To encourage farmers to communicate the actions taken as a result of their assessments, an awards program will be developed. The awards program will provide incentives for both industry and individual landowners and help the Georgia

Farm-A-Syst Program staff track the number of individual farm site assessments and actions taken. The awards program will recognize farmers and industries that demonstrate a high-level of environmental awareness by participating in nonpoint source management activities.

The Georgia Farm-A-Syst Program potentially could compliment other agricultural conservation programs. For instance, the self-assessment worksheets could be used in conjunction with the 1996 Farm Bill Program, possibly serving as a screening tool to identify high-risk farms so that NRCS may target cost-share dollars to reduce risks. As well, they could be used as one of the ranking factors in determining EQIP eligibility. Future partnerships with various agricultural organizations and agribusinesses could enhance understanding and enlist support in promoting pollution prevention practices through the implementation of the Georgia Farm-A-Syst Program. The Georgia Farm-A-Syst Program could also be linked to local Adopt-A-Stream Program efforts where volunteers conduct assessments as they monitor watershed activities and their impacts on streams.

Home-A-Syst, a parallel program, could be developed in Georgia over the next five years to target voluntary risk assessments for the homeowner. The National Farm-A-Syst Program has already developed this home version. UGACAES may serve as lead or work to identify another appropriate lead agency for implementation of this program. As with Farm-A-Syst, the national documentation and materials for Home-A-Syst would be modified to fit the needs and conditions in Georgia. The Georgia Farm-A-Syst Program is also working with the "green industry" to develop assessments that target urban agriculture.

### ***Pesticide Waste Management***

Over the past five years the GDA, in cooperation with the CES and GAEPD, has developed the Agricultural Pesticide Container Recycling Program. The majority of pesticide containers are composed of high density polyethylene plastics which are resistant to decomposition and consume large volumes of space per pound in landfills. Pesticide residues found in improperly rinsed containers may leak into landfill soil later filtering into groundwater. Collecting and recycling pesticide containers reduces potential soil and groundwater contamination and saves valuable space remaining in Georgia landfills.

Under this program, end users rinse containers and then deliver them to a State-authorized pesticide container collection point. End users include farmers, commercial aerial applicators, and the GADOT. When the program was initiated in 1991, only two counties participated to accumulate 2,100 pounds of plastic pesticide containers. In 1995, approximately 128,000 pounds of plastic pesticide containers were accumulated from 39 counties; in 1996 over 204,000 pounds were collected.

This program is currently in 40 counties, most of which are located in southwest Georgia. It is available at no cost to counties or individual participants. Discussions are underway to offer the program to structural pest control companies, lawn and turf companies, nurseries, and golf courses in the near future.

GDA provides information on starting county programs and trains individuals on proper container inspections. The CES helps educate pesticide users on proper rinsing techniques and distributes local collection information. In addition, ACCG promotes the Pesticide Container Recycling Program by distributing GDA container recycling program information to its members. ACCG, in its own publications, provides positive case studies of the counties participating in this program. This type of peer-to-peer contact communicates merits of the program to other counties.

The collected containers are processed into chipped plastic which is the property of the Agriculture Container Research Council (ACRC), the funding agency for this program. The ACRC is a cooperative effort funded by voluntary assessments among major crop protection product manufacturers, formulators, distributors, dealers, packagers, and others in the industry. The plastic chips are primarily used to produce shipping pallets that are then sold and used in the agricultural chemicals industry for shipping pesticide products from manufacturers to dealers.

The Pesticide Amnesty Days Program is a waste pesticide disposal pilot program. It offers farmers free disposal of outdated pesticides which often become inactive within 1-2 years. The program also collects pesticides that have been canceled and which can only be legally disposed of by hazardous waste facilities. Improper disposal of outdated or canceled pesticides can lead to groundwater contamination as well as contamination of soils, plants, and animals.

The GDA coordinates this voluntary initiative and the CES, the Georgia Crop Production Alliance, and the GFB provide program support. The CES is involved through county extension agents who discern grower's needs regarding the type and amount of pesticides that require collection. They also arrange waste pesticide pick-up sites and publicize amnesty days. This pilot program is currently in three locations. The first collection, in 1995, covered Dooly, Houston, and Peach counties and collected nearly 7,000 pounds of product. A second location for Berrien, Brooks, Colquitt, Cook, and Lowndes counties collected 8,200 pounds, and a third program site in Screven County collected over 28,000 pounds of waste pesticides in 1996. A fourth location covering a five-county area is planned with a future vision for statewide program sites.

### ***Benchmark Farms Program***

The Benchmark Farms Program, in its third year, is a cooperative effort involving USGS, GAEPD, UGACAES, and GAC. Its objective is to statistically quantify groundwater withdrawn for agricultural irrigation. This issue is critically connected

to quantity and quality considerations of the Floridan aquifer. A variety of efforts contribute to the study of saltwater intrusion in the Floridan aquifer and the associated need to develop management plans for groundwater withdrawal from confined aquifers. Documentation of agricultural groundwater use for irrigation is an integral step in this process and further supports monitoring agricultural impacts on groundwater quality.

Benchmark Farms is a voluntary program in which farmers monitor groundwater supply through quantity withdrawals and measure water quality through sampling efforts. The goal of this program is to gather the data required for recommendations on a potential State agricultural water use and management plan.

USGS began this national program in Georgia by developing volunteer monitoring of 23 wells in southwest Georgia. This effort, however, had limited scope in terms of funding, crops under irrigation, and geographic representation. In addition, volunteers conducted all monitoring activities, including responding to equipment failures, therefore, generalization of data proved to be unreliable. GAEPD now coordinates and funds an expanded initiative. The scope includes approximately 100 time-totalizer monitoring devices in both southwest and southeast Georgia. GAC is looking to increase the number of volunteer monitoring sites even further to 200-400. However, approximately 19,000 agricultural groundwater withdrawal permits have been issued in Georgia. Even the increased geographic monitoring area is not inclusive of the diverse regions in Georgia and may not be a valid representation of different irrigation regimes. In addition, the program remains a voluntary system. Without data gathered from regularly scheduled, accurately calibrated monitoring devices, combined with rigorous statistical methodology, estimates of agricultural groundwater use in Georgia and its proportional impact on water quality in the aquifers remains debatable.

The UGACAES has submitted a proposal to GAEPD Geologic Survey Branch to conduct a five year, \$1,300,000 comprehensive statistical study of agricultural water use in Georgia for permitting and long-term water supply and water quality decisions. An outcome of this study could include recommendations on a potential agriculture water use and management program in Georgia. The continued funding for this study will be considered for special appropriations during the next legislative session.

This statewide study, which has similar objectives as the Benchmark Farms Program, was implemented in July 1998. The UGACAES proposes to work at the field level to complete this representative agricultural irrigation monitoring study. It is specially positioned to accomplish this as the UGACAES already facilitates the permitting process for irrigation water withdrawals. County extension agents assist farmers in completing permit applications, available at the county offices, and then forward the forms to GAEPD Water Resources Branch for permit consideration.

County agents will use this familiarity to target a group of farms selected for crop and farm size and solicit farmer volunteers from this pool to represent spatially distributed crops and production volumes. Agents will install sophisticated monitoring meters and gather and report the monitoring data. In addition they could be trained to perform limited repairs to the equipment, if needed.

The UGACAES will perform statistical analyses of the different irrigation needs for different crop requirements considering the number of acres in the State dedicated to that type of crop production. The amount of water used for irrigation will be compared to the Federal census data by acreage irrigated, crop types in the county, and a sample of farmers. The UGACAES proposes to conclude this study with a statistically defensible understanding of water usage in a number of irrigation systems to aid GAEPD in determining current and future management of groundwater resources in the State.

### ***Georgia Sustainable Agriculture Program***

As part of the 1996 Farm Bill, Congress included provisions that all county extension agents become trained in sustainable agriculture practices. The USDA Southeast Region receives about \$300,000 annually to support training. When Georgia's program becomes active, a State plan will be submitted and base funding of \$10,000 will be received for training. The national program also provides opportunities for competitive grants to supplement training efforts.

The Georgia Sustainable Agriculture Program Coordinator, who is housed with the UGACAES, is overseeing development and implementation of this new program as a joint effort with Fort Valley State University. A primary goal is a train-the-trainer program. The coordinator plans to accomplish this goal by providing useable materials to a variety of agencies and groups and supporting their effort to train their own personnel or members. A stakeholders meeting has been held to develop a list of concerns and priority areas where training is most needed. The information generated will serve as the basis for development of the State's strategic plan and funding requests.

Initial projects planned include the establishment of a Sustainable Agriculture Program Internet web page and newsletter. In 1999, base funds supported the development of a Water Workbook. A competitive grant has been awarded to conduct training for sustainable beef cattle production in Eatonton and Fort Valley, Georgia. In 2000, training will target alternative watering sources for the maintenance of water quality; and rotational grazing, managing livestock fertility, or using livestock and poultry manures.

The Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program is a 10-year participatory research, training, and

information exchange funded by the United States Agency for International Development. The University of Georgia is the lead institution and manager of the more than 30-member institutional consortium that implements the program. Its purpose is to establish the principles of sustainable agriculture and natural resource management on a landscape scale.

The NRCC is conducting a variety of research initiatives in cooperation with this program. Those most directly related to water resources and thus having application to water quality management include:

*Protection of environmental quality in forage-grazing systems* — NRCC is investigating improved uses of the abundant soil, water, and climate resources for sustained pasture-based cattle production systems. Resource management includes integration of, among others, organic and inorganic fertilizers, animal and industrial wastes, and pesticides.

*Management of confined-animal production systems on landscape environmental quality* — Economic success of confined-animal production requires management of large quantities of animal wastes in relatively small geographical areas. Nitrogen and other trace gas emissions, accumulations of nutrients in holding areas and disposal sites and efficient utilization of these concentrated nutrients by land application are evaluated to maintain a long-term viable and economic production system while sustaining soil, water, and air quality.

*Soil and water quality improvement* — This research is focused on understanding interrelationships among microbial ecology, nutrient cycling, and soil physical properties as they relate to energy, water, and nutrient transport through the diverse landscapes. Surface residue management by double cropping and integrating animal manures into agricultural production systems are management issues that can increase soil organic matter and improve water and nutrient use efficiencies.

*Landscape distribution of nutrient concentrations in surface runoff and stream water as related to land management practices*— GIS systems and landscape models are used to evaluate management practices which protect water quality. Current measures include spatial and temporal distributions of nutrients in stream water relative to land management practices and landscape position in Southern Piedmont watersheds.

In addition to these research efforts, NRCC is initiating comprehensive assessments of farm management including environmental, economic, and social components. In the environmental areas, practices include: (1) filter strip management of crop lands using limited grazing on strips of native grasses adjacent to riparian zones; and (2) hot spot management where over-grazing or poor resource bases cause stress. Another practice that may be studied is selective



irrigation management. It is supported by NRCC base USDA funds.

Sustainable Farming Systems for the Southern Coastal Plain is a planned research project of the SEWRL, CES, and Abraham Baldwin Agriculture College related to the environmental behavior and fate of pesticides. Pesticide leaching and runoff are complex NPS pollution processes that depend on application factors such as site, formulation, amount and frequency; pesticide persistence and mobility; soil and field topography; weather and climate; and farmer decision making. The behavior and fate of pesticides in the environment is determined by these and other factors that make an interdependent system of processes so complex that computer simulation modeling is needed.

The Sustainable Farming Systems for the Southern Coastal Plain research project is scheduled to begin in FFY99 and continue between five and ten years. It will compare and model, using RZWQM and AGNP models, four representative production systems using different levels of inputs for productivity, net profit, ground and surface water impacts, aquatic and terrestrial ecosystem impacts, and small-producer compatibility. The successful development of a specific sustainable crop production system will require three demonstrated outcomes: benevolence to the environment, sustainable production alternatives to high-input systems, and economic analysis of lost yield due to pesticide application reductions compared to the cost of public water treatment to remove pesticide residues at the watershed scale. There will be an education component involving Abraham Baldwin Agriculture College that will incorporate research results and demonstration sites as part of curricula on sustainable agriculture; the CES will include the sites in its annual field day for producers.

This planned program will be supported by more than 20 years of research at SEWRL on pesticide, runoff, and leachate studies that have attempted to make pesticides less environmentally damaging. This body of research documents the pesticide's chemical properties and relates it to measures of potential for NPS. The research has resulted in the development of a simple, infield NPS predictive modeling technique of assessing risk-of-runoff based on pesticide environmental behavior and fate.

This project also is supported by generations of computer simulation modeling. SEWRL developed CREAMS, the first widely-used pesticide water-transport model. It estimated pesticide loss in surface runoff and indicated how the losses were divided between the sediment and water phases of runoff. However, it concentrated on the top one centimeter of soil depth only. GLEAMS and PRZM2 were subsequently developed by SEWRL and have become widely used models of pesticide fate. GLEAMS is a continuous, daily-time-step simulation of edge-of-field losses in runoff water pesticides, nutrients, and sediment from homogeneous agricultural fields. Subsequent development resulted in the model to be used in this research program. RZWQM, this model incorporates more sophisticated simulation

of pesticide behavior, including transport and dissipation processes, than earlier versions.

### ***Grazing Land Conservation Initiative***

The demand for grazing land has increased due to increased livestock production in Georgia. While nonpoint source pollution from grazing pasturelands is usually insignificant, the increased demand emphasizes the need for pastureland management. Specific management practices which can be used to minimize adverse environmental impact of pasturelands include: controlled grazing; composting of chicken litter and manure; land application of animal waste based upon soil, crop and environmental limitations; and the use of grass and riparian buffers around pasturelands.

The Grazing Land Conservation Initiative is an ongoing program based on national guidelines that have been modified to meet the needs and practices in Georgia. The demonstration projects seek to improve the management of pasture and range lands, to reduce nutrient and sediment loadings, and to improve water quality by implementing *resource management systems*.

The information component of this program promotes *resource management systems* by featuring: (1) BMPs on pasturelands, (2) improvement of stream corridor management, (3) dissemination of forage management information, (4) ecosystem management planning, and (5) identification and removal of barriers to BMP implementation. The BMPs related to grazing lands are outlined in the *Agricultural Best Management Practices for Protection Water Quality in Georgia*.

The Grazing Land Conservation Initiative provides three-day hands-on training on grazing land techniques to personnel of the NRCS, GSWCC, SWCD, and UGACAES. In addition, the initiative provides technical assistance to livestock operators, producers, and consultants. Workshops convey up-to-date grazing land principles and BMPs including: pasture management, nutrient management, pest management, stream and water body protection, and agricultural waste management systems.

NRCC initiated a study on grazing impacts on soil quality. Using plots grazed since 1994, the study contrasts impacts of two grazing intensities and hayed and unharvested plots. The work is designed to determine the impact of intensities on soil structure which affects both the soil profile and the soil quality. Support for this research will begin with base USDA funds. Additional funds will be sought in year five of the research from USDA, USEPA, and the National Science Foundation.

### ***Certified Crop Advisor Program***

The Certified Crop Advisor Program is a voluntary education program administered by the UGACAES promoting soil and water stewardship. The program provides educational and informational training on agriculture chemical use, soil fertility, soil and water management, and crop production to farm consultants and agriculture agency personnel.

Currently, there are approximately 240 certified advisors in Georgia. The program is supported through registration fees. The American Society of Agronomy is custodian of the national program.

Cropping systems research assesses long-term effects of no-till practices on soil's physical and biological ability to manage nutrient and water movement in cropping systems. Increases in soil organic matter content are associated with increases in aggregate stability which directly influences water infiltration rates. Improved water infiltration and greater water hold capacity not only reduce the risk associated with periods of water stress but also reduce runoff and soil loss.

The ARS has been conducting cropping systems research for 25 years. It is supported by base ARS federal USDA funds and is expected to continue into the future. Specific research activities include: nitrogen availability and water use in cotton cropping systems and nitrogen distribution in the soil profile in different areas of a cropping system over different lengths of time. The ARS has found changes to soil properties within 3-5 years of using no-till practices. Documented benefits include increased water infiltration to cover crops and decreased soil crusting and erosion.

### ***Aquaculture Industry***

Aquaculture has become an important and viable sector of the agriculture industry over the past twenty years. Since the growth of this industry is expected to continue to expand, its potential for impacting water resources of the State through water discharge and land application of production effluent should be considered. The aquaculture industry fully realizes the importance of water quality and water discharge issues. Discharge from aquaculture operations often meet higher water quality standards than animal waste lagoons because the water must continue to support live fish populations prior to its discharge.

The aquaculture industry is subject to Georgia's *Rules and Regulations for Water Quality Control* that require an NPDES permit for discharges from a concentrated aquatic production facility into the waters of the State. In addition, regulations affecting impoundments or discharges on trout streams require maintenance of the natural temperatures of streams designated as primary trout

waters and regulate the temperature elevation in secondary trout waters to no more than 2E Fahrenheit.

The *State Aquaculture Development Plan* was completed in 1996 at the request of the Aquaculture Development Commission. The commission was established by the General Assembly in 1988 to facilitate the development of the aquaculture industry in Georgia. Members of the commission include representatives from State and Federal agencies and the aquaculture industry.

Although agriculture is exempted from the Georgia Erosion and Sedimentation Act, agriculture enterprises such as fish farms are required to conduct activities consistent with best management practices. Specific aquaculture BMPs were developed in 1994 by the Southern Regional Aquaculture Center and the USDA.

The aquaculture best management practices were primarily developed for catfish production to address management of effluent land application and discharge into streams from aquaculture production facilities.

Catfish production is by far the largest sector of the aquaculture industry with approximately 500 producers in Georgia. Catfish farm effluent is often land applied. Education and management activities in this production area are funded by USDA. The *Catfish Quality Assurance* booklet describes management practices to help producers avoid drug or chemical residues in catfish and improve the skills and knowledge of farm managers. The booklet was funded by the Catfish Farmers of America. The UGACAES and the UGA Griffin Experiment Station have recently completed research in this activity area. The research, funded by USDA, examined application of water discharge from catfish production ponds to row crops for irrigation and fertilization purposes.

Trout production is sustained on a continuous water system; discharge is often into nearby streams. There are currently about 20 trout production facilities in Georgia for whom the UGACAES collect water quality data to assist in receipt of NPDES permits. The water quality analysis is funded by UGACAES. Trout production BMPs have been developed by the Trout Growers Association. They are similar to the management recommendations described in the *Catfish Quality Assurance* booklet.

Alligator production activities focus on lagoon management strategies which include water quality testing, nutrient characterization, and land application of lagoon effluent. Currently, there are eight alligator producers in Georgia. Alligator production is not a recognized activity under the State's aquaculture legislation. Operators, therefore, must receive a permit from NRCS to implement land application operations. Much of this activity area involves training NRCS personnel on the specifics of this industry to facilitate its ability to regulate it. This training is

conducted and funded by UGACAES.

The UGACAES also conducts education activities for aquaculture producers. Through demonstrations of research techniques, the connection between water quality parameters and the aquaculture environment are promoted. In addition, UGACAES makes available to producers various videos and publications that deal with water quality management and quality assurance. Both the ongoing education activities and the production of education materials are funded by UGACAES.

## **SILVICULTURE**

### **Overview**

Georgia's Silviculture Nonpoint Source Management Program activities involve a cooperative partnership that formally began with the Governor's Silviculture Nonpoint Source Pollution Technical Task Force in 1977. The task force was formed to assess the extent of nonpoint source pollution, mainly from erosion and sedimentation, caused by forestry operations. The task force consisted of an integrated team from the GFC, GAEPD, UGASFR, UGACAES, USFS, NRCS, GSWCC, GFA, GFBF, forest industry, and The Georgia Conservancy. After a three year field study of silvicultural practices, recommendations to minimize or eliminate erosion and sedimentation were developed in 1981. These recommendations were called best management practices and are currently published in a manual entitled *Georgia's Best Management Practices for Forestry*.

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

Major components of this program include: education of the commercial forestry community through workshops, demonstrations, presentations, and direct communication; periodic random surveys to evaluate the application of BMPs; periodic evaluation and revision of BMPs; and maintenance of a statewide network of foresters who investigate and resolve complaints, conduct special investigations, and, where necessary, direct enforcement actions to resolve difficult or unusual problems.

While the GFC has been designated the lead agency in managing and implementing the silviculture portion of the State's *Nonpoint Source Management Program*, the USFS is the lead agency in implementing nonpoint source management programs in the Chattahoochee and Oconee National Forests. A Memorandum of Understanding, executed in 1991 between GAEPD, USFS, and GFC, outlines the agency's responsibilities in meeting the requirements of Federal and State water quality laws.

The Memorandum of Understanding (MOU) between the U.S. Forest Service, Georgia Forestry Commission and the Georgia Environmental Protection Division identifies the responsibilities and activities of the participating agencies in implementing the State's *Nonpoint Source Management Program* as related to

activities in the Chattahoochee and Oconee National Forests.

The Forest Management Plans identify water quality issues on lands within and on lands draining the Chattahoochee and Oconee National Forests; recognize the State's assigned beneficial uses for streams as minimum water quality standards; and acknowledge the State's laws and regulations as minimum requirements. The Forest Management Plans will be revised to support the State's River Basin Management Planning process and to encompass a watershed management approach.

Commercial forestry activities are regulated under the Georgia Water Quality Control Act and, for road construction affecting wetlands and other waters of the United States, under Section 404 of the Clean Water Act. Other established, ongoing commercial forestry activities, however, are exempt from permitting requirements under the Georgia Erosion and Sedimentation Act and Section 404 of the CWA, provided Federal silvicultural BMPs are implemented.

According to *Water Quality in Georgia 1996-1997*, silviculture was not specifically listed as a cause for streams not supporting or only partially supporting their designated use. This may, in part, reflect the success of the nonregulatory Silviculture Nonpoint Source Management Program.

It is estimated that 86% of Georgia's commercial forest acreage remains in compliance with BMP guidelines. Recommended BMPs are expected to reflect the most effective and technologically advanced practices to prevent, control, and/or abate nonpoint source pollution. However, more information is needed. The forestry community seeks better understanding of the impact of forestry practices on water quality and the effectiveness of BMPs in maintaining water quality.

In addition, specific areas can be improved. For instance, of the nonpoint source pollution related to silvicultural activities, it is estimated that 90% originates from improperly constructed logging roads. In addition, most timber is owned by private landowners; 90% of timber landowners in the South and 68% in Georgia are private. Often they are absentee owners creating specific needs for outreach and education efforts. Finally, international influences have some bearing on silviculture in Georgia. In order to remain competitive in the European timber market, the forestry community must demonstrate that wood originated from forest acreage practicing sustainable forestry techniques.

Notwithstanding progress made to date, the forestry community remains committed to continued improvement of the State's water quality, enhanced and technologically advanced BMPs, and secured viability of Georgia's wood products in international markets. In cooperation with the GFC, the GFA, UGASFR, UGACAES, USFS, GSWCC, NRCS, SWPA, AFPA, GFBB, ACF, SAF, and the State

Board of Registration for Foresters support the implementation of BMPs in Georgia. Therefore, the emphasis of the Silviculture Nonpoint Source Management Program will continue to be education of the forest community on implementation of recommended BMPs and compliance monitoring.

Protecting, maintaining, or improving water quality impacted by silviculture nonpoint source pollution is possible only through the cooperation of a wide variety of State and Federal agencies, silviculture and environmental organizations, and landowners. The principle silviculture management agencies and organizations involved in nonpoint source management activities are described in the following paragraphs.

The Georgia Forestry Commission provides technical information and assistance regarding areas such as reforestation, forest stewardship and management, harvesting, marketing, and education. Services provided by the GFC include development of management plans, timber marking, loan or rental of equipment, fire brake plowing, and sales of seedlings. The Silviculture Nonpoint Source Management Program is managed by a Statewide Water Quality Coordinator and appointed foresters (District Water Quality Coordinators) from each of the 12 GFC districts.

The State and District Water Quality Coordinators conduct educational workshops, programs, training programs, and field demonstrations for the forestry community, including landowners, land management and procurement foresters, consulting foresters, timber buyers, loggers, and site preparation contractors. GFC District Water Quality Coordinators investigate and mediate complaints involving forestry operations. In addition, the GFC conducts biennial Statewide BMP Compliance Surveys to assess the effectiveness of voluntary BMPs in the forest community.

As part of GFC's ongoing administration of the silviculture portion of Georgia's *Nonpoint Source Management Program*, it is acting as the lead silvicultural agency coordinating and contributing to Georgia's River Basin Management Planning process. Following the GAEPD schedule of River Basin Management Planning, GFC provides resource data and trend data on commercial forestry activities, acreage and ownership, and BMP compliance rates. GFC will continue to work in coordination with GAEPD to implement the RBMP process in each of the State's 14 major river basins.

The U.S. Forest Service is authorized by Acts of Congress and the Secretary of Agriculture to administer and protect the lands and resources of the National Forest system and to cooperate with other agencies. The USFS is directed to meet Federal, State, interstate, and local substantive and procedural requirements respecting control and abatement of pollution in the same manner and to the same extent as a nongovernmental entity. It seeks to work with State agencies and to be



active and effective participant in the State's *Nonpoint Source Management Program*.

The Georgia Forestry Association is the primary statewide organization representing the forestry community in the State. The driving mission of the GFA is to promote the wise use of Georgia's forest resources. It boasts a unique and diverse membership including private landowners, forest products companies, loggers, consulting foresters, environmentalists, businesses, and other forestry community representatives. GFA and the forestry industry plays a significant role in encouraging the voluntary implementation of BMPs in Georgia. It works with landowners in protecting their property rights and adopting sound land management practices to ensure that the State's forests continue to provide clean air, clean water, soil conservation, wildlife habitat, beauty, and recreational opportunities. GFA also promotes the importance of replenishing forest resources through reforestation efforts.

The University of Georgia D.B. Warnell School of Forest Resources (UGASFR), established in 1906, is the oldest forest resources program in the South that provides forest resources service and outreach, instruction, and research programs. Programs in forestry, wildlife, fisheries, and water resources are directed to enhance the use and value of Georgia's vital renewable natural resources. Forest resources of Georgia contribute some \$19.5 billion annually to the economy. The importance of forest resources combined with the growth and vitality of Georgia has enabled UGASFR to enhance the excellence of its programs. UGASFR's faculty, staff, and student body are supported by on- and off-campus facilities and lands and cooperative relationships and programs with private industry and State and Federal agencies.

The University of Georgia College of Agricultural and Environmental Sciences (UGACAES) includes the Cooperative Extension Service and Experiment Stations. Services provided include classroom instruction in agriculture related topics; basic and applied research; consultative assistance and information on nonpoint source related impacts on water quality; water quality monitoring; pest control; and analyses of nutrients, pesticides, herbicides, and other constituents in forage, water, and animal waste.

Created in 1937 by an Act of the Georgia Legislature, the Georgia Soil and Water Conservation Commission has been designated as the administering or lead agency for agricultural nonpoint source management in the State. The GSWCC develops programs and conducts educational activities to promote conservation and protection of land and water resources devoted to agricultural uses including forest crops. Primary functions of the GSWCC are to provide guidance and assistance to the 40 Soil and Water Conservation Districts and provide oversight for the Georgia Erosion and Sedimentation Act.

The Natural Resources Conservation Services cooperates with Federal, State, and local units of government to provide technical assistance to landowners, producers, and special interest groups. Standards and specifications regarding conservation practices, animal waste management systems, grazing activities, plant materials, and other best management practices are developed and revised by a varied staff.

The Southeastern Wood Producers Association (SWPA) is a dual state logging association representing the loggers of Georgia and Florida. It was formed in 1990 to advance the logging profession by way of legislative activity, economic and safety updates, formation of insurance and financial programs, and improving and updating the public image of loggers. SWPA also provides educational training to the logging contractor and employees.

The American Forest and Paper Association (AFPA) is the national trade association of the forest, paper, and wood products industry, representing member companies engaged in growing, harvesting, and processing wood and wood fiber; manufacturing pulp, paper, and paperboard products from both virgin and recycled fiber; and producing engineered and traditional wood products. AFPA represents a segment of industry which accounts for over eight percent of the total U.S. manufacturing output. It has adopted the Sustainable Forestry Initiative<sup>SM</sup> Program.

The Georgia Farm Bureau Federation (GFBF) is a non-profit service organization representing its members in activities related to State and Federal legislation and commodity promotion and offering member services such as marketing, real estate, and insurance. GFBF assists in providing farmers a fair and equitable standard of living and insuring the existence of agriculture, including forest crops, as a vital and thriving industry in the future.

The Association of Consulting Foresters (ACF) is an organization of consulting foresters formed in 1948 for the purpose of maintaining and enhancing professional standards, to serve as a forum for the exchange of information and to promote the development of all aspects of forestry. Members are required to meet certain standards of ethics, education and experience.

The Society of American Foresters, Georgia Chapter (SAF) is a membership organization limited to practitioners or professors/teachers in the broad field of forestry. SAF advances the science, technology, education, and practice of professional forestry and uses the knowledge and skills of the forestry profession to benefit society.

The State Board of Registration for Foresters is composed of five foresters and one public member who are selected and appointed by the Governor. The board issues licenses for registered foresters and has the authority to refuse to grant a license to an applicant or revoke the license of a person licensed by the board or to

discipline a person licensed by the board upon a finding by the majority of the entire board. It is the responsibility of each registered forester to practice professional forestry in a manner which protects the public welfare and safety and in which meets generally accepted standards of practice, including, but not be limited to, adherence to BMPs. Failure to practice professional forestry in accordance with generally accepted standards of practice shall constitute unprofessional conduct as provided for in O.C.G.A. 43-1-19(a)(6) and shall be grounds for disciplinary action as provided for by law.

### ***Silvicultural Nonpoint Source Management Program***

The GFC has been designated by the GAEPD as the lead agency in managing and implementing the silviculture portion of the State's *Nonpoint Source Management Program*. GFC also serves as the technical agency for Federal reforestation cost-sharing programs. With the support of the forest industry, the GFC plays a primary role in promoting the voluntary implementation of best management practices in the forest community.

This program is managed by a Statewide Water Quality Coordinator and 12 foresters serving as District Water Quality Coordinators. The Statewide and District Water Quality Coordinators have received specialized training in erosion and sediment control, forest road layout and construction, stream habitat assessment and wetland delineation.

Recommended silvicultural best management practices address all aspects of forestry practices including forest road construction, timber harvesting, site preparation, and forest regeneration. BMPs are implemented primarily through a voluntary program emphasizing education and training of professional foresters. Although many forestry BMPs are voluntary, some, such as stream crossings, are Federally mandated and subject to Section 404, Clean Water Act regulations. In addition, forestry operations remain subject to the Georgia Water Quality Control Act. It is estimated that 86% of Georgia's commercial forest acreage is in compliance with these guidelines.

The GFC Statewide and District Water Quality Coordinators provide local and statewide training to the forest community through workshops, field demonstrations, presentations, management advice to landowners and the distribution of *Georgia's Best Management Practices for Forestry* manuals and brochures. In addition, training videos, slide programs, table top exhibits and BMP billboards have been developed to support the program.

The GFC Statewide and District Water Quality Coordinators also provide technical assistance and management advice. A *Sample Forest Products Sale*

*Agreement* includes spaces for specific BMP incorporation for the benefit of private landowners selling timber. Advice on developing forest management plans is given with the objective of generating plans that include best management practices. At other times, advice is given during consultations occurring as a result of complaint investigations with the objective of promoting BMP implementation.

Technical assistance is also available from the Chattooga River Watershed Coalition (CRWC), a private, non-profit organization engaged in BMP education focused on what it calls “lighter-touch” forestry practices. CRWC works with foresters to develop and refine low-impact forestry methods such as single tree or small group harvesting and temporary road building. As well, the CRWC provides foresters and landowners with information on how to design timber sale proposals or agreements which incorporate these “lighter-touch” practices.

GFC is the designated technical agency for Federal reforestation cost-sharing programs. All GFC District Water Quality Coordinators assist landowners in writing forestry management plans that include BMPs and conduct compliance inspections for any of the Federal reforestation cost-sharing programs. These programs include: (1) EQIP (previously known as Agriculture Conservation Program) emphasizing tree planting plans; (2) Forestry Incentives Program (FIP) which pays the landowner up to \$10,000 for planting trees; (3) Conservation Reserve Program (CRP) where highly erodible crop land is planted in a stable crop like grasses or trees with annual per acre payments to the landowner; (4) Stewardship Incentives Program (SIP) which complements and expands upon other cost-share programs by supporting the establishment of multiple resource practices, such as reforestation and afforestation, forest improvement, soil and water protection and improvement, riparian and wetland protection and improvement, fisheries habitat enhancement, wildlife habitat enhancement, and forest recreation enhancement; and (5) the Georgia Power and GFC sponsored Georgia Reforestation to Enhance Environmental Needs (GREEN) Program that cost-shares the expense of tree planting on eligible private open lands in Georgia.

The GFC is currently conducting forestry road construction demonstration projects. Improperly located or poorly constructed forest road systems are the source of approximately 90% of the sediment loading in streams during commercial forestry operations. Results from the 1991 Statewide BMP Compliance Survey indicated that roads in the Mountain and Piedmont physiographic regions were not being properly constructed by private landowners. Therefore, the GFC initiated these projects to demonstrate proper road layout and construction, stream crossing installations and stabilization measures to control erosion and sedimentation.

The GFC and cooperating agencies have constructed or upgraded 30 miles of roads in Baldwin State Forest, Chattahoochee National Forest, and Dawson and Dickson Forest, areas of highly erodible soils in the Piedmont physiographic region. These demonstration roads crossed perennial streams and required proper road

grade broad dips, wooden box culverts and geotextiles for stabilization.

The GFC also investigates and mediates complaints or concerns involving forestry operations on behalf of the GAEPD and, when wetlands are involved, USACE. The GFC has no regulatory authority and in situations where satisfactory compliance is not voluntarily instituted, the case is turned over to the GAEPD or USACE for enforcement action provided under the Georgia Water Quality Control Act or Section 404 of the Federal Clean Water Act, respectively.

Upon receipt of a complaint, the GFC notifies the landowner and conducts a field inspection of the site using county soil surveys or topographic maps to identify stream courses and potential water quality problems. If a written contract was executed, the GFC will verify if the agreement specifies BMP implementation. If problems do exist, the GFC will work with the timber buyer and/or logger on behalf of the landowner to correct the problems. Complaints usually involve logging debris left in streams and are resolved without involving the GAEPD and/or USACE.

Recently, Georgia's State Board of Registration for Foresters incorporated a land ethic requirement in their code and asked the State Attorney General's Office for a ruling on BMP compliance. The Attorney General determined that BMPs qualify as the minimum standards of practice because noncompliance violates State and/or Federal laws. The Attorney General further ruled that the board has the authority to sanction or revoke the license of registered foresters based on noncompliance. The board adopted procedures to sanction or revoke the license of registered foresters involved in unresolved complaints where actions or lack of supervision to implement BMPs have resulted in violations of the board's land ethic criterion, Georgia Water Quality Control Act, or Federal wetlands regulations.

GFC provides the board with opinions on matters of BMP negligence in the complaint resolution process. UGASFR participates in this effort by contributing technical expertise on specific BMP compliance determinations. GFA supports complaint resolution by proactive education of foresters and loggers on the professional consequences of unethical BMP negligence.

### ***Statewide BMP Compliance Survey***

In 1991, the GFC conducted a Statewide BMP Compliance Survey to assess the application of best management practices by logging operations. The survey of 349 harvesting sites conducted during 1991 revealed that best management practices had been properly applied to 86% of the total area harvested and that only 4.8% of the perennial and intermittent streams mileage had been adversely affected.

Regional BMP compliance was highest in the Coastal Plain physiographic region

(92%) and lowest in the Mountain physiographic region (61%). Forestry industry land had the highest rate of BMP compliance (93%) followed by private non-industrial forest lands (80%) and public lands (77%).

In 1998, the GFC initiated a standardized survey of BMP implementation, stream habitats and turbidity levels for selected harvested plots. The USFS 1995 Timber Output Report for Georgia was used for determining the number of sites evaluated resulting in a 10% statewide sample of harvested sites. Statewide and regional BMP implementation rates by ownership will be determined and compared with the results from the 1991 Statewide BMP Compliance Survey. The results from the biennial Statewide BMP Compliance Surveys will be used to update and revise the Silviculture Nonpoint Source Management Program and to target outreach and educational efforts.

The UGASFR supports this effort through ongoing research in locating forestry operations and forested wetlands; determining the rate of row crop to forestry conversion and the associated potential effect on soil erosion; and developing a forest inventory describing the percentage of forest base and types of forest cover and analysis with census data for ownership stratifications.

Georgia is participating in a task force organized by the Southern Group of State Foresters to develop cross-state physiographic region BMP compliance surveys. The task force is working to create a uniform regional BMP compliance survey instrument and scoring procedures with standardized criteria. This would align survey activities to the same two-year cycle in all participating states: Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Tennessee, Alabama, Georgia, Florida, Kentucky, South Carolina, North Carolina, and Virginia.

### ***Sustainable Forestry Initiative<sup>SM</sup>***

Georgia's Sustainable Forestry Initiative<sup>SM</sup> provides technical assistance and education to promote a proactive approach to forest management including protection of water resources. Sustainable forestry seeks to manage forest resources to meet present needs without compromising the ability of future generations to meet their own needs. It is implemented by practicing a land stewardship ethic which integrates the growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitats, and aesthetics.

Most timber is owned by private landowners; 90% of timber landowners in the South and 68% in Georgia are private. Often they are absentee owners. In order to compete in the European timber market that demands wood originate from sustainable forests, the forestry community must demonstrate that wood originated from forest acreage practicing sustainable forestry techniques. The GFA, AFPA,

GFC, UGASFR, and UGACAES developed the Sustainable Forestry Initiative<sup>SM</sup>, a comprehensive logger education program emphasizing the protection of water resources and the implementation of BMPs.

Two pertinent aspects of the Sustainable Forestry Initiative<sup>SM</sup> are: (1) A continuing series of Master Timber Harvester Workshops with a component devoted to the protection of water resources and the implementation of best management practices, and (2) A Landowner Outreach Program which endeavors to deliver information about forestry management and the protection of water resources to forest landowners. The Master Timber Harvester Workshops are currently conducted on the Georgia Statewide Academic and Medical Systems (GSAMS) network.

## **CONSTRUCTION**

### **Overview**

Management of construction as a nonpoint source of pollution focuses on measures to be applied during land development. Construction activities that include soil disturbance are particularly prone to soil erosion if preventive measures are not taken. Management practices are intended to control erosion and off-site deposition of sediment (rather than long-term control of stormwater quantity and quality). Preventing sediment from entering streams also results in a significant decrease in nutrients, heavy metals, pesticides, and toxic chemicals that attach to soil particles.

Management of nonpoint source impacts from construction activities in Georgia is primarily defined by the Erosion and Sedimentation Act. Signed into law in April 1975, the intent of the Act is to establish a comprehensive, statewide program for erosion and sedimentation control. This intent is to be accomplished through adoption and implementation of local ordinances and programs which regulate land disturbing activities. The Act establishes a permit process for land-disturbing activities, with some exemptions. To receive a permit, an applicant must submit an erosion and sedimentation control plan specifying best management practices.

Land-disturbing activities are defined as any activity which might result in soil erosion and the movement of sediments into State water or onto lands in the State. Examples include clearing, grading, excavating, transporting, or filling of land. Activities which are wholly exempt from the Act's requirements include surface mining; granite quarrying; minor land-disturbing activities such as home gardens and landscaping; agricultural and silvicultural operations; any project carried out under the technical supervision of the Natural Resources Conservation Service; and activities on sites of one and one-tenth acres or less (unless these activities occur within 200 feet of lakes or perennial streams). Partially exempt activities include construction of single-family residences which are not part of a platted subdivision, construction or maintenance of roads by State or local governments, and land-disturbing activities conducted by public utilities. Best management practices which must be used for partially-exempt and other land-disturbing activities incorporate a variety of procedures and technologies, including maintenance of buffer zones along streams.

Local governments, with oversight by the GSWCC, GAEPD and the local Soil and Water Conservation District (SWCD), are primarily responsible for implementing the Act. Local governments are encouraged to enact erosion and sedimentation control ordinances. These ordinances are reviewed by GAEPD and, if consistent with State law, the local government is certified as an issuing authority. In most of the State, local governments have adopted ordinances and been given the authority to issue and enforce permits for land-disturbing activities. In areas where a local government has not been certified as an issuing authority, GAEPD is



responsible for issuing and enforcing land disturbance permits. The SWCDs and the GSWCC conduct technical reviews of all erosion and sedimentation control plans before a land disturbing permit is issued.

The Erosion and Sedimentation Act was amended in 1980, 1985, and 1988 to strengthen GAEPD's regulatory overview and enforcement capability and to remove certain exemptions. Subsequent amendments authorized the GAEPD to grant variances for the conduct of land disturbing activities within certain distances of a stream, established a buffer requirement for the construction of single family dwellings along certain trout streams, and provided for the substitution of BMPs for numeric limits in permits for land disturbing activities. The Act provides that adherence to BMPs constitutes compliance with a land disturbance permit.

Two recent changes in Georgia's *Nonpoint Source Management Program* will contribute to better design, installation, and maintenance of BMPs on land-disturbing activities. First, as directed by the Federal Clean Water Act, the GAEPD has begun the process of issuing a general NPDES permit for stormwater discharge from construction activities on sites and common developments greater than five acres. This permit is a critical addition to provisions for management of nonpoint source runoff from construction. However due to numerous legal challenges, implementation of this permit has been delayed. Resolution of the administrative appeal is expected in 2000. The GAEPD expects that the general NPDES permit will be issued in 2000 with an expiration date in 2003. With the re-issuance of this permit in 2003, the GAEPD will lower the acreage threshold to sites and common developments greater than one acre. When implemented, the general stormwater permit for construction will provide an additional tool to address improper BMPs at construction sites and will enhance the State's ability to enforce water quality regulations.

Second, as directed by the 1996 amendments to the Georgia Water Quality Control Act, the Georgia Department of Natural Resources Board adopted an narrative instream standard for turbidity in 1997. The new turbidity standard requires that there be no substantial visual increase in turbidity due to human activities. Consistent with the majority of other nonpoint source management programs in Georgia, the new standard emphasizes BMPs. Designing, installing, and maintaining BMPs and complying with any issued permits constitutes compliance with the new narrative standard. This standard provides an avenue for enforcement action under the Georgia Water Quality Control Act which GAEPD can use regardless of the resolution of the legal challenge to the general permit for stormwater discharge from construction activities.

Degraded streams, with altered aquatic communities, are common in urban areas. Degradation may be most pronounced during development. When preventive measures are not taken or are not implemented effectively, soil erosion,

sedimentation, and stream degradation are likely to result from construction activities that involve soil disturbance. Studies of streams in Atlanta and Macon have indicated levels of sediments which significantly affect the quality of the aquatic environment (Report of the Georgia Board of Regents' Scientific Panel on Evaluating the Erosion Measurement Standard, 1995). Much of this urban sedimentation occurs during construction and/or development phases.

The GAEPD conducted a major study in 1981-1983 to determine the magnitude of the nonpoint source problem from urban, agricultural, and commercial forestry activities. The study involved 21 streams selected from different parts of the State. The study included chemical and biological parameters and demonstrated that the greatest potential nonpoint source impacts arise in urban streams. In addition to stormwater runoff, and of equal consequence, were impacts of poor land management practices in highly industrialized and commercial areas of urban settings. This study corroborated earlier GAEPD studies which concluded that sediment was the most severe pollutant from nonpoint sources.

The most recent Section 305(b) Report, *Water Quality in Georgia 1996-1997*, concludes that nonpoint sources contribute significantly to impacts in stream segments that do not support, or partially support, designated uses. Based on previous studies, it is likely that erosion and sedimentation from construction activities is a substantial proportion of this contribution.

The Georgia Environmental Protection Division is responsible for administering and enforcing a variety of regulatory programs, including programs defined by the Erosion and Sedimentation Act. Responsibilities under that Act include oversight of local implementation, implementation in areas without local issuing authorities and inspection, compliance, and enforcement activities. GAEPD also conducts a variety of outreach and educational activities addressing regulatory requirements for construction activities and practices to control erosion and sedimentation. The NonPoint Source Program with the Water Protection Branch has primary responsibilities for GAEPD activities under the Erosion and Sedimentation Act. GAEPD Regional Offices work with staff from the NonPoint Source Program and are responsible for inspection, compliance, and enforcement activities in those localities without local ordinances and erosion and sedimentation control programs.

The Georgia Soil and Water Conservation Commission and the 40 local Soil and Water Conservation Districts share responsibility with GAEPD for education and oversight of local erosion and sedimentation control programs as per the Erosion and Sedimentation Act of 1975. The GSWCC is the lead agency for agricultural nonpoint source prevention in the State. The GSWCC develops water quality programs and conducts educational activities to promote conservation and protection of land and water. The local Soil and Water Conservation Districts cover all counties in the State and are each composed of one to nine counties.

The Natural Resources Conservation Service, formerly the Soil Conservation Service, is a unit of the U.S. Department of Agriculture. NRCS cooperates with Federal, State, and local units of government to provide technical assistance to landowners, groups, and other parties. The NRCS District Conservationists provide technical and engineering expertise to the SWCDs during review of erosion and sedimentation control plans.

Local governments are primarily responsible for implementing the Erosion and Sedimentation Act. Those local governments which have enacted erosion and sedimentation ordinances and have been certified by GAEPD as issuing authorities are responsible for permitting and enforcement activities subject to oversight by GAEPD and the local Soil and Water Conservation District.

The USEPA signed a cooperative agreement with GAEPD in January 1997. The Performance Partnership Assistance Agreement is intended to ensure more effective environmental management while providing greater flexibility for GAEPD in administering Georgia's environmental protection programs. Under this agreement, USEPA will cooperate with GAEPD in stormwater inspections and enforcement.

Units of the University System of Georgia cooperate with these agencies in providing outreach and education intended to improve installation and maintenance of BMPs for control of runoff from construction activities. The University System of Georgia has been particularly instrumental in implementing demonstration projects for control of runoff from construction activities.

In addition, private non-profit organizations provide education and technical assistance in implementation of nonpoint source pollution controls for construction activities. The Chattooga River Watershed Coalition, the Hiawasee River Watershed Coalition, and the Upper Chattahoochee Riverkeeper are environmental organizations formed to help protect the Chattooga, Hiawasee, and Chattahoochee Rivers, respectively. All three organizations assist developers with compliance with erosion and sedimentation control requirements. They also work with local residents in responding to erosion problems, providing information on the issuing authority in specific localities, documenting impacts, and instructing people on how to file complaints and seek remedies to erosion and sedimentation problems.

### ***Erosion and Sedimentation Act***

Implementation of the Act involves local units of governments, the GAEPD Water Protection Branch, the GSWCC, and the 40 Soil and Water Conservation Districts across the State. Activities to implement the Act fall in two primary areas: implementation in areas with local ordinances and programs; and implementation in areas without local ordinances and programs. Education and outreach activities

also support implementation of the Erosion and Sedimentation Act.

In the first area of activity, municipalities and counties adopt local ordinances and request delegation of local issuing authority from the GAEPD. These local issuing authorities then become responsible for responding to requests for permits for land-disturbing activities. Currently, 240 municipalities and 132 counties have been certified as issuing authorities. Aside from increased local control over development activities, the primary benefit gained from certification as an issuing authority is timing: permits for land-disturbing activities must be granted within 45 days.

The GAEPD is responsible for oversight of local erosion and sedimentation control programs. The oversight role includes responding to requests for delegation of local issuing authority and recertifying local issuing authorities following amendment of State law regarding erosion and sedimentation. Recertification proceeds through the following steps: the GSWCC adapts the model erosion and sedimentation ordinance to correspond to amendments to State law; the new model ordinance is distributed to localities for revision of their ordinances; localities request recertification from GAEPD; GAEPD reviews revised local ordinances and recertifies those localities which comply with the revised State law. Localities which do not amend their ordinances or do not request recertification will be decertified. This process is currently under way following amendment of the Erosion and Sedimentation Act in 1994 and 1995.

GAEPD's oversight activities include overviews of local programs in areas with significant development underway. The purpose is to ensure that local issuing authorities are complying with their ordinances. Localities are selected for overviews based on relative growth rates and the number of complaints or requests from GAEPD Regional Offices. In addition to oversight activity, GAEPD will ensure that Section 319(h) Grant funds are available to local issuing authorities as seed money to hire additional personnel and, therefore, increase their capacity for erosion and sedimentation control management. Funds will be directed to issuing authorities located in watersheds identified in the Unified Watershed Assessment as Category I watersheds with the expectation that local funds will then be available to support the additional staff.

GAEPD's responsibilities also include processing of requests for stream buffer variances. The Act specifies that land-disturbing activities shall not be conducted in stream buffer zones ranging from 25 feet along any State waters (i.e., warmwater streams) to 100 feet along primary trout streams. Currently, the Director of the GAEPD may grant variances allowing construction to within 50 feet of the bank of primary trout streams, 25 feet of secondary trout streams, and the bank itself for other streams.

The Georgia Department of Natural Resources is currently refining requirements for stream buffer variances. The intent is to clarify the variance request process,

ensure that adequate water quality protection is provided, and promote the retention of buffers over variance-authorized encroachments. As proposed, variance requests will require documentation of approved erosion and sedimentation control plans and a conservation easement to offset the encroachment proposed requirements. Proposed requirements are more rigorous for variances along trout streams and less rigorous for activities related to certain single-family residences and publicly-owned water and sewer facilities. It is anticipated that this proposal will be revised following a comment period with procedures to be finalized by December 2000.

GAEPD also administers the erosion and sedimentation control program in areas where there is no local issuing authorities. Responsibilities here include responding to requests for permits for land-disturbing activities and undertaking inspection and enforcement actions. In addition, GAEPD conducts surveys of land-disturbing activities in selected localities. Surveys are intended to encourage local governments to apply for delegation of local issuing authorities. Localities are selected by staff at GAEPD Regional Offices, based on a community's capacity and openness to additional responsibility as an issuing authority. One community in each of the five (5) regions is targeted a year.

Complaint resolution under the Erosion and Sedimentation Act may involve local and regional governments, Regional Development Associations (RDA), Soil and Water Conservation Districts (SWCD), and Federal agencies. Procedures for response to complaints depend upon whether or not there is a local issuing authority. GAEPD is the lead agency on complaints where there is no local issuing authority. In this case, complaints are handled by the GAEPD Regional Offices. Where there is a local issuing agency, complaints are referred first to that entity. If not resolved, complaints are then referred to the GSWCC. If the situation remains unresolved after the appropriate SWCD has exhausted its local remedy, complaints are then referred to GAEPD for either selective enforcement or rescission of local issuing authority. The enforcement process potentially includes three steps: (1) issue a notice of intent; (2) issue a consent order (usually involving negotiated terms of time and fines to bring a site into compliance); and (3) issue an administrative order (non-negotiated fines, actions, and compliance time schedule).

### ***Stormwater Discharge from Construction Activities***

As directed by the Federal Clean Water Act, GAEPD is prepared to implement a permit program regulating stormwater discharge from construction activities. It is expected that the program will be implemented through a general NPDES permit providing for stormwater discharge from construction activities as a class. GAEPD sees this program as a crucial addition to its efforts to address nonpoint source impacts from sediment and expects it to greatly enhance the agency's ability to

enforce State water quality regulations in areas affected by construction activities.

A general permit to regulate stormwater runoff from construction activities was issued by GAEPD in September 1996. A petition challenging this permit was filed in October 1996. As a result of this petition, the general permit has been stayed and implementation of the general permit for construction activities is pending resolution of legal action. Resolution of the administrative appeal is expected in 2000. The GAEPD expects that the general NPDES permit will be issued in 2000 with an expiration date in 2003. This general NPDES permit will provide an effective tool beyond existing State laws and regulations to control the discharge of soils and sediment to State waters.

When implemented, it is expected that the permit program will be structured as follows. A general permit will authorize discharges of stormwater from construction activities that disturb an area greater than five acres, or tracts of less than five acres that are part of a larger overall development with an area greater than five acres (i.e., common development). To gain coverage under the general permit, a one-page notice of intent must be sent to GAEPD at least one week before initiating any construction activity subject to permit requirements.

For all construction activities subject to this permit requirement, the owner and the operator must jointly prepare and implement an erosion, sedimentation and pollution control plan. This plan must describe the BMPs which will be used to management the quality of stormwater runoff. In addition, the discharges must comply with Georgia's instream water quality standards (primarily the narrative turbidity standard). The permittee must prepare and implement a comprehensive monitoring program for monitoring the quality of stormwater runoff leaving the construction site. Developers are also required to send a notice of termination to GAEPD once the site is stabilized.

In December 1999, the USEPA promulgated the second phase of the stormwater regulations which extends the NPDES permit requirements for stormwater discharges from constructions sites from five acres to one acre. With the re-issuance of this general NPDES permit in 2003, the GAEPD will lower the acreage threshold to sites and common developments greater than one acre.

Again, implementation of this program is currently on hold due to legal action. When implemented, this permit program will provide GAEPD with a tool which enhances the State's ability to enforce water quality regulations.

Regardless of resolution of the challenges to this general permit, the GAEPD will still be able to enforce BMP violations at construction activities using the recently adopted turbidity standard and its BMP requirements. This standard states that all waters shall be free from turbidity which results in a substantial visual contrast in a water body due to human activities. It provides that comparisons shall be made

between a point immediately upstream of a turbidity-causing human activity and a point located sufficiently downstream from the activity so as to provide an appropriate mixing zone. The standard also states that, for land-disturbing activities, proper design, installation and maintenance of BMPs and compliance with issued permits shall constitute compliance with this turbidity standard.

Enforcement of this standard and its BMP requirements falls under the Georgia Water Quality Control Act. Unlike the Erosion and Sedimentation Act, enforcement does not rely on delegated local government agencies. In addition, maximum penalties under the Water Quality Control Act are \$50,000 per day versus \$2500 per day under the Erosion and Sedimentation Act. Consequently, the instream turbidity standard further enhances the State's ability to regulate erosion and sedimentation from land-disturbing activities.

### **Road Construction**

Methods for control of nonpoint source impacts from construction of public roads are established by the Georgia Department of Transportation (GDOT). Contractors are required to follow standards detailed in *Standard Specifications: Construction of Roads and Bridges*.

GDOT specifications require specific erosion and sedimentation control measures during the life of construction contracts with GDOT. These measures are to be shown on project plans. Temporary erosion control is also required outside of the right-of-way or easements where such work is necessary as a result of roadway construction (e.g., borrow pit operations, haul roads, etc.). Temporary erosion control provisions are to be coordinated with permanent erosion control measures to assure economical, effective, and continuous erosion control throughout the construction and post construction period.

The specifications provide guidance on design, construction, and maintenance of the following erosion control measures: baled straw erosion check, bituminous treated mulch, concrete paved ditches, bituminous treated roving (to be applied after planting), erosion control mats or blankets (to be applied after planting), erosion control check dams, grassing, permanent soil reinforcing mats (to be applied prior to grassing), reclamation of material pits and waste areas, rip rap, restoration of alteration of lakes and ponds, sand-asphalt ditch paving, sediment basins, silt control gates, silt retention barriers, sod, ditch checks, temporary mulch, temporary grassing, temporary silt fences, and temporary slope drains. Like all other aspects of contracted work, permanent and temporary erosion and sedimentation control measures are subject to inspection by the State highway engineer or an authorized representative.

GDOT specifications establish the following standards for control of erosion and sedimentation during construction of roads and bridges: erosion control features shall be installed and maintained by the contractor to contain erosion within the right-of-way and control discharge of stormwater from disturbed areas so that the turbidity of a stream shall not exceed 50 nephelometric turbidity units (NTU) higher than the turbidity level immediately upstream of construction. For drainage structure construction, the increase in turbidity may be as high as 60 NTU over the upstream reading but may not exceed that level. Turbidity testing is to be done by GDOT.

In FFY 1998, GDOT began requiring its contractors to have a certified erosion control inspector at work sites five acres and larger. The GDOT provides training to certify GDOT inspectors, contractors, local government staff, and utility employees as erosion control inspectors. Training will be ongoing, with recertification required every two years.

Nonpoint source runoff from private road construction is regulated under the Erosion and Sedimentation Act. Local issuing authorities or the GAEPD issue permits for land-disturbing activities following approval of erosion and sedimentation control plans.

### ***Erosion and Sedimentation Control Technical Study Committee***

The Erosion and Sedimentation Control Technical Study Committee (informally known as Dirt II) was convened in 1996 pursuant to the 1993 recommendations of the Georgia Senate Storm-Water Study Committee. Intended to follow-up on the work of the Georgia Board of Regents' Scientific Panel on Evaluating the Erosion Measurement Standard (informally known as Dirt I), the committee is charged with assessing ways to meet soil-erosion-related water quality standards in the most cost-effective manner.

This committee is composed of a diverse group of stakeholders representing local and State government officials, contractors and developers, various design professionals, industry, the University System of Georgia, environmental organizations, and interested individuals. The work of the Technical Committee is administered by the Chattahoochee-Flint RDC and is funded by the GAEPD through the Chattahoochee Basin Grant Assistance Program.

The overall goal is to identify and promote control systems that most effectively prevent erosion and control sediment before it can leave a site and damage off-site water quality and downstream users. Effectiveness will be evaluated on technical performance and cost to all parties. The committee will address the full range of site evaluation and planning, project management practices, and erosion prevention and sedimentation control techniques relevant to residential and commercial construction and linear projects such as roads and utilities. Activities will include



computer modeling to assess control systems across representative types of development projects and a range of site characteristics common in the Atlanta metro area. Overall costs and benefits, including direct costs and benefits to project developers and direct and indirect costs to downstream individuals and communities, will also be determined.

### ***Outreach and Technical Assistance***

In addition to the Dirt II initiative, several other outreach and technical assistance activities contribute to the control of nonpoint source runoff from construction activities.

Routine outreach activities are conducted jointly by the GSWCC, GAEPD, and the University System of Georgia. Programs include workshops on *Fundamentals of Erosion and Sedimentation Control* and on *Advanced Structural and Vegetative Controls*, *Landfill Operator Certification* courses, *Erosion and Sedimentation Control* training sessions with the Soil and Water Conservation Districts, annual training for staff at GAEPD Regional Offices, and presentations to a variety of construction trade organizations. In addition to these programs, the GSWCC distributes, and revises as necessary, a model local erosion and sedimentation control ordinance and the *Manual for Erosion and Sedimentation Control in Georgia* which provides guidance on best management practices for control of erosion and sedimentation from construction activities.

Outreach and technical assistance efforts by the Upper Chattahoochee Riverkeeper include distribution of erosion and sedimentation control kits. The kits were specifically for developers with funding from the Georgia Forestry Commission and Vulcan Materials. They include a pocket-sized field guide with information on proper installation of various BMPs, professional publications, a list of certified soil erosion professionals, and other information. The goal is to educate developers on soil erosion laws, effective practices, and the role of effective erosion control in reducing a developer's risks.

The Upper Chattahoochee Riverkeeper also recently completed a wet weather monitoring demonstration project in the Big Creek watershed. This project used volunteer monitors to assess wet weather sediment loading, with results being used to encourage local action to control sediment loading. Similar assessments may be done in other watersheds in the Upper Chattahoochee basin, if sufficient funding and local interest is available.

Finally, the School of Environmental Design at the University of Georgia has demonstration projects addressing swale and paving alternatives under development. One project will demonstrate the effectiveness of swale biofiltration basins in a wet-weather drainage flowing to the North Oconee River. This demonstration will use check dams of various construction materials and native vegetation plantings to filter stormwater flow in an existing stormwater drainage system. Water quality will be tested at various points in the system to determine the effects of the different design alternatives incorporated in the system. Installation is planned for year one of the project, with water quality impacts evaluated during year two. The project will also involve education and outreach for students and local government personnel.

A second project, if funded, will demonstrate the effectiveness of alternative paving materials. Plots of various paving materials, such as porous concrete and porous asphalt, will be sited on either the University of Georgia campus or the Griffin Research Station. In the second through fifth years of the project, infiltration rates and water quality impacts will be evaluated.

## **URBAN RUNOFF**

### **Overview**

The 1990 report of the Community Stream Management Task Force, *We All Live Downstream*, established a road map for urban runoff nonpoint source management in Georgia. The task force was convened in 1988 to assist the Georgia Department of Natural Resources with impacts on urban streams. The task force's report emphasized the importance of cooperative partnerships and building working relationships between the units of government responsible for land and water quality management. Educational, management, and support strategies were recommended to help move toward an integrated structure which would allow continued evolution of intergovernmental and private sector structures and promote development of urban stream management activities over time.

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

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

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

expanding its role in facilitation and support of local watershed management efforts. Development of this aspect of urban runoff nonpoint source management will continue through the activities planned for the next five years.

An array of programs to manage urban runoff are under development or being implemented in a variety of locales. Catalysts which contribute to more comprehensive management of urban waterbodies include public interest groups, local governments, regional development centers, State agencies, and State laws and regulations (e.g., Metropolitan Rivers Protection Act, Georgia Planning Act Part 5 Standards). The development and implementation of Total Maximum Daily Loads for waterbodies not meeting water quality standards will spur local and regional watershed management initiatives. *Fecal Coliform* Total Maximum Daily Loads were established in FFY99 for 101 waterbodies delineated on the Section 303(d) list. In addition, *Fish Consumption Guidelines* Total Maximum Daily Loads were established for 15 lake segments. Currently, Total Maximum Daily Loads must be developed for an additional 736 water quality criteria violations delineated on the Section 303(d) list.

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

Water quality in urban water bodies is the result of both point source discharges and the impact of diverse activities in the watershed. A variety of activities and processes contribute to nonpoint source loading in urban streams, including sedimentation associated with land disturbing activities; stormwater runoff from construction sites and residential, commercial, and industrial areas; combined sewer overflows; illicit discharges; spills; improper storage or disposal of deleterious substances; septic systems; and intermittent failure of sewage systems. Nonpoint source contamination can lead to particularly severe impairment in streams draining extensive commercial and industrial areas, where stormwater runoff, unauthorized discharges, and accidental spills may contribute to pollutant loading. Hydrologic and habitat modification, including alternations in flow regime due to development, stream channelization, and clearing of riparian vegetation can further diminish the integrity of urban streams.

The GAEPD conducted a major study in 1981-1983 to determine the magnitude of nonpoint source impacts from urban, agricultural, and commercial silvicultural activities. The study evaluated chemical and biological parameters in 21 streams selected from different areas of the State. Results indicate that the greatest potential for nonpoint source impacts are seen in urban streams. Poor land management practices in industrial and commercial areas of urban settings were of equal importance to stormwater runoff.

Studies reviewed by the Community Stream Management Task Force indicated that streams throughout the State are threatened by the effects of urban development. The most severe nonpoint source impacts are found in streams draining urban areas; impacts in these streams are often much greater than those seen in streams influenced by agriculture or silviculture. Urban runoff is identified as a potential cause of water quality impairment for nearly half of the waterbodies listed in *Water Quality in Georgia 1996-1997* as not supporting or partially supporting designated uses.

Groundwater is also susceptible to contamination from nonpoint sources. Nonpoint source pollution can come from a number of sources, such as business, industry, agriculture, and homes (i.e., septic systems). Solvents and hydrocarbons can be expected in the vicinity of developed areas. Hazardous materials represent another potential source of contamination. Groundwater pollution from hazardous materials may occur at industrial sites (both active and abandoned) and at isolated sites as a result of dumping or unintentional leaks (both past and present). The State's groundwater is most susceptible to pollution in the significant recharge areas of its aquifers.

The Georgia Environmental Protection Division has a primary role in management of urban runoff. GAEPD has been delegated authority to administer a variety of permit programs, including permitting of stormwater discharges. GAEPD uses its permit and regulatory powers to ensure groundwater protection, especially in significant groundwater recharge areas and wellhead protection areas. Five Regional Offices are responsible for monitoring, inspection, and enforcement under certain permit programs. In addition to these regulatory activities, GAEPD seeks to assist in development of local solutions to water quality problems; provide technical information on the water resources of the State; administer grant programs, with funds from various sources to support nonpoint source planning and assessment; and implement BMPs and regional or local watershed management initiatives.

The GAEPD also conducts a variety of outreach and educational activities addressing urban runoff in general, regulatory requirements, and cooperative or non-regulatory approaches. Programs within GAEPD which have responsibilities related to urban runoff include the Water Resources Management Program, housed in the Water Resources Management Branch; the Nonpoint Source Program, housed in the Water Protection Branch; and the Geologic Survey Branch (also known as the Georgia Geologic Survey).

The Georgia Department of Community Affairs (DCA) is the State's principal agency responsible for implementing the coordinated planning process established by the Georgia Planning Act. Responsibilities include promulgation of minimum standards for preparation and implementation of plans by local governments, review

of local and regional plans, certification of qualified local governments, development of a State plan, and provision of technical assistance to local governments. Activities under the Georgia Planning Act are coordinated with GAEPD, regional development centers, and local governments.

The Georgia Environmental Facilities Authority is primarily a lending organization that assists Georgia's cities and counties with loan and financing for projects including water and sewer system construction, water system improvements, solid waste facilities, stormwater controls, and environmental emergency projects. GEFA provides access to a range of financial and program options for Georgia's local governments.

Regional Development Centers (RDC) are councils of local governments with memberships consisting of all the cities and counties within each territorial area. There are currently 16 Regional Development Centers in Georgia. RDCs facilitate coordinated and comprehensive planning at local and regional levels, assist their member governments with conformity with minimum standards and procedures, and can have a key role in promoting and supporting management of urban runoff, including watershed management initiatives. RDCs also serve as liaisons with State and Federal agencies for local governments in each region. Funding sources include members' dues and funds available through DCA.

The Atlanta Regional Commission (ARC) is the regional development center serving the 10-county Atlanta region. The region includes the City of Atlanta and 63 other cities. ARC's enabling legislation directs the agency to research, study, and prepare plans for the control of water pollution. The commission serves as a forum where leaders come together to discuss and act on issues of region-wide consequence. ARC has been granted specific authority for management of development in the Chattahoochee River corridor under the Metropolitan Rivers Protection Act.

As entities with constitutional responsibility for land management, local governments have a significant role in management of urban runoff. The role of local governments include enacting and enforcing zoning, stormwater, and development ordinances; undertaking water supply planning; and participating in programs to protect wellheads and significant groundwater recharge areas. In addition to the RDCs, local governments are supported in this role by two other organizations, the Association County Commissioners of Georgia and the Georgia Municipal Association.

The Association County Commissioners of Georgia (ACCG) is a private, nonprofit, consensus-building, training, and legislative advocacy organization for all 159 county government in Georgia. ACCG works to assure Georgia counties can provide the necessary leadership, services, and programs to meet the health, safety, and welfare needs of their citizens. Its yearly policy process gives counties a

framework in which to reach consensus on policies ACCG will advocate. Natural resources and the environment is one of the key policy areas. The ACCG provides county governments with a framework for ongoing idea exchange with other counties, governments, business and academia, and for obtaining expert advice.

The Georgia Municipal Association is voluntary, nonprofit corporation representing 477 cities in Georgia. The Georgia Municipal Association (GMA) helps municipalities become as efficient, effective, responsive, and economically viable as possible so that their citizens may enjoy a high quality of life. GMA carries out this mission by providing a wide range of services and programs including advocacy, training, low-cost financing, franchise auditing, delinquent business license collection, consulting, technical assistance, and downtown revitalization development.

The U.S. Army Corps of Engineers (COE) plans, designs, builds, and operates water resources and other civil works projects, in cooperation with other Federal and State agencies and local sponsors, and executes an environmental restoration program for the Department of Defense and the USEPA.

The U.S. Environmental Protection Agency (USEPA) implements regulatory programs and provides technical assistance and outreach to protect human health and to safe guard the natural environment. Regulatory programs include Federal guidance for implementation of state stormwater, wellhead protection, and safe drinking water programs. Technical assistance activities include support for urban runoff demonstration projects and participation in regional and local watershed management initiatives.

The Natural Resources Conservation Service (NRCS) cooperates with Federal, State, and local units of government to provide technical assistance to landowners, producers, and special interest groups. Technical assistance includes development of standards and specifications for conservation practices, animal waste management systems, grazing activities, and plant materials. Other practices are installed through an established network of county offices which oversee demonstration projects and implement agricultural conservation programs. Goals and strategies for NRCS currently focus on water resources, soil resources, wildlife resources, animal and plant resource production, and community assistance/urban resources, among others.

The Resource Conservation and Development Councils (RC&D) are groups of local citizens that encourage economic development as well as the wise conservation of natural and human resources. RC&D are locally organized within geographic regions served by USDA. The 1962 Food and Agriculture Act established the RC&D Council Program, with USDA employees assigned as coordinators to assist each RC&D. There are currently 10 RC&D Councils in

Georgia.

The University of Georgia, Georgia Station Research and Education Garden (GSREG) is a rapidly developing facility dedicated to informing and educating the “green industry” and general public on the latest research conducted in sustainable urban agriculture. GSREG has research and demonstration plots to provide hands-on programs, both formal and informal, to teach strategies such as integrated pest management, biological pest control, irrigation methods, water conservation and best management practices. The primary focus of GSREG is to connect scientists and their research with the general public and to reduce the time it takes for pure research to reach industry and the homeowner.

The Georgia Environmental Organization (GEO) is a non-profit citizens organization established to preserve and protect the environment through research, planning and education. GEO works through coalition building, technical assistance, and community organizing to popularize and develop the goal of sustainability locally, regionally, and nationally.

The Georgia Conservancy was established in 1967 as a non-profit organization dedicated to the responsible stewardship of Georgia’s vital natural resources. The Georgia Conservancy pursues education, open dialogue and cooperation, long-range planning, and sustained commitment and advocacy to accomplish the goal of environmental protection with sustained economic vitality in Georgia. The Georgia Conservancy’s primary focus areas address water, natural areas, and air.

The Georgia Center for Law in the Public Interest is a non-profit, public interest corporation which focuses on environmental law. Over the past four years, this organization has provided more than \$750,000 in funding to supplement environmental projects around Georgia, including numerous waterway-specific protection and conservation programs. The Georgia Center for Law in the Public Interest has also had a lead role in lawsuits pursuing implementation of provisions of the Clean Water Act with current activities focused on oversight of compliance with TMDL requirements, development of watershed policies, and assessment of water quality impacts in the Chattooga River watershed.

The Georgia Environmental Policy Institute (GEPI) is a private, non-profit organization which provides legal and technical assistance to local governments, community organizations, and State agencies. GEPI focuses on the development of proactive environmental protection strategies, including progressive land use laws and policies and facilitation of community involvement. Staff and associates provide assistance with the development and implementation of local environmental protection ordinances and policies, with particular emphasis on protection of water quality, wetlands, open space, and other sensitive resources.

The Broad River Watershed Association (BRWA) was established in 1991 as



a non-profit regional land trust dedicated to the protection and management of the Broad River and its watershed in northeast Georgia. BRWA works to preserve the Broad River as a free-flowing river system and to support land use compatible with the maintenance of water quality, scenic rural character, and the preservation of sensitive natural areas and wildlife habitat.

The Nature Conservancy (TNC) fills a unique niche among environmental organizations: protecting land and waterbodies through acquisition via gifts, exchanges, conservation easements, management agreements, purchases from The Nature Conservancy's revolving Land Preservation Fund, debt-for-nature swaps, and management partnerships. The Nature Conservancy operates the largest private system of nature sanctuaries in the world, managed with sophisticated ecological techniques to preserve plants, animals, and natural communities. Conservation initiatives of the Georgia and Tennessee field offices are supported by individual and corporate contributions, foundation grants and membership dues and are undertaken in partnership with local, State and Federal organizations and agencies.

### ***Outreach and Technical Assistance***

Outreach and technical assistance programs can help address one of the major challenges identified by the Community Stream Management Task Force in *We All Live Downstream*: nonpoint sources of pollution are diffuse and varied; therefore, prevention, control, and abatement of nonpoint source impacts will require action by a wide range of audiences. Effective nonpoint source management must address the numerous activities of individuals, businesses, industries, and governments which can adversely affect urban and rural waters. In many cases, these groups are unaware of the potential impacts of their activities or the corrective actions which may be taken. Consequently, community and citizen educational strategies were emphasized in the task force's recommendations.

An objective of the GAEPD is to establish and maintain long term comprehensive programs to protect and enhance the quality of urban streams from nonpoint source pollution. The effective management of nonpoint source pollution from urban runoff requires a cooperative, intergovernmental approach implemented through integrated watershed planning and management. Therefore, the State's *Nonpoint Source Management Program* will be implemented in conjunction with the River Basin Management Planning process. Watershed planning and management initiatives are necessary to identify local problems, implement corrective actions and coordinate the efforts of cooperating agencies. In addition, outreach and technical assistance programs are necessary to encourage the implementation of watershed restoration action strategies, to promote pollution prevention and to transfer technologies to local and regional governments.

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

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

The success of the Georgia Project WET Program has been phenomenal. Since 1997, several Project WET facilitator training workshops have been successfully completed in Athens, Atlanta, Dahlonega, Macon, Savannah and Warner Robbins with over 140 Project WET facilitators trained statewide. In addition, over 115 Project WET educator workshops have completed in Georgia with more than 2,500 formal and non-formal educators implementing the Project WET curriculum statewide with a substantial number of students.

The Georgia Project WET Program provides facilitators and educators the use of additional resources such as the enviroscape module and groundwater module, demonstration tools used to emphasize the impact of nonpoint source pollution to surface and ground waters. A newsletter is published and distributed quarterly to over 2,500 educators with program updates, workshop schedules, information about available resources and reports about classroom activities.

The Georgia Project WET Program has been nationally recognized as a model program for its training strengths and techniques - specifically, the use of the arts in environmental education. The Georgia Project WET Program in conjunction with the International Rivers Network offers educators in Georgia the opportunity to participate in the *River of Words*, an international poetry and art contest for student (K-12). This contest provides students with the opportunity to explore their own watersheds and to learn their "ecological" addresses through poetry and art. National winners are selected by the former U.S. Poet Laureate, Robert Hass, and the International Children's Art Museum. Annually, only eight students are selected as national grand prize winners to be honored at the Library of Congress in Washington, DC. Since

1997, five students from Georgia have been recognized as national grand prize winners and an additional 30 students from Georgia have been national finalists and merit winners.

The Georgia Project WET Program provides educators with the *River of Words - Teacher's Guide* along with resource information specific to Georgia. Annually, selected poetry and art are published and on display throughout Georgia for the year following the contest.

The Georgia Adopt-A-Stream Program is a citizen monitoring and stream protection program with two staff positions in the GAEPD and four Regional Training Centers. Established in 1996, the Regional Training Centers are a network of college-based training centers located in Columbus, Milledgeville, Savannah and Valdosta, Georgia. This network of training centers allows the Georgia Adopt-A-Stream Program to be accessible to all areas of the State. The Regional Training Centers ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control.

Stakeholder involvement and stewardship are essential to implementing Georgia's River Basin Management Planning approach to water resource management. The Georgia Adopt-A-Stream Program objectives support the RBMP strategies for stakeholder involvement and stewardship: (1) increase individual's awareness of how they contribute to nonpoint source pollution problems, (2) generate local support for nonpoint source management through public involvement and monitoring of water bodies, and (3) provide educational resources and technical assistance for addressing nonpoint source pollution problems statewide.

Currently, more than 7,000 volunteers participate in 200 individual and 26 community sponsored Adopt-A-Stream Programs. Volunteers conduct clean-ups, stabilize streambanks, monitor streams using biological and chemical methods, and evaluate habitats and watersheds. These activities lead to a greater awareness of water quality and nonpoint source pollution, active cooperation between the public and local governments in protecting water resources, and the collection of basic water quality data. The Georgia Adopt-A-Stream Program focuses on what individuals and communities can do to protect Georgia's water resources from nonpoint sources of pollution.

Volunteers are offered different levels of involvement. Each level involves an education and action component on a local water body. The introductory level consists of setting up a project (i.e., identifying a stream segment, lake or wetland, identifying partners, registering with the Georgia Adopt-A-Stream Program), evaluating land use and stream conditions during a "watershed walk," conducting quarterly visual evaluations and clean-ups, and public outreach activities. Volunteers create a "Who to Call for Questions or Problems" list so that if something unusual

is noted, immediate professional attention can be obtained. Advanced levels of involvement include either biological monitoring, chemical monitoring or habitat improvement projects.

The Georgia Adopt-A-Stream Program conducts numerous presentations and workshops throughout the State. Approximately 1,000 volunteers participate in a variety of workshops each year. An *Introduction to Georgia Adopt-A-Stream Program* and *Watershed Walk* videos have been produced, duplicated and distributed on loan. The Georgia Adopt-A-Stream manuals have been printed and distributed to approximately 2,500 volunteers. In addition, a bi-monthly newsletter is published and distributed to over 2,500 volunteers with program updates, workshop schedules, information about available resources, and reports about local watershed projects.

In addition, the Georgia Adopt-A-Stream Program organizes the annual Georgia River Clean-Up Week - *Rivers Alive!* with over 7,000 volunteers cleaning up rivers, creeks, canals, lakes and ponds in over 100 locations statewide.

The Georgia Water Management Campaign (GWMC) has been established to enhance local governments' ability to manage and to protect water resources by translating water management policies into local government decision making capabilities, guidance and technical assistance. The Georgia Water Management Campaign is the result of three-part contract between the GAEPD, GEFA, and the Association County Commissioners of Georgia (ACCG). The campaign is endorsed by the Georgia Municipal Association, Georgia Rural Water Association and the Georgia Water and Pollution Control Association.

The GWMC promotes stakeholder involvement in the development and implementation of local watershed management initiatives. To accomplish its mission, the GWMC sponsors an annual Georgia Water Resources Leadership Summit to provide a "bottom up" and "top down" understanding of issues affecting the management and protection of water resources in Georgia. In addition, several outreach tools, such as public service announcements and videos, are being developed for local governments.

Outreach and technical assistance, including citizen monitoring, lay the groundwork for behavioral changes and are often a pre-requisite for effective implementation of comprehensive watershed management programs. State-level educational programs are supplemented by a number of other nonpoint source education initiatives, initiated by local governments, educational agencies, and private, nonprofit organizations.

Other initiatives have been implemented to further statewide coordination of urban runoff management and implementation of urban runoff best management practices. The Atlanta Regional Commission and the GAEPD will finalize in FFY01

a guidance manual for developers and local governments that illustrates proper design of best management practices for controlling stormwater and nonpoint source pollution in urban areas in Georgia. The manual will accelerate the response of the State and local governments in addressing water quality in urban streams which are heavily impacted by the velocity of runoff and the silt, bacteria, nutrients and heavy metals it contains. A primary objective of the manual is to integrate the requirements for water quality; as well as water quantity control which are appropriate in Georgia.

The GAEPD and the University of Georgia School of Environmental Design developed “model” land development code recommendations for incorporation into existing and/or new local government ordinances. These recommendations were designed to address urban runoff in local watersheds. An objective of this project was to bridge the jurisdictional void between the management of stream water quality and the management of land development activities in Georgia.

The document, *Land Development Provisions to Protect Georgia Water Quality*, describes recommended land development provisions that may be modified in or added local land development regulations to better protect water quality. The provisions outlined in the document were refined in a series of dialogues with a task force consisting of representatives from State, regional and local governments, developers, planners and environmental interest groups. This document is intended to serve as a partial “menu” from which each municipality can select appropriate provisions to adapt to local conditions.

The GAEPD and the Atlanta Regional Commission developed an guidance manual that can be used to assess urban water quality conditions and to determine the possible sources that are causing water quality degradation. The recommended assessment methods encompass chemical, physical and biological water quality indicators and dry-weather and wet-weather streamflow conditions. The *Urban Stream Assessment and Evaluation Guidelines* with the companion technical report delineate procedures for assessing the relative water quality of urban streams and establishing a water quality index.

### ***Water Supply Protection***

The Georgia Planning Act of 1989 requires each local government in the State to develop comprehensive plans to guide activities over a defined planning period. As mandated by Part V of the Georgia Planning Act and the Mountains and River Corridor Protection Act, the comprehensive plans must include the identification and protection of natural and historic resources. This rule established minimum requirements for water supply watersheds, groundwater recharge areas, wetlands, river corridors and mountains. These minimum requirements are known as *Part V Minimum Planning Standards*.

The Georgia Planning Act authorizes GAEPD to develop minimum standards and procedures for the protection of water supply watersheds and groundwater recharge areas. Minimum standards for water supply watersheds have been defined to allow development in a watershed without contaminating the water source to a point where it cannot be treated to meet drinking water standards. In water supply watersheds with areas greater than 100 square miles, corridors of all tributary streams within seven miles of the water supply reservoir must have restricted stream buffer zones, percent impervious areas, set backs and septic tank location limitations. In water supply watersheds with areas less than 100 square miles, criteria exist for stream buffer zones, percent impervious areas and set backs for all tributary streams within seven miles of the water supply and between the seven mile radius and the remaining watershed area.

For groundwater recharge areas, minimum standards have been defined for those areas considered to be significant recharge areas. GAEPD has delimited the State's significant groundwater recharge areas (*Hydrologic Atlas 18, 1989*) and susceptibility to groundwater pollution (*Hydrologic Atlas 20, 1992*). These maps at the scale of 1:100,000 have been distributed to the State's Regional Development Centers. Recharge areas and areas with higher than average pollution susceptibility are given special consideration in GAEPD's permit programs.

Local governments are directed to adopt water supply watershed protection plans and provisions for recharge area protection, consistent with minimum standards, as part of their comprehensive planning process. Plans are subject to review by Regional Development Centers and by the Department of Community Affairs.

In order for a comprehensive plan to meet the requirements of the *Part V Minimum Planning Standards*, the comprehensive plan must identify all environmental sensitive areas and the applicable criteria. Failure to adopt and implement an acceptable comprehensive plan could lead to the loss of certified governmental status and eligibility for State grant and loan programs. In addition, the GAEPD requires that the permittee develop appropriate water supply protection plans for new or modified water withdrawal permits.

To date, implementation of the minimum standards for protection of water supply watersheds and groundwater recharge areas has been highly variable across the State. In a 1994 assessment of implementation of the minimum standards, DCA found that fewer than 20% of local governments with jurisdiction over these areas were planning to implement all of the recommended protection measures, while less than 50% of local governments reported that they were implementing some of the recommended protection measures. These results demonstrate a need to improve implementation of protective criteria for water supply resources.

Under the Georgia Planning Act, the Regional Development Centers are required

to provide technical assistance to local governments in development and implementation of local comprehensive plans. Targeted assistance from the Regional Development Centers will help improve implementation of protection criteria for water supply resources over the next five years. The Chattahoochee-Flint RDC, for example, recently completed model ordinances and will target resources toward local adoption to provide protection for critical natural resources.

The Georgia Planning Act requires DCA to review five-year work plans submitted by local governments to outline steps for implementation of local comprehensive plans. Over the next five years, the review will include evaluation of implementation of protection measures for water supply watersheds, groundwater recharge areas, and other critical natural resources. If a locality fails to take sufficient steps to implement its comprehensive plan, including provisions for protection of critical natural resources areas, it can lose qualified local government status and become ineligible for State grant and loan programs.

A task force has been convened to assess the minimum natural resources planning standards and recommend steps to improve their implementation. Task force members include representatives from the GAEPD, DCA, ARC, and the Chattahoochee- Flint RDC. Despite limited resources, this task force is a mechanism which can lead to improved implementation of best management practices protecting water supply sources over the next five years.

Other State programs for water supply protection activities are preventive activities targeting public drinking water wells. GAEPD is currently assessing groundwater under the direct influence of surface water. If a public water source is determined to be under the direct influence of surface water, the water system has three choices: abandon the source; make improvements to the source, if feasible, to remove the surface contamination; or install treatment, including filtration, that will meet the requirements of federal surface water treatment regulations. Municipalities are given 18 months to comply.

A significant portion of this assessment of surface-groundwater interactions has been completed. Sources located in vulnerable areas (i.e., karst region of northwest Georgia and karst areas of south Georgia) serving the most people were evaluated first. About 75% of these high priority water sources have been evaluated with approximately 33% having shown evidence of surface influence. Of this 33%, all are either being removed from service, adding treatment, or taking corrective action to remove the influence. Springs and wells in these sensitive areas that to date have not shown surface influence will be monitored routinely for changes. For the remaining groundwater sources throughout the State, reviews of existing information on file with GAEPD are being conducted to identify systems which should have on-site evaluations. GAEPD projects that about one-tenth of these remaining groundwater sources should have site evaluations performed because they have shown either high or moderate risk of surface water contamination of groundwater

supplies.

GAEPD also plans to conduct aquifer vulnerability assessments by evaluating the probability of certain contaminants seeping into recharge areas and the resulting potential for nonpoint source pollution of public drinking water wells. Assessments will be based on the delineation of significant recharge areas and pollution susceptibility. If a public water supply system is found to have no potential for contamination, a report of those findings will be sent to USEPA. The GAEPD will then provide the municipality with a waiver of the relevant monitoring requirements. Municipal groundwater supplies will be re-evaluated for the chemical presence every five years when sanitary surveys are conducted on public drinking water wells. If contamination is found, monitoring will be resumed according to the chemical presence and source.

Georgia's wellhead protection program is designed to protect groundwater capture zones for municipal drinking water supplies drawing on surficial or unconfined aquifers. This program was approved by the USEPA in 1992 and wellhead protection rules were promulgated in 1993. The Georgia Geologic Survey is currently developing protection plans for the approximately 1200 municipal water supply wells in the State. Wellhead assessments will identify existing and potential nonpoint sources of pollution such as septic tanks, underground storage tanks, and urban runoff. Wellhead protection plans will include recommended best management practices to protect groundwater capture zones from contamination by nonpoint sources. After plans are complete, GAEPD will work with local governments to promote adoption of local wellhead protection ordinances. The wellhead assessment and protection standards will be incorporated into municipal groundwater withdrawal permits issued by GAEPD, with monitoring for permit compliance conducted by GAEPD on a five-year cycle.

Finally, as directed by the Safe Drinking Water Act Amendments of 1996, GAEPD is implementing a source water protection program. GAEPD is currently developing an implementation plan for review by the USEPA. Following approval of the State's source water assessment plan, GAEPD will undertake assessments for all public drinking water systems in the State (municipal and non-municipal). Assessments will cover the nearly 200 surface water intakes and over 3000 drinking water wells currently operating in Georgia. Source water assessments will identify areas that supply drinking water for each public water system, inventory contaminants, and assess water system susceptibility to contamination.

To assist with drinking water protection efforts, GAEPD's Geologic Survey Branch will increase its source assessment capacity with funding through the State Revolving Fund. Additional support staff have been hired to assess causes of impacts in wells where the source of contamination is ill-defined. Potential sources include leaking underground storage tanks, hazardous waste, spills, and other nonpoint sources.



Following completion of individual source water assessments, GAEPD will encourage local adoption of source water protection measures. Federal guidance specifies that the State Revolving Fund can be used to support source water assessment and protection activities. Existing wellhead protection, watershed and nonpoint source programs will provide the foundation for the State's program and subsequent local actions to provide source water protection.

### ***Regional Watershed Management Initiatives***

Regional watershed management initiatives can identify existing and potential sources of urban runoff, and assess local and best regional management practices. These efforts contribute significantly to preventing nonpoint source pollution, particularly important for urban runoff, given the expense and difficulty of abatement once development has occurred.

Region watershed management initiatives are being implemented in the Atlanta metropolitan region and the Coosa River and Savannah River Basins. Efforts in the Atlanta metropolitan region have been initiated by the Atlanta Regional Commission. The Atlanta Regional Commission expects to develop a water quality management plan for the region in order to coordinate regional water quality issues and needs with local governments, State and Federal agencies, and the general public. The final plan will include a GIS-based inventory of water resources and facilities, identification of water quality problems and pollutant sources, evaluation of watershed management scenarios and recommendations regarding regional solutions. The plan will serve as a tool providing technical and general information to the general public, elected officials and government staff, and will prioritize activities, resources and funding for preventing, controlling and/or abating nonpoint source pollution.

Regional watershed management initiatives have also been implemented in the Coosa River and Savannah River Basins. In the Coosa river Basin, regional watershed management activities were initiated at a workshop addressing regional water quality issues and solutions. Actions recommended by participants include development of best management practices, incentives for BMP implementation, land use planning and ordinances for watershed protection, control of stormwater runoff, creation and maintenance of vegetative buffers, and expanded volunteer monitoring.

In the Savannah River Basin, the Central Savannah River Area RDC is implementing a project using a geographic information system to assess urban runoff from residential development. Results will be used to inform local governments in the region about impacts from urban runoff in their jurisdictions and to promote actions to prevent, abate or control urban runoff from residential development.

## ***Municipal Stormwater Management***

Municipal stormwater is primarily managed through the NPDES Stormwater Permit Program administered by the Water Protection Branch of GAEPD, following guidance from USEPA. Permits for municipal storm sewers are issued on a system-wide basis with non-stormwater discharges to storm sewers prohibited and controls required to reduce the discharge of pollutants to the maximum extent practicable. Regulations for municipal stormwater permits require development of stormwater management programs and submission of annual reports.

Municipal stormwater management programs may include such measures as structural and non-structural controls, best management practices, inspections, enforcement and public education efforts. Stormwater management ordinances, erosion and sediment control ordinances, development regulations and other local regulations provide the necessary legal authority to implement the stormwater management programs. Illicit discharge detection and long-term wet weather sampling plans are also included in the stormwater management programs. Following Federal guidance, State regulations emphasize source control and annual progress in implementation of stormwater management programs.

Phase I permit requirements currently apply to discharge of stormwater from large and medium municipal separate storm sewer systems (defined by population greater than 250,000 and population between 100,000 and 250,000, respectively). The following areas are affected by current requirements: Clayton, Cobb, DeKalb, Fulton, and Gwinnett counties; Augusta, Macon, Savannah, Columbus; the counties surrounding these cities; and any other incorporated cities within these counties. Forty-five large municipal permits were issued in June 1994 and 13 medium municipal permits were issued in April and May of 1995. The permits have a five-year duration and were reissued in 1999 and 2000.

Local activities to comply with Phase I permit requirements are well underway in the affected jurisdictions. And, in some cases, local governments are taking steps to go beyond permit requirements. Gwinnett County, for example, has mapped streams listed in *Water Quality in Georgia 1996-1997* as partially or not supporting designated uses and is designing monitoring to create a database that will assist the County in efforts to abate water quality impairments in these streams. The City of Alpharetta has designed its volunteer water quality monitoring program to target stormwater outfalls in order to identify sources of specific contaminants for corrective action. Similarly, in Cobb County, stormwater monitoring is incorporated in the County's stream monitoring program, with monitoring by outfall part of the overall effort. Overall, Cobb County's stream and stormwater monitoring program is designed to follow State guidelines for stormwater monitoring, to help isolate sources of contaminants detected at specific outfalls, to evaluate effectiveness of stormwater BMPs, and to allow assessment of water quality trends in Cobb County

streams.

The Atlanta Regional Commission (ARC) facilitates the Atlanta Region Stormwater Management Task Force as a forum for cooperative management of stormwater in the Atlanta metro area and coordinates stormwater monitoring required for annual reports to GAEPD. The task force includes water managers from throughout the ten-county region and will help assist communities affected by Phase II regulations. Two model local ordinances and other guidance developed by ARC are available as a resource for affected communities in the Atlanta metropolitan area and in other regions. With funding from USEPA, GAEPD and the local governments, ARC is currently developing the *Georgia Stormwater Management and Urban Nonpoint Source Design Manual* and a regional stormwater/nonpoint source public education program.

Federal regulations to extend permits requirements to municipal separate storm sewers in smaller communities were published by the USEPA in December 1999. These Phase II regulations parallel the Phase I regulations in many aspects, but will provide a more flexible approach to stormwater management for the small municipalities. The Phase II municipal stormwater management programs will focus on six minimum control measures: public education and outreach, public participation and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control, and pollution prevention and good housekeeping at municipal operations.

Several localities which are likely to be affected by the Phase II regulations are already taking steps to enhance stormwater management. Athens-Clarke County is using SPLOST funds to identify priorities for additional stormwater controls and to fund projects to improve management of stormwater quantity and quality. The City of Gainesville recently upgraded its stormwater ordinance to increase detention requirements focusing on the Snapping Shoals Creek watershed. This project is designed as a pilot with the goal of extending the results to the rest of the Hall County. Monitoring is being done to assess stream conditions and separate point and nonpoint source impacts. Recommended actions to control or abate nonpoint source impacts will then be developed. It is expected that these recommendations will subsequently be incorporated in County development ordinance(s).

The City of Griffin implemented the State's first stormwater utility in 1998. This utility provides the capacity for the City of Griffin to address water quantity and quality issues and to comply with Phase II regulations. To enhance stormwater management, the City will complete GIS mapping of the drainage system, determine the required level of service for individual drainage watersheds, establish design-build plans for all watersheds, and undertake capital improvement projects. The City has obtained funding for nonpoint source and stormwater management projects through the Section 319(h) Grant and State Revolving Fund Loan Programs and other sources.

The Phase I and Phase II permit requirements, described above, target municipal separate storm sewers. Management of municipal stormwater and wastewater in some Georgia cities must also address combined sewer overflows (CSOs), which are regulated by separate NPDES discharge permits. As required by State law, CSOs have been identified and permitted in six cities in Georgia. In Columbus, Rome, and Cedartown, control structures have been completed and untreated CSOs have eliminated. Control structures are currently being implemented in the remaining three cities: Atlanta, Augusta, and Albany. Recent legal action, however, has brought the efficacy of control structures in the City of Atlanta into question. For CSOs in Atlanta, consequently, negotiations are currently underway to determine additional steps the City will take to resolve impacts from combined sewer overflows. Options being considered include actions to control the generation of pollutants at the source and retrofitting existing control structures to provide more effective treatment.

With full implementation of CSO controls in Georgia, the remaining challenge in addressing this nonpoint source will be developing efficient and effective ways to monitor permit compliance and water quality effects on the receiving waters. To address this challenge, the Cities of Atlanta and Columbus have initiated watershed studies to establish a holistic watershed approach to CSO and stormwater monitoring. The Atlanta Urban Watersheds Initiative is described in detail in the section of this chapter which outlines regional and local watershed management initiatives. The Columbus study was initiated recently to compare water quality in multiple watersheds with CSOs to that in a reference watershed without any CSOs. Monitoring will be done to compare stream conditions with reference conditions, assess CSO controls, and develop information for source water protection efforts. Study design includes baseline monitoring, spot monitoring, and targeted monitoring. When complete, study results will be used to develop models for TMDL evaluation and for assessment of source water susceptibility and management requirements.

In an effort to extend management of municipal stormwater beyond basic compliance with Federal and State laws and regulations, the GAEPD is requesting a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Watershed assessments will be generated by the permittee and will be subject to GAEPD approval.

Cobb County is currently completing such watershed assessments for Noonday, Noses, and Powder Springs Creeks. The Noonday Creek watershed assessment has led to plans to reduce point source phosphorus releases and to implement stormwater BMPs to reduce nonpoint source impacts. These plans were developed to supplement the County's application to expand an existing NPDES point source permit.

### ***Industrial Stormwater Management***

The Water Protection Branch of GAEPD currently has a permitting program, implemented under the NPDES Stormwater Permit Program, to manage discharge of stormwater from industrial facilities. Following Federal guidance, stormwater regulations emphasize source control and implementation of site-specific BMPs rather than end-of-pipe monitoring. State regulations require reductions in stormwater loading by use of BMPs. A five-year general permit for stormwater discharge from industrial facilities was issued in 1993 and reissued in 1998. To date, approximately 2500 facilities have submitted Notices of Intent (NOIs) to gain coverage under this general permit.

Two initiatives are planned to extend this program beyond basic compliance with Federal regulations. First, GAEPD will implement a strategy to ensure that all industrial facilities covered by regulations for stormwater discharge have complied with permit application requirements. Second, information on stormwater discharges will be evaluated to determine which categories of regulated industries pose the greatest environmental threat. The goals of this initiative are to help focus enforcement activity under the industrial stormwater program and to assess the need for general permits targeting specific industries.

### ***Technical Assistance***

The Association County Commissioners of Georgia (ACCG) and the Georgia Municipal Association (GMA) both address nonpoint source management through their technical assistance programs as well as their policy processes. Working jointly and individually with their members, the two associations currently provide technical assistance on watershed management through conferences and training sessions. Examples of technical assistance activities include the following: preparation of watershed management guidebooks in conjunction with the Conference of Southern County Associations; provision of a sound booth for production of public service announcements at annual conferences, supported by the Department of Community Affairs; distribution of newsletters such as *Counties and the Law*, and, as funding becomes available, preparation of technical assistance kits which include videotapes, slides, brochure, scripts, technical information, and resource lists on specific issues related to urban runoff. Partnerships with other organizations, including funding arrangements, will enable ACCG and GMA to extend their outreach and technical assistance to address additional aspects of urban runoff, use other avenues of communication and reach a larger proportion of their membership.

The Georgia Water Management Campaign is a new initiative which further

extends ACCG and GMA efforts to build local capacity for watershed management. The campaign is being developed as a partnership between ACCG, GAEPD, and GEFA with GMA participation.

The campaign is designed to enhance local governments' ability to manage and protect water resources by increasing their technical, financial, and managerial capacity to provide safe and dependable drinking water, and expanding their capability to develop and implement policies and programs designed to effectively protect water resources. The campaign will focus on aspects of watershed management particularly critical for local governments, including source water protection, drinking water capacity development, watershed protection, development control ordinances, and zoning benefits. Steps will be taken to enhance leadership communication and develop technical assistance and training programs on these topics. The campaign will initially be conducted for three years, with on-going activities assessed at that time.

The Georgia Environmental Policy Institute (GEPI) provides on-going assistance with development of proactive environmental protection strategies, including progressive land use laws and policies. Staff and associates work with local governments in developing and implementing ordinances and policies designed to protect water quality, wetlands, and other sensitive resources. Initiatives currently underway at GEPI include synthesis of scientific literature on the role of riparian buffers in nonpoint source pollution control and development of a guidebook for local governments drafting ordinances based on the minimum standards for river corridors and watershed protection. The guidebook will include explanation of the minimum standards and options available to local governments who want more protective measures. In addition, The Georgia Conservancy is compiling a toolbox for local governments presenting model development and zoning codes. The toolbox is expected to be ready for distribution in 2000.

The Georgia Station Research and Education Garden (GSREG) educates lawn and landscape management professionals, homeowners and the general public on the benefits and methods of implementing pollution prevention strategies in residential and commercial landscapes. These strategies reduce the volume of runoff as well as its fertilizer and pesticide loads. GSREG is affiliated with The University of Georgia College of Agricultural and Environmental Sciences – Griffin Campus which conducts the foremost research in the Southeast on sustainable urban agriculture strategies. These strategies include integrated pest management (IPM), biological pest control, proper fertilization, organic fertility options, irrigation methods, water conservation, and best management practices. The demonstration gardens provide hands-on opportunities both formal and informal programs for varied public audiences to learn various aspects of pollution prevention in urban landscapes. Industry people as well as school children, teachers, the physically disabled, the emotionally handicapped, inner city youth, garden clubs, families and visiting scientists may learn about integrated plant health management, xeriscaping,

use of native plants, water gardening, and so on.

Annually over 35,500 citizens participated in programs administered by the Georgia Station Research and Education Garden. An integrated pest management manual has been produced for industry people and is currently being adapted for homeowner use. Fact sheets, videos, teacher training materials, curricula for school children, education material for families will be developed in the future to promote pollution prevention in urban agriculture.

## **RESOURCE EXTRACTION**

### **Overview**

Surface mining is a \$1.7 billion industry in Georgia; it contributes substantially to the overall economy of the State. In 1990, Georgia ranked third in the nation in industrial mineral production and seventh in value of non-fuel mineral commodities produced. Mining in Georgia is concentrated primarily in stone, clays, and other construction and industrial materials. High grade kaolin and fuller's earth (clays) accounted for nearly 70 percent of the mineral income in 1990. These were followed by the production of granite, marble, sand, gravel, and other mineral products.

Surface mining is defined as any activity or process that removes minerals, ores, or other solid materials, including dredging of sand. Surface mining in Georgia encompasses a variety of activities ranging from sand dredging to open pit clay mining to a hard rock aggregate quarry. Surface mining in Georgia occurs mostly in rural areas; very little of the State's land area is affected.

Removal of vegetation, displacement of soils and other land disturbing activities are commonly associated with surface mining. These operations could result in adverse affects such as accelerated erosion, sterile soils, and sedimentation to surface waters.

Surface mining involves two categories of potential threat to surface waters. One type is related to the actual removal of mined materials. It concerns releases of pump-out water from the mining pit and discharges from mineral processing. Both of these releases are processed through either sedimentation basins or detention ponds prior to discharge into streams. This type of threat, therefore, is considered a point source and is regulated by the issuance of an NPDES permit.

The second type of threat of potential pollution related to surface mining involves mine reclamation activities. Reclamation is actually considered one of the various types of mining activities because it occurs in phases as the mining operation proceeds. From the first cut to the last, the overburden is moved twice. At each movement of this soil and rock debris, the overburden must be managed to prevent soil and mineral erosion. Until the mine is re-vegetated, and hence reclaimed, best management practices are implemented to prevent nonpoint sources of pollution.

The issuance of a surface mining permit regulates pollution threats from nonpoint sources. The application for this permit includes a Mine Land Use Plan, reclamation strategies, and surety bond requirements to guarantee proper management and reclamation of surface mined areas.

The Georgia Mining Association is an informal trade association of the mining industry in Georgia. It serves more than 200 members, 47 mining companies, and



over 150 associate companies that provide services and products to the industry. The association monitors legislative developments and coordinates industry response. It educates miners about laws and regulations that affect them and provides a forum for exchange of ideas. Through its newsletter and other printed material, and through its seminars, workshops, and annual conventions, the Georgia Mining Association serves as a source for mining industry information. It has several committees, including the Environmental Committee which meets three to four times a year.

The Georgia Environmental Protection Division has a primary role in managing mining activities. GAEPD is responsible for administering and enforcing the surface mining permit program and the industrial waste water discharge permit program. Five (5) Regional Offices are responsible for monitoring and inspecting permit compliance. Programs within GAEPD that have responsibilities related to surface mining include: the Solid Waste Management Program, housed in the Land Protection Branch; the Regional Offices, housed in the Program Coordination Branch; and the Permitting, Compliance and Enforcement Program, housed in the Water Protection Branch.

### ***Surface Mining Program***

Section 402 of the Federal Clean Water Act requires an NPDES permit for surface mining operations. Permits are issued by the Water Protection Branch of GAEPD. One permit is applicable to an entire mining region; additional mines require only a modification to the existing permit. The NPDES permit includes pollution control practices such as on-site sedimentation basins, swales, siltation fences, and detention ponds for pump-out water from the mining pit and for water discharges from mineral processing. In addition, the mining industry is working toward industry-wide standards for best management practices to prevent and reduce nonpoint source pollution.

The Georgia Surface Mining Act provides for the issuance of a mining permit at the discretion of the Director of GAEPD. This permit program is administered by the GAEPD Land Protection Branch. An application for permit must be accompanied by a Mined Land Use Plan that is consistent with land use in the area of the mine. It includes information on the property to be mined, number of acres, length of time of mining operation, extent of reserves, and reclamation of the affected land. The Director is empowered to deny or revoke permits, issue consent orders, initiate court actions, and/or forfeit funds to conduct reclamation.

The Mined Land Use Plan specifies activities prior to, during, and following mining to dispose of refuse and control erosion and sedimentation. Reclamation is one such mining activity; it occurs in phases as the mining operation proceeds from the first cut to the last. Generally, the reclamation strategy includes the use of

operational BMPs and guides procedures such as sedimentation ponds, erosion and sedimentation provisions, and construction controls.

The BMPs are drawn from the *Manual for Erosion and Sedimentation Control in Georgia*, the *Georgia's Best Management Practices for Forestry*, and from other states. The mining industry is conducting informal discussions on the potential of formalizing industry-wide recommendations on mining BMPs. If industry-wide standards are adopted, the mining industry would likely conduct demonstration projects to gauge the effectiveness of those BMPs.

The mine operator is responsible for completion of the Mined Land Use Plan and for filing a surety bond to ensure adequate funding for site reclamation. The surety bond is the main compliance device; to be released from the bond, the operator must demonstrate that reclamation was accomplished as outlined in the Mine Land Use Plan. Inspectors, however, from the GAEPD Regional Offices review mining procedures throughout the mining operation to ensure adherence to the Mined Land Use Plan including the application of specified BMPs.

The Georgia Surface Mining Act does not apply to activities of the Department of Transportation (DOT) related to its efforts to construct, repair, and maintain the Georgia public road system nor to any firm under contract with the DOT.

## **LAND DISPOSAL**

### **Overview**

Georgia's management of nonpoint source pollution impacts from land disposal (i.e., runoff/leachate from permitted areas) is primarily regulatory, with ancillary training and demonstration projects. Areas of concern related to potential nonpoint sources of pollution include leaching from permitted solid waste handling facilities, runoff from permitted land application systems, and leaching from on-site sewage management systems.

The State's programs regulating these nonpoint sources of pollution are administered by the GAEPD and the Georgia Department of Human Resources (GADHR). GAEPD regulates solid waste handling facilities and land application of sludge and wastewater through issuance of permits and compliance monitoring. The GAEPD Solid Waste Management Program regulates the proper siting, construction, operation, and monitoring of landfills so that pollution of groundwater will not become a threat to drinking water supplies. Permitted solid waste facilities are further required to have an approved groundwater monitoring plan and monitoring wells installed. The GAEPD also regulates and monitors sites where treated wastewaters are discharged via land application methods. GADHR has primary authority for oversight of on-site sewage management systems.

Georgia possesses an abundant and high quality groundwater supply. While currently high quality, this resource is susceptible to pollution from nonpoint sources in recharge areas. Potential nonpoint source pollutants include leachate from solid waste landfills or from on-site sewage management systems. Few cases of groundwater pollution, however, have been documented, and no significant portion of the population is at risk from groundwater pollution. Georgia operates its regulatory programs to follow an anti-degradation policy to ensure that regulated activities will not develop into significant threats to the State's groundwater resources.

Surface waters of the State are more heavily impacted by nonpoint sources of pollution. Land application practices permitted by GAEPD, however, do not represent even a moderate impact on waters which do not fully support designated uses (as listed in *Water Quality in Georgia 1996-1997*). Further, land application activities hold many potential benefits for processing wastewater including agricultural opportunities to capture nutrients and to re-use water. Neither solid waste management, on-site sewage management systems, nor land application represent a significant threat to the quality of Georgia's water at the present time.

The Georgia Environmental Protection Division has a primary role in administering solid waste management and land application activities. The Land Protection Branch is responsible for permitting industrial sludge land application

procedures and solid waste handling facilities including review and approval of facilities construction, operation and groundwater monitoring plans. Its duties also include directing training and certification of landfill operators. The Water Protection Branch is responsible for review and permitting activities related to land application of wastewater.

The Geologic Survey Branch (also known as the Georgia Geologic Survey) provides regulatory support, with responsibilities including review of landfill site assessments and groundwater monitoring plans and conduct of municipal and industrial septic system hydrogeological studies. The five Regional Offices, housed in the Program Coordination Branch, are responsible for monitoring and inspecting permit compliance under both solid waste management and land application programs.

The Georgia Department of Human Resources, through its Division of Public Health, seeks to promote and protect the health of people in Georgia and to enhance their quality of life. The GADHR Division of Public Health responsibilities include, among others, developing sound health policies and plans; monitoring and assessing community health status and needs; creating partnerships with communities and organizations; providing personal and population-based services and education; and enforcing laws and regulations that protect health and safety. The latter area of activity includes enforcement of laws and regulations addressing on-site sewage management programs.

The Georgia Environmental Facilities Authority is primarily a lending organization that assists Georgia's cities and counties with loans and financing for programs such as: water and sewer system construction, water system improvements, solid waste facilities, wastewater projects, environmental emergency projects and energy-related programs through the Division of Energy Resources. With GEFA, cities and counties have access to a range of financial and program options.

The University of Georgia College of Agricultural and Environmental Sciences (UGACAES) faculty, county cooperative extension agents, and technical specialists provide services in several key areas including: classroom instruction; basic and applied research; consultative assistance and information on nonpoint source impacts on water quality; application of Geographic Information Systems (GIS) and hydrologic modeling to the assessment of current and future water quality and quantity issues; and consultative assistance to agricultural clients with issues such as development of waste management systems and nutrient management plans. Extension agents located in county offices are knowledgeable about a wide variety of water quality topics and have informational material on a wide range of subjects. County agents provide laboratory analyses of water, forage, and animal wastes to determine levels of various nutrients, agrichemicals, and metals. County offices

also handle registration of water permits used for irrigation of agriculture crops.

The Pollution Prevention Assistance Division (P<sup>2</sup>AD) with the Georgia Department of Natural Resources develops programs and activities to facilitate reduction of pollution at the source and to instill a pollution prevention ethic that is consistent with the protection of human health and the environment. This is accomplished through the partial support for a pollution prevention coordinator housed with the UGACAES and funding for technical assistance and an applied research program for pollution prevention in agriculture with the CES. By working with the extension service, P<sup>2</sup>AD can take advantage of the existing network of county agents and environmental specialists, the widespread acceptance of the extension service with the agricultural community, and the outstanding research facilities of the UGACAES.

### ***Solid Waste Management Program***

The Solid Waste Management Program is a regulatory and technical assistance effort to prevent, control, and abate potential nonpoint source pollution to surface and groundwater. The GAEPD Land Protection Branch implements the program to ensure that solid waste facilities remain in compliance with regulatory requirements to prevent potential releases to the environment and to obtain corrective action where releases have occurred. Solid waste handling facilities are defined as landfills, incinerators, materials recovery facilities, transfer stations, compost facilities, and land application facilities.

GAEPD provides the overall coordination of statewide solid waste management activities including permitting of landfills and other handling facilities, closure and post-closure care of existing landfills, and providing financial assistance. With regulatory support from the GAEPD Geologic Survey Branch, it administers requirements for proper siting, construction, operation, and monitoring of such landfills so that leachate will not threaten groundwater sources of drinking water. The GAEPD Land Protection Branch also addresses potential nonpoint source pollution of surface water in its administration of the Solid Waste Management Program. During construction and operation of solid waste handling facilities, surface runoff is diverted to surface water leachate construction ponds or sedimentation ponds and is not permitted to come into contact with waste.

All permitted solid waste landfills are required to have an approved groundwater monitoring plan. Monitoring wells must be installed in accordance with the GAEPD standards for groundwater monitoring. GAEPD Regional Offices conduct inspections to ensure that all operating solid waste handling facilities and landfills in closure or post-closure care status remain in compliance. Post-closure requirements include groundwater monitoring for periods up to 30 years.

The Land Protection Branch also addresses surface water monitoring. Areas containing surface waters that are sources of drinking water supplies receive priority action for monitoring and corrective action, if necessary. The Land Protection Branch uses in-stream water quality standards to guide corrective action plans where surface runoff contamination occurs.

Solid waste landfill operators must attend training leading to certification as a statutory requirement. Training segments cover recycling, waste reduction, nonpoint source pollution control, permit review, surface water leachate construction ponds, and runoff sedimentation ponds during construction and operation of the facility. The GAEPD Land Protection Branch works with South Technical College and the Solid Waste Association of North America to provide two training courses per year for landfill operator certification. It further participates in the Solid Waste Association of North America meetings for exchange of technical information and education.

### ***Land Application Systems***

Land disposal systems are any method of applying discharges to the surface or beneath the surface of land which is likely to result in pollutants percolating, infiltrating, or being absorbed into the soil and then into the waters of the State. Land disposal systems include ponds, basins, or lagoons, but exclude landfills and septic systems. Land treatment is any land disposal system in which vegetation on the site, either agriculture or silviculture, is used to remove some of the pollutants applied. Sludge is the solid or semi-solid residue generated at a wastewater treatment or pretreatment facility. It is applied to land for the purpose of disposal, soil conditioning, or agricultural enhancement.

GAEPD has developed and implemented a permit system for these types of land application systems. Land application systems for final disposal of treated wastewaters have been encouraged in Georgia and are designed to eliminate surface discharges of effluent to water bodies. Land application of wastewaters is used as an alternative to advanced levels of treatment or as the only alternative in some environmentally sensitive areas. When properly operated, land application systems should not impact surface or ground waters.

The GAEPD is responsible for administration of the regulatory components of land disposal systems through the issuance of permits and compliance monitoring. Land disposal system permits for wastewater are reviewed and issued by the Water Protection Branch. Land disposal system permits for sludge wastes are reviewed and issued by the Land Protection Branch. The permits may be issued for land application disposal of domestic, municipal, commercial, or industrial wastes or wastewaters. However, sludge wastes generated by the treatment of industrial

process wastewater are excluded.

In general, monitoring of permit compliance is implemented through the GAEPD Regional Offices under the Program Coordination Branch. Groundwater leaving the land disposal system boundaries is monitored via monitoring wells to ensure that maximum contaminant levels for drinking water are not exceeded. A permittee who fails to comply with permit regulations may be subject to enforcement action. The Regional Offices may also monitor solid waste handling facilities where partially treated wastewaters are further treated by land application methods.

Numerous pilot projects are underway or planned that serve as laboratories in which to conduct research, training, and demonstrations of land application technology and practices. GEFA and P<sup>2</sup>AD have recently joined forces to provide grant assistance for land application pilot projects of industrial sludge and agricultural compost. In addition, funding is provided for land application training workshops for compost facility operators, wastewater operators, sewage sludge personnel, and farmers.

P<sup>2</sup>AD recently began managing the State's Industrial Solid Waste Program efforts. Work will continue, in partnership with the Georgia Water and Pollution Control Association, to train sewage sludge personnel. In addition, the potential agricultural opportunities and benefits for land application of sewage sludge and animal waste byproducts will be investigated.

The UGA has recently opened a Bioconversion Research & Demonstration Center. It will investigate different composting conversion technologies and techniques. Connected with this effort is the establishment of land utilization sites at the various UGA research stations to conduct land application demonstrations and measure runoff and leachate.

### ***On-Site Sewage Management Systems***

The Georgia Department of Human Resources (GADHR) has primary authority to regulate individual on-site sewage management systems, including septic systems. On-site sewage management systems are regulated under State law which provides that, for a building permit to be issued, any on-site sewage management system must conform to statewide rules and regulations established by GADHR. Each county board of health is required to assure compliance with these statewide rules and regulations.

At a minimum, local regulations specify the locations where septic tanks may be installed and locations where installation is prohibited; the minimum lot size or land area to be served by the septic tank or individual sewage management systems; the types of residences, buildings, or facilities which may be served by a

septic tank or individual sewage management system; permit requirements for installation of on-site sewage management systems; and provide for inspection of these systems prior to use. Minimum lot sizes are based, in part, on soil characteristics and susceptibility of groundwater to pollution. Local regulations also generally provide for repair or replacement permits for failing systems. In addition to these requirements, all persons installing on-site waste management systems in Georgia must be certified by GADHR.

GADHR and GAEPD have developed a formal Memorandum of Understanding, whereby GADHR will not permit any non-domestic septic system that accepts chemical wastes that could pollute groundwater. At GADHR's request, the GAEPD Geologic Survey Branch will assess potential groundwater impacts from new non-domestic septic systems. If the assessment indicates that a maximum contaminant level is likely to be exceeded, the GADHR will not permit the non-domestic septic systems as proposed.

GAEPD will also enforce remediation of any non-domestic septic system polluting groundwater with chemicals. The GAEPD Geologic Survey Branch recently inventoried non-domestic septic systems currently in use. Very few of the systems were used for non-sanitary waste and the owners of those systems have been required to stop disposing of non-sanitary waste, carry out localized groundwater assessments, and to clean up any detected contamination.



## **HYDROLOGIC/HABITAT MODIFICATION**

### **Overview**

Hydrologic and habitat modification can be a source of impairment to rivers and streams, lakes, reservoirs and ponds, and wetlands. Hydrological modification includes channelization or channel modification and flow alteration. Channel modification is river and stream channel engineering undertaken for the purpose of flood control, navigation, drainage improvement and reduction of channel migration potential. Straightening, widening, deepening or relocating existing stream channels; excavation of borrow pits, canals, underwater mining, and other practices that change the depth, width or location of waterways or embayments in coastal areas; and clearing or snagging operations are examples of channel modification. Channel modification typically results in more uniform channel cross sections, steeper stream gradients and reduced average pool depths.

Flow alteration describes a category of hydrological modification activities that result in either an increase or decrease in the usual supply of fresh water to a stream, river or estuary. Flow alterations include diversions, withdrawals and impoundments. In rivers and streams, flow alteration can also result from transportation embankments, tide gates, sluice gates, weirs and the installation of undersized culverts.

Channel modification can deprive wetlands and estuarine shorelines of enriching sediments; change the ability of natural systems to both absorb hydraulic energy and filter pollutants from surface waters; increase transport of suspended sediments to coastal and near-coastal waters during high-flow events; increase instream water temperatures; and accelerate the discharge of pollutants. Hydrological modification often diminishes the suitability of in stream and riparian habitat for fish and wildlife through reduced flushing, lowered dissolved oxygen levels, saltwater intrusion, interruption of life cycles of aquatic organisms, and loss of streamside vegetation.

Removal of streamside vegetation is reported to be the leading source of habitat impairment to rivers and streams. Losses of riparian vegetation are attributed to conversion to farmland, drainage for agriculture, forest harvesting, channelization, damming, creation of impoundments, irrigation diversions, groundwater pumping, and overgrazing.

The biological communities in streams depend on inputs of energy from outside sources. The primary source of energy and nutrients is small, low-order streams is organic debris (e.g., leaf litter) deposited from riparian vegetation. When riparian vegetation is removed, this source of energy and nutrients is eliminated or reduced. Stretches of streams and rivers are left with sunlight as the only source of energy and largely devoid of nutrient inputs. Other essential inputs to rivers and streams, such as woody debris - which provides microhabitats for fish and invertebrates, are

also lost when streamside vegetation is removed.

Riparian habitats, regardless of regional location, have many characteristics important to surrounding communities. They have a high rate of energy, nutrient, and species exchange; they are highly productive; they provide a unique microclimate with respect to upslope conditions; and they support diverse faunal assemblages that are often unique within the local environment. Loss of riparian vegetation therefore has negative effects on surrounding biotic communities.

Riparian vegetation also has an enormous capacity to store water. When it is removed, the natural hydroperiods of streams and rivers are altered and the loss of the buffering effects of water released by riparian vegetation during low flow periods and water stored by riparian vegetation during periods of flooding can cause severe stress to aquatic plants and animal communities. Riparian vegetation protects streambanks from erosion due flowing water, and this protection is also lost when the vegetation is removed.

Riparian vegetation also removes sediments as water passes through it, rebuilds floodplains, provides shelter for aquatic animals and wildlife under overhanging banks, provides food to aquatic and terrestrial wildlife, buffer water temperatures, and improves water quality for downstream users. Degraded water quality, increased severity of flooding, loss of wildlife, increased stream temperatures, and increased expense to purify water for public use are therefore some of the consequences of the removal of riparian vegetation.

An array of programs to manage nonpoint source impacts from hydrological and habitat modification are under development or being implemented in a variety of locations in Georgia. The Georgia Environmental Protection Division provides technical information about the State's water resources, administers grant programs to support nonpoint source management planning and assessment, and implements local and regional watershed management initiatives. In addition, the GAEPD conducts a variety of outreach and educational activities addressing hydrological and habitat modification, regulatory requirements, and cooperative and nonregulatory approaches.

The Georgia Department of Community Affairs (DCA) is the State's principal agency responsible for implemented the Georgia Planning Act of 1989 and coordinating activities with the GAEPD, Regional Development Centers and local governments.

The Regional Development Centers (RDC) are councils of local governments with memberships consisting of all the cities and counties within each territorial area. There are currently 16 Regional Development Centers in Georgia. The Atlanta Regional Commission (ARC) is the Regional Development Center serving the 10-county metropolitan Atlanta region. ARC has been granted specific authority for

development in the Chattahoochee River Corridor under the Metropolitan River Protection Act (MRPA).

As entities with constitutional responsibility for land management, local governments have a significant role in the management of urban runoff and hydrological and habitat modification with support from the Regional Development Centers, Association County Commissioners of Georgia (ACCG) and the Georgia Municipal Association (GMA). The ACCG is private, nonprofit, training and legislative advocacy organization for all 159 counties in Georgia. The GMA provides local governments with a wide range of services and programs including legislative advocacy, training, financing and technical assistance.

A variety of private, nonprofit organizations have significant roles in the management of urban runoff and hydrological and habitat modification in Georgia. The Georgia Environmental Policy Institute is a private, nonprofit organization which provides legal and technical assistance to local governments, community organizations and State agencies. The Georgia Environmental Policy Institute focuses on the development of proactive environmental protection strategies, including progressive landuse laws and policies, with particular emphasis on water quality issues.

The Nature Conservancy and The Georgia Conservancy fill a unique niche among environmental organizations - protecting land and waterbodies through acquisition via gifts, exchanges, conservation easements, management agreements and partnerships, and purchases.

### ***Wetlands Conservation***

Conservation of wetlands in Georgia is primarily implemented through a Federal program managed by the United States Army Corps of Engineers (COE). Under Section 404 of the Federal Clean Water Act and Section 10 of the Federal Rivers and Harbor Acts, the COE administers a permit program applicable to a range of activities in, on or around waters of the United States, including wetlands. Activities regulated under Section 404 include excavating, dredging or depositing fill materials to waters of the United States.

A few activities may be exempt from permit requirements - exemptions include construction or maintenance of farm ponds and irrigation ditches, maintenance of drainage ditches, construction of temporary sedimentation basins, and construction or maintenance of farm, forest or temporary roads done in accordance with best management practices. Ongoing agricultural and silvicultural activities may also be exempt from Section 404 regulations.

Although less significant than the Federal program, protection of wetlands in Georgia may also be accomplished through comprehensive planning and

ordinances with local governments. The Georgia Planning Act of 1989 establishes provisions for comprehensive planning by local governments and authorizes the Georgia Department of Natural Resources to develop minimum planning standards for protection of critical natural resources, including wetlands.

### ***River Corridor Management***

River corridor protection plans are to be incorporated in local comprehensive plans prepared under the Georgia Planning Act of 1989. As mandated by Part V of the Georgia Planning Act and the Mountain and Corridor Act, the comprehensive plans must include the identification and protection of natural and historic resources. This rule establishes minimum requirements for water supply watersheds, groundwater recharge areas, wetlands, river corridors and mountains. These minimum requirements are known as the *Part V Minimum Planning Standards*.

In water supply watersheds with areas greater than 100 square miles, corridors of all tributary streams within seven miles of the water supply reservoir must have restricted stream buffer zones, percent impervious areas, set backs and septic tanks location limitations. In water supply watersheds with areas less than 100 square miles, criteria exist for stream buffer zones, percent impervious areas and set backs for all tributary streams within seven miles of the water supply reservoir and between the seven mile radius and the remaining watershed area.

In order for a comprehensive plan to meet the requirements of the *Part V Minimum Planning Standards*, the comprehensive plan must identify all environmental sensitive areas and the applicable criteria. Failure to adopt and implement an acceptable comprehensive plan could lead to the loss of certified local government status and ineligibility for State grant and loan programs. In addition, the GAEPD requires that the permittee develop appropriate water supply protection plans for new or modified water withdrawal permits.

The River Corridor Protection Act establishes corridors along major rivers as critical natural resource areas and directs the Georgia Department of Natural Resources to establish minimum criteria for their protection. Requirements under the Act are intended to decrease nonpoint source impacts on surface water. Protected rivers are defined as any perennial river or watercourse with an average annual flow of at least 400 cubic feet per second (e.g., Altamaha, Chattahoochee, Coosa, Flint, Ochlockonee, Ocmulgee, Oconee, Ogeechee, Satilla, Savannah, St. Marys and Suwannee Rivers). The minimum standards require that each local government which contains a protected river corridor in its boundaries develop a river corridor protection plan which will maintain the integrity of a 100 foot buffer area on either side of the river.

While most local governments with protected rivers in their jurisdictions have completed plans which meet the State's minimum standards, some have gone

beyond the standards by designating longer river segments and/or wider corridors in their protection plans. In Irwin County, the only watercourse that meets the State's definition on a protected river is a segment of the Alapaha River. In their comprehensive plan, however, Irwin County has designated protected corridors along the full length of the Alapaha River and along other major rivers and creeks in the County (i.e., Satilla River, Willacoochee River and Reedy Creek). In addition, the protected corridors are wider than specified in the minimum standards, ranging from 500 to 1,000 feet from the stream channel. Similar provisions have been incorporated in the comprehensive plans for Cook, Echols, Lanier and Turner Counties.

The Regional Development Centers provide technical assistance to local governments on river corridor protection. As part of this effort, the Chattahoochee-Flint RDC has developed a model ordinance for river corridor protection and will be working with local governments in the region to promote its adoption. In addition, the DCA reviews work plans detailing implementation of local comprehensive plans. Over the next five years, DCA will direct local governments which have not already done so to adopt ordinances implementing their river corridor protection plans.

Special provisions have been established to manage the Chattahoochee River in the metropolitan Atlanta area. The Metropolitan River Protection Act (MRPA) was enacted in 1973 in recognition of the value of the Chattahoochee River as a natural resource and its vulnerability to impacts from nonpoint sources of pollution. The MRPA directed the Atlanta Regional Commission (ARC) to develop and adopt a Chattahoochee Corridor Plan establishing criteria to minimize the adverse impacts of development of land along the river. The MRPA and the Chattahoochee Corridor Plan require that all development, clearing and other land-disturbing activity within the protected corridor be reviewed and approved before the activity is initiated.

The MRPA created a provides for the protection of a corridor within 2000 feet of the Chattahoochee River between Buford Dam and Peachtree Creek. The MRPA was amended in 1998 to extend the protection corridor downstream to the southern end of the Atlanta region. New development must be reviewed by ARC for compliance with the MRPA and approved by the local government. Participating local governments include: Cobb, Gwinnett, Forsyth and Fulton Counties and the Cities of Atlanta, Berkeley Lake, Duluth, Roswell, Sugar Hill and Suwanee.

The Act was amended in 1983 to require the adoption of tributary buffer ordinances by local governments which are outside the corridor but have tributaries to the corridor portion of the Chattahoochee River. Under this amendment, tributary buffer ordinances are required in the following jurisdictions: DeKalb County and the Cities of Alpharetta, Buford, Cumming, Marietta, Norcross, Rest Haven and Smyrna.

All development, clearing or other land-disturbing activities within the corridor

must be reviewed and approved for consistency with the Chattahoochee Corridor Plan before any activity can begin. The Chattahoochee Corridor Plan established three sets of standards: vulnerability standards which specify the amount of land disturbance and impervious surface allowed on individual pieces of land, floodplain standards, and buffer zone standards which establish minimum buffers on the river and certain tributaries.

The Chattahoochee Corridor Plan establishes six vulnerability categories based on the following natural factors and their susceptibility to development impacts: vegetation, soil erodibility, hydrology, slope, aspect and bedrock geology. Vulnerability categories limit development by restricting the percentage of an area that can be disturbed and the percentage that can be converted to impervious surfaces.

The floodplain standards require balancing of cut and fill in the river's 100-year floodplain so that there is not reduction in flood storage. Obstruction of flood flow is also restricted in this area. In the 500-year floodplain building height is limited to 35 feet above the original grade.

Buffer zone standards for the corridor require undisturbed, natural vegetative buffers within 50 feet of the Chattahoochee River and prohibit all impervious surfaces within 150 feet of the river. Natural vegetative buffers are also required within 35 feet of designated tributaries.

With Section 319(h) Grant funds, the ARC and cooperating agencies will document the existing conditions and violations in the Chattahoochee River corridor between Buford Dam and Peachtree Creek in a photographic survey. The documentation will include identification of all visible intrusions into the undisturbed vegetative buffer (50 feet) and the impervious surface set back (150-foot) required under the standards of the Chattahoochee Corridor Plan as authorized by the MRPA.

Enforcement will be carried out through the local governments along the river that are responsible for enforcement actions against violation under the MRPA. The surveys will be delivered to the local governments and ARC will meet with each to discuss the violations (if any) and their proposed enforcement strategies. By December 2000, a survey report will be developed for each of the following local governments: Cobb, Fulton and Gwinnett Counties and the Cities of Atlanta, Roswell and Duluth. The survey documents and materials will also be used to develop educational programs for local governments and citizens on the importance of buffers in the Chattahoochee River corridor and how enforcement of buffer requirements protects water quality and controls surface runoff.

A related initiative is underway to develop an education program focused on West Point Lake. In addition to promotional materials addressing tourism, an environmental educational video about the Chattahoochee River will be produced

and provided to Georgia Public Television and to local libraries and schools.

River corridor management efforts in Rome and Floyd County focus on the Coosa River and its two major tributaries, the Oostanaula and Etowah Rivers. The City of Rome has established a task force to develop a riparian buffer ordinance for major rivers and streams in the City's jurisdiction. In addition, the Rome Downtown and River Development Authority is working to establish a greenbelt along the rivers to provide a trail system linking natural, historic and cultural resources.

Currently, The Nature Conservancy (TNC) is completing a project focused on watershed management measures designed to protect the Altamaha River floodplain. The Altamaha River Bioreserve recently developed a land cover classification for the lower Altamaha River watershed, collected information on land ownership patterns in the river's floodplain, and completed the second phase of an ecological inventory of the lower Altamaha River watershed. The ecological inventory will provide the basis for a management plan and conservation strategy for the lower Altamaha River watershed. In implementing this conservation plan, TNC will work with public and private partners to design watershed and floodplain protection measures.

### ***Riparian Restoration***

The Chattahoochee Headwaters Riparian Restoration and Education Project (RIP-REP) is a community-based project with two priorities: implementation of riparian restoration projects and education regarding riparian zones and their role in stream protection. Sponsored by the Upper Chattahoochee Riverkeeper, the project targets streams in the headwaters portion of the Chattahoochee River Basin, which includes parts of White, Habersham, Lumpkin, and Hall Counties. The primary water quality problems of the headwaters are due to erosion and sedimentation, elevated fecal coliform and elevated temperature levels. In addition, counties in the study area are experiencing significant population growth pressures. The assessment component of this study is expected to refine the Section 303(d) list of streams impacted by nonpoint sources of pollution.

Initially, RIP-REP will characterize the basin to assess sources of nonpoint source pollution and determine subwatershed in need of protection and/or restoration. Following basin characterization, subwatersheds will be prioritized for action. One site has been selected for a major riparian restoration project. The site selected is on the Left Fork of the Soque River, a primary trout stream affected by agricultural uses. A two-phase education program will also be established and RIP-REP staff will work with interested communities to design and implement local stream restoration projects.

Three working groups help guide the RIP-REP project. First, a technical working

group involves representatives from Federal and State agencies, regional organizations, and universities in the basin characterization. Second, a citizen working group comprises people from a variety of backgrounds who reside in the watershed. This group will be involved with the later phases of the restoration project including streambank stabilization work and tree planting. Finally, a local government working group is meeting to discuss potential inter-jurisdictional strategies for maintenance of water quality.

Local riparian restoration projects are underway in the Cities of Atlanta, Marietta and Rome and Chatham County. Efforts in the City of Marietta focus on streambanks in Victory Park. With Section 319(h) Grant funds, the City has implemented bioengineering techniques to restore streambanks in Victory Park. Streambanks in the park have poor structural integrity with bank failures contributing to erosion and sedimentation. Bioengineering best management practices will be installed to eliminate water quality impairments from sediment build-up, bank erosion, and construction debris. Since Victory Park is located within school zones, students will be invited to participate in presentations and field day demonstrations during the project. Upon completion, demonstration tours will be offered to the general public and interested organizations.

The City of Atlanta has implemented the Proctor Creek Streambank Restoration and Watershed Management Projects to address sediment loads in Proctor Creek caused by erosion, undercutting and incision of the stream channel and to reduce nonpoint source pollution from urban runoff through public awareness programs. Bioengineering consultants have completed design plans and implementation specifications for the streambank restoration project. The City of Atlanta should complete the streambank restoration at the Proctor Creek demonstration site (400 feet) in 2000. In addition, the City of Atlanta has initiated a student education curriculum with multi-disciplinary lessons plans about water cycle, watershed mapping, nonpoint source pollution prevention, stream assessment and monitoring.

The Savannah-Chatham Metropolitan Planning Commission is considering a pilot project to assess the water quality impacts of revegetating the banks of drainage canals. Historically, canal banks have been stripped of vegetation to increase their capacity to carry floodwater. As discussed with Chatham County and the NRCS, this project would be designed to introduce low-growing native vegetation at four sites. The goal would be to stabilize canal banks and reduce water quality impacts from bank stripping and herbicide application. Monitoring may include weather sediment monitoring to gather baseline data with additional monitoring following revegetation. If undertaken, this pilot project could develop into an on-going effort funded with SPLOST proceeds designated for drainage improvements.

In 1996, the City of Rome completed an assessment of the riparian corridor along Silver Creek. The intent was to identify physical improvements and programs necessary to restore trout habitat in a 1.7 mile segment of the stream adjacent to the



Etowah River. Assessment results indicated that riparian vegetative cover would be required to establish a stream temperature regime suitable for trout. The City of Rome is currently working with Trout Unlimited to revegetate the stream banks and to install rock weirs and other habitat enhancements.

### ***Local and Regional Watershed Management Initiatives***

The Big Haynes Creek Watershed Protection Plan, the Atlanta Urban Watersheds Initiative, and the Big Creek Watershed Study are currently addressing watershed issues in the metropolitan Atlanta region. The Upper Chattahoochee Basin Group, the Conasauga River Alliance, and the Broad River Watershed Association focus on watersheds in north Georgia outside the metropolitan Atlanta region.

The Big Haynes Creek Watershed Protection Plan addresses the watershed protection requirements of the Georgia Planning Act. Regulations developed under the requirements of that Act establish minimum protection criteria for water supply watersheds, with alternate criteria allowed as long as they provide equivalent protection. Local governments in the Big Haynes Creek watershed, assisted by the Atlanta Regional Commission, worked together to develop alternative criteria. The ARC is now assisting these governments in implementing their watershed protection plan. The plan allows the watershed to develop as projected in local comprehensive plans for the year 2020 so long as all nonresidential areas, as well as residential developments with lots smaller than one acre, are treated by structural stormwater controls. Implementation will be overseen by a Watershed Council, with input from a Technical Advisory Committee, and will include development of a regional detention plan program. When fully implemented, the plan will help prevent increases in nonpoint source runoff, will help protect water quality in a rapidly growing basin, and can serve as a model for multi-jurisdictional watershed protection.

The Atlanta Urban Watersheds Initiative will assess the condition of watersheds and streams and develop watershed management plans to guide improvements. The Atlanta Urban Watersheds Initiative is being coordinated by a steering committee with input from technical committees on environmental education and water quality. The steering committee members include representatives from the Atlanta Chamber of Commerce, Atlanta Planning Advisory Board, ARC, DeKalb Civic Coalition, DeKalb County, City of Atlanta, USEPA, GAEPD, Fulton County, Greater Atlanta Developers Council, Jackson Lake Homeowners Association, Safely Treating Our Pollution (STOP), Sierra Club, COE, Upper Chattahoochee Riverkeeper, and the West Point Lake Association.

The Atlanta Urban Watersheds Initiative involves two separate watershed studies. The first addresses areas that drain to the Atlantic Ocean through the Ocmulgee River Basin and the second addresses areas that drain into the Gulf of Mexico through the Chattahoochee-Flint River Basin. Watersheds include Peachtree, Nancy, Proctor, Utoy, Sandy, and Intrenchment Creeks and the South River. These waterbodies either do not support, or partially support, their designated use. Preliminary results indicate that nonpoint source pollution has a significant impact on these urban streams. Preliminary results also indicate that dry weather water quality problems cause much of the observed biological impairment.

The overall goal of the Atlanta Urban Watersheds Initiative is to determine the current conditions and uses of urban streams, assess the relative impacts of the different pollution sources, and evaluate options for improving water quality. Watershed studies will result in water quality management plans which lay out a framework for addressing nonpoint and point sources of pollution in the watersheds.

To date, evaluations of habitat, biological community, and pollutant loadings have been completed as have assessment of the impacts of urban runoff. These assessments will be combined with criteria developed by the steering committee to develop plans for prevention, control, and/or abatement of nonpoint source pollution. The plans will be designed to focus and coordinate activities in the watersheds, to plan for effective monitoring of streams, and to direct long-term capital improvements.

Subsequent phases of the program will include detailed planning and design of water quality enhancements. Remediation strategies may include a range of projects such as construction of retention/wetland areas or other stormwater management structures, acquisition of riparian easements for streambank stabilization and restoration efforts, or environmental educational initiatives.

The Big Creek Watershed Protection Study addresses the deterioration of stream condition due to the effects of urbanization. Big Creek is a major tributary to the Chattahoochee River which flows through one of the more dynamic growth corridors in the State. The 98 square mile watershed lies in five local jurisdictions and encompasses portions of the Atlanta region and the Georgia Mountains region. Monitoring by the City of Alpharetta has indicated that sediment is the most significant nonpoint source problem in the watershed.

The Big Creek Watershed Study is intended to provide a vehicle for local governments in the watershed to work cooperatively with the Regional Development Centers. The goals are to assess the impacts of urbanization on Big Creek and develop a plan to protect the resource by integrating the various elements of watershed protection: local government policies, development guidelines, wetlands protection, greenways development, and structural facility siting and design.

In 1994, representatives from local governments and interest groups formed the Upper Chattahoochee Basin Group (UCBG) to advise local and State authorities on the management of Lake Lanier and its watershed. Members include Gwinnett, Hall and Forsyth Counties, the City of Gainesville and the Lake Lanier Association. The UCBG is developing models and alternative land use scenarios to assist local, State and Federal jurisdictions and agencies in the management of Lake Lanier and its watershed.

The UCBG have completed a watershed model which estimates nutrient and heavy metal loading ratios for each of the lake's tributaries. A lake model uses the loading ratios for each of the lake's tributaries to calculate the impact of different management scenarios on water quality. Eight management scenarios, model results and implications were presented to the UCBG members and State officials in December, 1997. Results indicate that, even under conservative growth estimates, the biggest contributor to water quality problems in Lake Lanier is expected to be urban runoff. The models will be used to help educate the public about nonpoint source pollution impacts on Lake Lanier and to help identify specific watershed restoration action strategies to be implemented over the next five years.

The Conasauga River Alliance working with a steering committee of stakeholders and with technical assistance from the Limestone Valley RC&D Council inventoried the resources of the upper Conasauga River watershed (i.e., above US Highway 76 in Murray and Whitfield Counties), described threats to these resources, and generated local solutions for improved watershed management and resource protection. The alliance is a coalition of local citizens, conservation groups, businesses, and government agencies working together to "maintain a clean and beautiful Conasauga River forever." In addition, the Conasauga River Alliance has formalized a working relationship with the Georgia and Tennessee field offices of The Nature Conservancy

Water quality and quantity and sedimentation were the primary concerns evaluated through this study. Proposed solutions to the impacts of nonpoint source pollution include steps to promote adoption of agricultural, silvicultural and construction best management practices; land use planning; and development of alternate waste disposal systems. These proposals were presented to local governments as recommendations for implementation efforts.

Currently, the Conasauga River Alliance provides educational materials, technical and financial assistance for nonpoint source management projects, and is working to implement a variety of BMP demonstration projects. Participating groups and agencies include the Chattahoochee and Cherokee National Forests, Dalton College, Dalton Utilities, Dalton/Whitfield Clean and Beautiful, GADNR, GFC, Limestone Valley RC&D Council, Murray County Extension Office, NRCS, North Georgia RDC, Southeastern Tennessee RC&D Council, TN Department of Agriculture, TN Wildlife Resources Agency, The Nature Conservancy, COE, USEPA,

USES, USES, and the Whitfield County Extension Office.

Presently, the Broad River watershed is largely rural in character. In the near future, however, rural counties in this watershed will be facing development pressures associated with population migration from South Carolina and from Atlanta and Athens. With Federal funding, the Broad River Watershed Association (BRA) and cooperating agencies, DCA, UGA, the Georgia Environmental Policy Institute (GEPI), are working with local jurisdictions to address impacts of future growth on water resources.

The project is using GIS analysis to highlight potential conflicts between development and water-based resources. Areas with high development potential and areas of environmental sensitivity, including those which could impact or mitigate nonpoint source pollution, will be delineated and mapped. The database and analysis results will be shared with local officials to help them identify areas for priority consideration as they update and refine their land use plans. These activities will be supplemented by a locally-directed outreach effort to promote practices for nonpoint source pollution control, watershed management, and protection of environmentally sensitive areas.

In addition, the Georgia Environmental Policy Institute has received funding from the National Fish and Wildlife Foundation to work with private landowners to monitor water quality and to restore riparian habitat along with Broad River. The goal is to ensure the success of efforts to reintroduce the robust redhorse, a fish which is pre-listed on the federal endangered species list. GEPI will contribute to development of the comprehensive GIS database to support outreach, education, and ongoing easement and resource management efforts. Results are expected to include improved habitat, revegetation of the floodplain, and improved public awareness of watershed issues.

DeKalb County has established a watershed management program which addresses nonpoint source pollution impacts county-wide. The DeKalb County Watershed Management Program began in 1993 with Section 319(h) Grant funding to demonstrate vegetative streambank stabilization techniques in County parks. It has evolved into a county-wide program focusing on waterbodies in the Chattahoochee, South, and Yellow River Basins. Activities under this program address streambank erosion, sediment control violations, illegal dumping, and runoff of nutrients from fertilizer applications, car washes and other sources. Over 24 BMP demonstration projects have been completed on both public and private property, with an emphasis on re-establishing 25-foot vegetative buffers along streams in the County.

Partners in this comprehensive watershed management effort include Americorps, the Atlanta Outward Bound Center EcoWatch, the Greater Atlanta Community Corps, and the DeKalb County Roads and Drainage Department.

Current funding under Section 319(h) supports further development of the Comprehensive Watershed Management Program, including restoration of erosion problem areas and buffer reclamation areas in the Burnt Creek watershed and at various County parks, and volunteer water quality monitoring to assess the impact of these restoration projects. The County is also seeking funding under the RiverCare 2000 Program for acquisition of land along the South River.

Finally, local watershed management activities are also underway in the Peavine Creek watershed in the Chattahoochee River Basin. The Peavine Watershed Alliance (PWA) was established in 1997 by the Druid Hills Civic Association to determine the current condition of the stream, assess impacts of nonpoint source pollution, and evaluate best management practices for improving water quality. The PWA is grass root community-based volunteer organization dedicated to restoring and preserving the environmental qualities of the Peavine Creek watershed.

Participants include the City of Atlanta, Emory University, DeKalb County, Fernbank Science Center, Druid Hills Golf Course, and the City of Decatur. Goals for the community-based work in the Peavine Creek watershed include BMP implementation and expansion of the Adopt-A-Stream program through coordination of collection and use of volunteer monitoring data; mapping of the watershed; and creation of a call-in system to report water quality violations. The PWA is also working to inform elected officials, governmental staff and political candidates of the problems within the watershed and to provide innovative alternatives for the resolution of these problems. With Section 319(h) Grant funding, the PWA will develop a Watershed Restoration Action Strategy for the Peavine Creek watershed by 2003 and continue to conduct environmental education and outreach activities.

While the programs described above demonstrate some success, local capacities to develop and implement comprehensive watershed management programs face a number of constraints - insufficient financial resources, limitations on personnel and obstacles to the consensus-building required for cooperative watershed management. These problems are compounded in larger watersheds which cross jurisdictional boundaries. Assistance is necessary to help initiate watershed management efforts, to build local capacity for watershed management, and to progress from planning to full implementation. In addition to Regional Development Centers, the University of Georgia, The Georgia Conservancy and the GAEPD all provide such assistance.

Watershed management assistance from the University of Georgia focuses on the Etowah River Basin. Initiated in 1997, the Etowah River Basin Partnership involves students and faculty with a range of stakeholders within the river basin. This partnership provides an opportunity for students and faculty to work in consultation with stakeholders on integrated environmental problem-solving. Law and ecology students work with faculty guidance to address problems identified by various stakeholders in the Etowah River Basin. Stakeholders include

representatives of State and Federal agencies, local and regional governments, environmental advocacy groups, land trusts, and the development community.

Many of the concerns identified by the stakeholders address nonpoint source pollution impacts, watershed management, and water quality. Issues addressed to date include design and implementation of a greenway and wildlife corridor, enactment of conservation easements on specific properties, and implementation of local government measures to more effectively control erosion and sedimentation. With Section 319(h) Grant funding, a comprehensive watershed management program will be implemented in the Upper Etowah River watershed in 2000. This program will implement BMP demonstration projects addressing nonpoint source pollution from agricultural, silvicultural, urban runoff, construction and hydrologic/habitat modification.

Under Section 319(h) of the Clean Water Act, the USEPA awards a Nonpoint Source Implementation Grant to the GAEPD to fund eligible projects which support the implementation of the *Georgia Nonpoint Source Management Program*. Section 319(h) Grant funds for the prevention, control and/or abatement of nonpoint sources of pollution are made available annually to public agencies in Georgia. The GAEPD uses a competitive process to ensure that the most appropriate projects are selected for funding. Eligible recipients of Section 319(h) Nonpoint Source Implementation Grant funds include local, regional and State units of government, local authorities which operate local government service delivery programs, regional development centers, local school systems, State colleges and universities, and State agencies.

Priority is given to project proposals which implement the nonpoint source components of TMDLs that have been approved under Section 303(d) of the Clean Water Act; develop and/or implement nonpoint source components of Watershed Restoration Action Strategies; implement actions to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are partially or not supporting designated or beneficial uses due to nonpoint sources of pollution; and are located in the Unified Watershed Assessment as Category I watersheds. In addition, the GAEPD will provide technical and resource information as requested.

### ***Sediment Management***

The most significant nonpoint source impacts from hydrologic and habitat modifications in Georgia result from changes associated with urbanization. While much less significant, impacts from sediment associated with flow regulation and dredging are also targeted in Georgia's *Nonpoint Source Management Program*.

Over the next five years, management of sediment associated with hydrologic/habitat modification in Georgia will have two priorities. The first is control

of water quality impacts below dams. Provisions for control of water quality impacts below COE dams in the State include use of automatic water quality monitoring devices installed below the dams at Allatoona, Buford, West Point, and Walter F. George Lakes. The devices will monitor the quality of release waters hourly to ensure compliance with State standards for pH, temperature, and conductivity.

Special releases of water are used when necessary to abate water quality violations. Dam releases are also managed to alter sedimentation and improve fish habitat in the Oconee River. The Oconee River is one of the sites selected for reintroduction of the robust redhorse, a sucker which is pre-listed on the Federal endangered species list. The Robust Redhorse Conservation Project is monitoring reintroduction of the fish in the Oconee River, including on-going assessment of native mussel populations. Native mussels are the robust redhorse's food source and also serve as an indicator of water quality (sedimentation impacts, in particular). Through this project, release practices from Georgia Power's Sinclair Dam have been modified to improve habitat for the robust redhorse.

Finally, the dam at the Walter F. George Lake is subject to seepage creating downstream safety and sedimentation issues. The COE plans a major dam rehabilitation to eliminate safety concerns and improve downstream water quality by eliminating high sediment loads associated with seepage through the dam.

The second focus will be on management of sediment associated with dredging in the Savannah River basin. In an on-going program, the COE conducts toxicity testing of sediment dredged to maintain the shipping channel in the Savannah River. If toxic materials are found to be present, contaminated sediments are put in a lined and capped site for disposal.

The COE is considering a shift from individual permits to a regional permit for agitation dredging in the Savannah Harbor. Currently, berth owners must have individual permits for dredging. These permits will expire at the end of 1999, and the COE may move to a regional permit for agitation dredging at that time.

Related research is underway to assess the impacts of dredging activities on aquaculture in the Savannah River basin and to evaluate the impacts of erosion and dredging activities on the Savannah Harbor and inlet. This work is funded, in part, by the COE and is being conducted by the Skidaway Institute of Oceanography, Georgia Southern University, and the Georgia Department of Natural Resources. The results will be considered by the COE in on-going harbor management and may affect the pending shift to a regional agitation dredging permit.

## **OTHER NONPOINT SOURCES**

### **Overview**

Other nonpoint sources of pollution include atmospheric deposition, waste storage and storage tank leaks, highway maintenance and runoff, spills, in-place and natural contaminants (e.g., saltwater intrusion in coastal aquifers). The GAEPD regulates these nonpoint sources of pollution through the enforcement of existing regulations and compliance monitoring implemented by the Underground Storage Tank Management and Emergency Response Programs, and has undertaken steps to manage saltwater intrusion and assess the impact of naturally occurring metals in surface and ground water.

Small scale releases of pollutants result from a wide variety of everyday activities. Significant nonpoint source pollution may occur as a result of accidental leaks or spills of hazardous chemicals. These pollutants can potentially degrade nearby surface waters and/or enter and pollute the groundwater regime. The most effective method for preventing nonpoint source pollution from leaks and spills is to avoid them altogether through conscientious operation of facilities and the proper treatment, storage, use, disposal, and handling of hazardous chemicals.

Underground storage tanks may leak accidentally, particularly as the tanks and associated systems age. In Georgia, all underground storage tanks (UST) were required to meet specific spill, overfill, and corrosion protection standards by December 22, 1999, or be closed. To protect water quality, the GAEPD Land Protection Branch is overseeing the upgrade of all underground storage tanks. Currently, 67% of the 27,754 operational UST in Georgia meet these requirements, including all of the 2,200 State-owned UST.

Since 1998, 6,987 leaks from UST sites have been reported in Georgia. Of these, 970 leaks were reported in 1998. Most of these releases were associated with underground storage tanks installed before specific spill, overfill and corrosion protection standards were developed, and were discovered as owners were preparing for the December 22, 1999 deadline. To date, site investigations and corrective action procedures had been completed at 4,837 sites and initiated at the remaining 2,150 sites.

In the event that a spill were to occur, the Emergency Response Program of the GAEPD Program Coordination Branch works with the Water Protection Branch and other branches to minimize nonpoint source pollution to surface and ground waters. A well-trained and highly motivated Emergency Response Team oversees the immediate implementation of effective emergency clean-up operations.

Natural contaminants are also a source of pollution in Georgia. Saltwater intrusion along Georgia's coast is the most significant source of groundwater



pollution or contamination in the State. The second most significant source is naturally-occurring metals and radioactivity. Management of these nonpoint sources of pollution involves assessment of the extent of contamination, actions to prevent movement of contaminants into critical water sources, and steps to control exposure via drinking water.

The Georgia Environmental Protection Division has primary responsibility for managing the program activities under this major nonpoint source pollution category. The Land Protection Branch administers the Underground Storage Tank Management Program. Along with the five Regional Offices, housed in the Program Coordination Branch, its duties include enforcing minimum standards and overseeing corrective action. It also administers the Georgia Underground Storage Tank Trust Fund and manages Georgia's participation in the Federal Leaking Underground Storage Tank Trust Fund. The Program Coordination Branch maintains an Emergency Response Team that, along with the five Regional Offices and the Water Protection Branch, is responsible for the emergency response program activities. The Geologic Survey Branch (also known as the Georgia Geologic Survey) has responsibility for assessing the impact of naturally occurring metals to surface and ground water quality.

The Georgia Environmental Facilities Authority is primarily a lending organization that assists Georgia's cities, counties, and State agencies with loans and financing for programs such as: water and sewer system construction, water system improvements, solid waste facilities, wastewater projects, environmental emergency projects and energy-related programs through the Division of Energy Resources. With GEFA, cities, counties, and State agencies have access to a wide range of financial and program options.

### ***Underground Storage Tank Management Program***

The Underground Storage Tank Management Program provides regulation and technical assistance for the prevention, control, and abatement of nonpoint source pollution. Groundwater protection from leaking underground storage tanks (UST) was enhanced with the enactment of the Georgia Underground Storage Tank Act in 1988 and promulgation of the Rules for Underground Storage Tank Management. These regulations established corrective action requirements to clean-up leaks and instituted a financial assurance trust fund.

The GAEPD Land Protection Branch administers the Underground Storage Tank Management Program (USTMP). It is responsible for regulating approximately 27,754 UST at over 19,000 facilities, mostly gas stations. These regulations attempt to ensure such tanks do not leak petroleum or toxic chemicals into the environment, and if leaks do occur, that clean-up activities ensue. Activities under the USTMP fall under three categories: (1) regulatory compliance, (2) corrective action, and (3)

administration of the underground storage tank trust fund.

The objective of the USTMP regulatory compliance function is to prevent petroleum and toxic chemical releases by enforcing minimum standards for corrosion protection and leaks from UST and by establishing notification procedures for suspected leakage. By December 22, 1999, all of the approximately 27,754 regulated UST in Georgia must be upgraded to comply with spill, overfill, and corrosion protection requirements. Any UST installed after that date must meet these requirements at the time of installation. Owners or operators of existing UST can take one of three actions to comply with the upgrade requirements: (1) add spill, overfill, and corrosion protection, (2) close the UST system by December 22, 1999, or (3) replace each closed existing UST with a new UST. Of particular concern are the approximately 18,500 existing unprotected (bare) steel tanks and associated piping which must meet the corrosion protection requirements. These tanks must be upgraded through one of three methods: (1) adding cathodic protection, (2) adding an interior lining, or (3) adding cathodic protection and interior lining.

Where releases (leaks) from UST have occurred or cannot be prevented, corrective action is required. Once notified of a confirmed release, the owner or operator is required to immediately repair the leak and submit reports detailing the extent of contamination from the leak and the physical conditions of the site. Based on information in these reports, a determination is made by GAEPD Land Protection Branch regarding the need for corrective action, and if needed, what type of corrective action would be most appropriate. If corrective action is required, the owner/operator must submit a corrective action plan (CAP) that outlines how the contamination will be cleaned up. The CAP is reviewed and approved prior to remediation efforts. Inspections of the site are conducted to ensure cleanup efforts are in accordance with the approved plan. If an owner/operator fails to clean-up a contaminated site, an order may be issued requiring corrective action within a prescribed time frame. If the owner/operator fails to comply with the order, civil penalties up to \$25,000 for each day of continued noncompliance may be imposed.

Every UST owner/operator is required to have insurance or other financial assurance that leaks can be properly cleaned-up. Georgia provides the private owners/operators with such a mechanism through the Georgia Underground Storage Tank (GUST) Trust Fund. The GUST Trust Fund is financed by a voluntary Environmental Assurance Fee (EAF) of .05 paid on each gallon of petroleum product delivered to regulated tanks in Georgia. The EAF provides approximately \$10 million per year to the GUST Trust Fund. Nearly 95 percent of the regulated community participate in the GUST Trust Fund which provides each participating private owners/operators with \$1 million in corrective action and third-party liability coverage. Non-participating private owners/operators must carry private insurance.

In 1995, the Georgia Environmental Facilities Authority (GEFA) instituted a funding program for publicly owned UST. Its management team works with GAEPD

to assess existing UST belonging to State agencies. GEFA provides funding for these agencies to remove or upgrade the UST systems in accordance with the regulation compliance actions and time frame private owners/operators are subject to follow.

The GUST Trust Fund coverage includes costs associated with cleaning up petroleum product leaks, correcting environmental damage, supplying drinking water, and compensating third parties for personal injury or property damage. To be eligible for reimbursement from the GUST Trust Fund, the owner/operator must have paid the EAF and be in substantial compliance with UST rules and regulations. Interest from the GUST Trust Fund helps pay for the cost of administration of the program; GAEPD Regional Offices conduct GUST Trust Fund compliance and monitoring. The USEPA provides funds to Georgia from the Federal Leaking Underground Storage Tank (LUST) Trust Fund to clean up contaminated sites where a solvent owner/operator cannot be identified.

### ***Emergency Response Program***

The Emergency Response Program is a regulatory and technical assistance effort housed in the Program Coordination Branch. The program's primary responsibility is to respond to oil or hazardous material spills released into State waters, sometimes discharged to storm sewers. The program also investigates high priority complaints which need quick response handling.

The GAEPD Program Coordination Branch maintains an Emergency Response Team that responds to spills 24-hours a day. Each team member is cross-trained to address and enforce all environmental laws administered by the GAEPD. Team members interact with local, State, and Federal agency personnel to identify the pollutant source, control the spill, and coordinate all necessary clean-up actions. Team members serve in both a technical support capacity providing clean-up techniques and a regulatory mode during an incident. The GAEPD Program Coordination Branch Regional Offices conduct compliance monitoring and enforcement inspections.

The Emergency Response Program maintains a database of Right-To-Know reportable information. In compliance with the SARA Title III Program, this database lists the waters impacted or potentially impacted by pollution spills but not the degree of degradation.

### ***Saltwater Intrusion and Naturally-Occurring Metals***

The most significant contamination of groundwater in Georgia results from naturally-occurring or in-place contaminants. Naturally-occurring mineral salts (i.e.,

high total dissolved solids levels) cause the most extensive contamination of Georgia's aquifers with naturally-occurring metals while radioactivity is the second most significant source. The activities described are intended to control the impact of these natural contaminants.

Intensive use of groundwater in 24 coastal counties has led to saltwater intrusion into some areas of the Upper Floridan aquifer. The Floridan aquifer system is the primary water supply for most of south Georgia, some portions of the low country of South Carolina, southern Alabama, and significant portions of Florida. This system supplies about 50% of the groundwater used in Georgia and is the principal source of freshwater in a 24-county coastal area of the State. It yields large quantities of high-quality water for private domestic, municipal, industrial, and agricultural irrigation water supply.

Heavy localized withdrawals for municipal and industrial use have led to a formation of large cones of depression near Brunswick, Savannah, and Hilton Head Island, South Carolina. Declining water levels in these areas have caused lateral and vertical intrusion of seawater in the aquifer. One confirmed source and two potential sources of saltwater exist near Savannah and a saltwater wedge is slowly moving beneath Hilton Head Island, South Carolina towards Savannah. Near the eastern end of Bull Island, geologic conditions favorable for saltwater intrusion also exist. Saltwater from deeper groundwater zones is currently entering the aquifer at Brunswick. In addition, the USGS reports that saltwater may be entering the aquifer offshore from Tybee Island and that groundwater intrusion conditions in the St. Marys-Fernandina Beach area are similar to those at Brunswick.

To manage saltwater intrusion in the Upper Floridan aquifer, GAEPD, in consultation with South Carolina and Florida, has developed an *Interim Coastal Management Strategy*. The 24 counties covered by the *Interim Coastal Management Strategy* includes Burke, Screven, Jenkins, Emanuel, Candler, Bulloch, Effingham, Chatham, Bryan, Liberty, Evans, Tattnall, Long, McIntosh, Glynn, Wayne, Appling, Toombs, Bacon, Pierce, Brantley, Camden, Charlton, and Ware Counties. Under existing statutory authority, the GAEPD adopted an *Interim Coastal Management Strategy* in April 1997 to protect the Upper Floridan aquifer in southeast Georgia from saltwater intrusion. The *Interim Coastal Management Strategy* established guidelines for groundwater withdrawal and use in southeast Georgia through December 2005, at which time the GAEPD will implement a *Final Coastal Management Strategy* to protect the Upper Floridan aquifer.

During this interim period, the strategy directs caps on groundwater withdrawals in part of the study area. The 24-county region is divided into the north, central, and southern sub-areas. Given a lack of evidence that groundwater withdrawal in the northern and southern sub-areas affects saltwater intrusion, GAEPD will allow reasonable additional withdrawals in those areas, until an adverse impact is shown. Most of the central sub-area will be allowed limited expansion in groundwater use

(not to exceed 15 MGD by 2005). For Chatham, Glynn, and portions of Effingham and Bryan Counties, however, groundwater withdrawals will be capped at a level designed to prevent impact on existing users and protect groundwater sources for up to 100 years.

Limitations on additional groundwater use will be implemented through the GAEPD Water Resources Branch. If alternative sources exist, new permits for golf course irrigation and noncontact cooling water will not be issued. In the central sub-area, new permits will only be issued after an impact assessment, with new permits in Chatham and Glynn Counties requiring corresponding reductions in permitted withdrawals elsewhere in the counties. Overall, during the interim period, new permitted withdrawals in the 24-county region will be limited to 10% above total withdrawals for 1995 (estimated at 36 MCD).

As part of a longer-term protection program for the Upper Floridan aquifer, the *Interim Coastal Management Strategy* has two additional emphases: comprehensive water supply planning and additional studies to better assess impacts and to refine management strategies. GAEPD will provide water supply planning support to the 24 coastal counties for the completion of local water supply management plans by the year 2000. After December 31, 2000, groundwater withdrawal permits will only be issued if the user has an approved comprehensive water supply plan. In addition, some permits will require implementation of water conservation measures.

Over the next five years, significant effort will be directed toward enhanced modeling and improved understanding of the impacts of groundwater use and various management strategies. Groundwater monitoring wells are in place and water quality and water level data are being collected. Monitoring results have been used by GAEPD to develop a groundwater flow model for the Upper Floridan aquifer. The model simulation and the USGS MODFLOW modeling in turn will be used by GAEPD as part of its Coastal Groundwater Monitoring Survey to predict whether new groundwater withdrawals will accelerate saltwater contamination. To enhance GAEPD's predictive capacity, more sophisticated modeling tools are being developed to track the saltwater wedge moving toward the Savannah - Hilton Head Island area and to track saltwater intrusion in the Brunswick area.

Efforts are also underway to better document agricultural groundwater use for irrigation to support monitoring and agricultural impacts on groundwater quality. In addition, the Skidaway Institute of Oceanography and GAEPD Geologic Survey Branch have proposed studies which, if funded, will produce maps of offshore aquiclude areas (i.e., impervious layers of rock and sediment) and assessment of the magnitude of saltwater intrusion and the geographic boundaries of the saltwater wedge. Results of these monitoring and research efforts will be used to develop a comprehensive, long-term *Final Coastal Management Strategy*, to be completed by 2005, the end of the interim program.

Many sectors and groups have a vested interest in the development of long-term solutions to protect the Upper Floridan aquifer from saltwater intrusion. The GAEPD continues to work in partnership with South Carolina and Florida; with USGS; and with stakeholders in the industrial, municipal, and agricultural sectors, as well as with the general public in the 24 coastal counties. The Water Stewards is a private organization representing stakeholders in the agricultural sector, created in response to moratoriums on withdrawal of coastal groundwater. The Water Stewards hope to shape the long-term water management plan by participating in its development and by devising policy recommendations that support agricultural access to coastal groundwater resources. The Groundwater Guardian Team, a community-based group located in the Savannah area, was created to increase awareness and educational efforts surrounding coastal groundwater issues and to promote groundwater conservation strategies. The Georgia Conservancy is also involved in water education. It advocates an integrated, comprehensive, long-range ground and surface water withdrawal plan for both municipal and private operators in the coastal area.

The second most significant source of groundwater contamination in Georgia results from naturally-occurring metals and radioactivity. The source of radioactivity is minerals which are a minor constituent in some Georgia aquifers. While natural radioactivity may occur anywhere in Georgia, the significant problems have occurred at locations near the Gulf Trough, a geologic feature of the Upper Floridan aquifer in Montgomery, Wheeler, Jeff Davis, Telfair, Coffee, Ben Hill, Irwin, and Tift counties. Radon, a radioactive gas produced by these minerals, also has been noted in highly variable amounts in groundwater from some wells, especially in the Piedmont region. To produce safe drinking water, wells generally can be constructed to seal off the rock producing the radioactive elements and treatment systems can be used to remove radon from groundwater.

**SUMMARY**

<b>MILESTONES IMPLEMENTATION ACTIVITIES</b>	<b>CHAPTER PAGE</b>	<b>FFY00</b>	<b>FFY01</b>	<b>FFY02</b>	<b>FFY03</b>	<b>FFY04</b>	<b>FFY05 FFY15</b>
Implement River Basin Management Planning.  <i>Ongoing - Continuous</i>	3 - 1	X	X	X	X	X	X
Develop river basin management plans for the Savannah, Ogeechee, Ochlockonee, Suwannee, Satilla, St.Marys, Ocmulgee, Altamaha and Tennessee River Basins. <i>Ongoing - Continuous</i>	3 - 2	X					X
Update river basin management plans for the Savannah, Ogeechee, Ochlockonee, Suwannee, Satilla, St.Marys, Ocmulgee, Altamaha and Tennessee River Basins. <i>Ongoing - Continuous</i>	3 - 2	X					X
Finalized Watershed Restoration Strategies in accordance with the <i>Unified Watershed Assessment</i> framework. <i>Ongoing - Continuous</i>	3 - 7 4 - 1	X					X
Standardize watershed unit systems in Georgia to the 14-digit hydrologic unit equivalents with GIS coverages.	3 - 3 4 - 11		X				
Complete <i>Nonpoint Source Base Flow Protection GIS Database</i> for each of the 14 major river basins.	3 - 3 4 - 11	X					
Develop 38 Total Maximum Daily Loads for the St. Marys, Satilla, Suwannee and Ochlockonee River Basins.	3 - 8 7 - 61	X					

Develop 263 Total Maximum Daily Loads for the Ocmulgee, Oconee and Altamaha River Basins.	3 - 8 7 - 61		X				
<b>MILESTONES IMPLEMENTATION ACTIVITIES</b>	<b>CHAPTER PAGE</b>	<b>FFY00</b>	<b>FFY01</b>	<b>FFY02</b>	<b>FFY03</b>	<b>FFY04</b>	<b>FFY05 FFY15</b>
Develop 271 Total Maximum Daily Loads for the Chattahoochee and Flint River Basins.	3 - 8 7 - 61			X			
Develop 109 Total Maximum Daily Loads for the Coosa, Tallapoosa and Tennessee River Basins.	3 - 8 7 - 61				X		
Develop 55 Total Maximum Daily Loads for the Savannah and Ogeechee River Basins.	3 - 8 7 - 61					X	
Wasteload allocation and TMDL, if applicable, must be completed before a NPDES permit will be issued.	3 - 9					X	X
Issue 531 NPDES permits concurrently within the Chattahoochee and Flint River Basins. <i>Continuous - Ongoing</i>	3 - 9					X	X
Issue 345 NPDES permits concurrently within the Coosa, Tallapoosa and Tennessee River Basins. <i>Continuous - Ongoing</i>	3 - 9						FFY05
Issue 325 NPDES permits concurrently within the Savannah and Ogeechee River Basins. <i>Continuous - Ongoing</i>	3 - 9						FFY06



Issue 250 NPDES permits concurrently within the St. Marys, Satilla, Suwannee and Ochlockonee River Basins. <b>Continuous - Ongoing</b>	3 - 9						FFY07
Issue 349 NPDES permits concurrently within the Ocmulgee, Oconee and Altamaha River Basins. <b>Continuous - Ongoing</b>	3 - 9						FFY08
<b>MILESTONES IMPLEMENTATION ACTIVITIES</b>	<b>CHAPTER PAGE</b>	<b>FFY00</b>	<b>FFY01</b>	<b>FFY02</b>	<b>FFY03</b>	<b>FFY04</b>	<b>FFY05 FFY15</b>
Watershed assessment must be completed before a NPDES permit will be issued. <b>Ongoing - Continuous</b>	3 - 9 5 - 4	X	X	X	X	X	X
Implement Section 319(h) Nonpoint Source Implementation Grant Program. <b>Ongoing - Continuous</b>	4 - 1	X	X	X	X	X	X
Develop and update <i>Integrated Priority Ranking System</i> for nonpoint source management activities for loans from CWSRF. <b>Ongoing - Continuous</b>	4 - 4	X					X
Submit <i>Coastal Nonpoint Source Management Program</i> to NOAA and USEPA for review and approval. <b>Ongoing - Continuous</b>	4 - 5	X					X
Submit biennial reports, <i>Water Quality in Georgia</i> , as required by Section 303(d), 305(b) and 319(a). <b>Ongoing - Continuous</b>	4 - 6	X		X		X	X
Continue nonpoint source monitoring and assessment in conjunction with RBMP with waters prioritized by <i>degree of impairment</i> . <b>Ongoing - Continuous</b>	4 - 8	X	X	X	X	X	X

Define and assess baseline biological and chemical conditions in Level IV ecoregions in Georgia.	4 - 8		X				
Establish biological criteria (i.e., numerical scoring system) for wadable streams in Georgia.	4 - 8					X	
Expand Georgia Groundwater Monitoring Network to include monitoring of agricultural pesticides.  <i>Ongoing - Continuous</i>	4 - 10 7 - 25		X	X	X	X	X
<b>MILESTONES IMPLEMENTATION ACTIVITIES</b>	<b>CHAPTER PAGE</b>	<b>FFY00</b>	<b>FFY01</b>	<b>FFY02</b>	<b>FFY03</b>	<b>FFY04</b>	<b>FFY05 FFY15</b>
Initiate ribotyping study of fecal coliforms to establish database and to determine degrees of geographic and temporal separation.	4 - 12	X					
Implement Georgia Project WET Program and <i>River of Words</i> .  <i>Ongoing - Continuous</i>	4 - 13 7 - 67	X	X	X	X	X	X
Implement Georgia Adopt-A-Stream Program and <i>Rivers Alive!</i>  <i>Ongoing - Continuous</i>	4 - 13 7 - 68	X	X	X	X	X	X
Implement Georgia Water Management Campaign.  <i>Ongoing - Continuous</i>	4 - 15 7 - 69 7 - 78	X	X	X	X	X	X

Require operators of existing swine operations (AFO/CAFO) submit comprehensive nutrient management plans to GAEPD.	5 - 1			X			
Finalize new rules for non-swine feeding operations (AFO/CAFO) under the Georgia Water Quality Control Act.	5 - 2 7 - 17		X				
Document existing conditions and violations of the MRPA along the Chattahoochee River between Buford Dam and Peachtree Creek.	5 - 7 7 - 94		X				
Establish and maintain Statewide Nonpoint Source Management Task Force.  <i>Ongoing - Continuous</i>	6 - 2			X	X	X	X
Implement Agricultural Nonpoint Source Management Program and BMP Demonstration projects statewide.  <i>Ongoing - Continuous</i>	7 - 10	X	X	X	X	X	X
<b>MILESTONES IMPLEMENTATION ACTIVITIES</b>	<b>CHAPTER PAGE</b>	<b>FFY00</b>	<b>FFY01</b>	<b>FFY02</b>	<b>FFY03</b>	<b>FFY04</b>	<b>FFY05 FFY15</b>
Implement 24 buffer demonstration sites (5,000 acres) statewide in conjunction with CRP.	7 - 12 7 - 21					X	
Develop Agriculture Fertilizer BMP Manual.	7 - 18	X					
Implement 1996 Farm Bill Program (EQIP, CRP, WRP, WHIP, FPP) and establish priority conservation areas.  <i>Ongoing - Continuous</i>	7 - 19	X	X	X	X	X	X

Implement Georgia Farm-A-Syst Program.  <i>Ongoing - Continuous</i>	7 - 28	X	X	X	X	X	X
Implement Agricultural Pesticide Container Recycling Program in Georgia.  <i>Ongoing - Continuous</i>	7 - 29	X	X	X	X	X	X
Implement Benchmark Farms Program in Georgia.  <i>Ongoing - Continuous</i>	7 - 31	X	X	X	X	X	X
Implement Georgia Sustainable Agriculture Program.  <i>Ongoing - Continuous</i>	7 - 32	X	X	X	X	X	X
Implement Grazing Land Conservation Initiative in Georgia.  <i>Ongoing - Continuous</i>	7 - 35	X	X	X	X	X	X
Implement Certified Crop Advisor Program in Georgia.  <i>Ongoing - Continuous</i>	7 - 36	X	X	X	X	X	X
<b>MILESTONES IMPLEMENTATION ACTIVITIES</b>	<b>CHAPTER PAGE</b>	<b>FFY00</b>	<b>FFY01</b>	<b>FFY02</b>	<b>FFY03</b>	<b>FFY04</b>	<b>FFY05 FFY15</b>
Implement Silvicultural Nonpoint Source Management Program and BMP demonstration projects statewide.  <i>Ongoing - Continuous</i>	7 - 44	X	X	X	X	X	X
Complete biennial Statewide BMP Compliance Survey and update the Silvicultural Nonpoint Source Management Program.  <i>Ongoing - Continuous</i>	7 - 46	X		X		X	X

Implement Sustainable Forestry Initiative in Georgia.  <b>Ongoing - Continuous</b>	7 - 47	X	X	X	X	X	X
Issue General NPDES permit for stormwater discharges from construction sites greater than five acres.	7 - 50 7 - 55		X	X	X	X	X
Issue General NPDES permit for stormwater discharges from construction sites greater than one acre.	7 - 50 7 - 55					X	X
Revise requirements for stream buffer variance under the Erosion and Sedimentation Act.	7 - 53		X				
Finalize <i>Georgia Stormwater Management and Urban Nonpoint Source Design Manual</i> .	7 - 69 7 - 75		X				
Upgrade regulated UST to comply with revised spill, overflow and corrosion protection requirements.	7 - 105	X					
Implement <i>Interim Coastal Management Strategy</i> to protect the Upper Floridan aquifer.  <b>Ongoing - Continuous</b>	7 - 108	X	X	X	X	X	X

## **LONG- AND SHORT-TERM GOALS AND SUPPORTING PROGRAM AND ACTIVITIES**

***Develop and facilitate the implementation of Total Maximum Daily Loads for all Section 303(d) listed watersheds, as resources allow, by FFY15.***

*Establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.*

*Develop Total Maximum Daily Loads for an additional 736 water quality violations delineated on the Section 303(d) list by FFY04.*

*All NPDES permits will require a wasteload allocation, watershed assessment and TMDL, if applicable, by FFY04.*

*Develop and/or update River Basin Management Plans for all 14 major river basins in Georgia by FFY00.*

*Prepare biennial reports, Water Quality in Georgia, as required by Sections 303(d), 305(b) and 319(a) of the CWA in FFY00, FFY02 and FFY04.*

*Continue to implement River Basin Management Planning statewide.*

*Finalize Watershed Restoration Action Strategies in accordance with the UWA framework by FFY00.*

*Standardize watershed unit system to 14-digit HUC with GIS coverages by FFY01.*

*Complete NPS Base Flow Protection GIS databases for each of the 14 major river basins by FFY00.*

*Revise and update CWSRF Integrated Priority Ranking System for nonpoint source management activities by FFY00.*

*Continue to implement Section 319(h) Grant Program with priorities targeting Total Maximum Daily Loads, Section 305 (b) listed waterbodies and UWA Category I watersheds.*

*Continue to implement the Georgia Water Management Campaign.*

***Identify watersheds where nonpoint source pollution is causing impairment and restore designate uses for all Section 305(b) listed watersheds, as resources allow, by FFY15.***

*Establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.*

*Develop Total Maximum Daily Loads for an additional 736 water quality violations delineated on the Section 303(d) list by FFY04.*

*Develop and/or update River Basin Management Plans for all 14 major river basins in Georgia by FFY00.*

*Establish biological criteria (i.e., numerical scoring system) for wadable streams in Georgia by FFY04.*

*As provided for under the Georgia Water Quality Control Act, finalize rules for animal feeding operations by FFY01.*

*Prepare biennial reports, Water Quality in Georgia, as required by Sections 303(d), 305(b) and 319(a) of the CWA in FFY00, FFY02 and FFY04.*

*Continue to implement River Basin Management Planning statewide.*

*Finalize Watershed Restoration Action Strategies in accordance with the UWA framework by FFY00.*

*Standardize watershed unit system to 14-digit HUC with GIS coverages by FFY01.*

*Complete NPS Base Flow Protection GIS databases for each of the 14 major river basins by FFY00.*

*Revise and update CWSRF Integrated Priority Ranking System for nonpoint source management activities by FFY00.*

*Define and assess baseline biological and chemical conditions in Level IV ecoregions in Georgia by FFY01.*

*Continue nonpoint source monitoring and assessment in conjunction with River Basin Management Planning.*

*Continue to implement Section 319(h) Grant Program with priorities targeting Total Maximum Daily Loads, Section 305 (b) listed waterbodies and UWA CATEGORY I watersheds.*

*Finalize Georgia Stormwater Management and Urban Nonpoint Source Design Manual by FFY01.*

*Revise requirements for stream buffer variances under Erosion and Sedimentation Act by FFY01.*

*Issue General NPDES permit for stormwater discharges from construction sites >5 acres by FFY01; > 1acre by FFY04.*

*Initiate ribotyping of fecal coliforms to establish database and to determine geographic and temporal separation by FFY00.*

*Continue to implement the Georgia Water Management Campaign, Adopt-A-Stream and Project WET Programs.*

*Document violations of MRPA along Chattahoochee River from Buford Dam to Peachtree Creek by FFY01.*

*Implement 24 buffer demonstration sites (5,000 acres) statewide in conjunction with CRP by FFY04.*

*Develop Agriculture Fertilizer BMP Manual by FFY00.*

*Continue to implement Agriculture Pesticide Container Recycling Program in Georgia.*

*Continue to implement Georgia Water Quality Control Act and Erosion and Sedimentation Act.*

*Continue to implement the Georgia Planning Act - specifically Part V Minimum Planning Standards requirements.*

***Implement management measures specified in Section 6217 of the Coastal Zone Reauthorization Amendments, as resources allow, by FFY15.***

*Establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.*

*Develop and implement Coastal Nonpoint Source Management Program for Georgia by FFY01.*

*Continue to implement Coastal Zone Management Program in 11-county area.*

*Continue to implement Coastal Incentive Grant Program.*

*Continue to implement the coastal Marshlands Protection Act.*

***As provided for under the Georgia Water Quality Control Act, all animal feeding operations will develop and implement Comprehensive Nutrient Management Plans by FFY09.***

*Establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.*

*As provided for under the Georgia Water Quality Control Act, finalize rules for animal feeding operations by FFY01.*

*Continue to implement Agricultural Nonpoint Source Management Program - BMP demonstrations and workshops.*

*Continue to implement the Georgia Farm-A-Syst Program statewide.*

*Continue to implement Animal Waste and Nutrient Utilization demonstration projects.*

*Continue to implement 1999 Farm Bill Program in Georgia.*



*Continue to implement the Georgia Sustainable Agriculture Program.*

*Continue to implement Grazing Land Conservation Initiative.*

**Achieve 100% compliance of implementation of recommended best management practices for silviculture in Georgia by FFY15.**

*Establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.*

*Develop Total Maximum Daily Loads for an additional 736 water quality violations delineated on the Section 303(d) list by FFY04.*

*Develop and/or update River Basin Management Plans for all 14 major river basins in Georgia by FFY00.*

*Conduct biennial Silviculture BMP Compliance Surveys and update Silvicultural Nonpoint Source Management Program, as appropriate, in FFY00, FFY02 and FFY04.*

*Prepare biennial reports, Water Quality in Georgia, as required by Sections 303(d), 305(b) and 319(a) of the CWA in FFY00, FFY02 and FFY04.*

*Continue to implement Silvicultural Nonpoint Source Management Program - BMP demonstrations and workshops.*

*Continue to implement the Sustainable Forestry Initiative in Georgia.*

*Continue to implement MOU between USFS, GFC and GAEPD as related to the Chattahoochee and Oconee National Forests.*

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***Continue implementation of Comprehensive State Groundwater Protection Program to address nonpoint source pollution.***

*Establish and maintain a Statewide Nonpoint Source Management Task Force by FFY03.*

*Develop and/or update River Basin Management Plans for all 14 major river basins in Georgia by FFY00.*

*Develop and implement Coastal Nonpoint Source Management Program for Georgia by FFY01.*

*Expand Georgia Groundwater Monitoring Network to include monitoring of agricultural pesticides statewide by FFY01.*

*Develop and implement Final Coastal Management Strategy to protect Upper Floridan aquifer from saltwater intrusion.*

*Prepare biennial reports, Water Quality in Georgia, as required by Sections 303(d), 305(b) and 319(a) of the CWA in FFY00, FFY02 and FFY04.*

*Complete Nonpoint Source Base Flow Protection GIS Database for each of the 14 major river basins by FFY00.*

*Continue to expand and modify Georgia Groundwater Monitoring Network.*

*Continue to implement Interim Coastal Management Strategy to protect Upper Floridan aquifer from saltwater intrusion.*

*Continue to implement the Benchmark Farms Program in Georgia.*

*Upgrade regulated UST to comply with revised spill, overfill and corrosion protection requirements by FFY00.*