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### Section 7

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# Implementation Strategies

This section builds on the priority issues identified in Section 6 and proposes strategies to address the major water quality problems in the Savannah River basin.

Georgia’s Mission Statement for river basin management planning is “to develop and implement a river basin planning program to protect, enhance, and restore the waters of the state of Georgia that will provide for effective monitoring, allocation, use, regulation, and management of water resources”. Associated with this mission are a variety of goals which emphasize coordinated planning necessary to meet all applicable local, state, and federal laws, rules, and regulations, and provide for water quality, habitat, and recreation. For the Savannah basin, these goals will be implemented through a combination of a variety of general strategies, which apply across the basin and across the state, and targeted or site-specific strategies. Section 7.1 describes the big-picture management goals for the Savannah River basin. Section 7.2 describes the general and basinwide implementation strategies most relevant to the Savannah River. Targeted strategies for specific priority concerns within each subbasin, as identified in Section 6, are then presented in 7.3.

## **7.1 “Big Picture” Overview for the Savannah River Basin**

This Savannah River Basin Management Plan includes strategies to address a number of different basinwide objectives. These include:

- Protecting water quality in lakes, rivers, streams, estuaries, and coastal waters through attainment of water quality standards and support for designated uses;
- Providing adequate, high quality water supply for municipal, agricultural, industrial, and other human activities;
- Preserving habitat suitable for the support of healthy aquatic and riparian ecosystems;

- Protecting human health and welfare through prevention of water-borne disease; minimization of risk from contaminated fish tissue, and reduction of risks from flooding; and
- Ensuring opportunities for economic growth, development, and recreation in the region.

Achieving these objectives is the responsibility of a variety of state and federal agencies, local governments, business, industry, and individual citizens. Coordination between partners is difficult, and impacts of actions in one locale by one partner on conditions elsewhere in the basin are not always understood or considered. River Basin Management Planning (RBMP) is an attempt to bring together stakeholders in the basin to increase coordination and to provide a mechanism for communication and consideration of actions on a broad scale to support water resource objectives for the entire basin. RBMP provides the framework to begin to understand the consequences of local decisions on basinwide water resources.

RBMP, begun in 1993, is changing the way EPD and other state agencies do business. At the same time, local government comprehensive planning requirements require a higher degree of effort and awareness by local governments to address resource protection and planning for the future.

This plan presents general broad-scale goals and strategies for addressing the most significant existing and future water quality and quantity issues within the Savannah basin. The basin plan provides a whole-basin framework for appropriate local initiatives and controls, but cannot specify all the individual local efforts which will be required. The basin plan will, however, provide a context and general management goals for the local-scale plans needed to address local-scale nonpoint loads in detail. EPD expects local governments and agencies to take the initiative to develop local strategies consistent with the basin-scale strategies presented in this plan.

A number of concerns identified in this plan will affect planning and decision-making by local governments, state agencies, and business interests. Detailed strategies for addressing identified concerns are presented in Section 7.4. This section provides an overview of the key “big picture” issues and planning opportunities in the Savannah River basin.

### **7.1.1 Water Quality Overview**

As discussed in Section 5, water quality in the Savannah River basin is generally good at this time, although problems remain to be addressed and proactive planning is needed to protect water quality into the future. Many actions have already been taken to protect water quality. Programs implemented by federal, state, and local governments, farmers, foresters, and other individuals have greatly helped to protect and improve water quality in the basin over the past twenty years. Streams are no longer dominated by untreated or partially treated sewage or industrial discharges, which resulted in little oxygen and impaired aquatic life. For the most part, local government and industrial wastewaters are properly treated, oxygen levels have returned, and fish have followed.

The primary source of pollution that continues to affect waters of the Savannah River basin results from nonpoint sources. Key types of nonpoint source pollution impairing or potentially threatening water quality in the Savannah River basin include erosion and sedimentation, bacteria from urban and rural nonpoint sources, metals from air deposition or urban and rural sources, excess nutrient loads to reservoirs, and increases in water temperature resulting from loss of riparian canopy and increased paved surface areas. These problems result from the cumulative effect of activities of many individual landowners or managers. Population is growing every year, increasing the potential risks

from nonpoint source pollution. Growth is essential to the economic health of the Savannah River basin, yet growth without proper land use planning and implementation of best management practices to protect streams and rivers can create harmful impacts on the environment.

Because there are so many small sources of nonpoint loading spread throughout the watershed, nonpoint sources of pollution cannot effectively be controlled by state agency permitting and enforcement, even where regulatory authority exists. Rather, control of nonpoint loading will require the cooperative efforts of many partners, including state and federal agencies, individual landowners, agricultural and forestry interests, local county and municipal governments, and Regional Development Centers. A combination of regulatory and voluntary land management practices will be necessary to maintain and improve the water quality of rivers, streams, and lakes in the Savannah River basin.

### **Key Actions by EPD**

The Georgia EPD Water Protection Branch has responsibility for establishing water quality standards, monitoring water quality, river basin planning, water quality modeling, permitting and enforcement of point source NPDES permits, and developing Total Maximum Daily Loads (TMDLs) where ongoing actions are not sufficient to achieve water quality standards. Much of this work is regulatory. EPD is also one of several agencies responsible for facilitating, planning, and educating the public about management of nonpoint source pollution. Nonpoint source programs implemented by Georgia and by other states across the nation are voluntary in nature. The Georgia EPD Water Resources Branch regulates the use of Georgia's surface and ground water resources for municipal and agricultural uses, which includes source water assessment and protection activities in compliance with the Safe Drinking Water Act.

Actions being taken by EPD at the state level to address water quality problems in the Savannah River basin include the following:

- **Watershed Assessments and Watershed Protection Implementation Plans.** When local governments propose to expand an existing wastewater facility, or propose a new facility with a design flow greater than 0.5 million gallons per day, EPD requires a comprehensive watershed assessment and development of a watershed protection implementation plan. The watershed assessment includes monitoring and assessment of current water quality and land use in the watershed and evaluation of the impacts of future land use changes. A watershed protection implementation plan includes specific strategies such as land use plans and local actions designed to ensure that existing problems are being addressed and that future development will be conducted in a way to prevent water quality standards violations.
- **Total Maximum Daily Loads (TMDLs).** Where water quality sampling has documented standards violations and ongoing actions are not sufficient to achieve water quality standards in a two year period, a TMDL will be established for a specific pollutant on the specific stream segment in accordance with EPA guidance. The TMDL will specify the allowable loading of a pollutant from both point and nonpoint sources. EPD will implement TMDLs through a watershed approach using a combination of regulatory and non-regulatory tools. TMDLs established under the Clean Water Act for stream segments within this basin are included in this River Basin Plan and are incorporated by reference herein. Those stream segments are identified with a "3" in the 303(d) column of the table in Appendix E of this plan. The TMDLs for this river basin are too voluminous to be attached to this plan, but copies of any or all of the TMDLs adopted by reference may be obtained from EPD by sending a request to the address in the Preface.

- **Source Water Protection.** Most of the public water supply in the Savannah basin is drawn from surface water. To provide for the protection of public water supplies, Georgia EPD is developing a Source Water Assessment Program in alignment with the 1996 amendments to the Safe Drinking Water Act and corresponding recent EPA initiatives. This new initiative is expected to result in assessments of threats to drinking water supplies and, ultimately, local Source Water Protection Plans. Recent “Criteria for Watershed Protection” (a sub-section of the Rules for Environmental Planning Criteria) produced by the Department of Community Affairs set minimum guidelines for protection of watersheds above “governmentally owned” water supply intakes.
- **Fish Consumption Guidelines.** EPD and the Wildlife Resources Division work to protect public human health by testing fish tissue and issuing fish consumption guidelines as needed, indicating the recommended rates of consumption of fish from specific waters. The guidelines are based on conservative assumptions and provide the public with factual information for use in making rational decisions regarding fish consumption.

### **Key Actions by Resource Management Agencies**

Nonpoint source pollution from agriculture and forestry activities in Georgia is managed and controlled with a statewide non-regulatory approach. This approach is based on cooperative partnerships with various agencies and a variety of programs.

Agriculture in the Savannah River basin is primarily restricted to livestock and poultry operations. Key partners for controlling agricultural nonpoint source pollution are the Soil and Water Conservation Districts, the Georgia Soil and Water Conservation Commission, and the USDA Natural Resources Conservation Service. These partners promote the use of environmentally sound best management practices (BMPs) through education, demonstration projects, and financial assistance. In addition to incentive payments and cost-sharing for BMPs, three major conservation programs from USDA will be available to producers and rural landowners. These are the Conservation Reserve Program, which protects highly erodible and environmentally sensitive land; the Wetland Reserve Program, designed to protect, restore, and enhance wetlands with cost-share incentives; and the Wildlife Habitat Incentives Program, which will help landowners develop and improve wildlife habitat.

Forestry is a major part of the economy in the Savannah basin. The Georgia Forestry Commission (GFC) is the lead agency for controlling silvicultural nonpoint source pollution. The GFC develops forestry practice guidelines, encourages BMP implementation, conducts education, investigates and mediates complaints involving forestry operations, and conducts BMP compliance surveys. Recently, the State Board of Registration for Foresters adopted procedures to sanction or revoke the licenses of foresters involved in unresolved complaints where the lack of BMP implementation has resulted in water quality violations.

### **Key Actions by Local Governments**

Addressing water quality problems resulting from nonpoint source pollution will primarily depend on actions taken at the local level. Particularly for nonpoint sources associated with urban and residential development, it is only at the local level that regulatory authority exists for zoning and land use planning, control of erosion and sedimentation from construction activities, and regulation of septic systems.

Local governments are increasingly focusing on water resource issues. In many cases, the existence of high quality water has not been recognized and managed as an economic

resource by local governments. That situation is now changing due to a variety of factors, including increased public awareness, high levels of population growth in many areas resulting in a need for comprehensive planning, recognition that high quality water supplies are limited, and new state-level actions and requirements. The latter include:

- Requirements for Watershed Assessments and Watershed Protection Implementation Plans when permits for expanded or new municipal wastewater discharges are requested;
- Development of Source Water Protection Plans to protect public drinking water supplies;
- Requirements for local comprehensive planning, including protection of natural and water resources, as promulgated by the Georgia Department of Community Affairs.

In sum, it is the responsibility of local governments to implement planning for future development which takes into account management and protection of the water quality of rivers, streams, and lakes within their jurisdiction. One of the most important actions that local governments should take to ensure recognition of local needs while protecting water resources is to participate in the basin planning process, either directly or through Regional Development Centers.

### **7.1.2 Water Quantity Overview**

In addition to protecting water quality, it is essential to plan for water supply in the Savannah River basin. The Georgia EPD Water Resources Branch regulates the use of Georgia's surface and ground water resources for municipal and agricultural uses, and is responsible for ensuring sufficient instream flows are available during a critical drought condition to meet permitted withdrawal requirements without significant impact to the environment. The withdrawal permit process must not overuse the available resources. The Water Resources Branch is also responsible for regulation of public water systems for compliance with the Safe Drinking Water Act, and regulation of dams for compliance with the Safe Dams Act.

In 1997, Georgia EPD developed the "Interim Strategy for Managing Saltwater Intrusion in the Upper Floridan Aquifer of Southeast Georgia" to address concerns regarding the general regional use of groundwater throughout coastal Georgia that is leading to declining water levels in the Floridan aquifer. The Interim Strategy includes policies such as establishing caps on groundwater use in the areas of Glynn County, Chatham County and southern portions of Bryan and Effingham Counties, and a reduction in ground water use in Chatham County by at least 10 million gallons per day by December 2005.

## **7.2 General Basinwide Management Strategies**

There are many statewide programs and strategies that play an important role in the maintenance and protection of water quality in the Savannah basin. These general strategies are applicable throughout the basin to address both point and nonpoint source controls.

## 7.2.1 General Surface Water Protection Strategies

### Antidegradation

The State of Georgia considers all waters of the state as high quality and applies a stringent level of protection for each waterbody. Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-03(2)(b) contains specific antidegradation provisions as follows:

(b) Those waters in the State whose existing quality is better than the minimum levels established in standards on the date standards become effective will be maintained at high quality; with the State having the power to authorize new developments, when it has been affirmatively demonstrated to the State that a change is justifiable to provide necessary social or economic development and provided further that the level of treatment required is the highest and best practicable under existing technology to protect existing beneficial water uses. Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. All requirements in the Federal Regulations, 40 C.F.R. 131.12, will be achieved before lowering of water quality is allowed for high quality water.

The antidegradation review process is triggered at such time as a new or expanded point source discharge is proposed that may have some effect on surface water quality. Such proposals are reviewed to determine if the new discharge is justifiable to provide necessary social or economic development and that the level of treatment required is the highest and best practicable under existing technology to protect existing beneficial water uses.

Applicants for new or expanded point source discharges into any surface water must perform an alternative analysis comparing the proposed discharge alternative to a “no-discharge” land application or urban reuse alternative. The application for discharge to surface waters will only be considered if the less degrading alternatives are determined to be economically or technically infeasible. In all cases, existing instream water uses and the level of water quality necessary to protect the existing use shall be maintained and protected.

### Water Supply Watershed Protection Strategy

As population continues to increase within the Savannah River basin, it will become ever more important to protect the water quality of already developed raw water sources. EPD is acting in concert with the Department of Community Affairs to produce a set of “guidelines” which define, among other things, measures that local governments are encouraged to take to protect drinking water sources. The “guidelines” are entitled Rules for Environmental Planning Criteria, and establish environmental protection criteria for five environmental categories: water supply watersheds, groundwater recharge areas, mountains, river corridors and wetlands. The *Criteria for Watershed Protection* (a subsection of the Rules for Environmental Planning Criteria) set minimum guidelines for protection of watersheds above “governmentally owned” water supply intakes. The degree of protection depends upon the size of the watershed; watersheds with drainage areas of less than 100 square miles are subject to more strict criteria as summarized below:

- Impervious surface densities limited to 25 percent over the entire watershed.
- Buffer/setback requirements equal to 100/150 feet within seven (7) mile radius of the intake and 50/75 feet outside the seven (7) mile radius; and

- A reservoir management plan (including 150 foot buffer around the perimeter of the reservoir).

Watersheds with drainage areas of 100 square miles or more are subject to less strict criteria as summarized below:

- An intake on a flowing stream (as opposed to being located within a reservoir) shall have no specified minimum criteria; and
- An intake with a water supply reservoir shall have a minimum of 100 feet natural buffer within a seven mile radius of the reservoir, and no impervious cover constructed within a 150 foot setback area on both banks of the stream.

EPD is also actively working toward meeting the national goal that, by the year 2005, 60 percent of the population served by community water systems will receive their water from systems with source water protection programs (SWPP) in place under both wellhead protection and watershed protection programs. EPD intends to accomplish this goal by developing and implementing a source water assessment program (SWAP) in alignment with EPA's initiatives.

Although the procedures and strategies of the new program are incomplete to date, the Drinking Water Program (DWP) will compile a statewide source water assessment plan soliciting input from the public and approval from EPA. The plan will specify how the state will delineate areas providing source waters for public water systems, identify origins of contaminants in delineated areas, determine the susceptibility of public water sources to the contaminants and provide the basis for local individual source water protection plans for each different public water system. Once the statewide plan is approved the DWP will be allowed the flexibility to help complete the local source water protection plans for contracted public water systems and provide financial and technical assistance to help develop long range source water protection strategies for the public water system. The Source Water Assessment program will build upon EPD's other assessment and prevention programs, including the Well Head Protection Program, the Vulnerability Assessment and Waiver Program and the River Basin Management Plans, by soliciting active public participation from the local communities and assist in the preparation of the local water system's protection plan.

### **Total Maximum Daily Loads**

Section 303(d) of the Clean Water Act (CWA) establishes the TMDL, or total maximum daily load, process as a tool to implement water quality standards. Georgia is required by the CWA to identify and list waterbodies where water quality standards are not met following the application of technology based controls, and to establish TMDLs for the listed stream segments. The USEPA is required to approve or disapprove Georgia's 303(d) list of waters and TMDLs.

The most recent requirement for 303(d) list submittal occurred in 2000. Georgia public noticed and submitted a draft 303(d) list package to the EPA in February 2000. The public and EPA reviewed the draft 303(d) list package and provided comments in March 2000. Georgia reviewed the input, made appropriate changes and submitted a final 303(d) listing to the EPA in April 2000. EPA approved the Georgia list in August 2000.

Georgia's 2000 303(d) listing is based on the Georgia 305(b) water quality assessments. The 305(b) assessment is presented in the report *Water Quality in Georgia, 1998-1999*. The 305(b) assessment tables are reprinted in Appendix E of this report. The tables provide a code indicating the 303(d) listing status of assessed segments within the Savannah River basin. An explanation of the codes is given below. An "X" in the 303(d) column indicates the segment is on the Georgia 303(d) list.

NA Waters assessed as supporting designated uses. These waters are not part of the Georgia 303(d) list.

- 1 Segments identified as not supporting or partially supporting designated uses where actions have been taken and compliance with water quality standards achieved. These segments are not part of the Georgia 303(d) list.
- 2 Segments identified as not supporting or partially supporting designated uses where existing enforceable State, local, or Federal requirements are expected to lead to attainment of water quality standards within two years without additional control strategies. These segments are not part of the Georgia 303(d) list.
- 3 Segments where TMDLs were completed and approved by EPA in 1998-2000. These waters are not part of the Georgia 303(d) list.
- X Waters on the Georgia 303(d) list. These segments are assessed as not supporting or partially supporting designated uses, and may require additional controls to achieve designated uses. These segments make up the Georgia 303(d) list.

Georgia will address a number of the listed waters in the 2000-2001 time period, however, the majority of work on segments in the Savannah River will be addressed in the next iteration or cycle of Savannah river basin planning in 2001-2005.

### **7.2.2 Management of Permitted Point Sources**

The strategies in this section strive to minimize adverse effects from municipal, industrial, and concentrated discharges. Permitted discharges of treated wastewater are managed via the National Pollutant Discharge Elimination system (NPDES) permit program. The NPDES permit program provides a basis for regulating municipal and industrial discharges, monitoring compliance with effluent limitations, and initiating appropriate enforcement action for violations. EPD has formulated general strategies for a number of types of environmental stressors under the NPDES program.

### **Analysis of Alternatives**

Applicants for new or expanded point source discharges into any surface water must perform an alternative analysis comparing the proposed discharge alternative to a "no discharge", land application or urban reuse alternative. The application for discharge to surface waters will only be considered if the less degrading alternatives are determined to be economically or technically infeasible. In all cases, existing instream water uses and the level of water quality necessary to protect the existing use shall be maintained and protected.

### **Permit Issuance/Reissuance Strategies**

During the basin plan implementation phase, issues identified in the written basin plan pertaining to point source discharges will be assessed. The assessment will include such things as 1) identified point source discharge problem areas, 2) data evaluations, 3) wasteload allocations and/or TMDLs with identified problem point sources, and 4) toxic pollutants identified with point source discharges. Permits associated with identified problems will be evaluated to determine if a reopening of the permit is appropriate to adequately address the problem.

### **Watershed Assessment Requirements**

A watershed assessment is generally initiated when, due to growth and development, a local government sees a need to increase the hydraulic capacity of an existing

wastewater treatment facility (or propose a new facility) and contacts the EPD for a NPDES permit modification. If an antidegradation review demonstrates that it is not feasible to handle the additional capacity needs with a land treatment or other no discharge system, the community may pursue an increase in its surface water discharge. The initial step in this process is the completion of a watershed assessment, which is the first step towards assuring that all water quality standards will be maintained throughout a watershed during both critical dry and wet weather conditions in response to both point and nonpoint source loads.

The watershed assessment is actually a study, an assessment, and a plan. It is about collecting data and learning relationships between what is going on in a watershed and how these activities (land uses, etc.) impact water quality, then using this knowledge to develop both short and long term plans designed to ensure the attainment of water quality standards. The assessment should address current conditions and consider projected land use changes. Only when it can be demonstrated that water quality standards are and will continue to be maintained, can the EPD prepare a defensible permit for a proposed new wastewater treatment facility or proposed hydraulic expansion of an existing wastewater treatment facility discharging to the watershed. The assessment should include a detailed plan to address both current water quality problems and any predicted future water quality problems. Key components of such a plan will likely be adopted by EPD as “special conditions” of the pertinent new or modified NPDES permit.

### **Facility Construction/Improvements**

EPD has promoted continuing improvement in the quality of return flows from permitted point sources in the basin. Upgrading wastewater treatment facilities is a significant strategy to meet effluent limits from discharges. In the past ten years, various upgrades and improvements have been made to industrial and municipal treatment systems throughout the Savannah River Basin. The funding for these projects has come from state and federal construction grants and loans and the citizens of local municipalities. Appendix C provides detailed information on expenditures by city and county governments on upgrading wastewater treatment facilities in the basin.

### **Domestic Wastewater Systems**

The collecting, treating and disposing of wastewater in Georgia is regulated by a number of environmental laws that are administered by various agencies in local and state government. When a local government or private concern (owner) identifies a need for a wastewater treatment and disposal system it is imperative that thorough and adequate planning take place.

Wastewater systems that discharge treated wastewater to a surface stream must be permitted through the federal National Pollution Discharge Elimination System (NPDES) and meet all the requirements of that system. In Georgia, with very few exceptions, surface discharge permits will only be issued to publicly owned systems.

Wastewater systems that do not result in a discharge to surface waters, such as slow rate land treatment systems and urban reuse systems (no discharge), are permitted through the State of Georgia’s land application system (LAS) permitting process. Both publicly and privately owned systems can apply for and receive LAS permits.

### **Chlorine**

If a chlorine limit is not already required in an NPDES permit, all major municipal wastewater facilities (i.e., those with design flows greater than or equal to 1.0 million gallons per day [MGD]) are required to meet a chronic toxicity-based chlorine limitation

when the permit comes up for routine reissuance. The limitation is calculated based on a maximum instream concentration of 0.011 mg/l, the facility's design flow, and the 7Q10 low flow of the receiving stream. No facilities are given a limitation higher than 0.5 mg/l as this is deemed to be an operationally achievable number even if a facility does not have dechlorination equipment installed. Facilities which are given a limitation more stringent than 0.5 mg/l which do not already have dechlorination equipment installed, are given up to a two year schedule in which to meet the limitation. All discharging facilities which are upgrading are required to meet a chlorine limitation as part of the upgrade, based on the same criteria noted above.

### **Ammonia**

Ammonia in effluents poses a problem both as a source of toxicity to aquatic life and as an oxygen-demanding waste. New facilities and facilities proposed for upgrade are required to meet ammonia limits for toxicity if those limits are more stringent than instream dissolved oxygen based limits. Existing facilities are not be required to meet ammonia limits based on calculated toxicity unless instream toxicity has been identified through toxicity testing.

### **Metals/Priority Pollutants**

Major municipal and industrial facilities are required to submit periodic priority pollutant scans to EPD as part of their permit monitoring requirements or upon submittal of a permit application for permit reissuance. The priority pollutant data is assessed in accordance with the Georgia Rules and Regulations for Water Quality Control. The results of the assessment can be used to trigger either additional priority pollutant monitoring, a toxicity reduction evaluation or permit limits for certain parameters.

### **Color**

The State's narrative water quality standard for color requires that all waters shall be free from material related to discharges which produce color which interferes with legitimate water uses. EPD's color strategy will address this standard for industrial and municipal discharges by implementing permit limits and/or color removal requirements. EPD requires new facilities or discharges to prevent any noticeable color effect on the receiving stream. EPD requires existing facilities with color in their effluent to collect upstream and downstream color samples when their NPDES permit is reissued. The facility must conduct an assessment of the sources of color. Also, a color removal evaluation may be required at permit reissuance. EPD will also target facilities for color removal requirements based on significant citizen complaints of discoloration in streams.

### **Phosphorus**

EPD establishes phosphorus control strategies where needed to address water bodies where water quality is limited by excess phosphorus loading. At the present time, there are no data to suggest phosphorus loading problems in the Savannah River basin.

### **Temperature**

Permits issued for facilities which discharge to primary trout streams are required to have no elevation of natural stream temperatures. Permits issued for facilities which discharge to secondary trout streams are required to not elevate the receiving stream more than 2 degrees Fahrenheit.

## **Storm Water Permitting**

The 1987 Amendments to the federal Clean Water Act require permits to be issued for certain types of discharges, with primary focus on runoff from industrial operations and large urban areas. The EPA promulgated Storm Water Regulations on November 16, 1990. EPD subsequently received delegation from the EPA in January 1991 to issue General Permits and regulate storm water in Georgia. EPD has developed and implemented a strategy which assures compliance with the federal regulations.

The “Phase I” Federal Regulations set specific application submittal requirements for large (population 250,000 or more) and medium (population 100,000 to 250,000) municipal separate storm sewer systems. Accordingly, Georgia has issued individual area-wide NPDES municipal separate storm sewer system (MS4) permits to 58 cities and counties in municipal areas with populations greater than 100,000 persons. These permits authorize the municipalities to discharge storm water from the MS4s which they own or operate, and incorporate detailed storm water management programs. These programs may include such measures as structural and non-structural controls, best management practices, inspections, enforcement and public education efforts. Storm water management ordinances, erosion and sediment control ordinances, development regulations and other local regulations provide the necessary legal authority to implement the storm water management programs. Illicit discharge detection and long-term wet weather sampling plans are also included in the management programs. The permit requires the submission of Annual Reports to EPD, describing the implementation of the storm water management program. Among other things, the Annual Report includes a detailed description of the municipality's implementation of its Storm Water Management Plan.

EPA’s Phase I Rule addresses only municipalities with populations greater than 100,000 people and construction sites larger than five acres. EPA is proposing a Phase II Rule for municipalities with populations less than 100,000 people and construction sites smaller than five acres. This rule is not expected to be finalized until at least March, 1999. The Phase II Rule will eventually impact some of the municipalities within the basin.

EPD has issued one general permit regulating storm water discharges for 10 of 11 federally regulated industrial subcategories defined in the Phase I Federal regulations. The eleventh subcategory, construction activities, will be covered under a separate general permit, which is not yet finalized. The general permit for industrial activities requires the submission a Notice of Intent (NOI) for coverage under the general permit, the preparation and implementation of a storm water pollution prevention plan, and in some cases, the monitoring of storm water discharges from the facility. As with the municipal storm water permits, implementation of site-specific best management practices is the preferred method for controlling storm water runoff.

### **7.2.3 Nonpoint Source Management**

The strategies in this section address sources of environmental stressors which are not subject to NPDES permitting and typically originate from diffuse or nonpoint sources associated with land uses. Most strategies that address nonpoint source concerns are not regulatory in nature, but involve a variety of approaches such as technical assistance and education to prevent and reduce nonpoint source pollution in the basin. Strong stakeholder involvement will be essential to effectively implement many of these strategies.

## **Georgia Nonpoint Source Management Program**

The Georgia Environmental Protection Division (EPD) has produced the Georgia Nonpoint Source Management Program (PFY98-02), which provides an overview of the State's nonpoint source water quality management activities as well as a summary of what the State intends to accomplish in the next five federal fiscal years. The Georgia Nonpoint Source Management Plan addresses the following categories of nonpoint source pollution loading: Agriculture (crops, pasture, animal operations, aquaculture), Silviculture, Construction, Urban Runoff, Resource Extraction/Exploration/Development, Land Disposal (Runoff/Leachate from Permitted Areas), Hydrologic/Habitat Modification, and Other.

## **Agricultural Nonpoint Source Control Strategies**

Agricultural nonpoint source pollution continues to be managed and controlled with a statewide non-regulatory approach. This approach uses cooperative partnerships with various agencies and a variety of programs. A brief description of these agencies and outline of their functions and programs is provided below.

### *Soil and Water Conservation Districts (SWCDs)*

Georgia's SWCDs were formed by Act No. 339 of the Georgia General Assembly on March 26, 1937. Their role is to provide leadership in the protection, conservation, and improvement of Georgia's soil, water, and related resources. This is accomplished through promotion efforts related to the voluntary adoption of agricultural best management practices (BMPs).

### *Georgia Soil and Water Conservation Commission (GSWCC)*

Georgia's SWCDs receive no annual appropriations and are not regulatory or enforcement agencies. Therefore, the GSWCC was also formed in 1937 to support the SWCDs. GSWCC has been designated as the administering or lead agency for agricultural nonpoint source (NPS) pollution prevention in the state. The GSWCC develops NPS water quality programs and conducts educational activities to promote conservation and protection of land and water resources devoted to agricultural uses. Primary functions of the GSWCC are to provide guidance and assistance to the Soil and Water Conservation Districts and provide education and oversight for the Georgia Erosion and Sedimentation Act.

There are a number of other agricultural agencies administering programs to address water quality and natural resource management issues. Resource Conservation and Development (RC&D) Councils are organized groups of local citizens—supported by USDA—involved in a program to encourage economic development, as well as the wise conservation of natural and human resources. The University of Georgia College of Agricultural and Environmental Sciences (CAES) conducts an education and outreach campaign that encourages producers to increase productivity using environmentally sound techniques. This is accomplished through a number of programs like Farm\*A\*Syst, Well Water Testing, Nutrient Management, Soil and Water Laboratory Analysis, and informational material on a wide range of subjects. Georgia's Department of Agriculture (GDA) administers a wide variety of insect and plant disease control programs to help regulate the use of pesticides. GDA also inspects irrigation system requirements, such as check valves and back flow prevention devices, for protection of groundwater. The Agricultural Research Service (ARS) conducts research designed to improve the effectiveness of agricultural conservation techniques and promote sustainability. The Natural Resources Conservation Service (NRCS), along with the Farm Services Agency (FSA) and through local Soil and Water Conservation Districts,

administers Farm Bill Programs that provide technical and financial incentives to producers to implement agricultural BMPs. The Agricultural Water Use Coordinating Committee, through its individual members regularly applies for, and receives, funds under section 319(h) of the Clean Water Act to best management practices and demonstration projects throughout the state. The Georgia Soil and Water Conservation Commission has provided state leadership with many of these efforts.

Collectively, these programs will serve to address resource concerns related to agricultural land uses in a coordinated fashion over the next five years until the second iteration of the River Basin Management Planning Cycle. Much of the information regarding opportunities to participate under this voluntary approach to complying with water quality standards is disseminated through commodity commissions and organizations such as the Farm Bureau Federation, Agribusiness Council, Cattlemen's Association, Milk Producers Association, Pork Producers Association, Poultry Federation, and other agricultural support industries.

#### *Prioritization Activities under the Farm Bill*

The 1996 Farm Bill provides a number of programs, and processes, designed to address those environmental stressors related to nonpoint sources from Agriculture which were identified in section 4.1.2. A new flagship conservation program, the Environmental Quality Incentives Program (EQIP), will provide the lion's share of funding for technical, educational, and financial assistance. The USDA Natural Resources Conservation Service (NRCS) has leadership for EQIP and works with the USDA Farm Service Agency (FSA) to set policies, priorities, and guidelines. These two agencies take recommendations from local work groups and a State Technical Committee, comprised of resource professionals from a variety of disciplines, when addressing actual, and potential, resource impairments associated with agricultural land uses.

EQIP provides incentive payments and cost-sharing for conservation practices through 5 to 10 year contracts. Producers may receive federal cost-sharing up to 75 percent of the average cost of certain conservation practices such as terraces, grassed waterways, filter strips, buffer strips, manure management facilities, animal waste utilization, and 46 other conservation practices important to improving and maintaining the health of natural resources in an area. An individual producer can receive as much as \$50,000 in EQIP funds to implement needed conservation practices.

A majority of funds allocated to Georgia (65 percent) will be spent in priority areas where there are serious and critical environmental needs and concerns. High priority is given to areas where state and local governments offer financial and technical assistance, and where agricultural improvements will help meet water quality and other environmental objectives.

The remaining 35 percent of funds allocated to Georgia can be extended outside priority areas to other parts of the state. Eligibility is limited to persons who are engaged in agricultural productions. Eligible land includes cropland, pastureland, forestland, and other farm lands.

In addition to EQIP there are three major conservation programs from USDA that will be available to producers, and rural landowners. The first is the Conservation Reserve Program (CRP), which protects highly erodible and environmentally sensitive land with grass, trees, and other long-term cover. The Wetland Reserve Program (WRP) is a voluntary program designed to protect, restore, and enhance wetlands with cost-share incentives. Also, the Wildlife Habitat Incentives Program (WHIP) will help landowners develop and improve habitats for upland wildlife, wetland wildlife, endangered species, fisheries, and other wildlife.

## **Forestry Nonpoint Source Control Strategies**

In 1977, the Governor's Silviculture Task Force prepared a report which recommended a voluntary approach to the implementation of best management practices (BMPs) and the designation of the Georgia Forestry Commission (GFC) as the lead agency for implementing the Silviculture portion of the State Section 208 Water Quality Management Plan. The GFC was designated as the lead agency for silvicultural nonpoint source pollution prevention in the state in November, 1979. The Forestry Nonpoint Source Control Program is managed and implemented by the GFC, with the support of the forest industry, for the voluntary implementation of best management practices.

The Forestry Nonpoint Source Control Program is managed by a Statewide Coordinator and appointed foresters serving as District Coordinators from each of the 12 GFC districts. The Statewide and District Coordinators conduct educational workshops, training programs and field demonstrations for the forest community (i.e., landowners, land management and procurement foresters, consulting foresters, timber buyers, loggers, site preparation contractors). The GFC investigates and mediates complaints involving forestry operations. In addition, the GFC conducts BMP compliance surveys to assess the effectiveness of BMP in the forest community. The GFC has established procedures for installing water control structures in firebreaks to reduce soil erosion and sedimentation.

Recently, the State Board of Registration for Foresters adopted procedures to sanction or revoke the licenses of professional foresters involved in unresolved complaints where the lack of BMP implementation has resulted in state water quality or federal wetlands requirement violations.

Additional requirements are imposed within the National Forest areas of Georgia. Each National Forest produces and regularly updates and Land and Resource Management Plan to guide timber harvest and other activities. These plans establish long range goals and objectives; specific management prescriptions and the vicinity in which they will occur; standards and guidelines on how management prescriptions will be applied; and monitoring procedures to assure the Plan is followed.

## **Urban Nonpoint Source Control Strategies**

The 1990 report of the Community Stream Management Task Force, *We All Live Downstream*, established a road map for urban nonpoint source management in Georgia. The Task Force recognized two major impediments to effectively managing the quality of urban water bodies. The first is the division between 1) statutory responsibilities for management of water quality, granted to EPD, and 2) local government's Constitutional responsibility for management of the land activities which affect urban water bodies. The second impediment is the widespread nature of the nonpoint sources and the variety of activities which may contribute to impacts from urban runoff. They concluded that management of urban nonpoint source pollution 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."

EPD has a primary role in facilitating the management of urban runoff, and is responsible for administering and enforcing a variety of permit programs, including permitting of discharges. In addition to these regulatory activities, EPD seeks to assist in development of local solutions to water quality problems; provides technical information on the water resources of the state; and administers grant programs, with funds from various sources to support non-point source planning and assessment, implementation of

BMPs, and regional or local watershed management initiatives. EPD also conducts a variety of outreach and educational activities addressing urban runoff in general, regulatory requirements, and cooperative or non-regulatory approaches.

For urban runoff, activities of the Nonpoint Source Management Program interact strongly with point source controls for combined sewers and storm sewers, both of which discharge urban runoff through point conveyances. 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. EPD is implementing programs which go beyond traditional regulation, providing the regulated community with greater flexibility and responsibility for determining management practices. Current activities for urban surface runoff control include the following:

- Implement local nonpoint source (NPS) management programs, streambank and stream restoration activities, and community Adopt-A-Stream programs.
- Develop and disseminate local watershed planning and management procedures.
- Implement state and local Erosion and Sedimentation Control Programs.
- Prepare and disseminate technical information on best management practices and nonpoint source monitoring and assessment.
- Implement NPS education programs for grades K through 12 through Project WET (Water Education for Teachers), as described below in Section 7.3.6.
- Implement the Georgia Adopt-A-Stream Program, as described in Section 7.3.6.
- Identify and evaluate resources to support urban watershed planning and management.

## **7.2.4 Floodplain Management**

### **Floodplain Management Strategies**

Floodplain Management in the State of Georgia is administered under federal regulations and local ordinances. The federal statutes are found in Title 44 of the Code of Federal Regulations Parts 59-79. As a condition of participation in the National Flood Insurance Program (NFIP), local political jurisdictions voluntarily adopt Flood Damage Prevention Ordinances, which are based on federal regulations, to enforce and administer floodplain development. Georgia's Floodplain Management Office does not issue permits for floodplain development.

Georgia's Floodplain Management Office, located within the Department of Natural Resources, Environmental Protection Division, serves as liaison between the Federal Emergency Management Agency (FEMA) and local communities participating in the NFIP. However, Georgia's Floodplain Management Office has no regulatory authority. Participation by the local communities in the NFIP is a requirement for the Federal Government to make flood insurance available to all property owners. Through workshops, newsletters, technical assistance and community visits, the Floodplain Management Office assists local governments to maintain compliance with NFIP requirements. The Floodplain Management Office also provides technical data, floodplain maps, and training workshops to various public and private entities involved in floodplain management and floodplain determinations. In addition, the Floodplain Management Office reviews all state-funded and federal-funded projects for development in designated Special Flood Hazard Areas. A major thrust of the Floodplain Management Office is to increase the number of political jurisdictions participating in the NFIP, thereby increasing the number of flood insured structures in Georgia.

## **River Care 2000 Program**

Georgia also has strategies to protect and manage riparian floodplain areas. Of particular relevance is River Care 2000, a conservation program which Governor Miller established in September 1995. One key objective of this program is acquisition of river-corridor lands for purposes of protection and to forestall unwise development in flood-prone areas. The Coordinating Committee has approved procedures for three types of projects: Riverway Demonstration Projects, which improve public access to a river with scenic and recreation uses, and protects natural and historic resources by acquiring and managing land in the river corridor; Significant Sites, which are tracts of land which DNR will acquire and operate as a traditional state public-use facility: wildlife management or public fishing area, park or historic site, natural area, or greenway; and Restoration Sites, which are tracts of land which the state will identify, acquire, and manage to reduce nonpoint-source water pollution.

The River Care 2000 program is also charged with assessing important river resources throughout the state and identifying more effective management tools for river corridors. The program recently released a state-wide assessment of resources associated with rivers throughout the state (GA DNR, 1998).

### **7.2.5 Wetland Management Strategies**

The loss of wetlands, because of the associated adverse impacts to flood control, water quality, aquatic wildlife habitat, rare and endangered species habitat, aesthetics, and recreational benefits, has become an issue of increasing concern to the general public as they become better informed of the values and functions of wetlands. We still suffer from the lack of accurate assessments for current and historic wetland acreage, but, regardless of the method used to measure total acreage or wetland losses, Georgia still retains the highest percentage of precolonial wetland acreage of any southeastern state.

#### **Efforts to Track No Net Loss of Wetlands**

While the 1993 Federal Administration Wetlands Plan calls for a concerted effort by EPA and other federal agencies to work cooperatively toward achieving a no overall net loss of wetlands in the short term and a net increase in the quantity of the nation's wetlands in the long run, there have been no statutory or executive level directives to carry out this policy. Achievement of the goal of no net loss is dependent upon limited changes to regulations, memoranda of understanding, cooperative agreements, and other partnerships between federal, state, and local governments, conservation organizations, and private citizens.

All dredge and fill activities in freshwater wetlands are regulated in Georgia by the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act. The majority of wetland alterations occur under nationwide or general permits, which include permits for bridge building, minor road crossing fills, and fills of less than ten acres above the "headwaters" point of non-tidal streams where the annual average flow is less than 5 cubic feet per second. Enforcement is carried out by the COE and EPA in freshwater wetlands. Normal agricultural and silvicultural operations are exempted under Section 404 regulations.

The COE may require wetland mitigation activities in association were permitting, including creation, restoration, and protection of wetlands. COE may also require wetland restoration in case of violations. In the settlement of violations, restorations occurred on 16.8 acres in 1994, and 17.8 acres in 1995.

## **Land Acquisition**

The Department of Natural Resources (DNR), Wildlife Resources Division (WRD), began a land acquisition program in 1987 to acquire 60,000 acres of additional lands for Wildlife Management Areas (WMAs) and Public Fishing Areas (PFAs). This initiative was funded by \$30 million of 20-year obligation bonds to be paid off by hunting and fishing license increases and WMA permit fees.

Beginning in 1990 Governor Zell Miller initiated Preservation 2000, a \$60 million program to acquire 100,000 acres of lands to be used for wildlife and fisheries management, parks and recreation, natural area preservation, and general conservation. Additional wetlands acquisition occurs as part of the River Care 2000 initiative, discussed above.

### **7.2.6 Stakeholder Involvement/Stewardship Strategies**

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 corrective actions which may be taken. Stakeholder involvement and stewardship are essential to address these major challenges.

Georgia has chosen a two-pronged approach to encourage stewardship via education and citizen monitoring. EPD is the lead agency in these education and citizen monitoring programs, but, like other aspects of the state's nonpoint source management effort, cooperative efforts with local governments and community-based groups are critical to their implementation. Outreach and education, including citizen monitoring, lays the groundwork for behavior change and is often an important pre-requisite for effective implementation of BMPs and comprehensive watershed management programs.

General goals for stakeholder involvement and stewardship strategies are:

- Generate local support for nonpoint source management through public involvement and monitoring of streams and other water bodies and of results of management actions.
- Increase individual's awareness of how they contribute to nonpoint source pollution problems and implement appropriate strategies to motivate behavior change and actions to address those problems.
- Provide the educational tools, assistance, and support for addressing NPS problems to target audiences across the state.

### **Georgia Adopt-A-Stream**

The Georgia Adopt-A-Stream Program is a citizen monitoring and stream protection program with two staff positions in the EPD 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 allow the Georgia Adopt-A-Stream Program to be accessible to all areas of the State. The Regional Training Centers ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control. Savannah State University provides training and technical support at the regional level for the lower portions of the Savannah River Basin.

Currently, more than 7,000 volunteers participate in individual and community sponsored Adopt-A-Stream Programs. The existing community Adopt-A-Stream

Programs in the Savannah River Basin are located in Augusta (Richmond County), Hiawassee (Townsend County), Savannah (Chatham County) and Springfield (Effingham County).

Volunteers are offered different levels of involvement. Each level involves an education and action component on a local stream. Volunteers commit for a minimum of one year on a half-mile stream segment. The introductory consists of setting up a project (i.e., identifying a stream segment 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 one public outreach activity. 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 a habitat improvement project.

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 the Georgia Adopt-A-Stream Program” and “Watershed Walk” videos have been produced, duplicated and distributed on loan. The Georgia Adopt-A-Stream Program 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, reports about local watershed projects, and success stories.

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

### **Nonpoint Source Education: Project WET (Water Education for Teachers)**

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 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, EPD decided to initially target nonpoint source education efforts toward educators and students in grades K-12. As described above, EPD is currently targeting initial nonpoint education efforts towards both formal and non-formal educators.

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

Since 1997, several Project WET Facilitator Training Workshops have been successfully completed in Athens, Atlanta, Dahlonega, Macon, Savannah, Valdosta, and Warner Robins with a total of 141 Project WET Facilitators trained in Georgia. In addition, over 115 Project WET Educator Workshops have been successfully completed in Georgia with more than 2,000 educators implementing the Project WET Curriculum statewide.

Currently in the Savannah River Basin, there are 21 Project WET Facilitators with over 250 educators having received certified Project WET training. In addition, Oatland Island Environmental Education Center educators are certified Project WET Facilitators and conduct Project WET workshops for educators in the lower portions of the Savannah River Basin.

Georgia Project WET provides facilitators and educators the use of additional water resources such as the Enviroscape Module and the Ground Water Module, demonstration tools used to emphasize the impact of nonpoint source pollution to surface and ground waters pollution. In addition, the newsletter, “The Dragonfly Gazette,” is published and distributed quarterly to over 2500 teachers and environmental educators.

The Georgia Project WET Program has been nationally recognized for its training strengths and techniques – specifically the use of arts in environmental education. The Georgia Project WET Program in conjunction with 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, Rob Hass, and the International Children’s Art Museum. Annually, only eight students are selected as the National Grand Prize winners to be honored at the Library of Congress in Washington, DC and treated to many V.I.P. tours of the nation’s capital. Since 1997, five students from Georgia have been recognized as National Grand Prize Winners and an additional 20 students from Georgia have been as National Finalists.

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

### **7.2.7 Ground Water Protection Strategies**

In 1984, EPD developed its first management plan to guide the management and protection of Georgia’s ground water quantity and quality. The current version, Georgia Geologic Survey Circular 11, published in 1996, is the basis of Georgia’s application to be certified by U.S. EPA for a Comprehensive State Ground Water Protection Plan (CSGWPP). The goal of Georgia’s ground water management plan is:

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

The goal recognizes that not all ground water is of the same value. The Division’s goal is primarily preventive, rather than curative; but it recognizes that nearly all ground water in the state is usable for drinking water purposes and should remain so. EPD pursues this goal through a policy of anti-degradation by which ground water resources are prevented from deteriorating significantly, preserving them for present and future generations. Selection of this goal means that aquifers are protected to varying degrees according to their value and vulnerability, as well as their existing quality, current use, and potential for future use.

EPD has adequate legal authority to prevent ground water from being significantly polluted and to clean-up ground water in the unlikely event pollution were to occur. Extensive monitoring has shown that incidents of ground water pollution or contamination are uncommon in Georgia; no part of the population is known to be at risk.

In general, the prevention of ground water pollution includes—(1) the proper siting, construction, and operation of environmental facilities and activities through a permitting system; (2) implementation of environmental planning criteria by incorporation in land-use planning by local government; (3) implementation of a Wellhead Protection Program for municipal drinking water wells; (4) detection and mitigation of existing problems; (5) development of other protective standards, as appropriate, where permits are not required; and (6) education of the public to the consequences of ground water contamination and the need for ground water protection.

Ground water pollution is prevented in Georgia through various regulatory programs (administered by the State’s Department of Natural Resources) which regulate the proper siting, construction, and operation of the following:

- Public water supply wells, large irrigation wells and industrial wells withdrawing more than 100,000 gallons per day.
- Injection wells of all types.
- Oil and gas wells (including oil and gas production).
- Solid waste handling facilities.
- Hazardous waste treatment/storage/disposal facilities.
- Municipal and industrial land treatment facilities for waste and wastewater sludge.
- Municipal and industrial discharges to rivers and streams.
- Storage/concentration/burial of radioactive wastes.
- Underground storage tanks.

EPD prevents the contamination of ground water used for municipal drinking water through an EPA-approved Wellhead Protection Program. As a result of this program, certain new potentially polluting facilities or operations are restricted from wellhead protection areas, or are subject to higher standards of operation and/or construction. EPD also encourages local governments to adhere to the *Criteria for the Protection of Groundwater Recharge Areas* (a section of the Rules for Environmental Planning Criteria), which define higher standards for facility siting, operation, and clean-up in significant ground water recharge areas. The most stringent guidelines of these criteria pertain to those recharge areas with above average ground water pollution susceptibility indexes.

Additionally, EPD has legal authority under the Georgia Water Quality Control Act to clean up ground water pollution incidents. Additional clean up authority occurs as special trust funds established to clean up leaking underground storage tanks, abandoned hazardous waste sites, and scrap tire dumps.

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

## 7.3 Targeted Management Strategies

This section describes specific management strategies targeted to address concerns and priority issues for the Savannah River Basin that were described in Section 6. Strategies are presented for each issue of concern, with divisions by geographic area and/or HUC unit as appropriate. For each of the identified concerns, the management strategy consists of five components: a problem statement (identical to that given in Section 6), general goals, ongoing efforts, identified gaps and needs, and strategies for action. The purpose of these statements is to provide a starting point for key participants in the subbasin to work together and implement strategies for addressing each priority concern. In some cases, a strategy may simply consist of increased monitoring; in other situations, the stakeholders in the subbasin will need to develop innovative solutions to these water quality issues. While EPD will continue to provide technical oversight, conduct monitoring surveys as needed, and evaluate data on a basin-wide scale, locally-led efforts in the subbasins will be required to help to monitor, assess, restore, and maintain the water quality throughout the Savannah River Basin.

### 7.3.1 Metals and Toxicity

#### Tugalo River Subbasin (Hydrologic Unit 03060102)

##### *Problem Statement*

**Metals:** The water use classification of fishing was not fully supported in one segment of Eastanollee Creek due to exceedences of water quality standards for copper and zinc due to a combination of nonpoint runoff and the discharges from the Toccoa Eastanollee Creek WPCP and Coats American WTF.

**Toxicity:** The water use classification of fishing was not fully supported in one segment of Eastanollee Creek due to predicted toxicity. Aquatic toxicity tests on the Coats American WTF effluent predicted toxicity in the receiving stream at critical 7Q10 low flows.

##### *General Goals*

Meet applicable water quality standards; ensure that levels of metals and predicted effluent toxicity do not interfere with support of Eastanollee Creek's designated stream classification of fishing.

##### *Ongoing Efforts*

The City of Toccoa is under Federal and State Consent Orders requiring facility upgrades and sewerage system improvements to address metals issues. Coats American is constructing a wetland system to replace its current discharge to Eastanollee Creek. These efforts, when completed, should result in the water quality standards being met in Eastanollee Creek.

##### *Identified Gaps and Needs*

**Metals:** EPD will conduct follow-up monitoring of Eastanollee Creek during the next basin monitoring cycle to assess copper and zinc concentrations in the creek.

**Toxicity:** Once Coats American has completed the construction of its constructed wetland system, the industry will be required to conduct follow-up toxicity testing on the wetlands system discharge.

### *General Strategies for Action*

First address point source problems, then determine additional efforts required for nonpoint sources.

### *Specific Management Objectives*

1. Bring point sources into compliance.
2. Monitor to assess achievement of water quality standards or need for further reductions from nonpoint sources.
3. Encourage local government watershed planning and management to ensure that designated water uses are supported.

### *Action Plan*

1. The City of Toccoa has completed the upgrades to its wastewater treatment plants as required by the Order and is currently in compliance with its NPDES Permit. EPD will continue to monitor the compliance through monthly discharge monitoring reports submitted by the city.
2. Coats American completed the constructed wetland system as of 9/1/99.
3. EPA finalized a TMDL for zinc in Eastanolle Creek in March 2000.
4. EPD will implement the TMDL.
5. EPD will work with local governments to secure voluntary efforts to reduce potential nonpoint source for metals.

## **Upper Savannah River Subbasin (Hydrologic Unit 03060103)**

### *Problem Statement*

The water use classification of fishing was not fully supported in one segment of Cedar Creek due to an exceedence of the water quality standard for zinc due primarily to the City of Hartwell WPCP.

### *General Goals*

Meet applicable water quality standards; ensure that the discharge does not interfere with support of Cedar Creek's designated stream classification of fishing.

### *Ongoing Efforts*

The City of Hartwell WPCP discharge was eliminated June 1999.

### *Identified Gaps and needs*

*Metals:* EPD will conduct follow-up monitoring of Cedar Creek during the next basin monitoring cycle to assess zinc concentrations in the creek.

### *General Strategies for Action*

Re-evaluate water quality status during the next monitoring cycle to determine if further management is required.

### *Specific Management Objectives*

Monitor zinc concentrations in Cedar Creek during the next monitoring cycle to assess water quality status. If water quality standards are not met, work with the City of Hartwell to identify the causes and sources of impairment and develop and implement additional management measures.

### *Action Plan*

The City of Hartwell is required through a Consent Order to conduct stream studies to document improved water quality in Cedar Creek as the result of the elimination of the WPCP discharge. EPD will monitor the City's compliance with this Consent Order. Once the stream studies have been completed, EPD will review the results and make a determination if further action is needed to bring Cedar Creek into compliance with the water quality standards for fishing.

## **Middle Savannah River Subbasin (Hydrologic Unit 03060106)**

### *Problem Statement*

*Metals:* The water use classification of fishing was not fully supported in one segment of Butler Creek due to exceedences of water quality standards for selenium due to nonpoint sources and the discharge from the City of Augusta WPCP.

*Toxicity:* The water use classification of fishing was not fully supported in one segment of Rocky Creek due to toxicity resulting from runoff and groundwater leaching from the Southern Wood Piedmont facility.

### *General Goals*

Meet applicable water quality standards; ensure that levels of metals and toxicity do not interfere with support the designated stream classification of fishing in each creek.

### *Ongoing Efforts*

*Metals:* The City of Augusta WPCP upgraded to a constructed wetlands system. The City also eliminated all CSOs from its sewer system. The City has also revised its local limits (part of its Industrial Pretreatment Program) resulting more stringent limits for industrial users its sewer system.

*Toxicity:* The Southern Wood Piedmont site is being remediated in accordance with an EPD Order.

### *Identified Gaps and Needs*

*Metals:* EPD will conduct follow-up sampling of Butler Creek during the next monitoring cycle to assess selenium concentrations in Butler Creek.

*Toxicity:* EPD will continue to monitor the Southern Wood Piedmont remediation project to ensure its completion.

### *General Strategies for Action*

EPD assess water quality during the next monitoring cycle to determine if current efforts have resulted in achievement of water quality standards or if further actions are necessary.

### *Specific Management Objectives*

Monitor selenium concentrations in Butler Creek during the next monitoring cycle to assess current water quality status. If water quality standards are not met, work with the City of Augusta and other stakeholders to identify the causes of impairment and develop and implement additional management measures.

### *Action Plan*

1. EPD will monitor selenium concentration in Butler Creek during the next monitoring cycle.

2. EPD will monitor the Southern Wood Piedmont remediation project to ensure that the project is completed on time.

### **Brier Creek Subbasin (Hydrologic Unit 03060108)**

#### *Problem Statement*

*Toxicity:* The water use classification of fishing was not fully supported in one segment of Whites Creek. Aquatic toxicity tests of the City of Thomson WPCP effluent predicted toxicity in the receiving stream at critical 7Q10 low flow conditions.

#### *General Goals*

Eliminate predicted toxicity to support designated stream classification of fishing.

#### *Ongoing Efforts*

The City of Thomson WPCP is under Order to pay stipulated penalties for whole effluent toxicity limit violations. EPA and UGA scientists are currently evaluating potential sources of toxicity.

#### *Identified Gaps and needs*

Addressing the predicted toxicity in the Thomson WPCP effluent will require additional studies of the wastewaters being discharged to the city sewer system.

#### *General Strategies for Action*

EPD will continue to enforce the facility NPDES permit and Consent Order.

#### *Specific Management Objectives*

Evaluate findings of toxicity sources identification study and require the City of Thomson to implement measures to reduce toxicity in the Thomson WPCP effluent.

#### *Action Plan*

1. Once EPA/UGA completes their evaluation, EPD will formulate a strategy to ensure that the recommendations/findings are addressed by the City of Thomson.
2. EPA finalized a TMDL for toxicity for Whites Creek in March 2000.
3. EPD will implement the TMDL.

### **Lower Savannah River (Hydrologic Unit 03060109)**

#### *Problem Statement*

The water use classification of fishing was not fully supported in one segment of Buck Creek due to exceedences of water quality standards for copper due to nonpoint sources and the City of Sylvania WPCP discharge.

#### *General Goals*

Meet water quality standards to support designated stream classification of fishing.

#### *Ongoing Efforts*

The City of Sylvania WPCP is now in compliance with its copper limits. Major industrial user has reduced its copper discharge to the City.

#### *Identified Gaps and needs*

EPD will monitor copper in Buck Creek during the next monitoring cycle in order to assess current water quality status.

*General Strategies for Action*

EPD will assess water quality during the next monitoring cycle to determine if ongoing efforts result in achievement of water quality standards or if further actions are necessary.

*Specific Management Objectives*

Monitor copper concentrations Buck Creek during the next monitoring cycle to assess current water quality status. If water quality standards are not met, work with the City of Sylvania and other stakeholders to identify the causes and sources of impairment and develop and implement additional management measures.

*Action Plan*

Monitor copper concentrations during the next monitoring cycle.

**7.3.2 Fecal Coliform Bacteria****Problem Statement**

The water use classifications of fishing, wild/scenic, or drinking water were not fully supported in several water body segments due to exceedences of the water quality standards for fecal coliform bacteria. These water quality exceedences are found in a number of stream segments in the Savannah River basin and are primarily attributed to urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources, and/or animal wastes. A common strategy is proposed for addressing fecal coliform bacteria throughout the basin. However, achieving standards in individual stream segments will depend on the development of site specific local management plans.

*Tugaloo River Subbasin (Hydrologic Unit 03060102)*

The water use classifications of fishing or wild/scenic were not fully supported in six tributary stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources, and/or animal wastes.

Animal waste may contribute high loads of bacterial and microbial pathogens. The 1993 Watershed Nonpoint Source Assessment (NRCS) targeted the Tugaloo subbasin for generating the second highest load of animal waste (1,626,669 tons of waste per year) in the Savannah River basin. Because this subbasin contains the least agricultural land area (48,000 total acres in 1997), the animal waste may be concentrated in large-scale confined animal feeding operations (CAFOs) or may possibly be applied to a higher percentage of the total agricultural land.

*Upper Savannah River Subbasin (Hydrologic Unit 03060103)*

The water use classification of fishing was not fully supported in five tributary stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes.

*Broad River Subbasin (Hydrologic Unit 03060104)*

The water use classification of fishing was not fully supported in five stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes.

Animal waste may contribute high loads of bacterial and microbial pathogens. The 1993 Watershed Nonpoint Source Assessment (NRCS) reported that the Broad River subbasin generates the highest load of animal waste (8,888,655 tons of waste per year) in the Savannah River basin. This subbasin contains approximately 238,000 total acres of agricultural land, some of which is partially used for grazing animals, concentrated animal feeding operations, and animal waste application.

*Little River Subbasin (Hydrologic Unit 03060105)*

The water use classification of fishing was not fully supported in three stream segment due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources, and/or animal wastes.

*Middle Savannah River Subbasin (Hydrologic Unit 03060106)*

The water use classifications of fishing and/or drinking water were not fully supported in one Savannah River mainstem segment and seven tributary stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources, and/or animal wastes.

*Brier Creek Subbasin (Hydrologic Unit 03060108)*

The water use classification of fishing was not fully supported in three stream segments (Brier Creek, Brushy Creek and Reedy Creek) due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources, and/or animal wastes.

*Lower Savannah River Subbasin (Hydrologic Unit 03060109)*

The water use classifications of fishing and/or coastal fishing were not fully supported in one tributary stream segment (Runs Branch) and one estuarine harbor (Savannah Harbor) due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources, and/or animal wastes.

## **General Goals**

Meet water quality standards to support designated water uses and increase public awareness of fecal coliform bacterial pollution prevention through coordinated education and outreach efforts.

## **Ongoing Efforts**

The primary sources of exceedence of water quality standards for fecal coliform bacteria in the Savannah River basin are urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources, and/or animal wastes.

EPD administers and enforces a variety of permit programs designed to facilitate the management of urban runoff, including both point and nonpoint source controls. EPD's Nonpoint Source Program regulates municipal and industrial storm water discharges through the National Pollutant Discharge Elimination System (NPDES) permitting process. Sanitary sewer overflows are managed through EPD's Permitting Compliance and Enforcement Program. Animal wastes in Georgia are addressed through the Memorandum of Agreement (MOA) with NRCS and SWCC, and through recently adopted rules designed to regulate Concentrated Animal Feeding Operations (CAFOs)

for swine. This includes a requirement for certain operations to obtain individual NPDES permits.

In addition to regulatory activities, EPD assists in the development of local solutions to water quality problems by administering grant programs and providing technical assistance to various regional and local watershed management initiatives. EPD also conducts a variety of outreach and public education programs addressing urban runoff in general, point and Nonpoint source pollution, BMP implementation, regulatory requirements, and cooperative or nonregulatory approaches.

The Georgia Department of Human Resources (DHR) Division of Public Health - Environmental Services has promulgated new rules (O.C.G.A Chapter 290.5.26) to regulate the design, operation, and maintenance of on-site sewage management systems. DHR subsequently formed the On-site Sewage Management Systems Technical Review Committee in 1999. The Committee's function will be to make recommendations to DHR regarding the approval of new systems, assist DHR with the development and revision of standards and guidelines for new technology, assist with the adoption of periodic updates to the Manual for On-Site Sewage Management Systems, and serve as the final authority in contested interpretation issues regarding the Rules and the Manual for On-site Sewage Management Systems.

EPA Region IV initiated the Savannah River Basin Watershed Project in 1992. EPA, along with Georgia and South Carolina water quality agencies and other basin stakeholders, developed the project with the following goal: "To manage the Savannah River Basin using comprehensive management to conserve, restore, enhance, and protect it's ecosystems, especially aquatic ecosystems, in a way that allows the balancing of multiple uses". A number of committees consisting of interested stakeholders have completed Baseline Assessments which were used to develop an Initial Assessment Report. The Initial Assessment Report is the basis for the development of a watershed strategy for the Savannah River Basin. The watershed strategy will identify the highest priority issues, describe specific actions to address those issues, and coordinate cooperative efforts by project participants.

Eight Resource Conservation and Development (RC&D) Councils, four of which are in Georgia, are mobilizing to develop needed implementation measures identified in the Savannah River Watershed Project's Nonpoint Source Action Plan in the Tugaloo, Upper Savannah, Middle Savannah, Lower Savannah, Broad, and Little River subbasins.

The U.S. Army Corps of Engineers - Savannah District initiated the first phase of a two-phased comprehensive water resources study of the Savannah River Basin in 1998. The study was designed to "develop an updated plan addressing current and future needs in the basin, examine reallocation of storage at Corps of Engineers multi-purpose projects, and to develop a better management structure to address basin water resources. The study will complement and the Georgia River Basin Management Planning Process and the EPA's Savannah River Basin Watershed Project and will become a major tool to use in helping to accomplish portions of the EPD Basin Plan and the EPA Watershed Study's goals and objectives.

The University of Georgia College of Agriculture and Environmental Sciences' Animal Waste Awareness in Research & Extension (AWARE) program conducts research on animal waste management and provides public education through Southeast Sustainable Animal Waste Workshops and a variety of Internet publications.

Local Soil and Water Conservation Districts and RC&D Councils are working with producers to utilize animal waste according to Nutrient Management Plans through their Lagoon Pumpout Program in the Tugaloo, Upper Savannah, Middle Savannah, Lower Savannah, Broad and Little River subbasins.

Agriculture is making progress in controlling bacterial loads. Considerable effort has been directed toward animal confinement areas. Georgia Universities and agricultural agencies or groups are conducting several agricultural efforts with statewide implementations. Sustainable Agriculture and Farm\*A\*Syst Training will be scheduled within the basin. The University of Georgia and ARS have proposals for assessing nutrient and fecal coliform bacteria reducing BMPs on 10 farms that will have statewide implications. Soil and Water Conservation Districts annually convene Local Work Groups (LWGs) which are comprised of resource professionals from a variety of disciplines and interested stakeholders at the local level, to identify resource concerns in their areas. The LWGs develop proposals for USDA or other funding to address identified resource concerns.

The NRCS, along with support from the GSWCC and Georgia's Agricultural Community, is conducting watershed assessments to quantify agricultural NPS pollution in the Tugaloo and Little River subbasins.

The Georgia Soil & Water Conservation Commission (GSWCC) is demonstrating agricultural BMPs related to animal operations in the Tugaloo and Broad River subbasins.

The Chestatee-Chattahoochee Rivers RC&D is demonstrating the benefits of conservation buffers in the Tugaloo and Broad River subbasins and has also developed a proposal to demonstrate BMPs in tributaries of Lake Hartwell.

The Stephens County SWCD is implementing a watershed protection plan for Eastanollee Creek in the Tugaloo River subbasin.

The Little River is a Priority Area for USDA Cost-Share funds to implement agricultural BMPs through NRCS' EQIP Program.

The University of Georgia is testing agricultural uses of municipal biosolids in the Middle Savannah River subbasin.

The Coastal RC&D Council is demonstrating a watershed approach for agricultural BMP implementation in the Ebenezer Creek Watershed and is also demonstrating the benefits of conservation buffers in the Lower Savannah River subbasin.

### **Identified Gaps and Needs**

Sources of fecal coliform bacteria in many stream segments are not clearly defined. In some cases, fecal bacterial loads may be attributable to natural sources (e.g. wildlife); alternative bacteriological sampling methods may be useful to distinguish between human, other mammalian, and avian fecal coliform sources. Sanitary sewer leaks and overflows may be a source of fecal coliform bacteria as well. Some of the sampling was not conducted at a sufficient frequency to determine whether the monthly geometric mean criterion specified in the standard has actually been violated. Thus, an initial effort in the next RBMP cycle may be to continue the work to collect an adequate number of samples (four over a 30-day period) to support geometric mean calculations to determine if water quality standards are actually being exceeded.

Many fecal coliform bacteria reducing practices are expensive and the percentage of reduction is often unknown. Many landowners are reluctant to spend today's dollars for long term amortization in uncertain future markets. Agricultural BMPs cost share dollars (Farm Bill) and grants (Section 319) need to be concentrated in priority watersheds with sufficient technical workforce to implement BMPs through long term agreements or contracts to significantly reduce sediment loading.

Additional efforts should be directed toward increasing public awareness of fecal coliform bacteria pollution, with an emphasis on potential sources and controls. State and basin-wide coordination between agencies and organizations providing public education and technical assistance may help to extend outreach efforts. EPA's Savannah River Basin Watershed Project emphasized the need to create, improve, develop incentives for, and educate citizens and industries about BMPs.

### **Strategies for Action**

Separate strategies are needed to address Nonpoint fecal coliform bacteria loadings for urban and rural sources.

#### **A. General Strategies for Urban Sources**

Addressing urban runoff will be a complex task, and will require implementation of watershed pollution control programs by local governments. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation. For this five-year phase of the basin management cycle, management will concentrate on source control and planning. Evaluation of the efficacy of this approach will be made during the basin strategy re-evaluation scheduled for 2005 in accordance with the statewide RBMP management cycle. In addition, the EPA has developed a number of TMDLs for fecal coliform for the Savannah River and EPD will, along with partner agencies such as local governments, NRCS, and GPC, be implementing the TMDLs.

#### **Specific Management Objectives**

Stakeholders will work together to facilitate local watershed planning and management to ensure that designated water uses are supported.

Agricultural agencies will provide technical and educational assistance to producers for the purpose of facilitating agricultural BMP implementation.

#### **Management Option Evaluation**

Integrated management options will be proposed, implemented, and evaluated by local governments.

#### **Action Plan**

EPD will monitor and assess use support in listed stream segments during the next monitoring cycle and encourage local efforts to address nonpoint source pollution. EPD will complete reassessment of fecal coliform bacteria monitoring protocols and will propose a plan for resampling of selected streams identified as not supporting or partially supporting designated uses and complete sampling by December, 2002 in accordance with the statewide RBMP cycle.

EPD will continue to ensure that all permitted sources remain in compliance with permitted effluent limitations for fecal coliform bacteria. EPD will also request a comprehensive watershed assessment, focusing on both point and Nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention toward current and future Nonpoint source issues in their watersheds and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.

EPD will continue to administer the NPDES and Permitting and Compliance and Enforcement Programs (PCEP) and encourage local planning to address management on a basin-wide scale.

Local governments will continue to operate and maintain their sewer systems and wastewater treatment plants, monitor land application systems, develop and implement regulations, zoning and land use planning, and implement local watershed initiatives and monitoring programs. EPD will encourage local authorities to institute programs to identify and address illicit sewage discharges, leaks and overflows of sanitary sewers, and failing septic tanks within their jurisdiction.

DHR will continue to regulate on-site sewage management systems and will work to educate local governments and citizen groups about the need for proper design, construction, and maintenance of septic systems to protect water quality. DHR will also utilize the criteria presented in the Growth Planning Act for septic system setbacks from high value waters. Local municipalities should work with the local health departments to identify locations of septic systems and educate owners about the proper care and maintenance of septic systems.

The EPA finalized TMDLs for fecal coliform for Eastanolle Creek, Little River, Reed Creek, Stekoa Creek, Savannah Harbor, Rocky Creek (Augusta), and the Savannah River (Butler Creek to McBean Creek). The EPD will be responsible for implementing the TMDLs.

EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams. Citizen groups will implement Adopt-A-Stream programs, and work with local governments in implementing watershed initiatives.

### **Method for Tracking Performance**

EPD tracks point source discharges through inspections and evaluations of self-monitoring data. An evaluation of the status of listed water bodies will be made coincident with the next iteration of the RBMP cycle for the Savannah River basin in 2005.

### **B. General Strategies for Rural Sources**

Agricultural BMPs cost share dollars (Farm Bill) and grants (Section 319) need to be concentrated in priority watersheds with sufficient technical workforce to implement BMPs through long term agreements or contracts.

### **Specific Management Objectives**

Stakeholders will work together to encourage and facilitate local watershed planning and management to ensure that designated water uses are supported.

Agricultural agencies will provide technical and educational assistance to producers for the purpose of facilitating agricultural BMP implementation.

### **Management Option Evaluation**

Evaluation will be on a site-by-site basis. For agricultural BMP support, existing prioritization methods of the organics will be used.

## **Action Plan**

EPD will monitor and assess use support in listed streams, encourage local planning efforts and regulate point sources under the NPDES program. EPD will continue to ensure that all permitted sources remain in compliance with fecal coliform bacteria limits. EPD will also continue monitoring and assessment of Land Application Systems.

GSWCC and local SWCDs and RC&D councils, with assistance from NRCS, will continue to support adoption of BMPs for animal waste handling and will follow up on complaints related to fecal coliform bacteria associated with agriculture. Methods for prioritization and implementation of cost-share incentives under the 1996 Farm Bill will be targeted to areas of apparent water quality impact, including rural streams which may contain excessive fecal coliform bacteria loads from animal and cropland operations.

Local SWCDs will convene Local Work Groups to identify resource concerns and develop proposals for funding to address these concerns.

DHR will continue to regulate on-site sewage management systems and will work to educate local governments and citizen groups about the need for proper design, construction, and maintenance of septic systems to protect water quality. DHR will also utilize the criteria presented in the Growth Planning Act for septic system setbacks from high value waters. Local municipalities should work with the local health departments to identify locations of septic systems and educate owners about the proper care and maintenance of septic systems.

The EPA finalized TMDLs for fecal coliform for Eastanolle Creek, Little River, Reed Creek, Stekoa Creek, Savannah Harbor, Rocky Creek (Augusta), and the Savannah River (Butler Creek to McBean Creek). The EPD will be responsible for implementing the TMDLs.

The University of Georgia will provide on-farm assessments to local producers through the Farm-A-Syst program.

EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams. Citizen groups will implement Adopt-A-Stream programs, and work with local governments in implementing watershed initiatives.

## **Method for Tracking Performance**

Agricultural agencies will track rates of BMP implementation for cropland and animal operations. An evaluation of the status of listed water bodies will be made coincident with the next iteration of the RBMP cycle for the Savannah River basin in 2001-2005.

### **7.3.3 Erosion and Sedimentation**

#### **Problem Statement**

Water use classifications in the Savannah River basin are potentially threatened in many water body segments by erosion and loading of sediment which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, stream erosion (including head cutting, bank erosion, and shifting of the bedload), forestry practices, and agriculture. EPA added eight stream segments to the Georgia 303(d) list in June, 1999 as not fully supporting designated uses due to sedimentation, and potential threats from sediment loading are possible throughout the entire Savannah River basin. A common strategy is proposed for addressing erosion and sedimentation throughout the basin.

However, achieving standards in individual stream segments will depend on the development of site-specific local management plans.

*Tugaloo River Subbasin (Hydrologic Unit 03060102)*

EPA recently conducted a study of the Chattooga River subbasin to determine whether waters are not meeting water quality standards because of forestry and forestry-related activities. EPA reported that the following streams are partially supporting designated uses: Stekoa Creek and its tributary streams of Scotts Creek, Saddle Gap Creek, and Pool Creek; Upper Warwoman Creek; Law Ground Creek; and Roach Mill Creek. Chechero Creek was classified as not supporting designated uses. The concern is with excessive sediment and the adverse impacts to the aquatic community.

The United States Forest Service (USFS) is developing a project in the Chattooga River basin which will focus on reducing sediment from roads, trails, and areas of construction and cultivation. The project will improve water quality and aquatic habitats by relocating and improving recreation facilities, roads and trails, and through the conservation education programs.

The 1992 Georgia Forestry Commission (GFC) compliance survey examined one site involving 62 acres in this subbasin. The site occurred on USFS land. Overall, 97 percent of the harvested acres and 100 percent of main haul road miles were in compliance with BMPs. No site prepared acres or regenerated acres were evaluated. Another BMP survey was conducted during 1998 but the results are not complete.

Also the GFC assisted the EPA in the assessment of forestry BMPs in the Chattooga River Watershed subbasin as a result of a federal lawsuit against EPA. The EPA was charged with assessing BMPs for forestry and forestry-related activities in the basin to determine whether additional BMPs are needed to attain water quality standards. The sub-basin contains approximately 122,536 acres of public land and 56,168 acres of private land. All sites that were silviculturally treated within the last two years, prior to October 1997, were audited for BMP implementation.

Three sites were located on private lands that accounted for 121 acres along 1.31 miles of streams. Streamside Management Zone (SMZ) BMPs were fully implemented 78.2 percent. Stream crossing BMPs were implemented only 40.0 percent. Temporary haul roads were 68.2 percent. Timber harvesting was 63.1 percent. Chemical treatments were 100 percent. Control burning was 50 percent. Artificial planting was 100 percent. The overall average of applicable BMP implementation was 71.3 percent.

Sixteen sites were evaluated on the USFS lands that accounted for 382 acres along 29.75 miles of streams. Of the applicable BMPs for each practice evaluated, the scores were as follows: SMZs were 80 percent, Stream Crossings were 50.9 percent, Temporary haul roads were 82.6 percent, Timber harvesting was 95.7 percent, Control burning was 71.4 percent, and artificial regeneration was 100 percent. Total overall score was 80 percent.

Unpaved roads that serve several sites were evaluated independently. Although some of these roads carry a USFS designation, many are old county roads which the county no longer maintains but will not permit to be closed. A total of 11.5 miles were assessed along 2.15 miles of streams. Of the applicable BMPs, the scores were as follows: SMZs was 50 percent, Stream Crossings was 55 percent, Haul roads was 81.4 percent. The total overall average was 67.9 percent.

According to EPA assessments, TMDLs for sediment will likely be established on eight streams within the Chattooga basin.

*Upper Savannah River Subbasin (Hydrologic Unit 03060103)*

The 1992 Georgia Forestry Commission (GFC) compliance survey examined six sites involving 820 acres in this subbasin. Three sites were evaluated on private land and three were on forest industry lands. Overall, 86 percent of harvested acres and 56 percent of main haul road miles were in compliance with BMPs. No site preparation or regenerated acres were evaluated. By ownership, compliance for roads and harvesting on private lands was 44 percent and 79 percent, respectively. Compliance on forest industry land for roads and harvesting was 89 percent and 92 percent, respectively. Another BMP survey was conducted during 1998, but the results are not complete.

*Broad River Subbasin (Hydrologic Unit 03060104)*

The 1992 Georgia Forestry Commission (GFC) compliance survey examined nine sites involving 745 acres in this sub-basin. Three sites were evaluated on private lands, five on forest industry lands, and one on public land. Overall, 82 percent of harvested acres and 70 percent of main haul road miles were in compliance with BMPs. No site prepared or regenerated acres were evaluated. By ownership, compliance for roads and harvesting on private lands was 33 percent and 95 percent, respectively. Compliance on forest industry lands for roads and harvesting was 71 percent and 78 percent, respectively. Compliance for roads and harvesting on public land was 100 percent and 95 percent, respectively. Another BMP survey was conducted during 1998, but the results are not complete.

*Little River Subbasin (Hydrologic Unit 03060105)*

The 1992 Georgia Forestry Commission (GFC) compliance survey examined five sites involving 1,088 acres in this sub-basin. Three sites were evaluated on private lands and one site on forest industry lands and public lands each. Overall, 84 percent of harvested acres and 84 percent of main haul road miles were in compliance with BMPs. By ownership, compliance for roads and harvesting on private lands was 71 percent and 68 percent respectively. Compliance on forest industry lands for roads and harvesting was 50 percent and 88 percent respectively. Compliance on public lands for roads and harvesting was 100 percent and 95 percent respectively. Another BMP survey was conducted during 1998.

*Middle Savannah River Subbasin (Hydrologic Unit 03060106)*

The 1992 Georgia Forestry Commission (GFC) compliance survey examined three sites involving 479 acres in this subbasin. Two sites were evaluated on private lands and one on forest industry lands. Overall, 89 percent of harvested acres and 95 percent of main haul road miles were in compliance with BMPs. By ownership, compliance for roads and harvesting on private lands was 0 percent and 90 percent, respectively. Compliance on forest industry lands for roads and harvesting was 100 percent and 89 percent respectively. Another BMP survey was conducted during 1998, but the results are not complete.

*Brier Creek Subbasin (Hydrologic Unit 03060108)*

The 1992 Georgia Forestry Commission (GFC) compliance survey examined five sites involving 965 acres in this subbasin. Three sites were evaluated on private lands and two on forest industry lands. Overall, 79 percent of harvested acres and 77 percent of main haul road miles were in compliance with BMPs. By ownership, compliance for roads and harvesting on private lands was 78 percent and 76 percent, respectively. Compliance on forest industry lands for roads and harvesting was 77 percent and 82 percent respectively. Another BMP survey was conducted during 1998, but the results are not complete.

### *Lower Savannah River Subbasin (Hydrologic Unit 03060109)*

The 1992 Georgia Forestry Commission (GFC) compliance survey examined six sites involving 305 acres in this subbasin. Five sites were evaluated on private lands and one on forest industry lands. Overall, 95 percent of harvested acres, 86 percent of main haul road miles, and 100 percent of site prepared acres were in compliance with BMPs. By ownership, compliance for roads, harvesting, and site preparation on private lands was 85 percent, 95 percent, and 100 percent, respectively. Compliance on forest industry lands for roads and harvesting was 100 percent and 100 percent respectively. Another BMP survey was conducted during 1998, but the results are not complete.

### **General Goals**

Control erosion and sedimentation from land disturbing activities in order to meet narrative turbidity water quality standards and support designated uses. Increase public awareness of erosion and sedimentation through coordinated education and outreach efforts.

The GFC will encourage implementation of the newly revised 1999 forestry BMPs through workshops and demonstrations.

### **Ongoing Efforts**

Forestry and Agriculture both have voluntary E&SC programs built around implementation of BMPs and a water complaint resolution procedure in place. GSWCC recently updated and is distributing the Manual for Erosion and Sediment Control in Georgia and the Field Manual for Erosion and Sediment Control in Georgia. The GSWCC, with its agricultural partners, has produced and distributed three E&SC pamphlets; "Guidelines for Stream Bank Restoration", "A Guide to Controlling Erosion with Vegetation", and "Agricultural Management Practices". These and numerous other E&SC-related pamphlets and other informational materials are available in agricultural offices throughout the State. Soil and Water Conservation Districts annually convene Local Work Groups (LWGs) which are comprised of resource professionals from a variety of disciplines and interested stakeholders at the local level to identify resource concerns in their areas. These LWGs develop proposals for USDA or other funding to address identified resource concerns.

Forestry has made significant E&SC progress. GFC has been specifically targeting those landowner groups and regions with low compliance for increased BMP education through local talks, workshops, etc. The Georgia Forestry Association and the American Forest and Paper Association (AF&PA) sponsor Master Timber Harvesters Workshops with the goal of training every logger in the State on BMPs. In addition, the Georgia State Board of Registration for Foresters requires every licensed forester to implement BMPs as a minimum standard of practice. As they become standard within the industry, the new Forestry BMP Guidelines, printed in January, 1999, will result in additional sedimentation reductions with more riparian tree cover left over perennial and intermittent streams.

EPD serves as the "Issuing Authority", providing permitting, inspection, and compliance enforcement services in those localities across the State where local Erosion and Sedimentation Control Ordinances or Programs are not yet established. EPD is also continuing its efforts to develop a NPDES General Permit (No. GAR100000) for storm water discharges associated with construction activity. The permit will provide guidelines and regulations for effective control of silt, sediment and other pollutants which are carried by storm water runoff from construction sites. The General Permit has been

issued, appealed, and overturned four times between 1992 and 1998, but was approved in 2000.

An Erosion and Sedimentation Control (E&SC) Advisory Committee developed an Erosion and Sediment Control Complaint Resolution Procedure by which concerned citizens or other parties may register E&SC complaints. The procedure is a three-step process with Local Issuing Authorities serving as the primary contact, followed by the local Soil and Water Conservation District, and finally EPD in some cases. The purpose of the procedure is to provide timely and workable solutions to E&SC control complaints through local Soil and Water Conservation Districts.

There are several erosion educational initiatives underway which have an urban focus. Each year GSWCC and EPD conduct five formal E&SC courses to provide training to the regulated community, regulators, consultants, and interested citizens. GSWCC also provides detailed E&SC training for eight to 11 units of government each year. A task force established by the Lieutenant Governor and the Erosion and Sediment Control Technical Study Committee, also known as DIRT II, is assessing the economic and environmental impacts of erosion prevention and sediment control BMPs for urban construction sites. Another urban initiative is the U.S. Forest Service's Planting Along Stream Sides (PASS) which deals with vegetative plantings to reduce erosion from stream banks.

In 1997, EPD, in cooperation with the University of Georgia, prepared and distributed the *Land Development Provisions to Protect Georgia Water Quality* report. The report describes provisions which may be modified or added to local development programs to better protect water quality. Portions of the report address water quality impacts from storm water runoff and its relationship to urban development.

Large portions of the Tugaloo River Basin (HUC 03060102) are managed by the U.S. Forest Service as part of the Chattahoochee National Forest. Management of the National Forest is prescribed in a Land and Resource Management Plan, which specifies the standards and guidelines and appropriate timing and vicinity of allowed practices.

Eight Resource Conservation & Development (RC&D) Councils, four of which are from Georgia, are mobilizing to develop needed implementation measures identified in the Savannah River Watershed Project's NonPoint Source Action Plan in the Tugaloo, Upper Savannah, Middle Savannah, Lower Savannah, Broad, and Little River subbasins.

Local Soil and Water Conservation Districts and RC&D Councils are working with crop producers to reduce erosion and sedimentation through their No-Till Drill Program in the Tugaloo, Upper Savannah, Middle Savannah, Lower Savannah, Broad and Little River subbasins.

The NRCS is working with USFS and EPA to develop a GIS-based model to estimate erosion and sedimentation. The model is being field tested in the Tugaloo subbasin. The NRCS, along with support from the GSWCC and Georgia's Agricultural Community, is conducting watershed assessments to quantify agricultural NPS pollution in the Tugaloo and Little River subbasins.

The Chestatee-Chattahoochee Rivers RC&D is demonstrating the benefits of conservation buffers in the Tugaloo and Broad River sub-basins and has developed a proposal to demonstrate BMPs in tributaries of Lake Hartwell. The Chestatee-Chattahoochee Rivers RC&D is also demonstrating the benefits of streambank stabilization in the Broad River subbasin.

The Georgia Soil & Water Conservation Commission (GSWCC) is demonstrating agricultural BMPs related to animal operations in the Broad River subbasin.

The Stephens County SWCD is implementing a watershed protection plan for Eastanollee Creek in the Tugaloo River subbasin.

The Little River is a Priority Area for USDA Cost-Share funds to implement agricultural BMPs through NRCS' EQIP Program.

The University of Georgia is testing agricultural uses of municipal biosolids in the Middle Savannah River subbasin.

The Coastal RC&D Council is demonstrating a watershed approach for agricultural BMP implementation in the Ebenezer Creek Watershed and is also demonstrating the benefits of conservation buffers in the Lower Savannah River subbasin.

#### *Forestry BMP Education*

From 1996 through 1999, the GFC offered a 3-day Master Timber Harvester Workshop. During the 3-year period, the workshop was attended by the following number of personnel affiliated with timber buyers and loggers in the seven subbasins:

- Tugaloo River Subbasin (Hydrologic Unit 03060102) – 38 personnel
- Upper Savannah River Subbasin (Hydrologic Unit 03060103) – 80 personnel
- Broad River Subbasin (Hydrologic Unit 03060104) – 68 personnel
- Little River Subbasin (Hydrologic Unit 03060105) – 90 personnel
- Upper Savannah River Subbasin (Hydrologic Unit 03060106) – 118 personnel
- Brier Creek Subbasin (Hydrologic Unit 03060108) – 111 personnel
- Lower Savannah River Subbasin (Hydrologic Unit 03060109) – 39 personnel

#### **Identified Gaps and Needs**

A key for addressing erosion, sedimentation, and habitat issues on highly impacted streams is the definition of appropriate management goals. Many highly impacted streams cannot be returned to "natural" conditions. An appropriate restoration goal needs to be established in consultation between EPD partners and other stakeholders.

Many privately owned sawmills are not members of the AF&PA. These mills and their producers are not required to attend the Master Timber Harvesters Workshops. The GFC, UGA, GFA, and the Southeastern Wood Producers Association are working on a solution. A need still exists for education of private landowners who are selling timber for the last time prior to land development. Many such landowners attempt to maximize return on timber, sometimes at the expense of BMPs.

Much of the sediment being produced and adversely impacting streams and lakes is associated with development and maintenance of unpaved rural roads. In many instances E&SC plans, implementation, inspection, and enforcement are not adequate on unpaved rural road projects. Without aggressive inspection and enforcement, contractors sometimes tend to allow erosion to occur and attempt mitigation after the fact. Georgia DOT and other agencies charged with E&SC need to work with county road departments in identifying road segments that are high sediment producers and recommend abatement measures. Further monitoring may be needed to quantify the impact of unpaved rural roads as a source of sedimentation into streams.

Additional efforts should be directed toward increasing public awareness of erosion and sedimentation, with an emphasis on potential sources and controls. State and basin-wide coordination between agencies and organizations providing public education and technical assistance may help to extend outreach efforts. EPA's Savannah River

Basin Watershed Project emphasized the need to create, improve, develop incentives for, and educate citizens and industries about BMPs.

Adverse impacts of excess sediment loading include degradation of habitat and reduction of species diversity. These types of impacts are best evaluated through biological monitoring. EPD is developing increased capability for biomonitoring using Rapid Bioassessment Protocols (RBPs) for benthic macroinvertebrates. The EPD protocols also include habitat assessment. The WRD is working with the IBI (Index of Biologic Integrity) to assess fish communities. These tools will provide methods to detect and quantify impairment of aquatic life resulting from habitat-modifying stressors such as sediment, as well as impacts from other stressors.

### **General Strategies for Action**

Many agricultural sediment reduction practices are relatively expensive and landowners are reluctant to spend today's dollars for long term BMP amortization in uncertain future markets. Agricultural cost share dollars (Farm Bill) should be concentrated in priority watersheds with sufficient technical workforce to implement BMPs through long term agreements or contracts to reduce sediment loading. An understanding of the role of erosion and sedimentation in urban streams is incomplete at this time. Most of these streams are impacted by a variety of stressors. An incremental or phased approach is needed to address these issues.

### **Key Participants and Roles**

GFC: encourage implementation of the newly revised 1999 forestry BMPs through landowner assistance, workshops and demonstrations.

American Forest and Paper Association (AF&PA): The forest products industry has a strong record of stewardship on the land it owns and manages. Member companies have agreed to a Sustainable Forestry Initiative (SFI) program. The goal of the program is to improve the performance of member companies and licensees, and set new standards for the entire forest industry as well as for other forest landowners through implementation of the following twelve objectives:

1. Broaden the practice of sustainable forestry by employing an array of scientifically, environmentally, and economically sound forest practices in the growth, harvest, and use of forests.
2. Promptly reforest harvested acres to ensure long-term forest productivity and conservation of forest resources.
3. Protect the water quality in streams, lakes, and other water bodies by establishing riparian protection measures based on soil type, terrain, vegetation, and other applicable factors, and by using EPA approved Best Management Practices in all forest management operations.
4. Enhance the quality of wildlife habitat by developing and implementing measures that promote habitat diversity and the conservation of plant and animal populations found in forest communities.
5. Minimize the visual impact by designing harvests to blend into the terrain by restricting clear-cut size (120 acres average) and/or by using harvest methods, age classes, and judicious placement of harvest units to promote diversity in forest cover.
6. Manage company lands of ecologic, geologic, or historic significance in a manner that accounts for their special qualities.

7. Contribute to bio-diversity by enhancing landscape diversity and providing an array of habitats.
8. Continue to improve forest utilization to help ensure the most efficient use of forest resources.
9. Continue the prudent use of forest chemicals to improve forest health and growth while protecting employees, neighbors, the public, and sensitive lands.
10. Broaden the practice of sustainable forestry by further involving non-industrial landowners, loggers, consulting foresters, and company employees who are active in wood procurement and landowner assistance programs.
11. Publicly report Program Participants' progress in fulfilling their commitment to sustainable forestry.
12. Provide opportunities for the public and the forestry community to participate in the commitment to sustainable forestry.

From a water quality perspective, Objectives 3 and 10 are extremely important.

Performance measures for Objective 3 state:

- Participants will meet or exceed all established BMPs, all applicable state water quality laws and regulations, and the requirements of the Clean Water Act for forestland.
- Participants will establish and implement riparian protection measures for all perennial streams and lakes and involve a panel of experts at the state level to help identify goals and objectives for riparian protection.
- Participants will individually, through cooperative efforts or through AF&PA, provide funding for water quality research.

Performance measures for Objective 10 state:

- Participants will encourage landowners that sell timber to reforest, following harvest, and to use BMPs by providing these landowners with information on the environmental and economic advantages of these practices.
- Participants will work closely with the Southeastern Wood Producers Association, the Georgia Forestry Association, the University of Georgia School of Forest Resources, the Georgia Forestry Commission, the Georgia Wildlife Resources Division, and others in the forestry community to further improve the professionalism of loggers through the Master Timber Harvesters program by establishing and/or cooperating with existing state groups to promote the training and education of loggers in:
  1. BMPs, including road construction and retirement, site preparation, streamside management, etc.
  2. Awareness of responsibilities under the Endangered Species Act and other wildlife consideration.
  3. Regeneration and forest resource conservation.
  4. Logging safety.
  5. OSHA and wage and hour rules.
  6. Transportation.
  7. Business management including employee training, public relations, etc.

### **Specific Management Objectives**

Control erosion and sedimentation from land disturbing activities in order to meet narrative water quality standards.

### **Management Option Evaluation**

During this iteration of the basin cycle, management will focus on source control BMPs.

### **Action Plan**

EPD will work with local governments and with the issuing authority for erosion and sedimentation controls, first through education and second through enforcement, to control erosion at construction sites, and will encourage local governments to implement land use planning.

GSSWC and local SWCDs and RC&D Councils, and assistance from NRCS, will provide technical and educational assistance to producers to encourage the implementation of BMPs to control erosion of agricultural lands. The University of Georgia will provide on-farm assessments to local producers through the Farm-A-Syst program.

Local SWCDs will convene local workgroups to identify local resource concerns and develop proposals for funding to address these concerns.

The Georgia Forestry Commission (GFC) will encourage implementation of the newly revised 1999 forestry BMPs through workshops and demonstrations. GFC will continue to monitor BMP implementation rates through biennial surveys and determine effectiveness of BMPs through habitat assessments and rapid bioassessments of the aquatic organisms above and below forestry operations. GFC will target landowner and user groups with low implementation rates for BMP education to encourage compliance with forestry BMP guidelines. GFC will work with AF&PA and forestry community to provide BMP training.

American Forest and Paper Association (AF&PA): Member companies will document performance measures for each objective through annual reports to AF&PA as required for Objective 11. AF&PA will issue an annual report to the public.

EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of streams. Citizen groups will implement Adopt-A-Stream programs and work with local governments in implementing watershed initiatives. EPD and WRD will continue to develop biological monitoring capabilities designed to assess aquatic life.

### **Method for Tracking Performance**

GSWCC, GFC, EPD, and issuing authorities will track BMP implementation: GSWCC by the number of E&SC plans reviewed and DAT evaluations and recommendations; GFC through its biennial surveys; and EPD through routine inspections of permitted projects, surveillance for any incidences of noncompliance, and enforcement activities. NRCS will track BMP implementation through its NIMS reporting system.

### 7.3.4 Fish Consumption Guidelines

#### Problem Statement

Water use classifications were not fully supported in several water body segments due to fish consumption guidelines for mercury, PCBs, or chlordane.

#### *Tugaloo River Subbasin (Hydrologic Unit 03060102)*

The water use classifications of fishing and/or recreation were not fully supported in Lakes Hartwell, Burton, Rabun and Tugalo based on fish consumption guidelines due to PCBs and mercury in Lake Hartwell and mercury in Lakes Burton, Rabun and Tugalo. The guidelines are for largemouth bass, hybrid/striped bass and channel catfish in Lake Hartwell; certain sizes of largemouth bass in Lakes Burton and Tugalo, and for largemouth bass and white catfish in Lake Rabun.

#### *Upper Savannah River Basin (Hydrologic Unit 03060103)*

The water use classification was not supported in Lake Hartwell due to fish consumption guidelines primarily due to PCBs. In 1999, Georgia and South Carolina issued fish consumption guidance reflecting a joint reevaluation of data for Lake Hartwell. In Georgia these are for the Tugaloo Arm and for the main body in the dam forebay. In the Tugaloo Arm, hybrid and striped bass over 16 inches should not be eaten and restricted consumption of certain sizes of largemouth bass (PCBs and mercury) and channel catfish (PCBs) is recommended. In the lake main body, any size of hybrid or striped bass should not be eaten, and restricted consumption of largemouth bass and channel catfish is recommended.

The water use classification was not fully supported in Lakes Richard B. Russell and Clarks Hill (J. Strom Thurmond) based on fish consumption guidelines due to mercury. The guidelines are for largemouth bass and catfish in both lakes.

#### *Broad River Basin (Hydrologic Unit 03060104)*

The water use classification was not fully supported in Nancy Town Lake based on fish consumption guidelines due to chlordane residues in bream.

#### *Little River Basin (Hydrologic Unit 03060105)*

The water use classification was not fully supported in the Little River mainstream above and below Rocky Creek based on fish consumption guidelines due to mercury. The guidelines are for largemouth bass.

#### *Middle Savannah River Basin (Hydrologic Unit 03060106)*

The water use classification was not fully supported in the Middle Savannah River main stem based on fish consumption guidelines due to mercury. The guidelines are for largemouth bass and spotted sucker.

#### *Briar Creek River Basin (Hydrologic Unit 03060108)*

The water use classification was not fully supported in Briar Creek due fish consumption guidelines due to mercury. The consumption guidelines are for largemouth bass and spotted sucker.

#### *Lower Savannah River Basin (Hydrologic Unit 03060109)*

The water use classification was not fully supported in the Savannah River main stem and Pipemakers Canal due fish consumption guidelines due to mercury. The consumption guidelines are for largemouth bass, bowfin, and white catfish.

## General Goals

Work to protect human health by providing guidelines for consumption of fish.

## Ongoing Efforts

DNR has monitored fish and issued fish consumption guidelines. Ongoing efforts will focus on continued monitoring of residue levels and issuance of updated consumption guidance. Mercury may be present in fish due to mercury content in the soils, from municipal and industrial sources, or from fossil fuel use. It is also possible that the elevated mercury level is related to global atmospheric transport.

### *Tugaloo River Subbasin (Hydrologic Unit 03060102)*

There are no known point sources or other identifiable anthropogenic sources of mercury in the Tugaloo River Subbasin where fish consumption guidelines have been issued.

### *Upper Savannah River Basin (Hydrologic Unit 03060103)*

In 1999, Georgia and South Carolina issued fish consumption guidance reflecting a joint reevaluation of data for Lake Hartwell. The PCB contamination in Lake Hartwell originated from the historical industrial use at the Cornell-Dubilier Marketing site (formerly owned by Sagamo), on Town Creek in South Carolina. Portions of Lake Hartwell became eligible for Superfund support in 1990 and subsequent cleanup efforts have reduced inputs to the lake. The source of PCBs in Lake Hartwell has been remediated as part of the Superfund program and levels will continue to decrease over time. Although they were banned in 1976, PCBs do not break down easily and remain in sediment for years. It is now illegal to manufacture PCBs; however, in the past, these synthetic oils were regularly used as fluids for electrical transformers, cutting oils, and carbonless paper. Residual contamination in sediment presumably drives fish body burdens, but the cycling of PCBs in the lake is not fully characterized. South Carolina has continued to document a gradient of decreasing fish tissue PCB levels with distance from the Twelve Mile Creek to the Twelve Mile Creek embayment area of Lake Hartwell where the highest contaminant levels are found.

There are no known point sources or other identifiable anthropogenic sources of mercury in the Upper Savannah River Basin that have fish consumption guidelines issued for mercury.

### *Broad River Basin (Hydrologic Unit 03060104)*

The source of chlordane within Nancy Town Lake's watershed is thought to be nonpoint in nature. Chlordane was historically used as an agricultural pesticide, but was restricted to termite control use in 1978. It has since been banned for all uses. Chlordane is persistent in the environment and may remain in aquatic sediments for years. Review of trends in fish tissue chlordane residues in Georgia indicates that concentrations in fish tissue are declining. There is no known point or other identifiable anthropogenic source of the chlordane in this waterbody.

### *Little River Basin (Hydrologic Unit 03060105)*

There are no known point sources or other identifiable anthropogenic sources of mercury in the Little River Basin where fish consumption guidelines have been issued.

### *Middle Savannah River Basin (Hydrologic Unit 03060106)*

Sources of mercury in this section are considered to be from atmospheric background loadings and anthropogenic inputs. One point source in the Augusta area is the Olin

chlor-alkali plant. On-site sources such as groundwater, runoff and process water are collected, treated, monitored and discharged at the facility NPDES outfall. The facility has been in compliance with the NPDES mercury limit. Additional mercury may be entering the Savannah River from streams draining the U.S. Department of Energy Savannah River Site (SRS) in South Carolina. Some of the mercury found in streams within the SRS watersheds is thought to be anthropogenic. Mercury may also be present in fish due to mercury content in the natural soils, from municipal or industrial sources, or from fossil fuel use. It is also possible that the elevated mercury level is related to global atmospheric transport.

Analyses of fish tissue by EPD has shown that fish in the vicinity of the SRS in South Carolina (Upper Three Runs Creek, Four Mile Creek, Steel Creek, and Lower Three Runs Creek), and in the Savannah River at Cox Point, contain elevated concentrations of cesium (Cs-137), and strontium (Sr-90). Elevated concentrations of radionuclides were also observed in Ebenezer Swamp (connected to the Savannah River and located approximately 90 miles downstream of SRS). Elevated concentrations of radionuclides for fish adjacent to SRS are attributed primarily to operations at SRS. Since the aquatic environment in Ebenezer Swamp is different from that found in the main stem Savannah River and many miles downstream, elevated concentrations of radionuclides observed in fish from the swamp cannot be definitely linked to SRS operations. While specific fish consumption advisories have not been issued for radionuclides in the Savannah River by EPD or South Carolina, the data were evaluated in light of the current fish consumption guidelines based on mercury and deemed to be protective.

#### *Briar Creek River Basin (Hydrologic Unit 03060108)*

There are no known point sources or other identifiable anthropogenic sources of mercury in this watershed. Briar Creek is a coastal plain blackwater swamp system. These systems are characterized by a high content of organic carbon (organic ligand humic substances), low alkalinity and pH, and naturally lower dissolved oxygen content. Blackwater systems have been found to have physico-chemical characteristics that provide both a sink for the accumulation of mercury, and to provide an environment conducive to the methylation of mercury. As a result, baseline mercury residues found in fish tissues are higher than that found in other waterbodies having a different chemistry.

#### *Lower Savannah River Basin (Hydrologic Unit 03060109)*

There are no known point sources or other identifiable anthropogenic sources of mercury in this watershed.

### **Identified Gaps and Needs**

Sources of mercury are not well quantified. Mercury within the Savannah River Basin are likely derived from natural sources combined with unidentifiable anthropogenic sources, and/or from atmospheric deposition.

The source of PCBs in Lake Hartwell has been remediated as part of the USEPA Superfund program and levels are expected to continue to decrease over time.

The source of chlordane within Nancy Town Lake's watershed is thought to be Nonpoint in nature. Residue values are expected to decrease over time. The use of chlordane has been banned. Catfish collected in the Broad River were found to be free of chlordane.

EPD will continue to work with South Carolina to sample and test fish in the Savannah River for radionuclides. Guidelines will be reassessed as new data becomes available.

## **General Strategies for Action**

The strategy is to keep the fishing public notified of risks associated with fish consumption guidelines that have been issued for mercury, chlordane and/or PCBs.

The Lake Hartwell PCB source has been remediated to the extent feasible and the strategy is to keep the fishing public notified of risks associated with consuming fish contaminated with PCBs in this interstate water body.

The EPA proposed a TMDL for mercury in the Savannah River Basin in 2000 and is scheduled to finalize the TMDL in early 2001.

## **Specific Management Objectives**

EPD and WRD will work to protect public human health by issuing fish consumption guidelines as needed, indicating the recommended rates of consumption of fish from specific waters. The guidelines are based on conservative assumptions and provide the public with factual information for use in making rational decisions regarding fish consumption.

## **Action Plan**

- WRD and EPD will continue to sample and analyze fish tissue and issue fish consumption guidelines as needed. The next round of fish tissue sampling for this watershed will be considered in fiscal year 2002 in accordance with the river basin monitoring cycle.
- EPD will evaluate the need for additional sampling of different media (fish tissue, water and/or sediment), if localized anthropogenic sources are indicated.
- Georgia will continue to interface with South Carolina on fish tissue monitoring and consumption guidance issued on shared interstate waters.
- EPA will finalize a TMDL for mercury in the Savannah River Basin and the Georgia EPD will be responsible for implementing the TMDL.

## **Method of Tracking Performance**

Trends in fish tissue concentration; number of Fish Consumption Guidelines.

### **7.3.5 Dissolved Oxygen**

#### **Problem Statement**

Water use classifications for fishing, recreation and drinking water were not fully supported in several water body segments due to excursions of the water quality standards for dissolved oxygen. These excursions are primarily attributed to nonpoint sources, hydropower generation and to natural conditions.

*Upper Savannah River Subbasin (HUC 03060103)*

The water use classification of recreation was not fully supported in the Savannah River mainstem due to dissolved oxygen concentrations less than standards. Low dissolved oxygen concentration in the mainstem river segment was due to bottom water discharges from Lake Hartwell Dam.

#### *Broad River Subbasin (HUC 03060104)*

The water use classification of fishing was not fully supported in two stream segments (Bear Creek and Beaverdam Creek) due to dissolved oxygen concentrations less than standards due to water pollution control plant discharges.

#### *Middle Savannah Subbasin (HUC 03060106)*

The water use classifications of fishing and/or drinking were not fully supported in two Savannah River mainstem segments and one tributary stream segment (Butler Creek) due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the river segments was due to bottom water discharge from dams and low dissolved oxygen in the tributary was due to urban runoff and a water pollution control plant discharge.

#### *Lower Savannah River Subbasin (HUC 03060109)*

The water use classifications of fishing were not fully supported in three tributary segments (Buck Creek, Ebenezer Creek and Runs Branch) due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in two tributaries (Ebenezer Creek and Runs Branch) was due to nonpoint sources and a water pollution control plant contributed to the problem in Buck Creek. Dissolved oxygen may be lower in these areas due to natural conditions.

### **General Goals**

Meet water quality standards to support designated water uses.

### **Ongoing Efforts**

In the Broad River Subbasin EPD completed and is implementing TMDLs for Bear Creek and Beaverdam Creek. In the Lower Savannah River Subbasin, the City of Sylvania completed an Individual Control Strategy in 1994 and is in compliance with its NPDES Permit. A multiagency study of Ebenezer Creek is ongoing to address issues and implement solutions. The Coastal RC&D Council is demonstrating a watershed approach for agricultural BMP implementation in the Ebenezer Creek Watershed. The Coastal RC&D Council is demonstrating the benefits of conservation buffers in this subbasin.

### **Identified Gaps and Needs**

Low dissolved oxygen concentrations in this part of the state are often due to natural environmental conditions. Work is needed to identify and characterize natural background dissolved oxygen concentrations in this area.

### **General Strategies for Action**

#### *Upper Savannah River Subbasin (HUC 03060103)*

Low dissolved oxygen concentration in the mainstem river segment was due to bottom water discharges from Lake Hartwell Dam. In the summer and early fall, dissolved oxygen levels below the dam typically fall below standards. EPD will work with the Corps of Engineers to assess and implement feasible actions to maintain acceptable dissolved oxygen concentrations in waters released from the dam.

#### *Broad River Subbasin (HUC 03060104)*

Low dissolved oxygen concentrations in Beaverdam Creek was due to the City of Commerce water pollution control plant discharge. Low dissolved oxygen concentrations in Bear Creek was due to the City of Lavonia water pollution control plant discharge.

Both of these plant discharges are in compliance with permit limits. TMDLs have been developed and are being implemented by the Georgia EPD for Beaverdam Creek and Bear Creek. The TMDL will require additional treatment at each facility.

*Middle Savannah Subbasin (HUC 03060106)*

Low dissolved oxygen concentrations in the river segment was due to bottom water discharges from Clarks Hill Dam. During late summer and early fall, the low dissolved oxygen concentrations below Clarks Hill Dam below the dam typically fall below standards. EPD will work with the Corps of Engineers to assess and implement feasible actions to maintain acceptable dissolved oxygen concentrations in waters released from the dam.

Low dissolved oxygen concentration in Butler Creek was due to the City of Augusta water pollution control plant discharge. EPD has issued an Administrative Order to the City of Augusta requiring improvements in the water pollution control plant operation and maintenance.

*Lower Savannah River Subbasin (HUC 03060109)*

Low dissolved oxygen concentrations in Ebenezer Creek and Runs Branch were due to nonpoint sources. EPD will address nonpoint sources in the Runs Branch drainage through a watershed protection strategy.

### **Specific Management Objectives**

Maintain dissolved oxygen concentrations adequate to support aquatic life and meet water quality standards.

### **Action Plan**

*Upper Savannah River Subbasin (HUC 03060103)*

- The Corps of Engineers will evaluate alternatives in the dam operations to improve dissolved oxygen concentrations in the releases from Lake Hartwell.
- EPD will monitor and assess dissolved oxygen in the listed waters and work with the Corps to assess cost-effective changes.

*Broad River Subbasin (HUC 03060104)*

- EPD has developed and is implementing TMDLs for both listed waters and will monitor dissolved oxygen concentrations in these streams during the next monitoring cycle.
- City of Commerce will upgrade facilities to implement the TMDL and maintain water pollution control plant in compliance with permit.
- City of Lavonia will upgrade facilities to implement the TMDL and maintain water pollution control plant in compliance with permit.

*Middle Savannah Subbasin (HUC 03060106)*

- The Corps of Engineers will evaluate alternatives in the dam operations to improve dissolved oxygen concentrations in the releases from Clarks Hill Lake.
- EPD will monitor and assess dissolved oxygen in the listed waters and work with the Corps to assess cost-effective changes.
- The City of Augusta will continue to make plant improvements in accordance with the EPD order.

- EPD will monitoring dissolved oxygen in the listed waters during the next monitoring cycle.

*Lower Savannah River Subbasin (HUC 03060109)*

- EPD will monitoring dissolved oxygen in the listed waters during the next monitoring cycle.

### **Methods for Tracking Performance**

A reevaluation of the status of the listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Savannah River basin in 2001-2005.

### **7.3.6 Thermal Regime in Clarkes Hill Lake**

#### **Upper Savannah River Subbasin (HUC 03060103)**

##### **Problem Statement**

Hydropower generation at Richard B. Russell Dam includes pumpback (reverse flow) capabilities. Water released from the Russell Dam into the Savannah River immediately upstream of Clarkes Hill Reservoir is pumped back into Russell Lake. Pumping water back above the dam increases water temperatures in Clarkes Hill Lake downstream and may affect critical habitat for striped bass and hybrid (white x striped) bass. According to the DNR Wildlife Resources Division the trophy striped bass may be eliminated in Clarkes Hill Lake if the pumpback operation continues without significant mitigation measures.

##### **General Goals**

Operation of Richard B. Russell Dam and pumpback facilities in a manner consistent with maintaining water temperatures for the striped bass and hybrid bass fisheries of Clarkes Hill Lake.

##### **Ongoing Efforts**

WRD is working with the Corps of Engineers to assess feasible solutions.

##### **Identified Gaps and Needs**

Information is needed as to what specific changes in operation of the facility would result in improvement in the fishery.

##### **General Strategies for Action**

WRD will work with the Corps of Engineers to assess and implement feasible actions.

##### **Specific Management Objectives**

Maintain water temperatures for stripped bass fishing.

##### **Action Plan**

- WRD will continue to document the effects of thermal modification.

- Corps of Engineers will work to evaluate alternatives in operations to reduce temperature effects from the pumpback.

### **Methods for Tracking Performance**

WRD will monitor fish populations in Lakes Russell and Clarks Hill to assess fishery and effects of hydropower generation and pump back operations.

### **7.3.7 Protection of Threatened and Endangered Species**

#### **Problem Statement**

#### **Middle Savannah Subbasin (HUC 0050060106)**

The Middle Savannah Subbasin is home to the robust redhorse, a fish that is threatened or endangered and needs protection.

#### **General Goals**

To provide aquatic habitat and management to support the survival and propagation of threatened and endangered species; to meet or exceed state and federal laws, rules, and regulations for the protection of endangered species; and to incorporate planning for protection of threatened and endangered species into basin planning.

#### **Ongoing Efforts**

The WRD is working with other States, federal, and local agencies to help protect the robust redhorse in the Middle Savannah Subbasin.

### **7.3.8 Source Water Protection for Drinking Water Sources**

#### **Problem Statement**

Many public water supplies have no control over their source watersheds and have to spend additional treatment dollars to insure a high quality water supply. All streams with municipal water intakes need to have watershed assessments and protection plans developed, and implemented.

#### **General Goals**

EPD will establish proactive planning and management to maintain safety and high quality of drinking water sources on all streams with municipal water intakes by having watershed assessments and protection plans developed and implemented. All streams and existing lakes under serious consideration for use as public water supplies will have a source water assessment made early in the planning process.

#### **Ongoing Efforts**

Georgia efforts is developing a Source Water Program (SWAP) in alignment with EPA's initiatives. EPD is working with USGS on some programs elements and beginning to work with some water authorities in starting the process. Some water authorities and local governments have adopted source water protection measures in conjunction with Growth Strategies Initiatives.

### **Identified Gaps and Needs**

This is a new and much more comprehensive initiative and neither EPD nor many local authorities have much experience in performing the assessments and the protection plans. The Implementation Plan is still under development by EPD.

There are complexities in developing an assessment that would be general to all watersheds because of the varying land uses. Therefore, EPD has the task of deriving a number of approaches that can be applied to a watershed deepening upon the assistance of advisory committees and the public prior to submitting the SWAP Implementation Plan to EPD.

EPD must also find effective measures to promote and encourage local communities to adopt source water protection programs using the assessment results.

### **Strategies for Action**

EPD submitted to the Environmental Protection Agency a SWAP Implementation Plan in February 1999. EPD will describe in the SWAP Implementation Plan methods and approaches for (1) delineating the source water protection areas for all public water supply sources within the State ( the outer management zone for groundwater sources); (2) inventorying potential contaminants within the delineated protection zone; (3) determining water supply susceptibility to significant potential contaminants with in the protection zone; and (4) involving the public in developing SWAPs and make assessments available to the public.

### **Key Participants and Roles**

EPD, local governments, water authorities, federal, state, local agencies, and special interest groups.

### **Specific Management Objectives**

The EPD is actively working toward the national goal of the year 2005, 60 percent of the population served by community water systems will received their water from systems with source water protection systems (SWPP) in place under both wellhead protection and watershed protection programs". EPD intends to accomplish this goal by developing and implementing a source water assessment program (SWAP) in alignment with EPA's initiatives.

### **Management Option Evaluation**

Formulation will be on a site by site basis and be updated with each planning cycle in the basin.

### **Action Plan**

- SWAP Implementation Plan submitted to EPA in February 1999.
- Identify water intakes and authorities.
- Delineate watersheds contributing to intakes.
- Establish criteria and guidelines for assessments and protection plans.
- Provide support to water authorities and local governments.
- Review and approve source water protection plans.

## Methods for Tracking Performance

To be determined.

### 7.3.9 Groundwater Quality and Quantity

#### Lower Savannah River Subbasin (Hydrologic Unit 03060109)

##### Issue A. Upper Floridan Aquifer

###### *Problem Statement*

Regional use of ground water throughout coastal Georgia (and in South Carolina) has reduced water levels in the Upper Floridan aquifer. The declining groundwater levels have reduced pressures in the aquifer sufficiently to allow seawater to enter the aquifer in Port Royal Sound north of Hilton Head Island, South Carolina (and potentially elsewhere) then begin to slowly moving towards Savannah, Georgia. All municipal, industrial, and agricultural users withdrawing water from the Upper Floridan aquifer throughout this basin contribute to this salt-water intrusion problem.

Another concern is the water necessary for continued residential growth and commercial development in southern Effingham County and northwestern Chatham county.

###### *General Goals*

Stop the intrusion of salt-water before the municipal supply wells on Hilton Head Island, South Carolina and in Savannah, Georgia are contaminated.

###### *Ongoing Efforts*

After several years of working with the stakeholders throughout the coastal area, EPD developed the "*Interim Strategy for Managing Salt Water Intrusion in the Upper Floridan Aquifer of Southeast Georgia*" (dated April 23, 1997). This Interim Strategy defines the EPD roles and requirements for studies and stakeholder efforts through December 31, 2005. The legislature has funded an extensive Sound Science Initiative to provide some of the necessary information to determine what is happening in the aquifer and what can be done to minimize or eliminate the salt-water intrusion problems. The scientific information gathered shall be discussed with stakeholders and used in developing the Final Strategy for water withdrawals before January, 2006. To meet these objectives, EPD will do the following:

- (1) Conduct expanded scientific (Sound Science effort) and feasibility studies to determine with certainty how to permanently stop the salt-water intrusion moving towards Hilton Head Island, South Carolina and Savannah, Georgia.
- (2) Require the development of comprehensive local water supply plans in a 24 county area of southeast Georgia.
- (3) Create one or more technical advisory committees (TAC). With their input, the additional scientific information and the local water supply plans, develop a long-term ground water management plan for southeast Georgia by the end of the year 2005, which will protect the Upper Floridan aquifer from further salt-water intrusion.
- (4) Impose caps on ground water use in all areas of Glynn County, all of Chatham County, and southern portions of Bryan and Effingham counties, to avoid worsening the rate of salt water intrusion at Hilton Head - Savannah and at Brunswick.

- (5) Reduce ground water use in Chatham County by at least 10 million gallons per day by December 31, 2005 through conservation and substitution of surface water for ground water. Union Camp will provide at least 6.5 Mgd of the total 10 Mgd of ground water reduction in Chatham County. This will be affirmed through reductions in ground water use permits.
- (6) Allow, on an interim basis, increases in groundwater withdrawals up to an additional 36 Mgd in the areas of southeast Georgia that have little impact on salt-water intrusion problem.
- (7) Encourage and promote water conservation and reduced ground water usage wherever feasible, throughout southeast Georgia.

#### *Identified Gaps and Needs*

EPD needs an expanded compliance effort to better account for actual amounts of groundwater withdrawals from the Floridan aquifer.

EPD, USGS and several consulting firms are working on creating improved computer modeling efforts to provide better and more complete information regarding the impacts of withdrawals on salt-water intrusion into the aquifer.

EPD in conjunction with the USGS and contracted consulting firms is trying to identify alternative water sources to allow additional water from sources outside of the Floridan aquifer.

EPD and contracted consulting firms are assessing engineered and non-engineered methods of stopping/containing salt-water intrusion.

#### *Strategies for Action*

EPD and the coastal stakeholders currently are implementing policies recommended in the Interim Strategy, are analyzing new information developed under the Sound Science Initiative, and eventually, will be developing recommendations of policy measures for the Final Strategy to protect coastal Georgia from salt -water intrusion.

#### *Key Participants and Roles*

Georgia EPD: Monitor strategy efforts and inform stakeholders of progress via public meetings at the Upper Floridan Technical Advisory Committee (TAC); publish results of technical studies; assist the General Assembly in developing new targets that will help protect the aquifer; and initiate a public participation process that will develop a Final Strategy by December 31, 2005.

South Carolina DHEC: Because of the contamination moving under Hilton Head Island, SC DHEC expects to partner with EPD in development of the Final Strategy.

County and Municipal Governments: Each local government in the area has it's own interest in economic development and residential growth and expects to partner with EPD in the development of the Final Strategy.

Industrial Representatives: Industrial users are the largest users of groundwater in the area and expects to partner with EPD in the development of the Final Strategy.

Public Citizen groups: Public participation is essential to insure public acceptance on any proposed interim measures and in the development of the Final Strategy. The Interim Strategy commits EPD to aggressive public participation.

#### *Specific Management Objectives*

EPD and others will encourage water conservation by all parties. EPD needs to insure that Chatham County will reduce their groundwater usage by 10 Mgd by December 31,

2005. EPD will prevent any withdrawal increases within the rest of the Capped area, if not associated with any nearby withdrawal reductions to offset the increase. EPD will limit new or increased Upper Floridan Aquifer ground water withdrawals from elsewhere. Finally, EPD with a comprehensive program of scientific studies will develop the information needed to identify the best methods for stopping or reducing salt-water intrusion.

#### *Management Option Evaluation*

Apply the Interim Strategy to permitting actions in coastal Georgia.

Develop the Final Strategy by December 31, 2005.

#### *Action Plan*

Implement the Coastal Interim Strategy before December 31, 2005

Develop the Final Management Strategy for action in January, 2006.

Direct and manage the Sound Science Initiative.

Update stakeholders regularly using an aggressive public participation process.

#### *Methods for Tracking Performance*

Accurately measure water use (both ground and surface water) throughout the coastal region.

Develop ground water models that are capable of determining the velocity of the salt-water intrusion is accelerating or decelerating in its movement towards Hilton Head Island, SC and Savannah, Ga.

Utilize the Upper Floridan Technical Advisory Committee to audit the progress and results of the Sound Science Initiative.

### **Issue B. Contamination in Richmond County**

#### *Problem Statement*

EPD has concerns about potential groundwater contamination in the Augusta/Richmond area due to past and present industrial users. Rapid growth and expanding groundwater usage in the county may mobilize some of the contaminants located at these industrial sites, potentially affecting drinking water sources.

#### *General Goals*

Protection of the sources of drinking water from mobilization of these contaminants, by limiting any potential increased use of groundwater in the county, for either industrial or public drinking water, without associated reductions of groundwater use elsewhere in the county.

#### *Ongoing Efforts*

The Georgia EPD Drinking Water program is trying to limit any additional withdrawals of groundwater in the county, to prevent such withdrawals from pulling contaminants towards drinking water wells and thereby creating a new public health problem. If new withdrawals are permitted, they may potentially force movement in the subsurface of contaminants caused by past industrial incidents. If withdrawals are kept close to current amounts, it is thought that the contaminants will remain in place and not create any new hazard to public supply wells.

### *Identified Gaps and Needs*

Better delineation of the contaminant locations is important. Enhanced computer groundwater modeling would give EPD and the groundwater users in the county a better idea of impacts created by the existing withdrawals and any proposed new withdrawals.

### *Strategies for Action*

Try to limit any new groundwater withdrawals from being permitted, without associated groundwater withdrawals elsewhere in the county. Recommendations have been presented to the Augusta / Richmond County water system that for additional groundwater to be used in the fast growing suburban areas, greater use of the city's surface water treatment plant shall be required. Geographic areas which can use surface water should be placed on surface water, and the previous groundwater amounts supplied to those places may then be transferred or allocated farther out to the growth areas of the county, presently outside the reach of the surface water infrastructure. Industrial users are being requested to follow the same process, where they need to investigate sources of water alternate to new groundwater, such as the purchase of city water, use of self-supplied surface water or the reallocation of reduced groundwater from elsewhere.

### *Key Participants and Roles*

Georgia EPD (Drinking Water): Watch the water quality of the public supply wells, and the resulting impact of all groundwater withdrawals in the county. Encouraging the use of the surface water supplied by a large city water treatment plant.

Local governments: Investigating alternate sources of water rather than just going to groundwater.

Public Citizen groups: Being informed about water issues.

### *Specific Management Objectives*

EPD Drinking Water will work to protect public health by monitoring the water quality in the public supply wells. EPD will limit any new groundwater withdrawal permits to prevent the mobilization of subsurface contaminants. Treated surface water is to be used replace groundwater in the near urban areas, for new developments near distribution lines and generally for any additional growth where feasible. Any new groundwater usage must be offset by groundwater reductions elsewhere.

### *Action Plan*

EPD will encourage non-groundwater sources of water for any new developments or applications within the county.

EPD will develop better groundwater models to track the impact of any new or existing groundwater withdrawal in the county.

### *Methods for Tracking Performance*

EPD - Hazardous Waste monitoring of contamination sites should determine whether mobilization is occurring. EPD - Drinking Water monitoring of public water supply wells will determine any new public health hazards. Limiting any new withdrawals through the EPD - Water Resources Management Program may prevent any new mobilization from beginning.

## Issue C. Groundwater Quality and Quantity

### *Problem Statement*

Radioactive contamination is a concern from the Savannah River Site (SRS), a DOE nuclear weapons support facility in South Carolina. Radioactive contamination from SRS may enter the aquifer, pass under the Savannah River and impact users in Burke County, Georgia. The concerns date back to the 1960's and have always been related to groundwater movements. Elevated levels of radioactive tritium are routinely detected in fish, precipitation and surface water. Tritium has also been detected in shallow groundwater in Burke County.

### *General Goals*

Monitor the situation to be aware of any radioactive hazard in the groundwater.

### *Ongoing Efforts*

Working with South Carolina and the Federal government (Savannah River Site) to detect any potential radioactive contamination in Georgia groundwater.

### *Identified Gaps and Needs*

A more extensive network of monitoring wells in Georgia may be necessary to insure adequate warning of any contamination.

### *Strategies for Action*

Georgia EPD is pushing for more federal involvement in funding such monitoring activities.

### *Key Participants and Roles*

Georgia EPD

US Department of Energy

Savannah River Site contractors

## 7.3.10 Aquatic Habitat

### **Problem Statement**

Aquatic habitats in segments of the Savannah River mainstem and tributary streams may be affected by riparian development, erosion and sedimentation, hydroelectric power generation and channel alteration for navigational purposes near Savannah Harbor.

#### *Tugaloo River Subbasin (HUC 03060102)*

Trout streams in the Upper Tugaloo river subbasin are potentially affected by erosion, sedimentation, and temperature impacts. The Chattooga River, Tallulah River, and Panther Creek are examples when there is erosion and sedimentation due to graveled roads, forestry practices, and development.

Tailrace flows from dams on the Savannah River may also affect downstream dissolved oxygen and temperature. Problem statements and management strategies for these issues are addressed in sections 7.3.5 (dissolved oxygen) and 7.3.6 (temperature).

#### *Upper Savannah River Subbasin (HUC 03060103)*

Tailrace flows from Lakes Hartwell and Russell are primarily driven by hydropower generation schedules for supply of electricity during peak demand times. Flow rates of releases vary widely depending on demand. When not generating electricity, no minimum

flow is provided. The combination of fluctuating flows and potential low flows may affect fish and other aquatic life habitat and access for recreational users.

*Middle Savannah River Subbasin (HUC 03060106)*

Flows from Clarks Hill Dam are primarily driven by hydropower generation schedules for supply of electricity during peak demand times. Flow rates of releases vary widely depending on demand. When not generating electricity, no minimum flow is provided. The combination of fluctuating flows and potential low flows affect juvenile nursery habitat, robust redhorse spawning and rearing habitat, and access for recreational users.

*Lower Savannah River Subbasin (HUC 03060109)*

Striped bass populations in the Lower Savannah river are potentially affected by channel constriction caused by the berms and other structures which were not removed when the tide gate was removed from service in 1993.

### **General Goals**

To support designated water uses by preserving and protecting riparian and aquatic habitat.

### **Ongoing Efforts**

*Tugaloo River Subbasin (HUC 03060102)*

The Chestatee-Chattahoochee Rivers RC&D is demonstrating the benefits of conservation buffers in this Sub-Basin and has developed a proposal to demonstrate BMPs in Lake Hartwell Tributaries. Local Soil and Water Conservation Districts and RC&D Councils are working with producers to reduce erosion and sedimentation through their No-Till Drill Program.

The NRCS, along with support from the GSWCC and Georgia's Agricultural Community, is conducting watershed assessments to quantify agricultural NPS pollution in the Sub-Basin.

The NRCS is working with USFS and EPA to develop a GIS based model to estimate erosion and sedimentation and field testing this model in the Sub-Basin.

The Stephens County SWCD is implementing a watershed protection plan for Eastanolle Creek.

*Lower Savannah River Subbasin (HUC 03060109)*

The Corps of Engineers removed the tide gate from service in 1993. Issues which persist with the striped bass fishery may be related to channel constriction caused by the berms and other structures which have not been removed. The WRD and Corps of Engineers together with various other state and federal fish and wildlife agencies are investigating this potential problem.

WRD regularly restocks Striped Bass in this portion of the lower Savannah. The strategy is that continued restocking will eventually result in the restoration of a breeding population. Ongoing investigations of channel construction may indicate other needs.

### **Identified Gaps and Needs**

In the Lower Savannah River Subbasin, many more years of striped bass restocking may be required in order to determine if the discontinuation of tide gate operations will result in a self sustaining population of this species.

## General Strategies for Action

### *Tugaloo River Subbasin (HUC 03060102)*

Understanding the role of erosion and sedimentation in urban streams is incomplete at this time. Most of these streams are impacted by a variety of stressors. An incremental or phased approach is needed to address these issues.

Most agricultural sediment reduction practices are expensive and landowners are reluctant to spend today's dollars for long term BMP amortization in uncertain future markets. Agricultural cost share dollars (Farm Bill) need to be concentrated in priority watersheds with sufficient technical workforce to implement enough BMPs through long term agreements or contracts to reduce sediment loading.

### *Upper Savannah River Subbasin (HUC 03060103)*

WRD and EPD will work with the Corps of Engineers to assess the magnitude of impacts from reduced flows and implement feasible actions.

### *Middle Savannah River Subbasin (HUC 03060106)*

WRD and EPD will work with the Corps of Engineers to determine a regime of water releases, including those during and between peak power generation flows which to enhance the fishery, other aquatic life and recreational uses.

## Specific Management Objectives

### *Tugaloo River Subbasin (HUC 03060102)*

Control erosion and sedimentation from land disturbing activities in order to meet narrative water quality standards.

Evaluate forestry practices and management plans on National Forest lands.

Evaluate E&SC related to construction activities and stormwater management (vacation homes, urban development, etc.) and continue to manage erosion and sedimentation from land disturbing activities in order to meet narrative water quality standards.

### *Upper Savannah River Subbasin (HUC 03060103) and Middle Savannah River Subbasin (HUC 03060106)*

Maintain streamflows adequate to support aquatic life. Determine if feasible alternatives to present extremes in flows below hydropower generating facilities exist.

### *Lower Savannah River Subbasin (HUC 03060109)*

Obtain adequate information to determine whether channel constriction or other factors are affecting the striped bass fishery. Take cost-effective actions to minimize stress on the striped bass population.

## Action Plan

- EPD will participate in meetings with USFS and WRD to assist with updating each National Forest Management Plan as they relate to aquatic habitat protection.
- GSSWC and local SWCDs and RC&D Councils with assistance from NRCS will encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC will target landowner and user groups for BMP education to encourage compliance with forestry BMP guidelines.

- EPD will work with local governments with issuing authority for erosion and sedimentation controls first through education and second through enforcement to control erosion at construction sites, and will encourage local governments to implement land use planning.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams
- EPD and WRD will continue to develop biological monitoring capabilities designed to assess aquatic life.
- WRD and EPD will work with the Corps of Engineers to develop strategies for improving flow regimes below hydroelectric power facilities to improve habitats and environmental conditions for fish and other aquatic life.
- WRD will work with the Corps of Engineers to assess the viability of the striped bass populations in the lower Savannah River and to determine what factors limit that population.

### **Methods for Tracking Performance**

GSWCC, GFC, EPD, and issuing authorities will track BMP implementation: GSWCC by the number of E&SC plans reviewed and DAT evaluations and recommendations; GFC through its biennial surveys; and EPD through routine inspections of permitted projects, surveillance for any noncompliance, and the conduct of necessary compliance and enforcement activities. NRCS will track BMP implementation through its NIMS reporting system.

## **References**

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SCDHEC. December 1997. Watershed Water Quality Assessment Savannah and Salkehatchie River Basins. Technical Report No. 003-97. South Carolina Department of Health and Environmental Control, Columbia, SC.