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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 Ocmulgee 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 Ocmulgee 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 Ocmulgee River basin. Section 7.2 describes the general and basinwide implementation strategies most relevant to the Ocmulgee 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 Ocmulgee River Basin**

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

- Protecting water quality in lakes, rivers, and streams 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 waterborne 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 coordinate 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 Ocmulgee 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 Ocmulgee River basin.

### **7.1.1 Water Quality Overview**

As discussed in Section 5, water quality in the Ocmulgee 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 20 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 Ocmulgee River basin results from nonpoint sources. Key types of nonpoint source pollution impairing or potentially threatening water quality in the Ocmulgee River basin include erosion and sedimentation, bacteria and oxygen demanding substances from urban and rural nonpoint sources, metals from urban and rural sources, and nonpoint sources of mercury

(particularly air deposition) which accumulates in fish tissue. 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 Ocmulgee 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 (RDCs). 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 Ocmulgee 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 groundwater 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 Ocmulgee 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, EPD requires a comprehensive watershed assessment and development of a watershed protection 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 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, a TMDL will be established for a specific pollutant on the specific stream segment in accordance with USEPA guidance. The TMDL will specify the allowable loading of a pollutant from both point and nonpoint sources. EPD will coordinate the development of TMDL implementation plans with local RDCs and other stakeholders, particularly in those situations where the source of the pollutant a nonpoint source. In those cases where the cause of the problem is a municipal or industrial water pollution control plan discharge, EPD will coordinate needed improvements directly with the owner of the treatment facility through the NPDES permitting process.
- **Source Water Protection.** The public water supply in the Ocmulgee basin is drawn from surface and groundwater. To provide for the protection of public water

supplies, Georgia EPD developed a Source Water Assessment Program in alignment with the 1996 amendments to the Safe Drinking Water Act and corresponding recent USEPA initiatives. This new initiative will 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 for specific waters as needed. 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 Ocmulgee 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, four major conservation programs from USDA will be available to producers and rural landowners. These are the Environmental Quality Incentives Program (EQIP); 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. These conservation programs are also augmented by the NRCS watershed program, which provides landowners with cost share incentives to install conservation measures.

Forestry is a major part of the economy in the Ocmulgee basin. The Georgia Forestry Commission (GFC) is the lead agency for controlling silvicultural nonpoint source pollution. The GFC develops forestry BMP practice guidelines, encourages BMP implementation via University of Georgia sponsored educational workshops and demonstrations, investigates and mediates complaints involving forestry operations, and conducts biennial statewide BMP compliance surveys. 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 that takes into account management and protection of the water quality of rivers, streams, and lakes within their jurisdiction.

### **7.1.2 Water Quantity Overview**

In addition to protecting water quality, it is essential to plan for water supply in the Ocmulgee River basin. The Georgia EPD Water Resources Branch regulates the use of Georgia's surface and groundwater 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 response to the severe drought conditions in Georgia during the 1998-2000 period, EPD developed the *1998-2000 Georgia Drought Report* that summarizes the drought impacts and provides an objective assessment of the state's vulnerability and mitigation efforts; evaluates the management actions implemented by state and local authorities during the drought of 1998-2000; and presents a set of recommendations for improving drought preparedness and response. Among the recommendations included are for the state to develop an effective method to evaluate consumptive use of water for agricultural irrigation, and implement programs for reducing water use while protecting the prosperity of farmers and agricultural communities. (Note: Starting in FY04 the GSWCC will embark on a program to provide irrigation audits and a follow-up metering program of Georgia's 21,000 agricultural permit holders, of which about 2,333 permits are in the Ocmulgee River basin.)

## **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 Ocmulgee 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 water body. 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 Ocmulgee River basin, it will become even 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) sets 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 7 mile radius of the intake and 50/75 feet outside the 7 mile radius; and
- A reservoir management plan (including a 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 7 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 USEPA's initiatives.

USEPA approved EPD's Source Water Assessment and Protection Implementation Plan for Public Drinking Water Sources on April 24, 2000. The Plan specifies how source water assessment areas are to be delineated, lists potential contaminants of concern needing to be identified in the delineated areas, provides methodology for determining the susceptibility of a public water supply source and provides the basis for preparing local individual source water protection plans for public water supply systems. USEPA has given the Drinking Water Program (DWP) 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 builds 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 2002. Georgia public noticed and submitted a draft 303(d) list package to the USEPA in November 2001. The public and USEPA reviewed the draft 303(d) list package and provided comments. Georgia reviewed the input, made appropriate changes and submitted a final 303(d) listing package to the USEPA in March 2002. USEPA approved the Georgia list in April 2002.

Georgia's 2002 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, 2000-2001*. The 305(b) assessment tables for the Ocmulgee River basin are reorganized by HUC and presented in Appendix D of this report. The tables provide a code indicating the 303(d) listing status of assessed segments within the Ocmulgee River basin. An "X" in the 303(d) column indicates the segment is on the Georgia 2002 303(d) list.

A complete explanation of the codes in the 303(d) column is given below:

- 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 have been completed and approved by USEPA. 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.

TMDLs were developed for nearly all of the listed segments during the current cycle of basin planning. Coordination and development of TMDL implementation plans is scheduled for 2003.

### **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.

### Box 7-1: A Guide to Understanding TMDLs

A Total Maximum Daily Load, or TMDL, is a regulatory tool that provides a framework for helping stakeholders resolve water quality issues in waterbodies with persistent problems. Literally, it is a calculation of the maximum amount of a pollutant that a water body can receive and still comply with standards and attain its designated use. However, it is used only under certain circumstances and has implications far beyond the arithmetic of the numbers that go into it. This guide will provide a brief history of TMDLs, an explanation of the technical aspects, and information regarding implementation.

#### History

Section 303(d) of the Clean Water Act provides a mechanism for achieving water quality standards where technology-based controls alone are insufficient. It requires states to identify waterbodies that do not achieve designated uses after application of technology to point sources, and put the waterbodies on a list (which has come to be called the 303(d) list). States then develop TMDLs, and allocate the pollutant load to point sources and nonpoint sources. These sources would then be required to reduce their loads to the specified target, either through new permit limits for point sources or best management practices for nonpoint sources.

#### Technical Aspects

TMDLs are often difficult to understand at first. Even so, the components and methodology can be unraveled, explained, and understood.

The terms of the TMDL equation and definitions are as follows:

$$\text{TMDL} = \text{sum of WLA} + \text{sum of LA} + \text{MOS}$$

Term	Definition	Description
WLA	Wasteload Allocation	A portion of the TMDL allocated to a point source.
LA	Load Allocation	A portion of the TMDL assigned to a nonpoint source or natural background sources in the present or future.
MOS	Margin of Safety	TMDLs are required to contain an appropriate margin of safety. The margin of safety is a way to account for the uncertainty inherent in the calculations and modeling that went into developing the loading capacity and the allocations. This may be an explicit portion of the TMDL, or it may be incorporated implicitly through use of conservative assumptions.

Note: WLA and LA are expressed as "sum of WLA" and "sum of LA." As an example, if there were three point source dischargers, "sum of WLA" would be the sum of all three wasteload allocations, one for each discharger.

While the literal definition of TMDL is "total maximum daily load," the regulations allow it to be expressed in other forms. For instance, it may not be a daily load; fecal coliform bacteria TMDLs are generally expressed in monthly or annual terms. The guiding requirements are that the TMDL must be quantifiable, and it must be designed to achieve water quality standards. It must also have a margin of safety (implicit or explicit), and account for seasonal variation.

*Box 7-1 Continued on Next Page*

### **Box 7-1 Continued...**

#### ***Implementation***

While a TMDL is essentially just a set of numbers, the conditions under which it is invoked and the requirements it produces make it a tool for water quality regulation. TMDLs directly limit the allocations that can be made to point source dischargers requiring NPDES permits, such as wastewater treatment plants. This might limit future expansion of industry or wastewater treatment in a region. Most TMDLs, however, are needed because the water body has nonpoint sources of pollution that contribute to the failure to support a designated use. Agricultural operations, forestry operations, construction sites, suburban housing developments, and urban centers are all potential sources of various kinds of nonpoint source pollution. Pollutants are even transmitted long distances in the air and are deposited and washed off of land surfaces. In many cases, these sources must be addressed through urban land use planning efforts, and/or voluntary actions (often supported by the directed use of funding, such as agricultural cost-share programs to implement best management practices).

TMDL implementation plans will be produced and then acted upon. As the science used to create TMDLs improves, TMDLs may be revised. It will be a dynamic process, both for determining load allocations and for finding the actions needed to meet them and achieve the overarching goal of having clean water achieves compliance with water quality standards and supports designated uses.

### **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 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 will be maintained, can EPD prepare a defensible permit for a proposed new or expanded wastewater treatment facility in accordance with the EPD 303(d) permitting strategy. The assessment should include a detailed plan to address both current water quality and biological problems and any predicted future water quality and biological problems. Key components of such a plan may 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 10 years, various upgrades and improvements have been made to industrial and municipal treatment systems throughout the Ocmulgee River basin. The funding for these projects has come from state and federal construction grants and loans and the citizens of local municipalities.

### **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 takes place.

Wastewater systems that discharge treated wastewater to a surface stream must be permitted through the Georgia 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 re-issuance. 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 that are upgrading are required to meet a chlorine limitation as part of the upgrade, based on the same criteria previously noted.

### **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 required to meet ammonia limits based on calculated toxicity unless instream toxicity has been identified through toxicity testing.

### **Metals/Priority Pollutants/Aquatic Toxicity**

Major municipal and industrial facilities are required to conduct and submit results of periodic priority pollutant scans and aquatic toxicity tests to EPD as part of their permit monitoring requirements or upon submittal of a permit application for permit re-issuance. The data are assessed in accordance with the Georgia Rules and Regulations for Water Quality Control. The results of the assessments 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 that produce color that 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 re-issuance. 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. An example would be in the upper Ocmulgee River basin. EPD has established water quality standards for total phosphorus loading for major tributaries to Jackson Lake (see Table 5-3). Based on the tributary standards, EPD is implementing a strategy to reduce phosphorus loading from upstream water pollution control plant discharges.

## **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. There are no trout streams in the Ocmulgee River basin.

## **Stormwater Permitting**

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

Phase I of the federal regulations set specific application submittal requirements for large (population 250,000 or more) and medium (population 100,000 to 250,000) municipal separate storm sewer systems (MS4). The EPD has determined that the metropolitan Atlanta area is a large municipal system as defined in the regulations. Clayton, Cobb, DeKalb, Fulton, and Gwinnett Counties and all interlaying incorporated cities were required to comply with the application submittal target dates for a large municipal area. Forty-six stormwater permits have been issued to the Atlanta area municipalities.

Augusta, Macon, Savannah, Columbus and the counties surrounding these cities were identified as medium municipal systems as defined in the stormwater regulations. Twelve stormwater permits have been issued to the medium municipal systems in Georgia. The stormwater permits for large and medium municipal systems require the submittal of Annual Reports to EPD. Each year, the EPD reviews the Annual Reports from the large and medium municipalities. Among other things, the Annual Report includes a detailed description of the municipality's implementation of its Stormwater Management Program. The EPD provides comments on the Annual Reports to the MS4 permittees, noting areas of noncompliance and recommending improvements to the local Stormwater Management Programs.

On December 8, 1999 USEPA promulgated the Phase II Rules for Storm Water. Phase II requires NPDES permitting and the development of Stormwater Management Programs for a large number of smaller cities and counties. Construction sites from 1-5 acres and municipally-owned industrial facilities will also be regulated.

Significant progress has been made in the implementation of the Phase II Storm Water Rule concerning small municipal separate storm sewer systems (MS4s). EPD has evaluated the 2000 census data and determined a list of local governments whose jurisdictions resided within the urbanized areas in the state. As required by federal regulations, EPD also determined a waiver process, and a process to designate additional MS4s based on designation criteria. The total number of Phase II MS4s in Georgia is 86.

The General NPDES Storm Water Permit for small MS4s was issued in December 2002. The small MS4s submitted their Notice of Intent forms in March 2003 to apply for coverage under the general permit.

The EPD has issued general permits for the 11 industrial subcategories defined in the Phase I Federal Storm Water Regulations. During 1993, the EPD issued a general NPDES permit that regulates the discharge of stormwater from 10 categories of industrial activity. This permit was reissued in 1998 and will be reissued again in 2003. As of May 2003, approximately 41 Notice of Intent applications for this general permit have been submitted to the EPD.

A second general NPDES permit that would regulate stormwater discharges from construction activities was issued by EPD and subsequently appealed in 1992, 1994, 1995, 1996, and 1999. Settlement negotiations involving the regulated community who filed the three petitions, several environmental organizations, EPD, and a professional facilitator began in October 1999. After months of negotiation, EPD issued a revised general NPDES permit GAR 100000 for construction activities on June 12, 2000. The permit became effective on August 1, 2000. This permit currently regulates construction activity which results in land disturbances of five acres or greater. The construction permit requires permittees to implement best management practices, conduct inspections, and sample stormwater leaving their site after certain rainfall events. There is a three-tiered permitting structure to differentiate between permittees' responsibilities, which allows for easier enforcement. Georgia EPD has received approximately 20,000 Notice of Intent applications since the permit issuance in 2000. The construction general permit will be reissued in July 2003 to include construction sites between one and five acres.

The EPD will continue to regulate stormwater runoff from industrial and urban areas as a part of the point-source permitting process to protect water quality.

### **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**

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

The State's *Nonpoint Source Management Program* combines regulatory and non-regulatory approaches, in cooperation with other state and federal agencies, local and regional governments, state colleges and universities, businesses and industries, nonprofit organizations, and individual citizens. The State's *Nonpoint Source Management Program* was updated and approved by the USEPA in September 2000. This revision was intended to satisfy the requirements for funding under Section 319(b) of the Clean Water Act of 1987 and to delineate short- and long-term goals and implementation strategies. Just as important, it was designed to be an information resource for the wide range of stakeholders across the state who are involved in the prevention, control, and abatement of nonpoint sources of pollution. It has been developed as an inventory of the full breadth of nonpoint source management (regulatory and non-regulatory) in Georgia, including

activities which are currently underway or planned for in the time period FFY 2000 through FFY 2004.

The State's *Nonpoint Source Management Program* focuses on the comprehensive categories of nonpoint sources of pollution identified by the USEPA: Agriculture, Silviculture, Construction, Urban Runoff, Resource Extraction, Land Disposal, Hydrologic/Habitat Modification, and Other Nonpoint Sources. The Georgia EPD solicited participation from state and federal agencies, local and regional governments, state colleges and universities, businesses and industries, and nonprofit organizations with significant programs directed towards nonpoint source management. The State's *Nonpoint Source Management Program* comprehensively describes a framework for stakeholder coordination and cooperation and serves to implement a strategy for employing effective management measures and programs to control nonpoint source pollution statewide.

### **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*

Georgia's Soil and Water Conservation Districts (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*

Georgia's Soil and Water Conservation Commission (SWCCs) receive no annual appropriations and are not regulatory or enforcement agencies. Therefore, the Georgia Soil and Water Conservation Commission (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 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. 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 2002 Farm Bill provides a number of programs and processes designed to address 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 50 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 \$450,000 in EQIP funds over 10 years for contracts initiated between FY 2002 and FY 2007 to implement needed conservation practices.

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 was convened to develop a forestry Water Quality program that included the development of silvicultural Best Management Practices (BMPs). Spearheaded by the Georgia Forestry Commission (GFC), this Task Force was composed of 14 conservation and environmental representatives, University of Georgia professionals, and USFS personnel. As a result, BMPs were developed in 1981. The Task Force also prepared a report that recommended a voluntary (exempt from state and local Erosion & Sediment Control permitting) approach to the implementation of BMPs and the designation of the GFC as the lead agency for implementing the silviculture portion of the State Water Quality Management Plan. Their main roles are

BMP education, forestry complaint investigation, and BMP implementation monitoring. In January 1999, the BMPs were revised to reflect changes in new laws and advances in technology.

The GFC 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). From 1981 through June 2002, GFC foresters have conducted 1,580 BMP programs for 54,134 people in the forestry community. They have provided BMP advice in 67,678 plans covering over 4 million acres statewide. Over 75,000 BMP manuals have been distributed.

Working with the University of Georgia School of Forest Resources, the Georgia Forestry Association, member companies of the American Forest & Paper Association (AF&PA), and the Southeastern Wood Producers Association (SWPA), the GFC provides BMP education for the AF&PA's Sustainable Forestry Initiative (SFI) that provides education to the 1,500 loggers in the state. The initial course, started in December 1995, is a three-day workshop in which the participants are provided instruction on forest soils, wetlands, wildlife impacts, endangered species, BMPs, Occupational Safety and Health Administration (OSHA), and business management. Loggers are required to complete this course in order to deliver their products to participating mills and wood yards. In addition, they are required to obtain 12 hours of continuing logger education every 2 years.

The GFC investigates and mediates complaints involving forestry operations. Since 1981, the GFC has investigated 1,304 complaints statewide. Non-compliance cases are turned over to the EPD for enforcement under the Georgia Water Quality Control Act. Fines and penalties can range up to \$50,000 per day. 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.

In addition, the GFC conducts BMP implementation and compliance surveys to assess the implementation rates and effectiveness of BMPs. Statewide BMP surveys were conducted in 1991, 1992, 1998, and in 2002. Another survey is planned for 2004 and every two years after.

The GFC has established procedures for installing water control structures in the 25,000 miles of annual firebreaks to reduce soil erosion and sedimentation.

As a result of the federal Total Maximum Daily Load (TMDL) program, the GFC began a monthly BMP Assurance Examination Program in January 2003. The GFC will identify active forestry operations and conduct at least one examination per field once a month resulting in approximately 45 sites per month. The purpose is to get on the site early enough to provide BMP information to landowners and to provide advice to loggers or forest operators in order to prevent potential problems from occurring. The GFA, SWPA, and AF&PA member companies, who are now tracking wood compliance on private landowners, support this program.

Additional requirements are imposed within the National Forest areas of Georgia. Each National Forest produces and regularly updates a 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. Part of the Oconee National Forest is located in the Ocmulgee River basin in Jasper and Jones counties.

## 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 nonpoint 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 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.

## Erosion and Sediment Control

The Georgia Erosion and Sedimentation Act was signed into law in 1975 and has been amended several times, most recently in 2001. The legislative intent of the Act was to establish a comprehensive statewide soil, erosion and sedimentation control program to protect and conserve air, land, and water resources. This was to be accomplished through the adoption and implementation of local ordinances and programs which regulate certain land disturbing activities generally associated with urban development. EPD implements

the program where there is no local ordinance. The Act requires an erosion and sedimentation control plan and a land disturbing activity permit for sites greater than 1.1 acres. Erosion and Sedimentation Control Plans must be reviewed and approved by the Soil and Water Conservation District or by the local issuing authority before the land disturbing activity permit can be issued. Buffers of 25 feet for warm water streams and 50 feet for trout streams are required by the Act for the protection of water quality. The Act provides for a variance from these buffers under certain circumstances. Variances can only be issued by EPD. Procedures and criteria for obtaining a stream buffer variance are outlined in DNR's Erosion and Sedimentation Control Rules and Regulations and become part of the Land Disturbing Activity Permit. The Act provides for monetary penalties of up to \$2,500 per day, enforced by EPD or by the local issuing authority.

#### **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 (DNR), 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 Zell 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 statewide 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. There is a 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 pre-colonial 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 USEPA 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 10 acres above the "headwaters" point of non-tidal streams where the annual average flow is less than 5 cubic feet per second. The COE and USEPA carry out enforcement in freshwater wetlands. Normal agricultural and silvicultural operations are exempted from permitting under Section 404 regulations. However, agriculture is regulated by the Swampbuster provisions under the Farm Bill and Section 404 and landowners cannot convert forested wetlands to agricultural uses (including ponds) without first securing a COE permit. Silvicultural operations cannot convert wetlands to uplands by major drainage nor convert certain bottomland hardwood wetlands to pine stands via mechanical site preparation without first securing a permit from the COE.

The COE may require wetland mitigation activities in association with permitting, including creation, restoration, and protection of wetlands. COE may also require wetland restoration in case of violations.

#### **Land Acquisition**

The 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 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 previously.

### **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 awareness of how individuals 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 Georgia EPD and five Regional Training Centers, a network of college-based training centers located statewide. This network of training centers allows the *Georgia Adopt-A-Stream Program* to be accessible to all areas of the state. The Regional Training Centers ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control.

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

Currently, more than 10,000 volunteers participate in 200 individual and 40 community-sponsored *Adopt-A-Stream* programs. Volunteers conduct cleanups, stabilize streambanks, monitor waterbodies using biological and chemical methods, and evaluate habitats and watersheds at over 260 sites throughout the state. These activities lead to a greater awareness of water quality and nonpoint source pollution, active cooperation between the public and local governments in protecting water resources, and the collection of basic water quality data. The *Georgia Adopt-A-Stream Program* focuses on what individuals and communities can do to protect from nonpoint sources of pollution.

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

professional attention can be obtained. Advanced levels of involvement include biological monitoring, chemical monitoring, habitat improvement or riparian restoration projects.

In addition, the *Georgia Adopt-A-Stream Program* and *Keep Georgia Beautiful Program* coordinate *Rivers Alive*, Georgia's annual volunteer river clean up event held throughout the month of October that targets cleanups of streams, rivers, lakes, and wetlands statewide. The mission of *Rivers Alive* is to create awareness of and involvement in the preservation of Georgia's water resources.

*Rivers Alive 2002* included 120 local cleanup events and attracted more than 17,000 volunteers statewide. During October 2002, volunteers removed more than 300,000 pounds of trash and garbage from 780 miles of the state's waterways. Previous river clean up events in Georgia have been successful, but pale in comparison to the success that has been achieved by *Rivers Alive 2002*. Organizers and volunteers receive free t-shirts, watershed posters and signs, press releases and public service announcements. Additional information about *Rivers Alive* is available on the website, <http://www.riversalive.org>.

The Georgia Adopt-A-Stream Program provides volunteers with additional resources such as the *Getting to Know Your Watershed and Visual Stream Survey*, *Biological and Chemical Stream Monitoring*, *Adopt-A-Wetland*, *Adopt-A-Lake*, and *Adopt-A-Stream Teacher's Guide* manuals, PowerPoint presentations, and promotional and instructional training videos. In addition, a bi-monthly newsletter is published and distributed to over 3,000 volunteers statewide with program updates, workshop schedules, and information about available resources. Additional information about the Georgia Adopt-A-Stream Program is available on the *Rivers Alive* website, <http://www.riversalive.org/aas.htm>.

In addition, the Georgia Adopt-A-Stream Program activities have been correlated to the Georgia Quality Core Curriculum (QCC) Science Standards for grades K-12, and certified teachers in Georgia participating in Georgia Adopt-A-Stream Program training workshops will receive Staff Development Unit (SDU) credits. Additional information about the QCC correlations and SDU credits and the Georgia Adopt-A-Stream QuickTime Training Videos are available on the National Science Center's website, <http://tech.nscdiscovery.org/ee/aas.htm>.

The Georgia Adopt-A-Stream Program has partnered with the Environmental Education Alliance of Georgia to conduct an annual conference and awards ceremony. The 2003 conference, *Environmental Education - Connecting Communities and Classrooms*, was held in Savannah, Georgia, with over 250 participants. Additional information about the annual conference and awards ceremony are available on the website, <http://www.eealliance.org>.

### **Georgia Project WET (Water Education for Teachers) Program**

A report outlining a plan for nonpoint source education in Georgia was completed in 1994. The Georgia Urban Waterbody Education Plan and Program delineated nonpoint source education strategies for seven target audiences: general public, environmental interest organizations, civic associations, educators, business associations, local government officials, and state government officials. In October 1996, the Project WET (Water Education for Teachers) curriculum was selected as the most appropriate water science and nonpoint source education curriculum for the state. The Project WET curriculum is an interdisciplinary water science and education curriculum that can be easily integrated into the existing curriculum of a school, museum, university pre-service class, or a community organization. The goals of the Georgia Project WET Program are to facilitate and to promote awareness, appreciation, knowledge, and stewardship of water resources through the development and dissemination of classroom ready (K-12) teaching aids.

The success of the Georgia Project WET Program has been phenomenal. Since 1997, over 200 Project WET facilitators have been trained in Georgia with more than 4,500 formal and non-formal educators implementing the Project WET curriculum statewide with a substantial number of students – over 675,000 students annually.

The Georgia Project WET Program continues to be nationally recognized as a model program for its training strengths and techniques – specifically, the use of the arts in environmental education. The Georgia Project WET Program and the Georgia Center for the Book offer educators in Georgia the opportunity to participate in the *River of Words*, an international poetry and art contest for students (K-12). This contest provides students with the opportunity to explore their own watersheds and to learn their “ecological” addresses through poetry and art. National winners are selected by the former U.S. Poet Laureate, Robert Hass, and the International Children’s Art Museum. Annually, only eight students are selected as National Grand Prize Winners to be honored at the Library of Congress in Washington, DC. Additional information about *River of Words* is available on the website, <http://www.riverofwords.org>.

Over 30,000 entries were submitted to the *River of Words 2003* contest, and one of the eight National Grand Prize Winners was from Georgia. Since 1997, 11 students from Georgia have been recognized as National Grand Prize Winners, and an additional 81 students have been selected as National Finalists and Merit Winners.

The students’ original poetry and art are returned from the international competition and are on display in the *Georgia River of Words Exhibition* statewide. The Georgia Project WET Program offers a guidebook for educators with specific information about Georgia’s watersheds, and several nature centers throughout Georgia offer *River of Words* field trips and workshops for students and educators.

The Georgia Project WET Program provides educators with additional resources, such as the Enviroscope Nonpoint Source, Wetlands and Groundwater Flow Models – demonstration tools used to emphasize the impacts of nonpoint source pollution to surface and groundwaters, scripted theatrical performances and costumes, and promotional and instructional training videos. In addition, the newsletter, *Dragonfly Gazette*, and the *Georgia River of Words Art and Poetry Journal* are published and distributed to over 4,500 educators statewide and nationally.

The Georgia Project WET Program has partnered with the Environmental Education Alliance of Georgia to conduct an annual conference and awards ceremony. The 2003 conference, *Environmental Education – Connecting Communities and Classrooms*, was held in Savannah, Georgia, with over 250 participants. Additional information about the Georgia Project WET Program and the annual conference and awards ceremony are available on the website, <http://www.eealliance.org>.

### **7.2.7 Groundwater Protection Strategies**

In 1984, EPD developed its first management plan to guide the management and protection of Georgia’s groundwater 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 USEPA for a Comprehensive State Ground Water Protection Plan (CSGWPP). The goal of Georgia’s groundwater 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 groundwater is of the same value. EPD’s goal is primarily preventive, rather than curative; but it recognizes that nearly all groundwater 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 groundwater 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 groundwater from being significantly polluted and to cleanup groundwater in the unlikely event pollution were to occur. Extensive monitoring has shown that incidents of groundwater pollution or contamination are uncommon in Georgia; no part of the population is known to be at risk.

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

Groundwater 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 groundwater used for municipal drinking water through an USEPA-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 cleanup in significant groundwater recharge areas. The most stringent guidelines of these criteria pertain to those recharge areas with above average groundwater pollution susceptibility indexes.

Moreover, EPD has legal authority under the Georgia Water Quality Control Act to clean up groundwater 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 groundwater 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 that are targeted to address concerns and priority issues for the Ocmulgee River basin which 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 to address 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 basinwide scale, locally-led efforts in the subbasins will be required to help to monitor, assess, restore, and maintain water quality throughout the Ocmulgee River basin.

#### **7.3.1 Fecal Coliform Bacteria**

##### **Problem Statement**

The water use classification of fishing and/or drinking water was not fully supported in 65 stream segments and a portion of 1 lake due to exceedances of the water quality standards for fecal coliform bacteria. These water quality exceedances are found throughout the Ocmulgee River basin and are primarily attributed to urban runoff, septic systems, sanitary sewer overflows, wastewater treatment plant discharges, 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.

##### *Upper Ocmulgee River Subbasin (HUC 03070103)*

The water use classification of fishing and/or drinking water was not fully supported in 1 Ocmulgee River mainstem segment, and 58 tributary stream segments, and a 650-acre portion of Jackson Lake due to exceedances 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 Ocmulgee River Subbasin (HUC 03070104)*

The water use classification of fishing and/or drinking water was not fully supported in two Ocmulgee River mainstem segment and three tributary stream segments due to exceedances 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.

##### *Little Ocmulgee River Subbasin (HUC 03070105)*

The water use classification of fishing was not fully supported in two tributary stream segments due to exceedances 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**

General goals for this plan are to meet water quality standards to support designated water uses and increase public awareness of fecal coliform bacteria pollution through coordinated education and outreach efforts.

## **Ongoing Efforts**

General ongoing efforts as well as a summary of the fecal coliform bacteria TMDLs in the Ocmulgee River basin follow.

### **A. General Efforts**

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 stormwater discharges through the 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. TMDLs were completed for stream segments on the 2002 303(d) list in 2002. TMDL implementation plans will be developed in 2003.

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 non-regulatory 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) developed to regulate the design, operation, and maintenance of on-site sewage management systems. DHR subsequently formed the Onsite Sewage Management Systems Technical Review Committee in 1999. The Committee's function is to make recommendations to the department regarding the approval of new systems, assist the Department 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.

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. Ongoing training activities within the basin that address fecal coliform concerns include Sustainable Agriculture and Farm-A-Syst. 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 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 (SWCDs) and Resource Conservation and Development (RC&D) Councils are working with producers to utilize animal waste according to Nutrient Management Plans through their Lagoon Pumpout Program.

### **B. Fecal Coliform Bacteria TMDLs**

TMDLs were established for stream segments (Table 7-1) on the 303(d) list impacted by fecal coliform bacteria (see Box 7-1 for background information about TMDLs).

#### *Sources Considered in TMDL*

Nonpoint sources had the greatest impact on fecal coliform bacteria loading in the Ocmulgee River basin, while most point sources did not significantly impact fecal coliform bacteria loading. Point sources were identified in 33 listed segments; nonpoint sources occurred in all 66 segments. Point sources were water pollution control plants (WPCPs) and combined sewer overflows (CSOs). Urban nonpoint sources included stormwater runoff, leaking sewer collection systems, leachate from landfills, improper disposal of waste materials, and domestic animal feces. Most rural nonpoint sources involved wash off of fecal coliform bacteria from land surfaces during storm events, including the following:

- Wildlife feces deposition
- Livestock feces deposition during grazing
- Manure application to land surfaces
- Livestock feces deposition directly in streams
- Septic tank failure

#### *TMDL Modeling Methods and Results*

The TMDLs were developed with the Hydrologic Simulation Program FORTRAN (HSPF) watershed model. This model simulated the seasonal and geographic variation of FC loading and stream concentrations over 5-10 years. A 30-day critical period was determined during which the highest simulated violation of the standard occurred (geometric mean of at least 4 samples in a 30-day period no greater than 200 counts/100 mL from May through October). Calculating the TMDLs with a critical period ensured that each stream would meet this standard during any month over the simulated period.

Simulated loading over the 30-day critical period was adjusted so that the geometric mean of the concentrations (the  $n$ th root of the product of  $n$  concentrations) at each segment's outlet was less than or equal to the target of 200 counts/100 mL. TMDLs were calculated as the sum of point and nonpoint source loads over the 30-day critical period and a margin of safety was applied. A TMDL was reported for each listed stream segment (Table 7-1).

#### *TMDL Implementation*

EPD will work with the Georgia Regional Development Centers (RDCs) on the development of TMDL Implementation Plans in 2003.

### **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 bacteria sources. Sanitary sewer leaks and overflows may be a source of fecal coliform bacteria as well. Many fecal coliform bacteria reducing practices are relatively 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) should be concentrated in priority watersheds with sufficient technical workforce to implement BMPs through long-term agreements or contracts to reduce fecal coliform loading.

Additional efforts should be directed toward increasing public awareness of fecal coliform bacteria pollution, with an emphasis on potential sources and BMPs. State and basinwide coordination between agencies and organizations providing public education and technical assistance may help to extend outreach efforts.

### **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 reevaluation scheduled for 2007 in accordance with the statewide RBMP management cycle. In addition, EPD and USEPA finalized TMDLs for stream segments on the 2002 303(d) list for the Ocmulgee River basin in 2002. EPD will be coordinating the development of TMDL implementation plans with RDCs in 2003.

#### **Specific Management Objectives**

Stakeholders should 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.

**Table 7-1. Fecal Coliform Bacteria TMDLs in the Ocmulgee River Basin**

<b>Stream Name</b>	<b>Segment Description<sup>1</sup></b>	<b>HUC</b>	<b>Length (miles)</b>	<b>Use Support<sup>2</sup></b>	<b>TMDL (#/30 days)</b>
Alcovy River	Cedar Creek to Bay Creek	03070103	4	NS	4.74E+12
Alligator Creek	Batson Creek to Lime Sink Creek	03070105	12	NS	9.20E+12
Almand Branch	Tanyard Branch to Snapping Shoals	03070103	5	NS	7.73E+11
Bay Creek	Headwaters to Beaver Creek	03070104	9	NS	3.02E+11
Beaver Ruin Creek	Gwinnett County	03070103	8	PS	3.11E+12
Big Cotton Indian Creek	Panther Creek to Brush Creek	03070103	5	NS	2.25E+12
Big Flat Creek	Headwaters to Flat Creek	03070103	13	NS	7.26E+12
Big Haynes Creek	Brushy Creek to Little Panther Creek	03070103	2	PS	2.68E+12
Big Haynes Creek	Headwaters to Brushy Creek	03070103	9	PS	2.68E+12
Big Haynes Creek	Little Haynes Creek to Yellow River	03070103	5	PS	2.68E+12
Big Indian Creek	Mossy Creek to Ocmulgee	03070104	7	PS	3.27E+12
Big Sandy Creek	Aboothlacoosta Creek to Ocmulgee	03070103	10	NS	5.60E+11
Bromolow Creek	Headwaters to Beaver Ruin Creek	03070103	5	PS	7.75E+12
Cabin Creek	Headwaters Griffin to Towaliga River	03070103	16	NS	6.06E+11
Camp Creek	Headwaters to Jackson Creek	03070103	6	NS	3.20E+12
Cedar Creek	Headwaters to Alcovy River	03070103	4	PS	1.72E+11
Cobbs Creek	Headwaters to Shoal Creek	03070103	7	NS	2.96E+12
Conley Creek	Headwaters to South River	03070103	9	NS	4.88E+12
Doless Creek	Headwaters to Doolittle Creek	03070103	2	PS	8.52E+10
Doolittle Creek	Headwaters to South River	03070103	5	NS	1.15E+12
Falling Creek	Little Falling Creek to Ocmulgee River	03070103	9	NS	7.52E+11
Honey Creek	Headwaters to South River	03070103	13	NS	2.94E+11
Hopkins Creek	Headwaters to Alcovy River	03070103	4	NS	3.33E+11
House Creek	Ball Creek to Little House Creek	03070104	8	NS	1.51E+11
Intrenchment Creek	Headwaters to South River	03070103	6	NS	4.40E+12
Jacks Creek	Headwaters to Yellow River	03070103	4	NS	1.65E+12
Jackson Creek	Gwinnett County	03070103	7	PS	1.03E+13
Little Haynes Creek	Hwy 20 to Big Haynes Creek	03070103	11	NS	9.33E+11
Little Stone Mountain Creek	Headwaters to Stone Mountain Lake	03070103	3	NS	5.34E+11
Little Suwanee Creek	Tributary to Yellow River	03070103	2	NS	1.48E+12
McClain Branch	Headwaters to Honey Creek	03070103	2	NS	3.45E+11
No Business Creek	Headwaters to Norris Lake	03070103	6	NS	2.25E+12
North Branch South River	Atlanta	03070103	3	PS	4.36E+11
Ocmulgee River	Sandy Run Creek to Big Indian Creek	03070104	23	PS	9.24E+15
Ocmulgee River	Tobesofkee Creek to Echeconnee Creek	03070103	7	PS	1.06E+14
Pew Creek	Gwinnett County	03070103	4	PS	1.35E+12
Rocky Creek	D/s English Rd (CR152) to Tawaliga River	03070103	5	PS	5.5E+12
Shetley Creek	Headwaters to Bromolow Creek	03070103	2	NS	6.85E+11
Shoal Creek	Headwaters to Alcovy River	03070103	5	NS	8.13E+11
Shoal Creek	Headwaters to South River	03070103	7	NS	1.29E+12
Snapfinger Creek	DeKalb County	03070103	18	NS	7.59E+11

Stream Name	Segment Description <sup>1</sup>	HUC	Length (miles)	Use Support <sup>2</sup>	TMDL (#/30 days)
Snapping Shoals Creek	Almand Branch to South River	03070103	10	NS	1.85E+12
South River	Atlanta to Flakes Mill Road	03070103	16	NS	3.106E+13
South River	Flakes Mill Road to Pole Bridge Creek	03070103	9	NS	5.87E+13
South River	Pole Bridge Creek To Hwy 20	03070103	15	NS	8.64E+13
South River	Snapping Shoals to Jackson Lake	03070103	7	PS	1.49E+14
South River	Hwy 20 to Snapping Shoals Creek	03070103	11	PS	1.49E+14
Stone Mountain Creek	Headwaters to Stone Mountain Lake	03070103	4	NS	1.72E+12
Sugar Creek	U/S Memorial Drive to South River	03070103	6	NS	1.68E+12
Sweetwater Creek	Lee Daniel Creek to Yellow River	03070103	6	NS	1.85E+13
Swift Creek	Headwaters to Yellow River	03070103	5	NS	7.96E+11
Tobesofkee Creek	Cole Creek to Todd Creek	03070103	8	NS	5.82E+11
Tobesofkee Creek	Lake Tobesofkee to Rocky Creek	03070103	10	PS	5.82E+11
Town Branch	D/S Jackson South WPCP to Aboothlacoosta Creek	03070103	3	NS	2.75E+11
Turkey Creek	Headwaters to Yellow River	03070103	4	NS	7.30E+11
Turnpike Creek	Hwy 280 to Sugar Creek	03070105	24	NS	7.76E+12
Tussahaw Creek	Wolf Creek to Lake Jackson	03070103	6	NS	3.67E+14
Walnut Creek	Headwaters to Ocmulgee River	03070103	20	NS	4.02E+11
Watson Creek	Headwaters to Yellow River	03070103	3	NS	1.07E+12
Wise Creek	Headwaters to Ocmulgee River	03070103	6	NS	1.79E+11
Yellow River	Big Haynes Creek to Jackson Lake	03070103	25	NS	8.25E+13
Yellow River	Hammock Creek to Big Haynes Creek	03070103	9	PS	6.53E+13
Yellow River	Sweetwater Creek to Centerville Creek	03070103	15	NS	5.23E+13
Yellow Water Creek	1 mile d/s Stark Road	03070103	7	NS	2.84E+11
Lake Jackson	Newton, Butts, and Jasper Counties	03070103	N/A <sup>3</sup>	PS	TBD <sup>4</sup>

<sup>1</sup>See Appendix D for designated uses.

<sup>2</sup>NS = Not supporting designated use; PS = Partially supporting designated

<sup>3</sup>Affected area equals 650 acres.

<sup>4</sup>To be determined. Monitoring data was insufficient to develop a TMDL.

### Management Option Evaluation

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

### Action Plan

TMDLs have been completed for stream segments on the 2002 303(d) list. TMDL implementation plans will be completed in 2003.

EPD will assess use support in listed stream segments and encourage local efforts to address nonpoint source pollution. 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 the attention of localities 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 (PCEP) Programs and encourage local planning to address management on a basinwide 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.

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 Ocmulgee River basin in 2007.

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

Agricultural cost share dollars (Farm Bill), grants (Section 319), and loans (Clean Water Act State Revolving Fund) need to be concentrated in priority watersheds with sufficient technical work force to implement BMPs through long-term agreements or contracts.

#### **Specific Management Objectives**

Stakeholders should 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 will be used.

#### **Action Plan**

EPD will 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 assessment of Land Application Systems. TMDLs were completed for stream segments on the 2002 303(d) list. EPD will be coordinating the development of TMDL implementation plans with RDCs in 2003.

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 2002 Farm Bill will

be targeted to areas of apparent water quality impact, including rural streams that may contain excessive fecal coliform loads from animal and cropland operations.

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

The 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. The 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 University of Georgia will provide on-farm assistance to local producers through their 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 Ocmulgee River basin in 2007.

## **7.3.2 Erosion and Sedimentation**

### **Problem Statement**

Water use classifications 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. There are 55 stream segments listed in this subbasin as not fully supporting designated uses due to poor fish communities or sedimentation. 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.

#### *Upper Ocmulgee River Subbasin (HUC 03070103)*

There are 39 stream segments listed in this subbasin as not fully supporting the designated water use of fishing due to poor fish communities due to sedimentation.

#### *Lower Ocmulgee River Subbasin (HUC 03070104)*

There are 15 stream segments listed in this subbasin as not fully supporting the designated water use of fishing due to poor fish communities due to sedimentation.

#### *Little Ocmulgee River Subbasin (HUC 03070105)*

There is one stream segment listed in this subbasin as not fully supporting the designated water use of fishing due to poor fish communities due to sedimentation.

### **General Goals**

A general goal of this plan is to control erosion and sedimentation from land disturbing activities in order to meet narrative turbidity water quality standards and support designated uses. The plan also seeks to increase public awareness of erosion and sedimentation through coordinated education and outreach efforts.

## Ongoing Efforts

General ongoing efforts as well as a summary of the sediment TMDLs in the Ocmulgee River basin follow.

### A. General Efforts

Sediment TMDLs have been completed for 41 stream segments. TMDL implementation plans will be developed in 2003. TMDLs will be developed during the next basin planning cycle for 16 stream segments that were added to the Georgia 2002 303(d) list based on data collected in 2001.

Forestry and Agriculture both have voluntary Erosion and Sedimentation Control Act (E&SC) programs built around implementation of BMPs and water complaint resolution procedures 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 Streambank Restoration*, *A Guide to Controlling Erosion with Vegetation*, and *Agricultural Management Practices*. These, along with a number 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 and is specifically targeting those landowner groups and regions with low compliance from their surveys for increased BMP education through local talks, workshops, etc. The Georgia Forestry Association, the American Forest and Paper Association (AF&PA), and the University of Georgia 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. The Forestry BMPs, printed in January 1999, will result in additional sedimentation reductions and more riparian tree cover left over perennial and intermittent streams.

EPD currently 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.

A general NPDES permit that would regulate stormwater discharges from construction activities was issued by EPD and subsequently appealed in 1992, 1994, 1995, 1996, and 1999. Settlement negotiations involving the regulated community who filed the three petitions, several environmental organizations, EPD, and a professional facilitator began in October 1999. After months of negotiation, EPD issued a revised general NPDES permit GAR 100000 for construction activities on June 12, 2000. The permit became effective on August 1, 2000. This permit currently regulates construction activity, which results in land disturbances of five acres or greater. The construction permit requires permittees to implement best management practices, conduct inspections, and sample stormwater leaving their site after certain rainfall events. There is a three-tiered permitting structure to differentiate between permittees' responsibilities which allows for easier enforcement. EPD has received approximately 20,000 Notice of Intent applications since the permit issuance in 2000.

In an effort to determine compliance with the construction general permit, Georgia EPD and the USEPA partnered to form the Stormwater Task Force, which conducted over 200 inspections between May and September 2001. The Task Force adopted a "zero

tolerance" enforcement position with regard to violations of the permit. Substantial fines were levied on permittees found to be in violation.

Looking ahead to the construction permit re-issuance in July 2003, a group of stakeholders called the Stormwater General Permit Advisory Committee (GPAC) has been holding regular meetings to discuss permit issues. GPAC is comprised of those parties who were involved in the settlement negotiations of 1999, with the addition of Georgia Department of Transportation (DOT). GPAC is a forum for these groups and the general public to discuss issues related to the construction permit. GPAC is currently tasked with recommending appropriate changes to the current permit and examining how Phase II NPDES permitting, which will require permit coverage for sites disturbing between one acre and five acres, can be incorporated into the permit. Input has also been received from the Erosion and Sediment Control Overview Council.

An 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 8 to 11 units of government each year. A task force established by the Erosion and Sediment Control Technical Study Committee, known as DIRT II, has completed its assessment of 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 streambanks.

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 that may be modified or added to local development programs to better protect water quality. Portions of the report address water quality impacts from stormwater runoff and its relationship to urban development.

Local Soil and Water Conservation Districts and Resource Conservation and Development (RC&D) Councils are working with crop producers to reduce erosion and sedimentation through their No-Till Drill Program in the Ocmulgee River basin.

#### *Forestry BMP Education*

From 1995 through 2003, the GFC provided BMP training at the 3-day Master Timber Harvester Workshop. During this period, the workshop was attended by the following number of personnel affiliated with timber buyers and loggers in the three subbasins:

- Upper Ocmulgee River Subbasin (Hydrologic Unit 03070103) – 153 personnel
- Lower Ocmulgee River Subbasin (Hydrologic Unit 03070104) – 141 personnel
- Little Ocmulgee River Subbasin (Hydrologic Unit 03070105) – 61 personnel

#### *Upper Ocmulgee River Subbasin (HUC 03070103)*

The GFC conducted BMP Implementation and Compliance Surveys in 1991, 1992, 1998, and in 2002. No data was extracted specifically for the Ocmulgee River basin during the 1991 survey. However the data for the Upper Ocmulgee River subbasin should

be similar to the statewide data for the Piedmont region. There, the results indicate that the overall percentage of acres in compliance with BMPs was 77.9 percent. The percentage of streambanks or channels in compliance with BMPs was 95.9 percent.

*During the 1992 survey*, the GFC examined approximately 1,295 acres on 17 sites in the Upper Ocmulgee subbasin. Fifteen sites were evaluated on non-industrial private forestlands (NIPF), with one each evaluated on forest industry and public lands. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 90 percent of the harvested acres were in compliance with BMPs. By ownership, compliance was 89.2 percent on NIPF and 100 percent on both forest industry and public lands.
- Overall, 94 percent of main haul road miles were in compliance with BMPs. By ownership, compliance was 94 percent on NIPF, 100 percent on forest industry, and 100 percent on public lands.
- No mechanical site-prepared acres were evaluated.
- There was one site that had chemical site preparation and that occurred on the NIPF landowner. The percentage of acres in compliance with BMPs was 99 percent. That one site also had been burned with 100 percent of the acres in compliance with BMPs. That site also was reforested with 100 percent of the acres being in compliance with BMPs.
- Overall, 89.9 percent of the acres were in compliance with BMPs. By ownership, compliance was 89.2 percent on NIPF and 100 percent on forest industry and public lands.
- There were 44.1 miles of stream evaluated with 99.1 percent being in compliance with BMPs.

*During the 1998 survey*, the GFC examined approximately 1,706 acres on 21 sites in the Upper Ocmulgee subbasin. Eighteen sites were on NIPF landowners and three sites were on forest industry lands. According to the Southern Group of State Foresters recommended protocol, adopted in 1997, two scores will now be reported. Compliance is the measure of units (acres, miles of road, number of stream crossings, etc.) in compliance with BMPs. Implementation rate is the percentage of applicable BMPs that are implemented in their entirety over the tract. Key highlights and areas for improvement for each category of practice are discussed below.

Overall, 93.9 percent of the streamside management zone (SMZ) acres were in compliance with BMPs with 12 water quality risks identified. The percentage of applicable BMPs implemented was 82 percent. The main problem was logging debris was left in stream channels on 41 percent of the sites. Rutting occurred on 20 percent of the sites. By ownership, overall compliance was 93.1 percent and implementation was 79.7 percent on NIPF lands. On forest industry lands, compliance and implementation were both 100 percent.

- Overall, 28 stream crossings were evaluated and all occurred on the NIPF lands. Only 17.9 percent were in full compliance with BMPs. The percentage of applicable BMP implementation was 42 percent resulting in 28 water quality risks identified. Serious problems were found regarding random crossings; steep approaches; proper culvert location; installation, inadequate size, and stabilization of exposed fill; and the use of skidder fords and debris and dirt type crossings and their removal.
- Overall, 59 percent of the forest road miles evaluated were in compliance with BMPs. The percentage of applicable BMPs implemented was 71.7 percent resulting in 8 water quality risks identified. The main problem was inadequate or lack of installation of water diversion measures in roads as this was done on only

29 percent of the sites. By ownership, on NIPF lands, overall compliance was 57.8 percent with 70.8 percent of the BMPs implemented resulting in 8 water quality risks identified. On forest industry lands, compliance was 66.7 percent, with 76 percent of the applicable BMPs being implemented and no water quality risks.

- Overall, 98.3 percent of the harvested acres were in compliance with BMPs. The percentage of BMP Implementation was 80.4 percent resulting in 9 water quality risks. The main problems found were log decks that were retired and stabilized on 38 percent of the sites and skid trails that were retired and stabilized on 50 percent of the sites. By ownership, on NIPF lands, overall compliance was 98 percent with 80 percent of the applicable BMPs implemented resulting in 9 water quality risks. On forest industry lands, compliance was 99 percent with 82 percent of the applicable BMPs implemented but no water quality risks identified.
- Overall, 100 percent of the mechanical site preparation, chemical site preparation, burning, and artificial regeneration acres were in compliance with BMPs as well as the percentage of BMP implementation. No water quality risks were identified.
- There were 7 perennial and 10 intermittent streams evaluated, accounting for approximately 7.94 miles of stream; 90.4 percent of those miles were in compliance with BMPs.
- Overall, 98.3 percent of the acres in the Upper Ocmulgee River subbasin were in compliance with BMPs. The percentage of applicable BMPs implemented was 72.6 percent resulting in 57 water quality risks. By ownership, compliance on NIPF lands was 98.0 percent with 71.2 percent of the applicable BMPs implemented resulting in all 57 water quality risks. On forest industry lands, BMP compliance was 99.1 percent, with 84.1 percent of the applicable BMPs implemented but no water quality risks identified.

*During the 2002 survey*, the GFC evaluated approximately 1,411 acres on 22 sites in the Upper Ocmulgee subbasin. Eighteen sites were on NIPF lands, two sites were on forest industry lands, and two sites were on public lands. As with the 1998 survey, two scores will now be reported according to the Southern Group of State Foresters recommended protocol. Compliance is the measure of units (acres, miles of road, number of stream crossings, etc.) in compliance with BMPs. Implementation rate is the percentage of applicable BMPs that are implemented in their entirety over the tract. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 97.5 percent of the streamside management zone (SMZ) acres on 21 sites were in compliance with BMPs. The percentage of applicable BMPs implemented was 87 percent resulting in 9 water quality risks identified. The main problem was logging debris was left in stream channels on 32 percent of the sites. Roads within the SMZs were not maintained or adequately stabilized but on 28.6 percent of the sites. Water bars were not installed in firebreaks that tied into stream channels. By ownership, overall compliance was 95.5 percent and implementation was 83.9 percent on NIPF lands resulting in 9 water quality risks. On forest industry lands, compliance and implementation were both 100 percent. On public lands, compliance and implementation were both 100 percent.
- Overall, 16 stream crossings were evaluated on 13 sites. Thirteen of these crossings occurred on the NIPF lands, and the remaining three occurred on public lands. The forest industry did a great job of avoiding crossings altogether. On NIPF lands, six of the crossings were pre-existing, and seven were new and associated with the forest operation. Only 16.7 percent of the pre-existing crossings were in full compliance with BMPs while 28.6 percent of the new crossings were in compliance. Overall on NIPF lands, compliance was 23.1 percent and the percentage of applicable BMP implementation was 70.3 percent

resulting in 27 water quality risks identified. Serious problems were found regarding steep approaches, proper culvert installation, inadequate size and stabilization of exposed fill, the use of debris and dirt type crossings and their removal. On public lands, there were three new dirt and debris crossings used on one site. Compliance was zero percent and BMP implementation was 81.8 percent, but no water quality risk was identified.

- Overall, 23.8 percent of the 34.2 forest road miles evaluated on 21 sites were in compliance with BMPs. There were 32.62 miles of pre-existing road of which only 21.4 percent were in compliance with BMPs. Of the 1.58 miles of newly constructed road, 74.7 percent were in compliance with BMPs. The overall percentage of applicable BMPs implemented was 73.6 percent resulting in 18 water quality risks identified. The main problem was inadequate or lack of installation of water diversion measures in roads as this was done on only 29 percent of the sites. By ownership, on NIPF lands, overall compliance was 16.1 percent with 73.1 percent of the BMPs implemented resulting in 18 water quality risks identified. On forest industry lands, overall compliance was 93.5 percent with 79.2 percent of the applicable BMPs being implemented and no water quality risks. On public lands, overall compliance was 92.5 percent with 69.2 percent of the applicable BMPs being implemented.
- Overall, 99.2 percent of the harvested acres were in compliance with BMPs on 22 sites. The percentage of BMP implementation was 88.5 percent resulting in 5 water quality risks. Main problems found were log decks that were retired and stabilized on 85.7 percent of the sites and skid trails that were retired and stabilized on 68.8 percent of the sites. By ownership, on NIPF lands, overall compliance was 98.8 percent with 86.5 percent of the applicable BMPs implemented resulting in 5 water quality risks. On forest industry and public lands, compliance was 100 percent with 100 percent of the applicable BMPs implemented.
- There were no mechanical or chemical site preparation, artificial regeneration or forest fertilization sites evaluated in the subbasin.
- There was one site evaluated for pre-suppression firebreak plowing on NIPF lands. Approximately 1.53 miles of break were evaluated with none in compliance with BMPs or BMP implementation. Six water quality risks were identified.
- Overall, 22 sites were evaluated for equipment servicing. Overall BMP implementation was 98.5 percent. Only one site had evidence of improper servicing and that occurred on NIPF land.
- There were 4 perennial and 20 intermittent streams evaluated accounting for approximately 12.48 miles of stream of which 93.3 percent of those miles were in compliance with BMPs. The 2.65 miles of perennial streams were in 100 percent compliance, while the 9.83 miles of intermittent streams were in 91.56 percent compliance.
- Overall, 99.1 percent of the acres evaluated in the Upper Ocmulgee River subbasin were in compliance with BMPs. The percentage of applicable BMPs implemented was 81.7 percent resulting in 66 water quality risks. By ownership, the number of acres in compliance on NIPF lands was 98.7 percent with 79.9 percent of the applicable BMPs implemented resulting in all 66 water quality risks. On forest industry lands, the number of acres in BMP Compliance was 100 percent with 92.8 percent of the applicable BMPs implemented. On public lands, the number of acres in BMP Compliance was 100 percent with 89.7 percent of the applicable BMPs implemented.

*Lower Ocmulgee River Subbasin (HUC 03070104)*

The GFC conducted BMP Implementation and Compliance Surveys in 1991, 1992, 1998, and in 2002. No data was extracted specifically for the Ocmulgee River basin during the 1991 survey. However the data for the Lower Ocmulgee River subbasin should be similar to the statewide data for the Coastal Plain region where the percentage of acres in compliance with BMPs was 93.3 percent with 95.1 percent of the stream miles in compliance with BMPs.

*During the 1992 survey*, the GFC examined approximately 2,282 acres on 16 sites in this subbasin. Eleven sites were evaluated on non-industrial private forestlands (NIPF) with five on forest industry lands. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 89.6 percent of the harvested acres were in compliance with BMPs. By ownership, compliance was 79.4 percent on NIPF lands and 97.8 percent on forest industry.
- Overall, 86.7 percent of main haul road miles were in compliance with BMPs. By ownership, compliance was 82 percent on NIPF lands and 100 percent on forest industry.
- One mechanical site-prepared site was evaluated on both NIPF and forest industry land each. The percentage of acres in compliance was 100 percent.
- No sites were evaluated for chemical site preparation.
- One site was evaluated on both NIPF and forest industry land each for burning. Overall, 88.8 percent of the burned acres were in compliance with BMPs. By ownership, compliance was 85.1 percent on NIPF lands and 98 percent on forest industry.
- No sites were evaluated for reforestation.
- Overall, 89.4 percent of the total acres were in compliance with BMPs. By ownership, compliance was 81.7 percent on NIPF lands and 97.9 percent of forest industry lands.
- There were 16.6 miles of stream evaluated, with 92.2 percent of the miles being in compliance with BMPs.

*During the 1998 survey*, the GFC examined approximately 1,337 acres on 17 sites in the Lower Ocmulgee River subbasin. Thirteen sites were on NIPF lands and four sites were on forest industry lands. According to the Southern Group of State Foresters recommended protocol, adopted in 1997, two scores will now be reported. Compliance is the measure of units (acres, miles of road, number of stream crossings, etc.) in compliance with BMPs. Implementation rate is the percentage of applicable BMPs that are executed in their entirety over the tract. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 86.2 percent of the streamside management zone (SMZ) acres were in compliance with BMPs. The percentage of applicable BMPs implemented was 72.2 percent resulting in 5 water quality risks identified. The main problem was logging debris was left in stream channels on 89 percent of the sites. Rutting occurred on 22 percent of the sites. By ownership, compliance was 70.4 percent and implementation was 71.1 percent on NIPF lands resulting in 5 water quality risks. On forest industry lands, compliance was 93.6 percent with implementation at 77.8 percent but no water quality risks identified.
- Overall, 39 stream crossings were evaluated and only 7.7 percent were in full compliance with BMPs. The percentage of applicable BMP implementation was 52.9 percent resulting in 15 water quality risks identified. Serious problems were

found regarding random crossings; road ditches connected to stream channels; proper culvert location; installation, inadequate size, and stabilization of exposed fill; the use of skidder fords and debris and dirt type crossings, and their removal. By ownership, on NIPF lands, compliance was 0 percent and implementation was 49.1 percent resulting in 12 water quality risks. On forest industry lands, compliance was 42.9 percent and implementation was 64.7 percent resulting in 3 water quality risks.

- Overall, 88 percent of the forest road miles evaluated were in compliance with BMPs. The percentage of applicable BMPs implemented was 71.3 percent resulting in 3 water quality risks identified. The main problem was inadequate or lack of installation of water diversion measures in roads as this was done on only 21 percent of the sites. By ownership, on NIPF lands, overall compliance was 84.1 percent with 71.9 percent of the BMPs implemented resulting in 3 water quality risks identified. On forest industry lands, compliance was 91.3 percent, with 69.6 percent of the applicable BMPs being implemented and no water quality risks.
- Overall, 99.4 percent of the harvested acres were in compliance with BMPs. The percentage of BMP implementation was 94.9 percent resulting in no water quality risks. The main problem found was skid trails that were retired and stabilized on 71 percent of the sites. By ownership, on NIPF lands, overall compliance was 98.9 percent with 93.7 percent of the applicable BMPs implemented. On forest industry lands, compliance was 100 percent with 100 percent of the applicable BMPs implemented.
- Overall, 100 percent of the mechanical site preparation, chemical site preparation, burning, and artificial regeneration acres were in compliance with BMPs, as well as the percentage of BMP implementation. No water quality risks were identified.
- There were no perennial and 10 intermittent streams evaluated, accounting for approximately 10.41 miles of stream of which 88.6 percent were in compliance with BMPs.
- Overall, 99 percent of the acres evaluated in the Lower Ocmulgee River subbasin were in compliance with BMPs. The percentage of applicable BMPs implemented was 75 percent, resulting in 23 water quality risks. By ownership, compliance on NIPF lands was 98.4 percent with 73.9 percent of the applicable BMPs implemented resulting in 20 water quality risks. On forest industry lands, BMP compliance was 99.6 percent with 78.16 of the applicable BMPs implemented with 3 water quality risks identified.

*During the 2002 survey*, the GFC evaluated approximately 1,779 acres on 16 sites in the Lower Ocmulgee subbasin. Twelve sites were on NIPF lands and four sites were on forest industry lands. No sites were evaluated on public lands. As with the 1998 survey, two scores will now be reported, according to the Southern Group of State Foresters recommended protocol. Compliance is the measure of units (acres, miles of road, number of stream crossings, etc.) in compliance with BMPs. Implementation rate is the percentage of applicable BMPs that are implemented in their entirety over the tract. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 96.6 percent of the streamside management zone (SMZ) acres on 11 sites were in compliance with BMPs. The percentage of applicable BMPs implemented was 85.7 percent resulting in 4 water quality risks identified. Appropriate SMZ widths were established, and the recommended tree canopy was maintained on 81.8 percent of the sites. Harvesting within the SMZ minimized soil disturbance on 100 percent of the sites. Logging debris was left in stream channels on 10 percent of the sites. Roads within the SMZs were not maintained or adequately stabilized on any of the sites. Mechanical site preparation occurred within the

SMZ on 1 site. By ownership, overall compliance was 96.1 percent and implementation was 82.3 percent on NIPF lands resulting in 3 water quality risks. On forest industry lands, compliance was 97.4 percent, and implementation was 91.7 percent, resulting in 1 water quality risk.

- Overall, 26 stream crossings were evaluated on 8 sites. Twenty of these crossings occurred on the NIPF lands, and the remaining six occurred on forest industry lands. Sixteen of the crossings were pre-existing, and 10 were new and associated with the forest operation. Only 62.5 percent of the pre-existing crossings were in full compliance with BMPs while 10 percent of the new crossings were in compliance. Of the total crossings, 42.3 percent were in compliance with BMPs. By ownership, on NIPF lands, total compliance on 20 crossings was 50 percent, of which 90 percent of the pre-existing crossings were in compliance, while only 10 percent of the new crossings were in compliance. The percentage of applicable BMP implementation was 72.4 percent resulting in 21 water quality risks identified. Problems were found regarding proper culvert installation, inadequate size, and stabilization of exposed fill. The use of skidder fords and debris and dirt type crossings and their removal accounted for 45 percent of the non-compliance. On forest industry lands, there were 6 pre-existing crossings of which only 1 was in compliance. There were no new crossings constructed. Compliance was 16.7 percent, and BMP implementation was 65.4 percent, resulting in 6 water quality risks identified.
- Overall, 68.3 percent of the 12.32 forest road miles evaluated on 15 sites were in compliance with BMPs. There were 11.11 miles of pre-existing road of which only 64.9 percent were in compliance with BMPs. Of the 1.21 miles of newly constructed road, 100 percent were in compliance with BMPs. The overall percentage of applicable BMPs implemented was 77.2 percent resulting in 14 water quality risks identified. The main problem was inadequate or lack of installation of water diversion measures in roads, as this was done on only 45 percent of the sites. By ownership, on NIPF lands, overall compliance was 64.6 percent with 74.2 percent of the BMPs implemented resulting in 9 water quality risks identified. On forest industry lands, overall compliance was 78.6 percent with 83.7 percent of the applicable BMPs being implemented and 5 water quality risks.
- Overall, 99.9 percent of the harvested acres were in compliance with BMPs on 16 sites. The percentage of BMP implementation was 91.4 percent resulting in 4 water quality risks. Main problems found were skid trails were retired and stabilized on 50 percent of the sites. By ownership, on NIPF lands, overall compliance was 96.1 percent with 82.3 percent of the applicable BMPs implemented, resulting in 3 water quality risks. On forest industry and public lands, compliance was 97.4 percent with 91.7 percent of the applicable BMPs implemented resulting in 1 water quality risk.
- There was one mechanical site preparation site evaluated in the subbasin and that occurred on NIPF land. Overall, 100 percent of the acres were in compliance with BMPs, and 100 percent of the BMPs were implemented.
- There were no chemical site preparation, burning, artificial regeneration, or forest fertilization sites evaluated in the subbasin.
- Overall, 14 sites were evaluated for equipment servicing. Overall BMP implementation was 97.6 percent. Only at one site was there evidence of improper servicing, and that occurred on NIPF land.
- There were 2 perennial and 11 intermittent streams evaluated accounting for approximately 10.38 miles of stream of which 89.8 percent of those miles were in

compliance with BMPs. The 1.18 miles of perennial streams were in 100 percent compliance, while the 9.20 miles of intermittent streams were in 88.48 percent compliance.

- Overall, 99.8 percent of the acres evaluated in the Lower Ocmulgee River subbasin were in compliance with BMPs. The percentage of applicable BMPs implemented was 83.1 percent resulting in 50 water quality risks. By ownership, the number of acres in compliance on NIPF lands was 99.7 percent with 82.2 percent of the applicable BMPs implemented resulting in 35 water quality risks. On forest industry lands, the number of acres in BMP compliance was 99.8 percent with 85.2 percent of the applicable BMPs implemented resulting in 15 water quality risks.

*Little Ocmulgee River Subbasin (HUC 03070105)*

The GFC conducted BMP Implementation and Compliance Surveys in 1991, 1992, 1998, and 2002. No data was extracted specifically for the Ocmulgee River basin during the 1991 survey. However the data for the Little Ocmulgee River subbasin should be similar to the statewide data for the Coastal Plain region where the percentage of acres in compliance with BMPs was 93.3 percent, with 95.1 percent of the stream miles in compliance with BMPs.

*During the 1992 survey*, the GFC examined approximately 244 acres on 6 sites in this subbasin. Five sites were evaluated on non-industrial private forestlands and 1 on forest industry lands. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 74.9 percent of harvested acres were in compliance with BMPs. By ownership, compliance was 73.7 percent on NIPF and 79 percent on forest industry.
- Overall, 81.2 percent of main haul road miles were in compliance with BMPs. By ownership, compliance was 86.2 percent on NIPF and 33.3 percent on forest industry.
- One site was evaluated for mechanical site preparation and that occurred on the NIPF. Overall, 97.8 percent of the acres were in compliance with BMPs.
- No sites were evaluated for chemical site preparation, burning, or regeneration.
- There were 1.5 miles of stream evaluated with 93.3 percent in compliance with BMPs.

*During the 1998 survey*, the GFC examined approximately 319 acres on 4 sites in this subbasin. Three sites were on the NIPF lands with 1 site on forest industry land. According to the Southern Group of State Foresters recommended protocol, adopted in 1997, two scores will now be reported. Compliance is the measure of units (acres, miles of road, number of stream crossings, etc.) in compliance with BMPs. Implementation rate is the percentage of applicable BMPs that are executed in their entirety over the tract. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 88.7 percent of the streamside management zone (SMZ) acres were in compliance with BMPs. The percentage of applicable BMPs implemented was 60 percent, resulting in 4 water quality risks identified. The main problems were logging debris left in stream channels, rutting, and un-stabilized roads within the SMZ. By ownership, compliance was 100 percent and implementation was 100 percent on NIPF lands resulting in 0 water quality risks. On forest industry lands, compliance was 81.8 percent with implementation at 33 percent with 4 water quality risks identified.

- Overall, 7 stream crossings were evaluated and all occurred on forest industry lands. None were in full compliance with BMPs. The percentage of applicable BMP implementation was 36 percent resulting in 6 water quality risks identified. Serious problems were found regarding random crossings, road ditches connected to stream channels, stabilization of exposed fill over culverts, the use of skidder fords and debris, and dirt type crossings and their removal.
- Overall, 81.7 percent of the forest road miles evaluated were in compliance with BMPs. The percentage of applicable BMPs implemented was 73.3 percent resulting in 2 water quality risks identified. The main problem was inadequate or lack of installation of water diversion measures in roads as this was done on only 50 percent of the sites. By ownership, on NIPF lands, overall compliance was 100 percent with 85.7 percent of the BMPs implemented resulting in 0 water quality risks identified. On forest industry lands, compliance was 77.1 percent with 62.5 percent of the applicable BMPs being implemented and 2 water quality risks.
- Overall, 92.5 percent of the harvested acres were in compliance with BMPs. The percentage of BMP implementation was 78.6 percent resulting in 1 water quality risk. The main problems found were un-stabilized log deck skid trails. By ownership, on NIPF lands, overall compliance was 100 percent with 100 percent of the applicable BMPs implemented. On forest industry lands, compliance was 86.8 percent with 50 percent of the applicable BMPs implemented resulting in 1 water quality risk.
- Overall, 97.1 percent of the mechanical site preparation acres on 2 NIPF sites were in compliance. No forest industry sites were evaluated. The percentage of BMP implementation was 80 percent. The main deficiency was windrows not on the contour.
- No sites were evaluated for chemical site preparation or burning.
- Overall, 91.4 percent of the artificial regeneration acres were in compliance with BMPs, with the percentage of BMP implementation at 67 percent. No water quality risks were identified. Machine planting did not follow the contour. This all occurred on the NIPF lands.
- There were no perennial and 2 intermittent streams evaluated accounting for approximately 1.13 miles of stream, of which 89.4 percent of those miles were in compliance with BMPs. On NIPF land, compliance was 100 percent and 82.4 percent on forest industry.
- Overall, 93.8 percent of the acres evaluated in the Little Ocmulgee River subbasin were in compliance with BMPs. The percentage of applicable BMPs implemented was 66.7 percent resulting in 13 water quality risks. By ownership, compliance on NIPF lands was 97.2 percent with 87.5 percent of the applicable BMPs implemented resulting in 0 water quality risks. On forest industry lands, BMP Compliance was 86.7 percent with 45.2 percent of the applicable BMPs implemented with 13 water quality risks identified.

*During the 2002 survey*, the GFC examined approximately 653 acres on 7 sites in this subbasin. All seven sites were on the NIPF lands. As with the 1998 survey, two scores will now be reported according to the Southern Group of State Foresters recommended protocol. Compliance is the measure of units (acres, miles of road, number of stream crossings, etc.) in compliance with BMPs. Implementation rate is the percentage of applicable BMPs that are implemented in their entirety over the tract. Key highlights and areas for improvement for each category of practice are discussed below.

- Overall, 98.8 percent of the streamside management zone (SMZ) acres were in compliance with BMPs. The percentage of applicable BMPs implemented was

96.3 percent resulting in no water quality risks. Appropriate SMZ widths were established and maintained on 83.3 percent of the sites. Logging debris was kept out of stream channels on all sites. Soil disturbance within the SMZs was minimized on all sites. One site did have a road within the SMZ with water control structures that directed surface flow toward the stream.

- Overall, eight stream crossings were evaluated on four of the NIPF sites. All eight were in full compliance with BMPs. The percentage of applicable BMP implementation was 94.2 percent, resulting in no water quality risks. The only problem found was the lack of water diversion measures before stream approaches.
- Overall, 95.7 percent of the forest road miles evaluated on 7 sites were in compliance with BMPs. Of the 3.36 miles of pre-existing road, 95.2 percent were in compliance with BMPs. Approximately 100 percent of the 0.4 miles of newly constructed road were in compliance with BMPs. The percentage of applicable BMPs implemented was 92.9 percent resulting in no water quality risks identified. The main problem was inadequate or lack of installation of water diversion measures prior to SMZs as this was done on only 33 percent of the sites.
- Overall, 99.9 percent of the harvested acres on 7 sites were in compliance with BMPs. The percentage of BMP implementation was 96.7 percent resulting in no water quality risks. Main problems found were un-stabilized skid trails.
- There were no sites evaluated for mechanical site preparation, burning, artificial regeneration, or forest fertilization practices.
- One site was evaluated for chemical site preparation. Overall, the percentage of acres in BMP compliance was 100 percent, and BMP implementation was 100 percent with no water quality risks identified.
- Overall, seven sites were evaluated for equipment servicing. Overall BMP implementation was 100 percent.
- There were no perennial and 6 intermittent streams evaluated, accounting for approximately 3.7 miles of stream of which 91.6 percent were in compliance with BMPs.
- Overall, 99.9 percent of the acres evaluated in the Little Ocmulgee River subbasin were in compliance with BMPs. The percentage of applicable BMPs implemented was 95.5 percent, resulting in no water quality risks.

## **B. Sediment TMDLs**

EPD established TMDLs for 41 stream segments that were not meeting designated uses due to sedimentation. Two of the segments, Shellstone Creek and Little Shellstone Creek, were subsequently changed to a status of meeting designated uses on the 2002 305(b)/303(d) list, so the remaining 39 TMDLs are presented in Table 7-2. USEPA established a TMDL for one segment as well (Tobesofkee Creek, shown at the end of Table 7-2). One of the EPD TMDLs is also for Tobesofkee Creek, but it is for a segment upstream from the one discussed in the USEPA TMDL.

Excessive sedimentation is harmful to aquatic life, which is discussed in detail in Section 4.2.7. Georgia's water quality regulations provide a narrative standard for the maintenance of biological integrity (391-3-6-.03(2)(a), EPD, 2002), and state that waters must be free of materials that produce conditions that interfere with designated uses (391-3-6-.03(5)(c), GAEPD, 2002). All of the streams have a designated use of fishing. The TMDLs were finalized and approved in early 2002.

The TMDLs were developed using a modeling approach to predict the amount of sediment that can reach each stream without causing further impact. In some cases, the

results showed that a reduction in sediment load was needed. In other cases, no reduction in sediment load was indicated. This seems counter-intuitive – that the segment is impacted by sediment yet no reduction is needed – until you consider historic land use and long-term sediment transport dynamics. During the late 1800s and the early 1900s in the Georgia Piedmont region, there was widespread clearing of land, as well as a lack of agricultural practices that reduce soil erosion. Huge volumes of sediment moved into the streams and filled stream channels. During the last several decades, however, much agricultural land has been converted to forest, and soil conservation practices have greatly reduced erosion from agricultural lands. Many of the impacted streams now have sediment delivery rates similar to streams showing no impacts from sedimentation. The conclusion is that current impacts are due to historic sediment deposited in the stream channels. Sediment does get carried downstream during high stream flows, so it is assumed that the sediment will eventually clear out of the streams. Recent research shows that channels in headwater and upper stream reaches are getting larger, which suggests that sediment is moving out of these streams (Rulhman and Nutter, 1999).

#### *Summary of Data Used for Basis of Listing*

The listings with EPD TMDLs were based on studies performed by WRD in 1998 and 1999 on the fish communities occurring in the streams. WRD gathered data on fish using specific sampling techniques and calculated measures of the health of the fish populations using the Index of Biotic Integrity (IBI) and the modified Index of Well-Being (IWB). These indexes account for the density, diversity, condition, weight, and other factors that characterize the fish populations. Streams having IBI and IWB scores of Excellent, Good, or Fair were listed as meeting designated use, while streams with scores of Poor or Very Poor were listed as not meeting designated use and were placed on the 305(b)/303(d) list.

The USEPA TMDL was based on USEPA studies in that watershed in 2001.

#### *Sources Considered in TMDLs*

Both point sources and nonpoint sources of sediment were considered in the TMDLs. Nonpoint sources are associated with soil erosion from a variety of land covers – agricultural lands, urban lands, quarries and strip mines, road surfaces and ditches, and even forests and pastures. Modeling results found that the primary land cover that contributes sediment was agricultural lands (74.3 percent), followed by quarries and strip mines (11.0 percent), and roads and ditches (10.7 percent). However, the proximity of these lands to the streams had a great impact on the amount of sediment delivered to the stream. Point sources included permitted discharges of solids and turbidity, and WLAs were set according to permit limits. Soil erosion from construction sites were also considered to be point sources since they are regulated by NPDES permits for stormwater discharge.

#### *TMDL Modeling Methods and Results for Nonpoint Sources*

Nonpoint source loads were estimated using the Universal Soil Loss Equation (USLE) and the Watershed Characterization System (WCS). The USLE has been used for decades, primarily in the agricultural field to estimate average annual sediment loss from fields based on several factors. It has been applied to many land uses in addition to agriculture. WCS incorporates the USLE to calculate sediment loss, and uses another relationship to predict the amount of sediment delivered to the streams. Sediment loads from roads and ditches in the watershed were also included, and silvicultural practices in forests were considered. All upstream areas were included in the analysis.

The modeling was performed on the impaired watersheds and 38 unimpaired watersheds. The model predicted an average annual sediment load of 0.54 tons/acre/year for the unimpaired watersheds. This loading rate was the basis for establishing the TMDLs. EPD used 0.54 tons/acre/year as the TMDL loading rate if a watershed's rate was greater than

0.54 tons/acre/year. If a watershed's loading rate was less than 0.54 tons/acre/year, the watershed's current loading rate was used. In each case, the TMDL loading rate was multiplied by the watershed area to convert the TMDL into tons/year of sediment.

#### *TMDL Implementation*

Point sources will continue to be regulated under the NPDES permitting system. The EPD will coordinate with RDCs in the development of implementation plans to address nonpoint source issues. The implementation plans are scheduled for completion in 2003.

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

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, for which improved capabilities are needed. EPD is developing increased capability for biomonitoring using Rapid Bioassessment Protocols (RBPs) for benthic macroinvertebrates. 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.

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.

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. Additional 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 basinwide coordination between agencies and organizations providing public education and technical assistance may help extend outreach efforts.

#### **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) and perhaps low interest loans (Clean Water State Revolving Fund) 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.

Table 7-2. TMDLs for Biological Impairment Due to Sediment in the Ocmulgee River Basin

Stream Name	Segment Description	HUC	Length (miles)	TMDL (tons/yr)	WLA (tons/yr)	LA (tons/yr)
Bay Creek	Headwaters to Beaver Creek	03070104	9	697	100	597
Big Sandy Creek	Upstream Indian Springs	03070103	8	1,507	0	1,507
Brown Branch	Headwaters (locust Grove) to Wolf Creek	03070103	5	1,664	0	1,664
Butlers Creek	Tributary to Ocmulgee River	03070103	5	270	0	270
Cabin Creek	Headwaters, Griffin to Towaliga River	03070103	16	4,150	257	3,893
Calapatchee Creek	Upstream Lake Wildwood	03070103	13	1,331	0	1,331
Cole Creek	Tributary to Tobesofkee Creek	03070103	6	484	0	484
Eightmile Creek	Tributary to Towaliga River	03070103	5	92	0	92
Gladesville Creek	Headwaters to Little Falling Creek	03070103	9	656	0	656
Hansford Branch	Monroe County	03070103	2	28	0	28
Harmon Pye Branch	Tributary to Wise Creek	03070103	1	337	0	337
Hartley Branch	Tributary to Deep Creek	03070103	1	1,420	0	1,420
Herds Creek	D/S Ga. Hwy. 212 to Ocmulgee River	03070103	6	1,370	0	1,370
Little Chehaw Creek	Headwaters to Chehaw Creek	03070103	3	1,048	0	1,048
Little Deer Creek	Headwaters to Deer Creek	03070103	6	3,075	40	3,035
Little Deer Creek Tributary	Headwaters to Little Deer Creek	03070103	1	383	38	345
Long Branch	Tributary to Ocmulgee River	03070103	3	491	0	491
Malholms Creek	Headwaters to Tussahaw Creek	03070103	6	755	0	755
Mill Dam Creek	Monroe County	03070103	4	225	0	225
Phinazee Creek	Lamar/Monroe Counties	03070103	6	382	0	382
Red Creek	Tributary to Rocky Creek	03070103	3	1,226	0	1,226
Rock Creek	Upstream Lite-N-Tie Rd.	03070103	1	458	90	368
Rocky Creek	Downstream from English Rd (CR 152) to Towaliga River	03070103	4	1,283	0	1,283
Rocky Creek	Jasper County	03070103	5	252	0	252
Rocky Creek	Upstream Big Sandy Creek	03070103	6	346	0	346
Rocky Creek	Upstream Lake Wildwood	03070103	7	1,613	0	1,613
Rum Creek	Rum and Town Creeks, Upstream Lake Juliette	03070103	6	2,962	64	2,898
Sand Branch	Tributary to Towaliga River	03070103	2	51	0	51

Table 7-2. TMDLs for Biological Impairment Due to Sediment in the Ocmulgee River Basin

Stream Name	Segment Description	HUC	Length (miles)	TMDL (tons/yr)	WLA (tons/yr)	LA (tons/yr)
Scoggins Creek	Tributary to Ocmulgee River	03070103	2	535	0	535
Third Branch	Tributary to Ocmulgee River	03070103	3	72	0	72
Tobesofkee Creek	Barnesville to Cole Creek	03070103	8	9,260	43	9,217
Tobler Creek	Tributary to Ocmulgee River	03070103	6	2,271	0	2,271
Town Branch	Headwaters (Jackson) to Aboothlacoosta Creek	03070103	3	290	21	269
Tributary to Tobesofkee Creek	Barnesville	03070103	2	358	0	358
Walnut Creek	Downstream Hwy 42	03070103	4	2,758	0	2,758
Walnut Creek	Headwaters to Ocmulgee River	03070103	20	10,551	0	10,551
White Creek	Lamar/Monroe Counties	03070103	4	438	0	438
Wise Creek	Headwaters to Ocmulgee River	03070103	6	1,769	0	1,769
Wood Creek	Headwaters to d/s Ga. Hwy. 83	03070103	3	634	0	634
Tobesofkee Creek (USEPA TMDL)	Monroe, Bibb, and Lamar Counties	03070103	Not specified	29,400	162*	22,300

## Key Participants and Roles

The Georgia Forestry Commission (GFC): encourages implementation of the newly revised 1999 forestry BMPs through 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 12 objectives:

- 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.
- Promptly reforest harvested acres to ensure long-term forest productivity and conservation of forest resources.
- 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 USEPA approved BMPs in all forest management operations.
- 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.
- 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.
- Manage company lands of ecologic, geologic, or historic significance in a manner that accounts for their special qualities.
- Contribute to bio-diversity by enhancing landscape diversity and providing an array of habitats.
- Continue to improve forest utilization to help ensure the most efficient use of forest resources.
- Continue the prudent use of forest chemicals to improve forest health and growth while protecting employees, neighbors, the public, and sensitive lands.
- 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.
- Publicly report program participants' progress in fulfilling their commitment to sustainable forestry.
- 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 GFC, 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**

Controlling erosion and sedimentation from land disturbing activities in order to meet narrative water quality standards is an important management objective.

### **Management Option Evaluation**

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

### **Action Plan**

Sediment TMDLs have been completed for 42 stream segments. TMDL implementation plans will be developed in 2003. TMDLs will be developed for 16 new stream segments that were added to the Georgia 2002 303(d) list using 2001 data during the next river basin planning cycle.

EPD and WRD will continue to develop biological monitoring capabilities designed to assess aquatic life. EPD will work with local governments 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.

GSWCC, local SWCDs, and RC&D Councils, with assistance from NRCS, will provide technical and educational assistance to producers to encourage the implementation of BMPs to control erosion of agricultural lands. Local SWCDs will convene local workgroups to identify resource concerns and develop proposals for funding to address these concerns. The University of Georgia will provide on-farm assessments to local producers through their Farm-A-Syst Program.

The GFC will encourage implementation of the 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 communities.

### **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 PRMS reporting system.

### **7.3.3 Low Dissolved Oxygen**

#### **Problem Statement**

Water use classification for fishing was not fully supported in 11 water body segments due to excursions of the water quality standards for dissolved oxygen. These excursions are primarily attributed to nonpoint sources and to natural conditions.

#### *Upper Ocmulgee River Subbasin (HUC 03070103)*

The water use classification of fishing was not fully supported in two tributary stream segments due to dissolved oxygen concentrations less than standards. Low dissolved oxygen concentrations coincided primarily with low or zero flows, slow stream velocities, shallow water depths, and high temperatures. Natural conditions may contribute to the cause of low dissolved oxygen in streams in the Ocmulgee River basin.

#### *Lower Ocmulgee River Subbasin (HUC 03070104)*

The water use classification of fishing was not fully supported in four tributary stream segments due to dissolved oxygen concentrations less than standards. Low dissolved oxygen concentrations coincided primarily with low or zero flows, slow stream velocities, shallow water depths, and high temperatures. Horse Creek in Houston County was also affected by effluent from a municipal water pollution control plant. The plant relocated its discharge point from Horse Creek to the Ocmulgee River on August 31, 1999. Natural conditions may contribute to the cause of low dissolved oxygen in streams in the Ocmulgee River basin.

#### *Little Ocmulgee River Subbasin (HUC 03070105)*

The water use classification of fishing was not fully supported in one Little Ocmulgee River mainstem segment and four tributary stream segments due to dissolved oxygen concentrations less than standards. Low dissolved oxygen concentrations coincided primarily with low or zero flows, slow stream velocities, shallow water depths, and high

temperatures. Natural conditions may contribute to the cause of low dissolved oxygen in streams in the Ocmulgee River basin.

### **General Goals**

A general goal of the plan is to meet water quality standards to support designated water uses.

### **Ongoing Efforts**

General ongoing efforts as well as a summary of the dissolved oxygen TMDLs in the Ocmulgee River basin are discussed.

#### **A. General Efforts**

TMDLs have been completed for the all 2002 303(d) listed stream segments except for Horse Creek. TMDL implementation plans will be developed in 2003.

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.

#### **B. Dissolved Oxygen TMDLs**

EPD established TMDLs for 11 stream segments (Table 7-3) that did not meet the dissolved oxygen (DO) criteria for their designated uses (see Box 7-1 for background information about TMDLs). These streams are all designated "Fishing" and are regulated by the following DO water quality standards:

A daily average of 5.0 mg/l and no less than 4.0 mg/l at all times for water supporting warm water species of fish. 391-3-6-0.03 (c) (1) (GAEPD, 2002).

If natural, background DO concentrations occur below this standard, a stream reach is required to be at or above 90 percent of the background DO concentrations, based on the USEPA natural water quality standard (USEPA, 1986). Modeling was used to estimate the amount of daily loading that can occur without violating the Georgia DO standards.

#### *Sources Considered in TMDL*

Ten point sources were identified in 5 of the 11 segments. These sources included several ponds and wastewater treatment facilities, and two of these sources contributed significantly to low DO concentrations. Nonpoint sources included mixed land use, forests, and wetlands. Leaf litter decomposition and wetlands with naturally low DO concentrations were considered significant nonpoint sources. Runoff from mixed land uses, including agriculture, had a minor effect on DO in the Ocmulgee River basin.

#### *TMDL Methods and Results*

EPD developed the TMDLs with the steady state Georgia DOSag model. EPD chose a low flow, high temperature steady state because all measured DO standard violations occurred during low flow, high temperature conditions. The models were calibrated with 1999 water quality data for the Ocmulgee River basin (supplemented with 2000 sediment oxygen demand measurements from other streams in southern Georgia). Since natural DO concentrations were consistently below the numeric standard, EPD designed the TMDLs to achieve at least 90 percent of natural DO concentrations during the 7Q10 flow. Several conservative modeling assumptions were used for an implicit margin of safety. Seasonality was not a factor since DO violations occurred only during summer months.

A TMDL was reported for each listed stream segment (Table 7-3). Load reductions were recommended for two point sources, and no load reductions were recommended for nonpoint sources. These load reductions will ensure compliance with water quality standards even during periods of very low flows.

*TMDL Implementation*

Point sources will be regulated through the NPDES permitting system. EPD will continue to work with local governments, agricultural, and forestry agencies (e.g., Natural Resources Conservation Service, the Regional Development Councils, the Georgia Soil and Water Conservation Commission, and the Georgia Forestry Commission) to educate the public and encourage the use of best management practices for improving dissolved oxygen concentrations.

**Table 7-3. Dissolved Oxygen TMDLs in the Ocmulgee River Basin**

Stream Name	Segment Description <sup>1</sup>	HUC	Length (miles)	Use Support <sup>2</sup>	TMDL (lbs/day) <sup>3</sup>
Alligator Creek	Batson Creek to Lime Sink Creek	03070105	12	NS	92
Big Creek	Headwaters to Ocmulgee River	03070104	33		169
Big Horse Creek	Alligator Creek to Ocmulgee River	03070104	15	PS	139
Cabin Creek	Headwaters, Griffin to Towaliga River	03070103	16	NS	767
Doless Creek	Headwaters to Dolittle Creek	03070103	2	PS	6
Gum Swamp Creek	Hwy 257 to Little Creek	03070105	19	NS	141
House Creek	Ball Creek to Little House Creek	03070104	8	NS	72
Limestone Creek	Headwaters to Ocmulgee River	03070104	7	PS	51
Little Ocmulgee River	Wilcox Creek to Alligator Creek	03070105	12	PS	548
Sugar Creek	Turnpike Creek to Little Ocmulgee River	03070105	5	NS	131
Turnpike Creek	Hwy 280 to Sugar Creek	03070105	24	NS	204

<sup>1</sup> See Appendix D for designated uses

<sup>2</sup> NS = Not supporting designated use; PS = Partially supporting designated

<sup>3</sup> Refers to lbs/day of oxygen demanding material

**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 continue to identify and characterize natural background dissolved oxygen concentrations in this area.

**General Strategies for Action**

Low dissolved oxygen concentrations in the streams in the Ocmulgee River basin coincided primarily with low or zero flows, slow stream velocities, shallow water depths and high temperatures. EPD will address point and nonpoint sources as appropriate in TMDL implementation plans.

**Specific Management Objectives**

A specific management objective is to maintain dissolved oxygen concentrations adequate to support aquatic life and meet water quality standards.

**Action Plan**

- EPD will implement TMDL wasteload allocations through the NPDES permitting program; assess use support in the listed waters; develop TMDL implementation plans.

- Local governments will implement stormwater management strategies and manage operations of water pollution control plants; participate in development of TMDL implementation plans.
- WRD will continue work to study habitat requirements for fish populations.
- NRCS will continue BMP implementation.
- Local S&WC Districts and RC&D Councils will continue Lagoon Pumpout Program.
- RDCs will help coordinate development of TMDL implementation plans.

### **Method for Tracking Performance**

A re-evaluation of the status of the listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Ocmulgee River basin in 2003-2007.

### **7.3.4 Fish Consumption Guidelines**

#### **Problem Statement**

The water use classifications were not fully supported in four water body segments and four lakes due to fish consumption guidelines for mercury and/or PCBs. There are no known point source discharges or other identifiable anthropogenic sources of mercury or PCBs in these watersheds. Mercury may 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 and deposition. PCBs are no longer manufactured but persist in the aquatic environment for some time.

#### *Upper Ocmulgee River Subbasin (HUC 03070103)*

The water use classification of fishing was not fully supported in one segment of the Ocmulgee River (flathead catfish), one segment of the South River (largemouth bass) and in Jackson (channel catfish) and High Falls Lakes (channel catfish and largemouth bass) based on PCB residues in fish tissue.

The water use classification of drinking water was not fully supported in Big Haynes Reservoir in Rockdale County based on mercury residues in fish tissue. The assessment for mercury in fish tissue is based on the Trophic-Weighted Residue Value being in excess of 0.3 mg of mercury per kilogram of fish tissue. See Box 5-2 in Section 5 for details regarding assessment of mercury in fish tissue.

#### *Lower Ocmulgee River Subbasin (HUC 03070104)*

The water use classification of fishing was not fully supported in two Ocmulgee River mainstem segments due to PCB residues in fish tissue. The guidelines are for flathead catfish. These segments were added to the Georgia 303(d) List in 2002. TMDLs will be developed for these segments in the next basin plan cycle.

#### *Little Ocmulgee River Subbasin (HUC 03070105)*

The water use classification of fishing was not fully supported in Little Ocmulgee State Park Lake (Gum Creek Swamp) in Telfair and Wheeler counties based on mercury residues in fish tissue. The assessment for mercury is based on the Trophic-Weighted Residue Value being in excess of 0.3 mg of mercury per kilogram of fish tissue. See Box 5-2 in Section 5 for details regarding assessment of mercury in fish tissue.

#### **General Goals**

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

## Ongoing Efforts

General ongoing efforts as well as a summary of the mercury and PCB TMDLs in the Ocmulgee River basin are discussed.

### A. General Efforts

DNR has monitored fish and issued fish consumption guidelines. There are no known point source discharges or other identifiable anthropogenic sources of PCBs or mercury in the Ocmulgee River basin watersheds. Ongoing efforts will focus on continued monitoring of residue levels and issuance of updated consumption guidelines. TMDLs have been completed for listed segments on the Ocmulgee and South Rivers and for Jackson, High Falls, and the Little Ocmulgee State Park Lakes. TMDL implementation plans will be developed in 2003.

### B. Mercury TMDLs

USEPA established mercury TMDLs for the Big Haynes Reservoir and the Little Ocmulgee State Park Lake in February 2002 (Table 7-4). See Box 7-1 for background information about TMDLs. Georgia requires that fish tissue concentrations remain at or below 0.3 mg of mercury per kg of tissue (GAEPD, 2002). USEPA converted this tissue standard to an ambient water quality standard specific to the individual water bodies using measured mercury concentrations, fish consumption rates, and related factors.

**Table 7-4. Mercury TMDLs**

Lake Name	Location	HUC	Acres Affected	Use Support	TMDL (kg/yr of Hg)
Big Haynes Reservoir	Rockdale County	03070103	650	PS	0.03
Little Ocmulgee State Park Lake (Gum Swamp Creek)	Telfair and Wheeler Counties	03070105	224	PS	3.77

PS = Partially supporting designated

### *Sources Considered in TMDL*

USEPA estimated that air deposition causes 99 percent of mercury contamination. Air deposition is caused by widespread air point sources both within and outside the United States. Examples of air point sources include incinerators and electrical power plants. USEPA estimated that water point sources cause less than 1 percent of mercury contamination.

### *TMDL Modeling Methods and Results*

When simulating mercury loading, USEPA accounted for nonpoint loading from runoff, erosion, and air deposition as well as the instream processes of mercury cycling and bioaccumulation. Nonpoint source runoff was modeled with the Watershed Characterization System (WCS), and instream processes were modeled with SWAT5. Wet and dry deposition rates were acquired from the Mercury Report to Congress (USEPA, 1997) and the Mercury Deposition Network sample collection site in the Okefenokee Swamp. These air deposition rates were entered into the WCS as yearly averages. The WCS calculated the total mercury load entering the Ochopee mainstem from the subbasins, and the subbasin load was entered into SWAT5 to simulate mercury concentrations throughout the mainstem. Simulated total mercury concentrations ranged from 3.4 to 4.5 ng/L.

USEPA included critical conditions and implicit margins of safety in the TMDL calculation. Average annual flow and average annual loading were used as the critical conditions because mercury in fish tissue accumulates over time and does not depend on season. To ensure protection from mercury toxicity, USEPA based the load reduction on

the highest simulated water column concentration (4.5 ng/L). USEPA was also conservative in estimating the future reduction in air deposition; for example, voluntary control measures and new regulations were not considered.

The relationship between loading and water column concentration was linear, so a proportion was developed relating the highest simulated concentration (4.5 ng/L), the current annual average load (4.99 kg/yr), and the water quality target (3.5 ng/L). In this way, USEPA calculated TMDLs for mercury shown in Table 7-4.

#### *TMDL Implementation*

In this TMDL, USEPA is using a phased-approach, which outlines steps that need to be taken to better characterize the pollutant allocation. USEPA is using the phased-approach because very little data exists on sources of mercury contamination. During Phase 1, mercury loading will be monitored to provide additional data for analysis.

USEPA will use the information collected in Phase 1 to better understand air deposition and point source loading. In Phase 2, USEPA may reevaluate the load allocations based on this information.

### **C. PCB TMDLs**

EPD established polychlorinated biphenyl (PCB) TMDLs for one stream segment and two lakes in the Ocmulgee River basin (Table 7-5). See Box 7-1 for background information about TMDLs.

**Table 7-5. PCB TMDLs in the Ocmulgee River Basin**

<b>Stream Name</b>	<b>Segment Description</b>	<b>HUC</b>	<b>Extent</b>	<b>Use Support<sup>1</sup></b>	<b>TMDL</b>	<b>Year</b>
South River	Highway 20 to Snapping Shoals Creek	03070103	11 miles	PS	1.04E-3 kg/day	2002
High Falls Lake	Monroe County	03070103	4102 acres	PS	0 kg/day	1998
Jackson Lake	Newton, Butts, and Jasper Counties	03070103	699 acres	PS	0 kg/day	1998

<sup>1</sup> PS – Partially Supporting designated use

#### *Sources Considered in TMDL*

There are no known point or nonpoint sources of PCBs in the watersheds. No NPDES point sources are permitted to discharge PCBs. EPD attributed PCB loading to urban runoff and combined sewer overflows. Other possible sources are soil erosion, air deposition, and movement of contaminated sediment.

#### *TMDL Modeling Methods and Results*

PCBs in fish tissue accumulate over time and do not depend on season; therefore, average annual flow and average annual loading were used as the critical conditions. For the PCB TMDLs, EPD multiplied the average annual flow by the water quality standard to calculate a TMDL of 1.04E-3 kg/day of PCBs.

#### *TMDL Implementation*

EPD will develop a TMDL Implementation Plan in 2003.

### **Identified Gaps and Needs**

The source of mercury or PCBs in the basin is not well quantified. Mercury within these watersheds is likely derived from natural sources or from atmospheric deposition.

### General Strategies for Action

Because mercury and PCBs are not originating from any known point or other identifiable anthropogenic sources, the strategy is to keep the fishing public notified of risks associated with fish consumption.

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.
- EPD will evaluate the need for additional sampling of different media (fish tissue, water, and/or sediment), if localized anthropogenic sources are indicated.
- EPA will implement reductions in air mercury sources over time that will achieve load reduction required in the TMDL.

#### Method of Tracking Performance

Trends in fish tissue concentration of mercury and PCBs.

### 7.3.5 pH

#### Problem Statement

The water use classification of fishing was not fully supported in five segments due to an exceedance of water quality standards for pH.

##### *Upper Ocmulgee River Subbasin (HUC 03070103)*

The water use classification of fishing was not fully supported in one tributary stream segment due to pH levels below the minimum pH standard of 6.0. It is not known whether the pH violations are due to nonpoint source influences or natural conditions.

##### *Lower Ocmulgee River Subbasin (HUC 03070104)*

The water use classification of fishing was not fully supported in two tributary streams due to pH levels below the minimum pH standard of 6.0. It is not known whether the pH violations are due to point source influences, nonpoint source influences, or natural conditions.

##### *Little Ocmulgee River Subbasin (HUC 03070105)*

The water use classification of fishing was not fully supported in two tributary stream segments due to pH levels below the minimum pH standard of 6.0. It is not known whether the pH violations are due to point source influences, nonpoint source influences, or natural conditions.

#### General Goals

One of the general goals is to meet water quality standards to support a designated stream classification of fishing.

#### Ongoing Efforts

General ongoing efforts as well as a summary of the pH TMDLs in the Ocmulgee River basin are discussed.

### A. General Efforts

TMDLs have been completed for the four listed tributary stream segments. TMDL implementation plans will be completed in 2003.

Other efforts include encouraging local watershed planning and management to ensure that designated water uses are supported.

### B. pH TMDLs

TMDLs were established for four stream segments that did not meet the pH criteria for their designated uses (see Box 7-1 for background information about TMDLs). All of the streams have a designated use of fishing. The TMDLs were prepared by the USEPA and finalized in early 2002.

pH is a relative measure of the acidity or alkalinity of a solution, and generally ranges from 0 to 14 with a pH of 7 indicating a neutral solution (for example, distilled water). Decreasing pH below 7 indicates greater acidity, while increasing pH above 7 indicates greater alkalinity. For example, vinegar has a pH of 2, while bleach has a pH of 12.5. Aquatic life can tolerate a pH in a fairly narrow range. Georgia's water quality standards state that pH must remain in a range of 6.0 to 8.5. These stream segments have violations for pH less than 6. Low pH is problematic because it can increase the concentrations of dissolved metals in water, which is harmful to aquatic life.

The listed stream segments are shown in Table 7-6. Note that all have the same TMDL – a pH of 6.0 to 8.5. Since pH is not a load but a relative measure of acidity/alkalinity the TMDL uses the Georgia water quality standard as the target. These TMDLs specify that waters discharged into these stream segments, both from point and nonpoint sources, have a pH within the 6.0 – 8.5 range.

**Table 7-6. pH TMDLs in the Ocmulgee River Basin**

Stream Name	Segment Description	HUC	Length (miles)	Use Support	TMDL
Boar Tusk Creek	Headwaters to Yellow River	03070103	3	PS	pH 6.0 to 8.5
House Creek	Ball Creek to Little House Creek	03070104	8	NS	pH 6.0 to 8.5
Sugar Creek	Turnpike Creek to Little Ocmulgee River	03070105	5	NS	pH 6.0 to 8.5
Turnpike Creek	Hwy 280 to Sugar Creek	03070105	24	NS	pH 6.0 to 8.5

NS – Not supporting designated use

PS – Partially supporting designated use

#### Summary of Data and Sources

All of the pH violations for the listed segments are for pH values lower than 6. Monitoring data from 1999 were evaluated in the assessment. Lower pH readings tended to occur during summertime low flow conditions.

Sugar Creek has one permitted point source, while the other segments have no permitted point sources. A five-year compliance history for the point source discharge (Eastman South WPCP) showed no permit violations for pH.

The TMDLs for these segments state that there are potential nonpoint sources that could contribute to or be the cause of the pH violations. However, there is no information currently available to characterize potential nonpoint sources. The low pH values may be a result of natural processes in the watershed.

*TMDL Implementation*

Point sources will continue to be regulated under the NPDES permitting system; however, the analyses suggest that point sources are not likely to be the cause of impairment in the watersheds. The EPD will work with the RDCs to develop implementation plans in 2003.

**Identified Gaps and needs**

The cause of the low pH in the streams is not well quantified. Natural processes within the watersheds may be the cause of the low pH values documented in the streams.

**General Strategies for Action**

Because the pH issues are not originating from any known point sources or other identifiable anthropogenic sources, the strategy is to provide for additional periodic monitoring to assess pH trends in the streams.

**Action Plan**

TMDLs have been completed for Boar Tusk Creek, House Creek, Sugar Creek, and Turnpike Creek. TMDL implementation plans will be completed in 2003.

**Methods for Tracking Performance**

Trends in pH values documented in water samples are a method of tracking performance.

**7.3.6 Metals and Toxicity****Problem Statement**

The water use classification of fishing was not fully supported in one segment due to an exceedance of water quality standards for metals, and in two segments due to toxicity.

*Upper Ocmulgee River Subbasin (HUC 03070103)*

The water use classification of fishing was not fully supported in two tributary stream segments due to toxicity. Aquatic toxicity tests of effluent from dischargers predicted toxicity in the receiving streams at critical, low flow conditions. The affected tributaries were Big Flat Creek (receiving effluent from the Loganville WPCP), and Cabin Creek (receiving effluent from the City of Griffin's Cabin Creek WPCP and Spring Industries, Inc.).

*Lower Ocmulgee River Subbasin (HUC 03070104)*

The water use classification of fishing was not fully supported in one Ocmulgee River segment due to exceedance of metals standards (mercury) from nonpoint sources.

**General Goals**

Meeting water quality standards to support a designated stream classification of fishing is one of the general goals.

**Ongoing Efforts**

General ongoing efforts as well as a summary of the toxicity and mercury TMDLs in the Ocmulgee River basin are discussed.

**A. General Efforts**

TMDLs for chronic toxicity and mercury have been completed for the listed segments. TMDL implementation plans will be completed in 2003.

Encouraging local watershed planning and management to ensure that designated water uses are supported.

## B. Toxicity and Mercury TMDLs

USEPA established TMDLs for the stream segments listed on the Georgia 2002 303(d) list for toxicity and mercury (see Box 7-1 for background information on TMDLs).

Toxicity harms living organisms through chronic and acute toxic effects. Chronic toxicity causes long-term stresses or abnormal changes to an organism, and acute toxicity causes short-term stresses or changes (Clesceri, 1998). The TMDL target of 1.0 chronic toxicity unit (TU<sub>c</sub>) will prevent both chronic and acute effects based on USEPA's Technical Support Document for Water Quality-based Toxics Control. Chronic toxicity units are equal to 100 divided by the no observable effects concentration (NOEC). In the case of whole effluent toxicity, 1.0 TU<sub>c</sub> indicates that undiluted effluent (an NOEC of 100 percent) causes no observable toxic effects. This target will prevent the effluent from causing toxicity, even during low flow conditions.

The mercury TMDL was established as a part of a TMDL developed for a portion of the Ocmulgee River from Cedar Creek to House Creek. The segment was listed on the Georgia 2000 303(d) list as not supporting designated uses due to mercury in fish tissue. USEPA finalized the TMDLs shown in Table 7-7 in February 2002.

**Table 7-7. Toxicity and Mercury TMDLs in the Ocmulgee River Basin**

Stream Name	Segment Description	HUC	Length (miles)	Use Support	TMDL
Big Flat Creek	Headwaters to Flat Creek	03070103	18	NS	1.0 TU <sub>c</sub>
Cabin Creek	Headwaters to Towaliga River	03070103	16	NS	1.0 TU <sub>c</sub>
Ocmulgee River	Cedar Creek to House Creek	03070104	36	PS	47.40 µg/yr

NS – Not supporting designated use

PS – Partially supporting designated use

### *Sources Considered in TMDL*

USEPA considered point and nonpoint sources in the development of the TMDLs. Point sources were considered the source of the potential toxicity at critical low flow conditions. Nonpoint sources (air deposition) were considered the source of the mercury.

### *TMDL Results*

In the toxicity TMDLs, present and future point sources were allocated 1.0 TU<sub>c</sub>. Nonpoint sources were allocated 0.0 TU<sub>c</sub>, meaning that present and future nonpoint sources should not contribute to toxicity. In the mercury TMDL, nonpoint sources, predominantly air deposition were allocated 42.48 µg/yr and point sources 0.20 µg/yr.

### *TMDL Implementation*

EPD will develop TMDL implementation plans in 2003.

### **Identified Gaps and Needs**

Addressing predicted toxicity in the point source discharges at critical, low flow conditions will require additional studies of the wastewaters being discharged and actions to reduce toxicity as needed to meet TMDL requirements. It is unknown if mercury concentrations documented in the water column in one Ocmulgee River segment represent actual mercury in the water or whether they are due to problems with quality assurance/or quality control issues in the sampling or analysis procedures. Samples collected by the USEPA during the TMDL development process indicated compliance with standards. Additional data is needed.

## General Strategies for Action

Address predicted toxicity due to point sources at critical, low flow conditions through the NPDES permitting program is a general strategy for action. Conduct additional mercury monitoring.

### Action Plan

TMDLs for chronic toxicity and mercury have been completed for the listed stream segments. TMDL implementation plans will be completed in 2003 with implementation of needed point source actions through the NPDES permitting program. Additional monitoring for mercury will be conducted on the stream segment of the Ocmulgee River listed for mercury.

### Methods for Tracking Performance

Continued tracking of toxicity test results from tests conducted by point sources to assess predicted toxicity of their discharges. Assess mercury concentrations in the one segment of the Ocmulgee River listed on the Georgia 2002 303(d) list.

## 7.3.7 Drought Conditions

### Problem Statement

Drought conditions in Georgia during the 1998-2000 period significantly impacted river basins throughout the state including the Altamaha, Ocmulgee, and Oconee basins. According to the National Oceanic and Atmospheric Administration and the state climate office, rainfall shortages in the state during the May 1998-August 2000 period range from just over 20 inches in North Central Georgia to just over 30 inches in West Central Georgia. Recorded rainfall shortages in the Altamaha, Ocmulgee, and Oconee regions were about 25 inches.

In 2000, EPD developed the *1998-2000 Georgia Drought Report* that documents and evaluates the management actions implemented by state and local authorities during the drought of 1998-2000; provides a summary of drought impacts and an objective assessment of the state's vulnerability and mitigation efforts; and presents a clear set of recommendations for improving drought preparedness and response.

### General Goals

Georgia's goals are to control its level of drought preparedness, reduce its drought vulnerability and effectively manage its resources to meet the complex water demands of its natural environment, citizens, and economic prosperity.

### Ongoing Efforts

Comprehensive drought planning measures will be ongoing with the assistance of experts and stakeholders from within Georgia, and the state has contracted with a team of experts from across the nation to guide and facilitate the process. The result of this effort will be a drought plan that provides a statewide framework, regional approach, and linkages with local drought plans.

### Strategies for Action

The *1998-2000 Georgia Drought Report* provides recommendations that are designed to supplement actions taken by all Georgians to better manage their water resources, and can be facilitated by a number of state agencies, including EPD. The six recommendations in the report are as follows:

1. Emergency Relief: The State of Georgia should provide emergency grants and loans to assist local governments with critical or threatened water supplies.

2. Water Conservation: The State of Georgia must develop a comprehensive water conservation plan to address a wide range of water conserving measures that can be implemented to reduce water demand in Georgia.
3. Agricultural Water Use: The State of Georgia must develop an effective method to evaluate consumptive use of water for agricultural irrigation, and implement programs for reducing water use while protecting the prosperity of farmers and agricultural communities.
4. State Water Plan: The State of Georgia must perform a detailed review of existing water policy and laws and develop a comprehensive state water plan that will provide the framework and support for effective management of Georgia's water resources.
5. State Drought Plan: The State of Georgia must continue developing a comprehensive drought plan and drought management process in order to implement appropriate drought response, preparedness and mitigation measures in future droughts.

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