

# GEORGIA'S WATERSHED PROTECTION APPROACH: RIVER BASIN MANAGEMENT PLANNING

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**Abstract.** The Georgia Environmental Protection Division (GAEPD) of the Department of Natural Resources has adopted a watershed protection approach to water resources management. This approach, referred to as river basin management planning, is an integrated holistic approach focusing on water resources related activities within a watershed. GAEPD is currently developing the river basin management planning program and implementing it in the Chattahoochee, Flint, Coosa, and Oconee River basins. Basin management plans for other river basins in the State are also scheduled for development. River basin management planning is not a new regulatory program, but represents a new approach to water resources management for the State of Georgia.

## INTRODUCTION

The Georgia Environmental Protection Division of the Department of Natural Resources is dedicated to the protection and enhancement of water resources throughout the State of Georgia. Insuring an ample supply of clean water to support aquatic life, drinking water, recreation, and other uses is one of the major goals of GAEPD. Many governmental agencies and environmental groups are partners in this effort. More importantly, each individual is a partner in the effort to control water pollution and to enhance the quality of water resources in Georgia.

We are fortunate in Georgia to have a good supply of clean water. Programs implemented by local governments, industry, farmers, foresters, and individuals have helped to control water pollution. Improvements in wastewater treatment by local governments and industry have made a significant contribution to improving water quality in our rivers and streams over the past twenty years.

However, many significant water quality challenges remain, including the difficulty of controlling stormwater runoff from urban and agricultural lands. Another issue

of concern is soil erosion and subsequent sedimentation which occurs whenever we disturb the earth and fail to properly implement effective erosion/sediment control measures.

We must also face the challenge of conducting long-term planning to protect our water resources and to project future water supply needs in order to promote plans and conservation practices to provide clean water for all future uses.

We are currently at a turning point in our efforts to protect water quality. Albert Einstein once said, "The significant problems we face cannot be solved at the same level of thinking we were at when we created them." We have used a command and control regulatory approach over the past twenty years to address point source pollution problems and achieved significant success. But regulatory approaches may not work as well with the issues we face today such as urban development, erosion/sedimentation, stormwater runoff, and aquatic habitat destruction. Across the nation we are realizing that we must adopt an integrated, holistic, watershed protection approach to make further strides in improving water quality. We have also come to realize that many of the water quality problems in evidence today result from how we use the land and what we put on the land. Thus, in most cases local citizens and local governments will have to play the champion's role in the future.

A watershed protection approach will provide a tool for the assessment and prioritization of water resource issues, development of solutions, and opportunities for targeted, cooperative actions to reduce pollution and enhance aquatic habitat. The watershed approach will provide opportunities for participation by many stakeholders, and the solutions implemented will draw on the combined experiences and resources of many stakeholders.

## GEORGIA'S RIVER BASIN MANAGEMENT PLANNING

Georgia has adopted a river basin management planning (RBMP) approach to watershed protection as defined in State law (O.C.G.A. 12-5-520) passed by the Georgia General Assembly in 1992. The law designated the Chattahoochee, Flint, Coosa, and Oconee Rivers as the first basins to be addressed. The law requires each plan include a description of the basin or watershed, identification of local governments in each basin, land use inventories, and a description of plan goals which may include providing environmental education, improving water quality, reducing pollution at the source, improving aquatic habitat, reestablishing native species of fish, restoring and protecting wildlife habitat, and providing recreational benefits. A description of the strategies and measures necessary to accomplish the goals is also to be a part of each management plan. The law also requires a seven person local advisory committee be appointed to provide advice and council to GAEPD during the plan development.

The local advisory committees for the Chattahoochee, Flint, Coosa, and Oconee River Basins were convened in 1993 and consist of a cross section of stakeholder interests including local governments, agriculture, industry, forestry, environmental groups, and landowners. The four basin committees met together in January, 1994, in a facilitated meeting and finalized the proposed mission statement and goals described below.

In addition to local advisory committees, GAEPD is incorporating stakeholder involvement in its RBMP program. GAEPD envisions stakeholder involvement as one of the key components of the RBMP program. In addition to local advisory committees, stakeholder meetings are planned to facilitate public input at important stages of the planning process. GAEPD planned and hosted initial stakeholder meetings in Albany, Griffin, Helen, Atlanta, and Columbus in late 1994, to invite and encourage stakeholder input early in the planning process for the Chattahoochee and Flint River basins. GAEPD considers stakeholder involvement as a continuous process, not limited to scheduled meetings, and encourages stakeholders to provide input and assistance at any time. In addition to providing input it is likely that stakeholders will play a major role in implementation of non-regulatory water resource protection strategies.

State, federal, and local governments and agencies play a major role in all water resource protection and enhancement programs across Georgia. Creating and supporting governmental partnerships will be another

### VISION: *CLEAN WATER*

*Clean Water* to drink, *Clean Water* to support aquatic life, and *Clean Water* for recreation.

### MISSION:

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.

### GOALS:

1. To meet or exceed State, federal, and local laws, rules, and regulations, and be consistent with other applicable plans.
2. To identify existing and future water quality issues, emphasizing nonpoint sources of pollution.
3. To propose water quality improvement practices encouraging local involvement to reduce pollution, and monitor and protect water quality.
4. To involve all interested citizens and appropriate organizations in plan development and implementation.
5. To coordinate with other river plans and regional planning.
6. To facilitate State, federal, and local activities to monitor and protect water quality.
7. To identify existing and potential water availability problems and to coordinate development of alternatives.
8. To provide for education of the general public on matters involving the environment and ecological concerns specific to each river basin.
9. To provide for improving aquatic habitat and exploring the feasibility of reestablishing native species of fish.
10. To provide for restoring and protecting wildlife habitat.
11. To provide for recreational benefits.
12. To identify and protect flood prone areas within each river basin, and encourage local and State compliance with federal floodplain management guidelines.

guiding principle of the river basin management planning program in Georgia. Initial efforts culminated in a governmental partners meeting in January, 1995, hosted by GAEPD. State, federal, and local government representatives participated in presentations of the national and Georgia watershed protection approaches and discussed ways to work together on RBMP in Georgia. One major project (described later) involving a number of agencies is the delineation of watersheds within each river basin in Georgia.

The U. S. Environmental Protection Agency provided funding in 1994 for the Cadmus Group, a consultant with experience in basin wide planning, to help GAEPD develop a framework for implementing RBMP in Georgia. The consultant is facilitating the efforts of a GAEPD work group made up of representatives of the Water Protection and Water Resources Branches. The work group is working on developing a basin planning cycle, basin plan outline, basin groupings, planning schedules, issue prioritization strategies, task assignments, and resource needs. A number of the initial efforts of the work group are described below.

It should be emphasized that the Georgia program will address both water supply and surface and groundwater quality issues. This comprehensive approach to water resource management and protection is a cornerstone of Georgia's program for RBMP.

## GEORGIA'S MAJOR RIVER BASINS

The State's major river basins will provide the geographical framework and focus for RBMP. Fourteen major river basins have been defined in the State of Georgia and are shown on Figure 1. These river basins are the Altamaha, Chattahoochee, Coosa, Flint, Ochlockonee, Ocmulgee, Oconee, Ogeechee, Saint Marys, Satilla, Savannah, Suwannee, Tallapoosa, and Tennessee. River basin management plans will be prepared for each of these major river basins.

State regulatory programs and support activities, normally allocated statewide, will be focused in each major river basin on a rotating schedule to achieve the following objectives:

- Facilitate efficient use of limited financial and personnel resources for water resource activities.
- Provide opportunities for intergovernmental resource sharing.

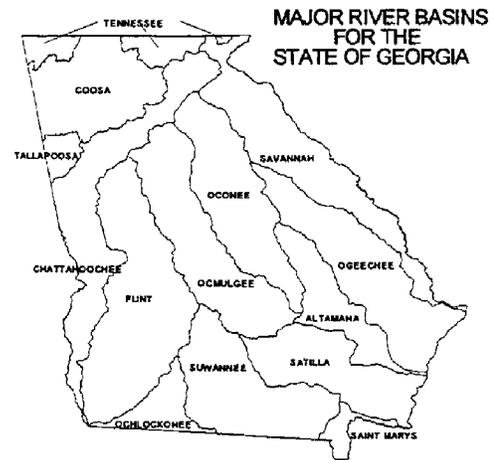


Figure 1. Major river basins for the state of Georgia.

- Improve spatial detail of water quality assessments resulting from increased monitoring coverage within river basins (a set of core trend monitoring sites will be maintained statewide).
- Improve basic knowledge of the watershed as well as the synergistic and cumulative impacts within the watershed.
- Provide a framework for more centralized data management.
- Improve opportunities for management strategy implementation by increasing stakeholder involvement within the watershed.
- Provide consistent and integrated decision making for water resource issues.

Focusing State regulatory programs on watersheds represents an alternative approach to water resources management in the State of Georgia.

## WATERSHED DELINEATION PROJECT

The major river basins provide the geographical framework for RBMP, however, a smaller watershed unit system is needed to provide the organizational elements within a major river basin. This smaller watershed system will provide the basis for many RBMP tasks. The objective of the watershed delineation project is to develop a consistent and standard system of defined watersheds for the State, and to provide the watershed boundaries for mapping and data management.

Currently, the State's major river basins have been divided by the U.S. Geological Survey (USGS) into smaller watersheds called hydrological units. The USGS uses these smaller watershed units for cataloging purposes and has assigned an eight digit code to each. Many water and land resource management agencies use these hydrological units for watershed related work. GAEPD, Natural Resource Conservation Service (formerly the Soil Conservation Service) and the U.S. Forest Service and others have further subdivided the USGS hydrological units into finer watershed units. However, few agencies use a common watershed delineation scheme.

As a result, many agencies are interested in a standard watershed system for the State of Georgia, and are participating in a project to develop standardized watersheds within the USGS hydrological units. This interagency project is being coordinated by the USGS. The USGS is also providing quality assurance and quality control, as well as geographic information system (GIS) expertise to develop a GIS watershed coverage.

At this time methods and criteria are being developed for defining the watershed units as well as procedures for delineating, digitizing, and numbering the watershed units. One criteria for watershed delineation that has been agreed upon is that watershed units must be hydrologically sound or based upon the hydrologic definition of a watershed and not defined by artificial boundaries such as government jurisdictions.

GAEPD is taking the lead on delineating watersheds in the Chattahoochee and Flint River basins, and has completed delineating the boundaries for the USGS hydrological units for these basins on USGS 7.5 minute quadrangle maps having a map scale of 1:24,000. Previous USGS hydrological unit boundaries were delineated using 1:100,000 scale maps. Therefore, using the 1:24,000 scale maps will improve the precision of the watershed boundary delineations.

## RIVER BASIN MANAGEMENT PLANNING CYCLE

A RBMP cycle (see Figure 2) has been developed to provide the process for developing and implementing river basin management plans. The RBMP cycle consists of 14 elements organized into five phases designed to develop and implement RBMP over a five year period. The objectives of the individual cycle elements are described below.

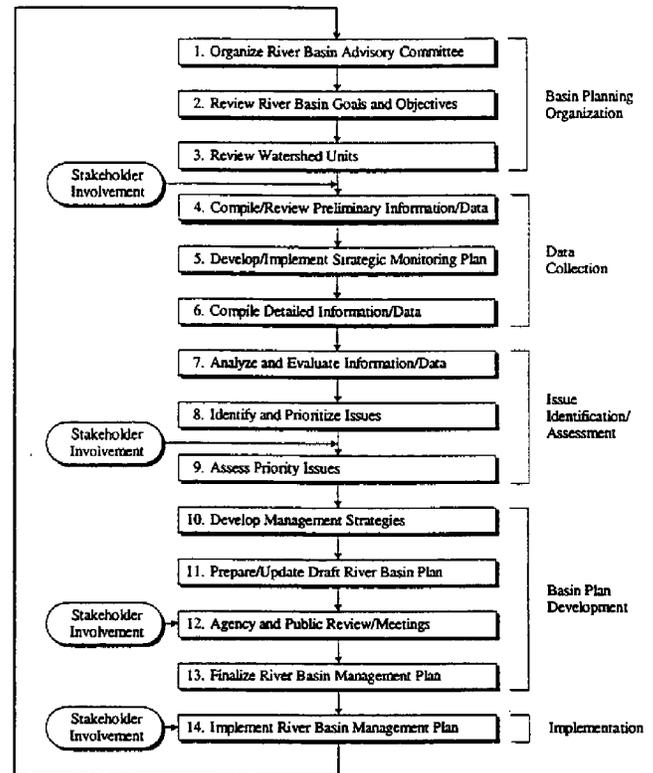


Figure 2. River basin management planning cycle.

### Basin Planning Organization

**Organize River Basin Advisory Committee.** Public participation or stakeholder involvement is an important aspect of Georgia's RBMP. The river basin management planning law requires the Director of GAEPD to appoint at least seven citizens and a chairman to a local advisory committee to provide advise and counsel to the Director during the development of the management plans. The local advisory committees are to meet at the call of the chairman but not less than once every four months.

In addition to the local advisory committee, basin stakeholders will be encouraged to participate in developing and implementing the river basin management plan. GAEPD will host meetings (see Stakeholder Involvement below) to familiarize the stakeholders with the progress of the individual basin plans and seek input on issues and actions at important points in the planning process.

**Review River Basin Management Goals and Objectives.** The overall mission, goals, and objectives for RBMP were drafted by GAEPD in 1993. In January, 1994, GAEPD hosted a combined meeting of the local advisory committees for the Chattahoochee, Flint, Coosa,

and Oconee River basins for the purpose of reviewing and reaching consensus on the mission, goals, and objectives. The mission, goals, and objectives resulting from the facilitated meeting serve as the overall mission, goals, and objectives for the statewide RBMP program. This information was also presented for input at the initial stakeholder meetings for the Chattahoochee and Flint River basins held in December, 1994, and in a Governmental Partners meeting held in January, 1995. These goals and objectives will be reviewed in the initial steps of each basin planning cycle and goals and objectives specific to the individual basin may be added.

**Review Watershed Units.** Watershed units smaller than the river basin will be identified, delineated, and enumerated. These watershed units will provide the geographic framework to identify, assess, and prioritize water resource management issues; target monitoring requirements and management strategies; and provide the basis for data management including geographic information systems (GIS).

**Stakeholder Involvement** will be encouraged at this point in the cycle to introduce RBMP and receive information and comments from all interested stakeholders, and to solicit input on water resource issues in the river basin. The major objective of this initial stakeholder involvement is to provide early involvement in the RBMP process.

## **Data Collection**

**Compile/Review Preliminary Information/Data.** Readily available information and data will be compiled and analyzed to begin characterizing each river basin, and to develop the strategic monitoring plan. Such data may include geographic information system GIS data coverages from various agencies, water use and availability, point source discharge locations and loadings, and water quality trend monitoring data. This initial information and data review will help identify deficiencies in the available information, and provide input to the strategic monitoring plan and future RBMP activities. This information may also be included or referred to in the final river basin management plan documentation.

**Development/Implement Strategic Monitoring Plan.** A strategic monitoring plan will be developed and implemented to collect data to characterize basin water quality and to monitor the effectiveness of river basin management actions or implementation strategies. The

strategic monitoring plan will specify the water quality monitoring to support basin wide assessment activities. The monitoring plan objectives will be developed based on watershed units, review of preliminary information/data, and stakeholder recommendations. The plan will describe the objectives and strategy including specific station locations, water quality parameters, and sampling frequency.

Some water resource issues will require additional detailed assessments to evaluate their magnitude and define their causal relationships. Such detailed assessments or intensive surveys, may include water availability and use studies, assimilative capacity studies, Total Maximum Daily Load (TMDL) evaluations, use attainment studies, and the work to support these activities including intensive field surveys, data analyses, and numerical modeling. Detailed assessments may be proposed according to priority issues to obtain sufficient information and data to develop appropriate management strategies.

**Compile Detailed Information/Data.** Existing information and data of varying types will be available for each basin. GAEPD will use its information resources and databases, and request information from other agencies, organizations, and stakeholders where appropriate. Information and data will be sought for basin characterization (e.g., land use, hydrology, water availability, population and demographics, water supply demand, economics, water quality, resource management). Information and data collected for each river basin may be entered into databases and GIS coverages to facilitate its long-term management.

## **Issue Identification/Assessment**

**Analyze and Evaluate Information/Data.** Analysis of basin wide monitoring data and stakeholder information will focus on issue identification and resource management strategies. Information and data limitations will be identified so that initial findings can be appropriately qualified. Some assessment and quantification of water availability and use requirements, loading estimates, and assimilative capacity may be performed to develop causal relationships.

**Identify and Prioritize Issues.** Basin wide water resource issues identified during the initial stakeholder involvement and those identified during the monitoring, information/data collection, and analysis will be prioritized. GAEPD will develop methods for prioritizing

river basin water resource issues, and for identifying those needing corrective actions.

**Stakeholder Involvement** will be encouraged at this point in the RBMP cycle to receive input on the water resource issues and priorities.

**Assess Priority Issues.** The priority issues identified during the RBMP process may require additional study to facilitate decision making. A variety of assessment tools such as numerical modeling may be used. The results of the assessments will be factored into the management strategies for the particular priority issue.

### **Basin Management Plan Development**

**Develop Management Strategies.** GAEPD will propose strategies to address the issues identified in the river basin. Potential strategies include water supply alternatives, point source and nonpoint source controls, best management practices, stormwater management, erosion and sediment control, and habitat restoration. Where applicable, strategies will be evaluated for their effectiveness in achieving water resource goals using predictive modeling or other methods. Regulatory constraints and procedures will be considered and stakeholder cooperation will be encouraged where voluntary efforts are needed to meet water supply and water quality goals.

**Prepare/Update Draft River Basin Plan.** GAEPD will prepare a draft river basin management plan documenting the results of the planning process including a comprehensive basin characterization including information on data collected, analyses results and the methods used, issue identification and prioritization, water resource management goals, and management and implementation strategies. For successive river basin management plans, the existing plan will be updated to reflect plan progress and changing conditions in the river basin.

**Agency and Public Review/Hearings.** The draft river basin management plan will be distributed to the local advisory committee, the governmental partners, and made accessible to interested stakeholders. Stakeholder meetings will be conducted to explain the content of the river basin management plan and to solicit stakeholder comments and recommendations to the plan.

**Stakeholder Involvement** will be encouraged at this point in the RBMP process to obtain comments and recommendations to the plan.

**Finalize River Basin Management Plan.** Appropriate modifications will be made to the draft river basin management plan based on the comments and recommendations received during the review process. The final plan will be reviewed and adopted by the Board of the Georgia Department of Natural Resources.

### **Implementation**

**Implement River Basin Management Plan.** The RBMP cycle concludes with the implementation of management strategies. Potential activities during this period will include National Pollutant Discharge Elimination System (NPDES) point source and stormwater permitting activities, surface water and groundwater withdrawal permitting, nonpoint source best management practices implementation, voluntary self-monitoring programs, adopt-a-stream programs, compliance monitoring, and enforcement actions. RBMP is designed to provide more consistent and documented water resource management decisions. GAEPD will consider implementation strategies that are both within its regulatory capacity, and those that will be voluntary.

**Stakeholder Involvement** will be encouraged to support and implement the river basin management plan strategies recommended by GAEPD. Some management strategies may be voluntary and their successful implementation can only be achieved by the appropriate stakeholders.

### **RIVER BASIN MANAGEMENT PLAN OUTLINE**

GAEPD has prepared a draft outline as part of the RBMP framework development. The outline described below is an initial attempt to define the content of a river basin management plan. A brief description of each chapter follows.

#### **Executive Summary**

The executive summary will provide a broad perspective on the condition of the basin and the management strategies recommended to protect and enhance water resources.

## Introduction

The introduction will provide an explanation of the legal basis for the plan, the purpose, goals and objectives, and a plan guide to how to use the document.

## River Basin Description

A thorough description of the basin and its important characteristics will be provided. Examples of characteristics are boundaries, climate, geology, hydrogeology, geochemistry, ecoregions, land use, local government jurisdictions, population, etc.

## Water Availability

Surface and ground water availability within the basin will be described, and forecasts may be made for future demand. Following availability and demand will be a section on historic, present and possible proposed permitting activities.

## Environmental Stressors

Stressors to water quality in the basin will be examined in detail with a listing of point sources (NPDES permitted discharges), and non-point sources resulting from land use practices. Pollutant loading determinations may be made for important water quality constituents.

## Assessment

An assessment of water quality and quantity in the streams, lakes, and groundwater will be provided along with an assessment of the basin's biological integrity. The data sources and analysis techniques for these assessments will be discussed.

## Concerns and Priority Issues

Assessing the basin will bring issues of concern to the forefront which will be prioritized and listed in this section. A description of the ranking system and criteria used for prioritization will be included.

## Implementation Strategies

Strategies for addressing issues will be presented in the order that they appear on the priority list with a description of each issue, overview of alternatives considered, and descriptions of recommended options for implementation.

## Future Issues and Challenges

Due to limited resources (data, time, funding, etc.), some issues will be addressed in future iterations of each basin planning cycle. Long-range goals will be discussed, to set the stage for further improvements in managing

water resources and water quality.

## Appendices

The appendices will contain technical information for those interested in specific technical details involved in the planning process.

## RIVER BASIN GROUPS AND PLANNING SCHEDULE

The major river basins previously described have been organized into five groups for RBMP. Grouping was necessary to accomplish the following: 1) complete river basin management plans for each major river basin in a timely manner; 2) repeat RBMP activities in each basin every five years; 3) coordinate National Pollutant Discharge Elimination System (NPDES) permitting (including wasteload allocations) which has a five year renewal period.

The five river basin groups are shown in Figure 3 and are as follows: Chattahoochee-Flint, Coosa-Tallapoosa-Tennessee, Oconee-Ocmulgee-Altamaha, Savannah-Ogeechee, Suwanee-Satilla-Ochlockonee-Saint Marys.

These river basin groups were determined based on river basin location, contributing drainage, physiographic features, and related water resource issues. The basin groups are critical to the scheduling of RBMP efforts.

A proposed schedule (Figure 4) has been developed to complete plans for each major river basin and to establish a long-term basin planning process involving detailed reassessments of each river basin on a five year rotating



Figure 3. Major river basin groups for RBMP.

basis. For instance, the initial Chattahoochee and Flint River basin plans will be completed in 1997. These basins will be reassessed beginning in 1999 with the process culminating in updated plans in the year 2003. Similarly, plan implementation for each river basin will be based on a rotating schedule. This approach will provide needed long-term perspectives and a defined schedule. This is a key issue, since the long-term, defined schedule offers the opportunity for many governmental agencies and stakeholders to plan partnerships and participation in the planning and implementation processes.

The initial scheduling process was complicated by several issues. First, the State law requires plans for the Coosa and Oconee River basins, which are in different basin groups (as previously defined), be the second set of plans to be started. Second, there is a significant opportunity to coordinate Georgia's RBMP work with the ongoing Tri-State (Alabama, Florida, Georgia)/U. S. Army Corps of Engineers (USACE) Comprehensive Study of the Alabama-Coosa-Tallapoosa and Appalachian-Chattahoochee-Flint (ACT-ACF) basins which involves the Chattahoochee, Flint, Coosa, and Tallapoosa River basins. Thus, the Tallapoosa River basin plan is tentatively scheduled with the Coosa and Oconee River basin plans. However, program resources are not adequate to develop plans for the Tennessee, Ocmulgee, and Altamaha River basins at the same time. Third, an additional objective is to coordinate planning work with South Carolina on the Savannah River basin. In addition, the USACE, in coordination with other Federal agencies, is proposing a Comprehensive Study of the Savannah River basin which would commence in 1997. Thus, the proposed schedule tentatively places the Savannah and Ogeechee River basins in the rotation beginning in 1996. Scheduling Georgia's RBMP to coincide with these other

basin initiatives provides opportunities for resource, data, and information sharing.

As shown in the schedule, once the initial complications are worked out, the program will converge into a long-term rotating schedule. The schedule also shows that in a few years RBMP will be ongoing in all the major river basins in Georgia.

It should be noted that under the scheduling provisions of the RBMP law it would take approximately 16 years to complete the plans for all 14 river basins. The proposed schedule provides for the 14 plans to be completed in approximately 11 years. Secondly, the law does not require the river basin plans to be updated on a rotating basis as is currently planned.

### SUMMARY

RBMP represents a new approach to water resources management for the State of Georgia that focuses on the watershed, rather than state-wide program specific approaches. It is not a new regulatory program, but rather a new way of applying existing regulatory programs. Water supply and surface/groundwater quality issues will be addressed in an integrated manner. Stakeholder involvement will be emphasized throughout the planning and implementation process.

Partnerships will be developed to share plan development and implementation opportunities. Similar watershed protection approaches are becoming a national initiative of varying scales ranging from small individual watersheds to large interstate watersheds.

RBMP is anticipated to be more effective in addressing the water resource issues faced today such as a reliable adequate water supply, reducing nonpoint source pollution, and protecting and restoring aquatic habitat. It is hoped that stakeholder involvement will encourage local governments, industry, agriculture, and citizens to take an active role in protecting Georgia's water resources.

If you have questions or need additional information contact the authors at 404-656-4905, Water Protection Branch, or 404-656-3094, Water Resources Management Branch.

RIVER BASIN MANAGEMENT PLANNING SCHEDULE

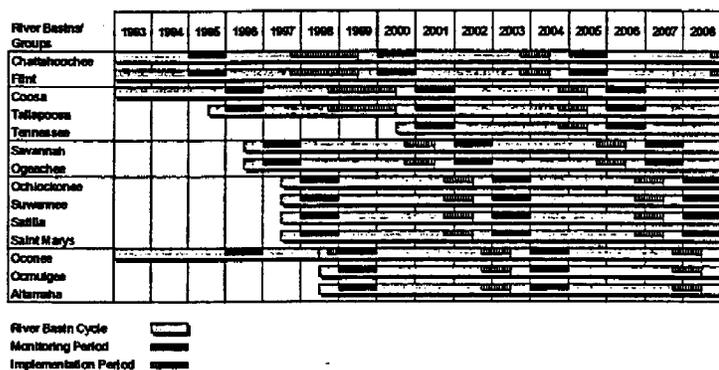


Figure 4. River basin management planning schedule.