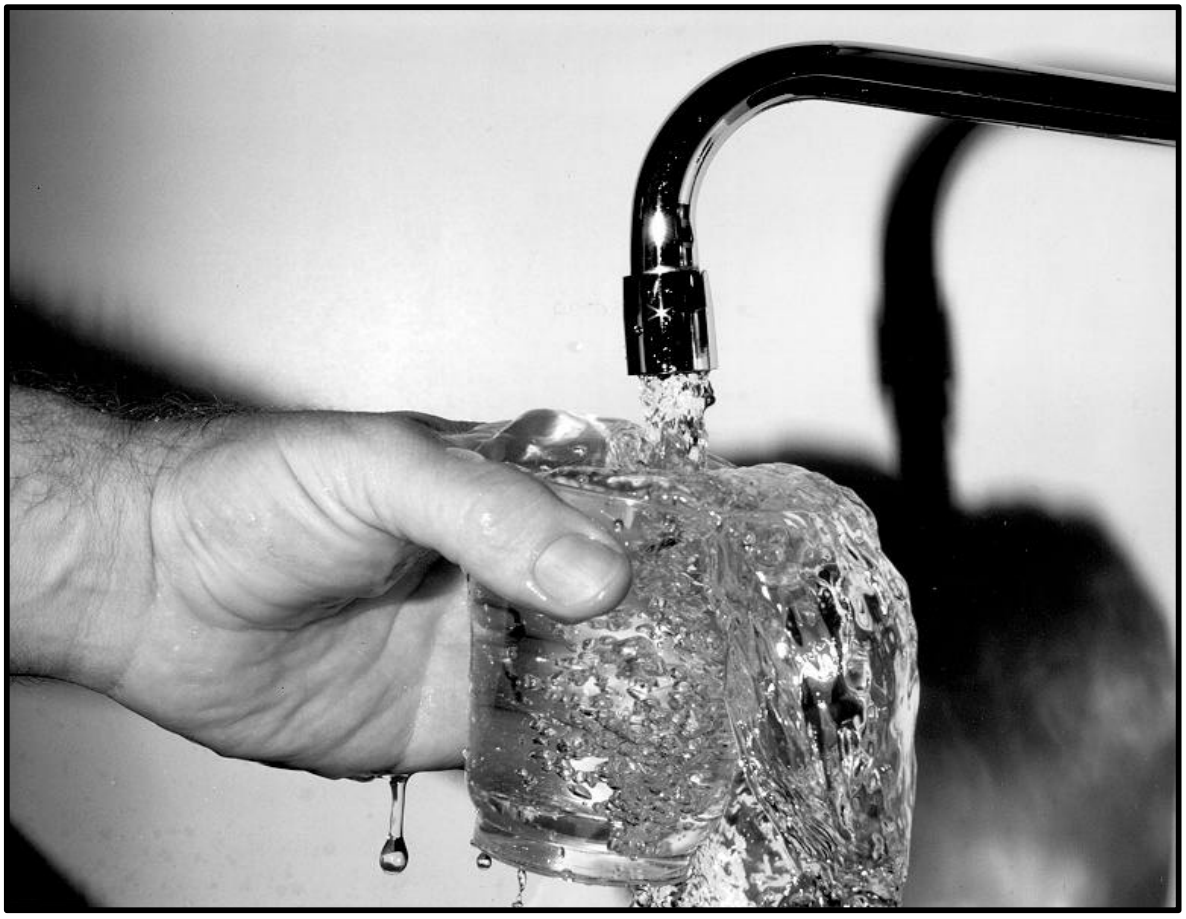
Section A

Source Water Assessment Implementation Plan



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DEFINITION OF TERMS

Public Drinking Water System (PWS) - a system that provides water to the public for human consumption through pipes or other constructed conveyances, if such system has at least fifteen (15) service connections or regularly serves an average of twenty-five (25) individuals daily at least 60 days out of the year. There are three types of public water systems based upon the types of customers served. The three types are Community, Non-Transient Non-Community, and Transient Non-Community water system. For simplicity public water systems ownership will be classified in this document as *either local government owned* or *non-governmental owned* (privately owned by a company, investor or individual).

- **Community water system (CWS)** - a public drinking water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. Examples include municipalities, subdivisions and mobile home parks.

- **Non-community water system (NCWS)** - a public drinking water system which provides piped water for human consumption to at least 15 service connections or which serves at least 25 individuals at least 60 days out of the year but which is not a community water system. There are two types of non-community water systems; Non-transient and Transient.

  - **Non-transient, non-community (NTNCWS)** -public drinking water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year. Examples include schools, industrial parks and other places of businesses.

  - **Transient non-community water system (TRNCWS)** - public drinking water system that is not a community water system or a non-transient non-community system; provides piped water for human consumption to at least 15 service connections or which regularly serves at least 25 persons at least 60 days a year. Examples include highway rest stops, restaurants or other food service establishments, motels, golf courses and parks.

Source water (Also Public Drinking Water Source) - the water body, within the surface or subsurface, from which water is withdrawn for a public water system to be treated and/or distributed.

- **Surface water** - any and all waters located in rivers, streams, branches, creeks, ponds, tributary streams, drainage basins, natural lakes, artificial reservoirs and impoundments and groundwater under the direct influence of surface water.

- **Groundwater** - any and all waters located in subsurface aquifers that is either obtained by drilling of wells or natural springs

- **Groundwater Under the Direct Influence of Surface Water -** is defined as any water beneath the surface of the ground with either: significant occurrence of insects or other microorganisms, algae, or large diameter pathogens such as *Giardia lamblia* or significant and relatively rapid shifts in water quality characteristics such as turbidity, temperature, conductivity, or pH which closely correlate with climatological or nearby surface water conditions.

LIST OF ACRONYMS

ACCG	Association County Commissioners of Georgia
CHD	County Health Department
DHR	Georgia Department of Human Resources
DNR	Georgia Department of Natural Resources
DPH	Division of Public Health (of the Georgia Department of Human Resources)
DWSRF	Drinking Water State Revolving Fund
FGDC	Federal Geographic Data Committee
EPD	Environmental Protection Division (of the Georgia Department of Natural Resources)
GIS	Geographic Information Systems
GMA	Georgia Municipal Association
GPS	Global Positioning Systems
GWHPP	Georgia Wellhead Protection Program
GWUDI	Groundwater Under Direct Influence of Surface Water
IOC	Inorganic Chemical
PWS	Public Water System
RDC	Regional Development Center
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemical
SWAP	Source Water Assessment Program
SWAPP	Source Water Assessment and Protection Plan
SWPP	Source Water Protection Program
TMDL	Total Maximum Daily Load
USEPA	U. S. Environmental Protection Agency
USGS	U. S. Geological Survey
VOC	Volatile Organic Chemical
WHPP	Wellhead Protection Program

Purpose

This Section of the document package is the Source Water Assessment Implementation Plan proposed by the Georgia Environmental Protection Division (EPD). The purpose of this "implementation plan" is to outline and describe the strategies EPD will use to satisfy the Source Water Assessment requirements for public drinking water sources. The intended audience of this plan is the U. S. Environmental Protection Agency (USEPA), officials, owners and operators of public water systems, and any other interested stakeholders concerned with water quality or drinking water quality. This plan was originally submitted to USEPA January 29, 1999 for approval. EPD received comments from USEPA on July 13, 1999. Changes were made to the plan to incorporate USEPA comments. This plan has been resubmitted to USEPA on March 28, 2000.

1.0 Introduction

The 1996 Amendments to the Federal Safe Drinking Water Act (SDWA) brought about a new approach for ensuring clean and safe drinking water served by public water supplies in the United States. Building upon the past strengths of the Surface Water Treatment Rule, expansion of water monitoring, and other compliance measures, the U. S. Environmental Protection Agency (USEPA) is now advocating prevention of contamination as an important tool in the protection of public water supplies. In order to implement prevention and protection strategies, an assessment of potential pollution sources upstream or in close proximity of drinking water supply source must be first conducted. USEPA required all states to develop and submit implementation plans for comprehensive Source Water Assessment Programs (SWAP), by February 6, 1999.

1.1 Requirements of USEPA SWAP

This document presents the Georgia Environmental Protection Division's (EPD) implementation plan and strategies for assessing potential contamination and promoting protection of Georgia's drinking water sources. The strategies described in this plan build upon existing programs within EPD and other state and federal agencies. This plan links these programs and supplements them where necessary to meet priority needs.

As required under the 1996 SDWA Amendments, this implementation plan describes EPD's approach for conducting a statewide SWAP. The approach must include:

1. Delineation of watershed and wellhead protection areas of public drinking water sources;
2. Inventorying of potential sources of contamination within the delineated assessment areas;
3. Determination of water source susceptibility to significant potential contaminants within the assessment area;
4. Establishment of a timetable for completing assessments for all drinking water sources within the state; and

5. Reporting the results of each assessment in individual "Source Water Assessment Plans" to be made available to the public and public water system owners.

The information and results of the Source Water Assessment Plans will be used by the public water system owners and the local governments in developing Source Water Protection Plans (SWPP). EPD will provide advice and guidance to local entities in developing source water protection plans. The public will benefit from the implementation of source water protection plans by having a more secure and safe drinking water supply and the possible reduction of costs associated with monitoring and treatment.

1.2 Goals

This section discusses the USEPA and Georgia EPD goals for Source Water Assessment and Protection.

1.2.1 USEPA National Goals

USEPA's national goal is, by the year 2005, to have 60 percent of the population receiving their drinking water from public water systems with (SWPP) in place (either wellhead protection and/or watershed protection programs). In order to define protection measures, an assessment needs to be conducted to identify potential pollution sources within an assessment area. The USEPA has directed states to accomplish this goal by developing and implementing a source water assessment program for the protection and benefit of public water systems and for the support of monitoring flexibility. The EPD is actively working toward this goal through existing programs and by establishing a Source Water Assessment Program and a Source Water Protection Program in alignment with USEPA's guidance and requirements. It may not always be possible for a public water system to force protection measures on the sources of pollution identified as part of the assessment. These pollution sources may be outside the Systems'jurisdictions or are preempted by state or constitutional law. It is EPD's intent to identify the next steps and the responsible jurisdictions for taking the next steps for developing a SWPP.

Approximately 80 percent (EPD existing public drinking water permits) of Georgia's population is served by surface water systems. To meet USEPA's year 2005 goal of protecting source water for 60 percent of the population served by community water systems, EPD will be working closely with the state's larger governmentally owned community surface water systems to initiate and enhance watershed protection. These activities will be done concurrently by assisting smaller drinking water systems in conducting assessments and by accelerating the Wellhead Protection Program (WHPP) and the Monitoring Waiver Program (non-governmental groundwater systems).

1.2.2 Georgia EPD Goals

EPDs ultimate objective is to develop and implement a source water assessment and protection plan that contributes to the safety of drinking water and help ensures all state and federal water quality standards are met. EPD will meet this objective by enforcement of existing regulations and permit conditions, integrating agency initiatives, providing guidance and education to local governments and conducting public outreach. This objective will be met while trying to minimize economic burden and avoiding duplication of efforts while adverting possible confusion with similar water protection program requirements.

To accomplish this, a vision statement, mission statement and list of goals have been established to guide the assessment process.

Georgia EPD Vision, Mission and Goals

VISION: To have the best quality drinking water from Public Water Systems that serve the citizens of Georgia
MISSION: To develop a source water assessment plan for each public water system to help protect the sources ensuring quality drinking water that meets all state and federal regulations and to assist in the promotion and implementation of the protection plans.
GOALS: **1. Assist local communities and organizations in implementing practices that maintain and improve source water quality and meet state water quality standards;** **2. To ensure adequate and appropriate plant treatment of raw (unfinished) water by lowering risk of pass through contaminants;** **3. To maintain raw water quality that current water plant treatment allows for and to attempt to improve raw water quality where it jeopardizes the treatment of the water plant and increases water treatment costs** **4. To ensure significant contaminants of concern are inventoried for each drinking water source;** **5. To determine the susceptibility of drinking water sources to identified potential significant contaminants;** **6. To involve all interested citizens and appropriate organizations in SWAP plan development and implementation; and** **7. To coordinate with other river basin and regional planning efforts in the state.**

Table 1

Although protection measures are not mandated by the, Federal Safe Drinking Water Act, EPD encourages local governments, permit holders, and other jurisdictions with authority to implement protection measures. In Georgia the majority of the state's population is living within watersheds that are the primary sources of the state's drinking water supplies. Georgia cannot afford to not have protection of these vital water supply sources.

1.3 Existing State Initiatives for Protecting Water Resources

Water management programs in Georgia are directed toward protection and enhancement of water resources across the state through effective management (i.e., allocation of water withdrawal and discharge quantities through permits, and enforcement of the conditions of these permits). EPD follows an anti-degradation strategy for the surface waters and groundwaters in Georgia, focusing on long-term water management through protection and enhancement of water quality, projection of water demand and availability, protection of water supplies and coordination of permitted withdrawals and discharges.

EPD has implemented various programs for the assessment and protection of the state's water resources and has been working with local governments on source water protection initiatives. EPD's encourages local governments and governmentally owned community water system owners to prepare comprehensive watershed plans that can address all elements of EPD's various watershed assessment and protection programs, regulations and requirements. However it is EPD's intent to allow flexibility to the local governmental in the development of these comprehensive watershed plans. The Source Water Assessment and Protection Program will be an important part of the comprehensive watershed plans.

Local government comprehensive watershed plans can incorporate information and data from the Source Water Assessment and Protection Program, the Wellhead Protection Program, Drinking Water Monitoring Waiver Program, Groundwater Under the Influence of Surface Water Program, Comprehensive State Groundwater Protection Program, Watershed Assessment for Domestic Wastewater Systems (for NPDES discharge permit increases), Storm Water Management, Nonpoint Source Management Strategies, River Basin Management Planning, Environmental Planning Criteria for Water Supply Watersheds, the Erosion and Sedimentation Control Act, the Unified Government Watershed Plan (TMDLs) and the Pollution Prevention Program.

EPD also has regulatory responsibilities that include establishing water quality use classifications and standards, assessing and reporting on water quality conditions, issuing point source discharge permits under the National Pollutant Discharge Elimination System (NPDES) program, issuing permits for withdrawal of surface water and groundwater, and regulating land-disturbing activities under the Erosion and Sedimentation Control Act.

1.3.1 EPD Groundwater Protection Activities

EPD is currently conducting groundwater assessments under the Wellhead Protection Program for local governmental community water well and spring sources and under the Monitoring Waiver Initiative for non-governmental community and non-community, non-transient water sources. EPD also plans to use additional assessment data and information collected by the ongoing Groundwater Under the Influence of Surface Water Program. EPD proposes to utilize assessments from these programs to satisfy SWAP requirements for groundwater sources. Other programs currently in place to protect groundwater sources are the Georgia Groundwater Protection Coordination Committee, Well Monitoring Program for Plumes and Trends, and the Sound Science Initiative for Coastal Georgia.

1.3.1.1 Wellhead Protection Program

EPDs Wellhead Protection Program (WHPP) was approved by USEPA in September 1992 and went into effect in July 1993. The WHPP is designed to assess groundwater sources for governmentally owned community water systems for potential contamination and then issue a plan, to the system owner, with source water protection recommendations. The WHPP is a program intended to prevent pollution of drinking water wells and springs supplies in Georgia. The program involves collecting GPS coordinates for the water sources and inventorying potential pollution sources within certain inner and outer management zones. Within EPD, the WHPP is managed by the Geologic Survey Branch with assistance from the Water Resources Branchs Drinking Water Program. EPD proposes to utilize the assessments from this program to satisfy the SWAP for local government groundwater sources.

1.3.1.2 Drinking Water Monitoring Waiver Initiative

The Monitoring Waiver Initiative went into effect in 1992. One of the responsibilities of the Monitoring Waiver Initiative is to assess **non-governmental owned community and non-community, non-transient** groundwater sources for potential chemical contamination and issue a risk assessment plan to the owners. This activity is intended to reduce water system chemical monitoring and associated costs by exempting public water systems from analyzing their drinking water for some of the drinking water parameters. The Monitoring Waiver Initiative uses the WHPP's area delineation methods as the techniques to determine the monitoring waiver review area, groundwater contaminant travel times and site contamination inventories. EPD proposes to utilize the assessments from this activity to satisfy the SWAP for non-governmental community and non-community, non-transient groundwater sources.

1.3.1.3 Groundwater Under the Direct Influence of Surface Water Program

The Federal Drinking Water Regulations, Surface Water Treatment Rule (SWTR) and the Georgia Rules for Safe Drinking Water, (Chapter 391-3-5) require that public water systems that utilize groundwater be evaluated for direct surface water influence. EPD has developed criteria for determining which sources are Groundwater Under the Direct Influence of Surface Water (GWUDI). These criteria include review of system records, on site inspection, and water quality analysis.

Groundwater sources located in karst areas are in water-soluble limestone aquifers with cavernous porosity. These areas are more vulnerable to direct surface influence than in other areas of the state. The assessment aspect of this program will satisfy portions of the conjunctive delineation recommendation of the USEPA Guidance. Groundwater sources found to be under the influence of surface water would show significant potential for contamination.

1.3.1.4 Comprehensive State Groundwater Protection Program

EPD is the lead agency in the implementation of Georgia's Comprehensive State Groundwater Protection Program, certified by the USEPA as meeting core requirements in 1997. A key component of this program focuses on nonpoint sources of groundwater pollution, including widely used agricultural and industrial chemicals and on-site sewage disposal systems treating domestic and non-domestic sewage effluent. These regulatory programs are complemented by non-regulatory activities at EPD, including administration of grant programs under Section 319 of the Clean Water Act and the State Revolving Loan Fund, provision of technical assistance on many aspects of nonpoint source management, and continuation of an active water quality outreach and education program. The protection aspect of this program will help with the SWPP when potential pollution sources of nonpoint nature are found near groundwater sources used for drinking water.

1.3.2 EPD Surface Water Protection Activities

EPD currently is conducting surface water assessments and initiating protection efforts under a series of strategies, plans and criteria. While the data, information and approaches from current EPD programs will be very useful in satisfying portions of the SWAP and SWPP, currently no individual EPD program meets the requirements for the individual Source Water Assessment Plans for surface drinking water intakes. Therefore assessments will be conducted for each intake or groups of intakes where applicable, or included in comprehensive watershed plans that incorporate the SWAP requirements. Other programs currently in place to assess and protect surface water sources are the Watershed Assessments for Domestic Wastewater Systems, Nonpoint Source Management Strategies, River Basin Management Plans, Environmental Planning Criteria, Erosion and Sedimentation Control Act and other agency involvement.

The SWAP will closely follow the basin schedule set in the River Basin Management Plans due to similar priorities and available data collected for the River Basin Management Plans.

Areas where public water system utilities have no control over their source water quality, water withdrawal permits and plant operation permits will not be conditioned for any protection implementation measures beyond existing authorities. Other approaches, such as commitments to help coordinate with those having the appropriate authority, will be taken. Also there is a requirement to identify the appropriate jurisdiction of authority to implement. EPD Anticipates assistance from the Association of County Commissioners, the Georgia Municipal Association, the Regional Development Commissions, the Department of Community Affairs and others in evaluating approaches to further defines the appropriate jurisdiction of authorities for source water protection

implementation.

1.3.2.1 Watershed Assessments for Domestic Wastewater Systems (NPDES increases)

EPD Watershed Assessment Program may be initiated when a local government requests a new or expanded waste load allocation for its NPDES municipal wastewater discharge permit or a new or expanded land application system permit. This EPD Watershed Assessment Program includes the gathering of existing information about a watershed and the NPDES point and nonpoint pollution sources, as well as the collection of new chemical and biological monitoring data. The information collected during the assessment is used to evaluate current and predicted future water quality problems (presumably caused by urban growth once the increase is approved) and to recommend short and long-term solutions. Local governments can use these recommendations to develop a "Watershed Protection Plan", parts of which will be incorporated into the NPDES discharge permit or land application system permit, and other enforceable watershed or water resources protection programs such as the Source Water Assessment Plan. The watershed assessment will be especially convenient when both the wastewater discharge and drinking water intake are located in the same local watershed.

1.3.2.2 Nonpoint Source Management Strategies

Water quality data collected for 305(b) and 303(d) lists, as well as, TMDL requirements will be utilized for SWAP assessments where applicable. TMDL development plans, which will be developed for water bodies that include significant nonpoint sources, can include any data gathered from the Source Water Assessment Plan as well as provide a prioritization mechanism to focus on problem areas of the water supply watershed. One particular important strategy is the Unified Watershed Assessment. The Georgia Environmental Protection Division (EPD), USDA-Natural Resources Conservation Service (NRCS), and Georgia Soil and Water Conservation Commission (GSWCC) have been working cooperatively with a number of federal, state, and local organizations to address natural resource issues and concerns under the Clean Water Action Plan (CWAP), and more specifically the Unified Watershed Assessment (UWA). UWAs provide a road map of priority areas to be addressed in 1999, 2000, and beyond.

The UWA prioritization process consists of a two-step effort. The first step is an assessment, and categorization, of Georgia's fifty-two (52) 8-digit watersheds. This part of the UWA was completed by October 1, 1998 in accordance with EPA and USDA guidance. The assessment step included extensive public participation and resulted in seventeen (17) 8-digit watersheds being identified as impaired and in need of restoration activities. The second step in the Unified Watershed Assessment (UWA) process is to develop a Watershed Restoration Action Strategy (WRAS). "WRASs" are described in the Clean Water Action Plan (CWAP) as response plans to restore those watersheds that do not meet clean water, natural resources, and public health goals and, are most in need of restoration. EPA and USDA guidance encourages states to consider six (6) elements when developing Watershed Restoration Action Strategies (WRASs). They are: public participation, monitoring, water quality, action, implementation and funding.

Other source water protection initiatives being developed by Georgia's Agricultural Nonpoint Source Program and the Forestry Nonpoint Source Control Program will be elements of Georgia's SWAP. These are statewide non-regulatory programs with approaches using cooperative partnerships with various agencies and a variety of activities and programs to address agricultural and silviculture nonpoint sources of pollution.

1.3.2.3 River Basin Management Plans

EPD's SWAP Implementation Plan will link existing and future programs in the state's source water protection initiatives. There are commonalties in data requirements and public participation for SWAP to a number of these programs, in particular, efforts under the River Basin Management Plan. The River Basin Management Plan focuses on a basin wide approach to managing and protecting surface waters and groundwaters, and is EPD's framework for implementing all future water protection programs. River Basin Management Plans are being prepared for all fourteen major river basins in Georgia (see Figure #1). The watersheds within the basins are being delineated to develop a consistent and standard system of defined watersheds for the state, and to provide the watershed boundaries for mapping and data management. Delineation and mapping of surface water intake watersheds will be integrated, to the extent possible, with these ongoing efforts. Eventually, the scheduling should allow for a fully integrated river basin protection effort.

1.3.2.4 Environmental Planning Criteria

The Georgia Planning Act of 1989 encourages each local government to develop a comprehensive plan to guide its activities over a 20-year planning horizon. The Environmental Planning Criteria is part of the minimum planning criteria that was developed by EPD and applied by the Department of Community Affairs. Sections of the Rules for Environmental Planning Criteria establish minimum standards for protection of large (i.e. 100 square miles or greater) and small (i.e. less than 100 square miles) water supply watersheds and groundwater recharge areas. Section 391-3-16-.01 Criteria for Water Supply Watersheds includes recommended requirements and practices to be implemented by local governments to protect water supply watersheds. The requirements for schedules and implementation of water supply watershed protection are incorporated into the Surface Water Withdrawal Permits. The local governments which have completed this effort, or those currently implementing their watershed protection plans will satisfy most of the SWPP protection requirements of Georgia EPD. However, a Source Water Assessment Plan will need to be completed through either a comprehensive watershed approach or for the individual intake. EPD will continue to work with stakeholders and advisory committees to improve the science, practicality and adaptability of the Environmental Planning Criteria.

1.3.2.5 Erosion and Sedimentation Control Act

The Erosion and Sedimentation Control Act was established in April 1975 as a comprehensive, statewide program for erosion and sedimentation control to conserve and protect air, water and land

resources of the state but administered by the local governments. Sediment caused by erosion is a significant contributor of nonpoint pollution in Georgia's rivers and streams and is a major drinking water concern. A review of the local government's erosion and sedimentation program by EPD may occur when excessive sediment is found to be a significant pollution source to an intake downstream.

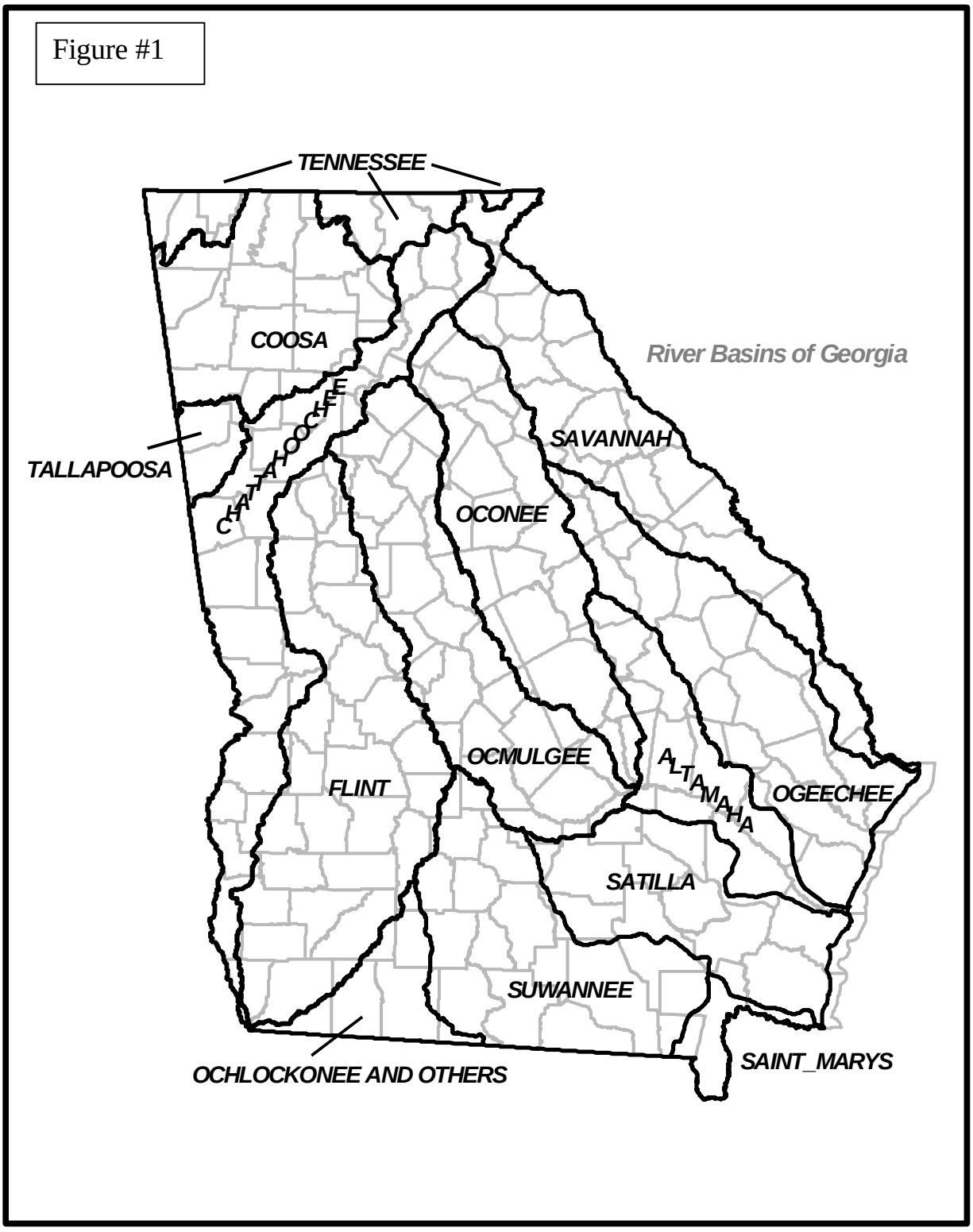
1.3.2.6 Pollution Prevention Assistance Division

The Pollution Prevention Assistance Division (P^2AD) is a non-regulatory division of the Georgia Department of Natural Resources. Created in 1993, the Divisionś services are free, multi-media in scope, and confidentiality protected. The program provides technical assistance to business, industry, agriculture, and government in the areas of pollution prevention, waste reduction, solid waste and recycling, full cost accounting, and energy efficiency. Also, the Division houses two programs primarily for citizens: household hazardous waste and radon awareness. Types of assistance include the following: an Information Center and library, on-site pollution prevention assessments, workshops and training, a quarterly newsletter, a webpage, publications, and a pollution prevention recognition program. Three employees, in cooperation with the University of Georgia, are specifically focused on agricultural pollution prevention and by-product reuse issues. P^2AD also participates in the Georgia Environmental Partnership, which is a joint effort with the University of Georgiaś Biological and Agricultural Engineering Department and Georgia Techś Economic Development Institute, to better deliver environmental assistance services to industries throughout Georgia. The Division has ongoing pollution prevention partnerships with the stateś Department of Defense facilities, the Metro Atlanta Chamber of Commerce, the Georgia Station Research and Education Garden. The Pollution Prevention Assistance Division will be an important partner in the Source Water Protection Program.

1.3.2.7 Other Agency Involvement

Many agencies are partners in EPD's water resources management efforts. The Georgia Soil and Water Conservation Commission has been designated by EPD as the lead agency to address agricultural nonpoint sources of pollution and also has a role in the management of runoff from construction activities. Similarly, the Georgia Forestry Commission (GFC) has been designated by EPD as the lead agency to address nonpoint sources of pollution from silviculture. Agencies which cooperate in these areas of water resources management include the U.S. Department of Agriculture - Natural Resources Conservation Service, the Georgia Farm Bureau, the Georgia Forestry Association, the Georgia Agribusiness Council, the University System of Georgia, the Georgia Department of Agriculture, and a number of other state and federal agencies and private organizations. Through a Memorandum of Understanding between EPD and Georgia Forestry Commission, the U.S. Forest Service is the lead agency for silviculture activities on National Forest land. The Georgia Department of Human Resources Division of Public Health is also playing a role in assisting EPD with implementing SWAP. The Division of Public Health (DPH), through its local county boards of health, administers core environmental health regulatory programs which includes on-site sewage management.

Figure #1


TENNESSEE
COOSA
River Basins of Georgia
CHATTAHOOCHEE
TALLAPOOSA
SAVANNAH
OCONEE
OCMULGEE
ALTAMAHA
FLINT
OGEECHEE
SATILLA
SUWANNEE
SAINT_MARYS
OCHLOCKONEE AND OTHERS

1.4 Public Participation

EPD has existing programs with goals and objectives to protect and enhance the quality of the state's water resources. Several of these programs have policies which use a public participation format similar to the process described in EPA's *State Source Water Assessment and Protection Programs Guidance, August 1997* (Final Guidance). The public participation process for existing programs may not directly parallel the 1996 SDWA requirements but do have comparable aspects which are being utilized, including open public meetings and hearings, stakeholder meetings and comment periods, and technical committees. A detailed summary of all SWAP Implementation Plan public participation is found in the public participation section of the SWAP Implementation Plan.

1.4.1 Technical and Citizens Advisory Committees

A statewide technical advisory committee and a citizens advisory committee have been established to assist EPD in developing its SWAP Implementation Plan. These committees have been structured, to the extent possible, to include organizations that are also participating on other EPD water resources and watershed management programs. Many other organizations were invited to participate based upon USEPA's recommendations for such committees. However some organizations declined to participate. The public participation section of the SWAP Implementation Plan shows all organizations, groups and individuals invited and those who choose to participate in either the citizens' and/or technical advisory committees. If any organization, group or individual not originally invited but later requested to participate in the advisory committees, their requests were honored and names added to the committees. Meetings for both "advisory committees" are scheduled to run concurrently. Advisory Committee meetings were held on March 5, 1998, June 25, 1998, November 16, 1998 and January 14, 1999. An addition advisory committee meeting was held on October 14, 1999 in order to address USEPA comments for the SWAP Implementation Plan and review EPD responses. Minutes from all of the committees are found in the public participation section of the SWAP Implementation Plan.

1.4.2 Citizens Advisory Subcommittee for Surface Water Intakes

EPD is working with a subcommittee of the technical and citizens advisory committees in deriving a statewide approach to assess public drinking water intakes that are supplied by surface water. This approach was developed with the intent to make Georgia's SWAP flexible and readily understandable for use by local communities. The tasks of the subcommittee are: to agree on definitions for "contaminants of concern" and potential pollution sources, develop "user friendly" methods to establish assessment areas for public surface water intakes, determine intake susceptibility methodology, and review the proposed SWAP goals. The subcommittee met on April 21, 1998, May 18, 1998, June 8, 1998 and December 1, 1998. The subcommittee's recommendations were presented on June 25, 1998, November 16, 1998 and January 14, 1999 to the Advisory Committees for consideration. Two additional subcommittee meetings were held on November 18, 1999 and December 8, 1999 in order to revise the assessment area methodology, clarify the potential pollution source inventory and update

the susceptibility determination methodology. These meetings were held based upon recommendations from the advisory committee. A summary of the subcommittee's members and activities are described in the public participation section of the SWAP Implementation Plan.

1.4.3 Public Meeting and Hearing

In accordance with the USEPA Guidance, a combined public meeting and hearing was held on January 25, 1999. During the public meeting EPD presented the Implementation Plan to the general public and discussed changes to the plan as a result of comments received. A summary of minutes of the Public Meeting and Hearing is described in the public participation section of the SWAP Implementation Plan.

1.4.4 Public Participation and Wellhead Protection Program

Public participation was an integral aspect of the development of Georgia's Wellhead Protection Program (WHPP). The initial Wellhead Protection Plan was subjected to two "strawman" meetings to obtain input from EPD, USEPA, local government officials and other interested parties. These meetings were held in Atlanta on December 6, 1991 and Athens on May 20, 1992.

The WHPP was approved by USEPA in September 1992. In accordance with the Administrative Procedures Act, EPD held public meetings around the State at which time the public was granted the opportunity to comment on the proposed amendments to the Rules for Safe Drinking Water. Meetings were held in Macon and Albany on April 12 and 13, 1993 and in Atlanta on April 16, 1993. After all comments were reviewed and addressed, the Department of Natural Resources adopted the Wellhead Protection Rules on June 4, 1993.

An educational video regarding the need for protecting groundwater in general and the need for wellhead protection in particular was prepared during federal fiscal year 1991. This video was distributed to all the Regional Development Centers and has been shown at numerous groundwater association meetings and trade conferences.

1.4.5 Georgia Water Campaign

Another aspect of Georgia's public participation process is work being conducted by the Association County Commissioners of Georgia (ACCG). The Georgia Water Campaign which is being coordinated by ACCG was established to enhance local government decision making capabilities, guidance, and technical assistance. The Campaign through the effort of the EPD, ACCG, and Georgia Municipal Association (GMA) is working to:

1. Increase communication between local, state, and federal government, industry leaders, environmental organizations, academia, and water professional associations;

2. Increase local government's commitment to protection and management of water resources; and
3. Provide coordinated delivery of water management technical assistance to local governments throughout Georgia.

The Source Water Assessment Plan Development Local Government Outreach Program that has been undertaken by the Georgia Water Management Campaign is described in the appendices of reference documents.

EPD will use the statewide Georgia Water Campaign to promote demonstration and pilot projects to improve the practicality and effectiveness of proposed minimum guidance..

2.0 Assessment Elements

This section of the implementation plan discusses the different factors that influence and guide the content, schedule and delegation of responsibility for each individual drinking water source assessment plan.

Each individual drinking water source assessment plan must satisfy three key requirements:

1. Delineate the source water assessment and protection areas for all public water supply sources, within the State (the outer management zone for groundwater sources);
2. Inventory potential contaminants within the delineated area;
3. Determine water source susceptibility to significant potential contaminants within the assessment area.

2.1 Location of State Drinking Water Sources

The types of water sources are generally dependent on the physiographic region of the state. Most of the surface water intakes are located in the Piedmont and Ridge and Valley physiographic provinces of Georgia; most of the wells are found in the Coastal Plain physiographic province. Many of the larger population centers (e.g., Atlanta, Athens, Augusta, Columbus, Dalton, Rome, Macon and parts of Savannah) utilize surface water. Only a few large population centers (e.g., Albany, Richmond County, Valdosta and Savannah) use groundwater as a source of drinking water.

2.2 Prioritization of Assessments

EPD's public drinking water permit records indicate that the most populated areas of Georgia are served by surface water systems with the majority of the population in the Chattahoochee, Flint, Coosa, Ocmulgee, and Savannah river basins. Surface source waters in many areas of these river basins are being stressed by mass development and land use practices. By concentrating SWAP

activities on surface drinking water sources in these highly populated areas and by accelerating the Wellhead Protection Program (WHPP), Georgia plans to meet USEPA's year 2005 goal by having 60 percent of the population served by community public water systems with SWPPs in place. However assessments for other surface drinking water sources and non-governmental, non-transient groundwater systems (Monitoring Waiver Program) will also be done concurrently.

2.3 General Time Table for Implementation and Completion of Assessments

EPD will begin implementing its SWAP Implementation Plan immediately after USEPA approval. EPD is requesting an eighteen month extension in order to complete the assessments for non-governmental community systems under the Monitoring Waiver Program and the assessments for surface water sources.

Assessments are currently in progress for groundwater sources. Local government community groundwater source assessments (i.e. the Wellhead Protection Plans) are scheduled for completion by December 2001. Non-governmental, non-transient groundwater source assessments are scheduled for completion by December 2002. Transient groundwater system will be scheduled for completion within 3 ½ years from the EPA approval of the Georgia SWAP.

Assessments for surface water sources will be completed over a three-year period following the River Basin Management Plan and the EPD watershed delineation schedule. The assessments for surface water intakes located in the Chattahoochee and Flint River basins are scheduled to begin in year 1999. The assessments for surface water intakes located in the Coosa, Tallapoosa, and Oconee River basins are scheduled to begin in year 2000. The assessments for surface water intakes located in the Savannah, Ogeechee, Ocmulgee, and Tennessee River basins are scheduled to begin in year 2001. EPD will provide the delineations of the intake watersheds to meet these time schedules and assessments will be completed within the final deadline of May 6, 2003.

There are approximately 175 public drinking water surface water sources within the state and 2284 active public drinking water wells. Of these, approximately 600 are transient sources.

2.4 Delegation of Assessment Responsibilities

This section discusses the delegation of assessment responsibilities. EPD plans to add a condition to all public surface drinking water intake permits requiring a Source Water Assessment Plan be completed. Drinking water systems that use groundwater already have wellhead protection requirements. Modifications to the Rules for Safe Drinking Water in year 2000 will include regulations for SWAP.

2.4.1 Groundwater Systems

Since groundwater assessment programs are already established through the Wellhead Protection and

the Waiver Initiative, the EPD's Geologic Survey Branch and Drinking Water Program staff will conduct assessments for groundwater sources. These assessments are currently on file at EPD drinking water program offices Suite 1360 Twin Towers, Atlanta, Georgia 30334 for review.

2.4.2 Surface Water Systems

Large surface water systems, which supply water (directly or through wholesale) to a population of 50,000 or more, will be delegated the responsibility of developing and implementing a Source Water Assessment Plan. As funding permits, EPD may provide a portion of the funding through the use of the 15% set aside from the Drinking Water State Revolving Fund (SRF) to assist these large surface water systems. These systems will be expected to submit a proposed scope of work to EPD for approval. The proposal must outline the assessment strategies, procedures and steps that will be taken to meet minimum guidance. Since many of these partners will be receiving funds from the SRF, EPD will monitor progress by attending periodic meetings with partners and requiring quarterly or biannual progress reports from the local government and the utility as a joint entity. To allow flexibility, the delegated parties can request to deviate from the river basin time table (Section A.2.3) for appropriate reasons in the proposals as long as the final deadline for all assessment plans are met. However those partners who request to deviate from the timetable will be expected to produce a more comprehensive plan. EPD has developed minimum guidelines for the surface water assessments to help guide these proposals. However, EPD encourages these larger systems to expand their assessments beyond the minimum guidelines. If necessary, EPD will provide the delineated watersheds of each intake in GIS format and any data of pollution sources EPD maintains. (Section A.2.6)

Surface water systems, which supply water (directly or through wholesale) to a population less that 50,000, will have the assessment done by EPD using the minimum guidelines. However, EPD expects full cooperation and assistance from the surface water system in conducting and updating source inventories and susceptibility determinations. Systems wishing to conduct an assessment will be allowed the flexibility to do so. These systems will be expected to submit proposals outlying assessment strategies and procedures. As funding permits, EPD will try to provide a portion of the funding through the use of the 15% set aside from the Drinking Water State Revolving Fund to assist these other surface water systems.

EPD encourages both large and small surface water systems to create partnerships with each other and EPD in order to conduct assessment of common regional watersheds. (Section A.2.4.4)

2.4.3 Groundwater Under the Direct Influence of Surface Water (GWUDI) Systems

Since GWUDI assessment programs are already established, the EPD Drinking Water Program staff

will conduct assessments for the GWUDI sources.

2.4.4 Regional Water System Partnerships

EPD has partnered and proposed partnering with several local communities and governmental groups which have taken a proactive approach toward developing and implementing source water assessment and protection measures for their drinking water sources. As funding permits, EPD has and will continue to try to provide a portion of the funding for these regional efforts through the use of the 15% set aside from the Drinking Water State Revolving Fund. Some regional initiatives already underway involve Columbus Water Works, the Atlanta Regional Commission (Big Creek and the Metro Atlanta Region, the Alcovy Basin Watershed Protection Planning Group and the Governors Environmental Advisory Council. Other efforts are underway in the North Georgia and Coosa RDC areas with the cities of Dalton, Rome, Cartersville and Calhoun etc. These projects have incorporated extensive public participation and are using the USEPA Final Guidance for conducting assessments and have features in their studies and programs for source water protection. Results from these projects can be used by other communities where applicable and will be promoted in EPD's SWAP. The appendices of reference documents provide a description of each existing partnership initiative.

2.4.5 Federal Facilities

All public water systems owned and operated by federal facilities are permitted by EPD. Therefore these public water systems will be required to complete a source water assessment plan. EPD, in negotiations with representatives from federal facilities (US Army and US Air Force), is delegating the responsibilities of the SWAP to the federal facilities that operate public water systems. All Federal facilities are subject to the same minimum requirements as other public water systems.

2.5 Contaminants of Concern

The "Contaminants of Concern" EPD will focus upon are those finished water contaminants regulated under the SDWA for groundwater and surface water (i.e. contaminants with an established maximum contaminant level (MCL), contaminants regulated under the Surface Water Treatment Rule, and the microorganism Cryptosporidium). Contaminants of Concern are broken down into the five categories; acute contaminants, constituents that interfere with treatment, non-acute regulated chemicals, Non Regulated Pathogen and Taste, Odor and Color Contributors.

Contaminants of Concern

Category Type	Contaminants	Reasoning
Acute Contaminants	**Fecal coliform (as an indicator), nitrate, nitrite**	**Immediate risk to human health**
Constituents that interfere with	**Ammonium nitrate and turbidity**	**Secondary contaminants in**

treatment	**(or suspended sediment)**	**excess amounts can cause treatment problems**
Non Acute Regulated Chemicals	**Volatile organic chemicals (VOC), synthetic organic chemicals & pesticides (SOC), inorganic chemicals (IOC) MCLs**	**Long term exposure can possibly cause cancer and other health problems**
Non Regulated Pathogen	***Cryptosporidium parvum* and *Giardia lamblia***	**Currently no regulations but associated with immediate risk to health**
Taste, Odor and Color Contributors	**Iron, manganese, copper, algae blooms (nutrients)**	**Little risk to human health but makes water less desirable and gives public impression of contaminated water.**

Table 2

2.6 Data Availability

As part of the Wellhead Protection and Monitoring Waiver Programs, the location coordinates of wellheads, springs, and potential pollution sources are being collected using Global Positioning System (GPS) measurements. EPD expects this data will be available early enough to initiate assessments as scheduled.

As part of an EPA 319 non-point source grant requirement, EPD is locating the drinking water supply intakes plus certain potential pollution sources including, landfills, surface mines, NPDES wastewater outfalls, and Land Application Systems (LAS) organized by river basins using Global Positioning System (GPS) measurements. This spatial data will be available to be used in source water assessment plans.

All GPS data is corrected and converted into Geographic Information Systems (GIS) coverages at a scale of 1:24,000. The GIS coverages are further reviewed for errors to meet all FGDC requirements.

Maps created from GIS spatial data will be the primary means of identifying additional potential pollution sources. Many existing spatial data sources of potential pollution sources are already documented through various programs and agencies in the state. Spatial locations of regulated facilities such as wellheads, surface drinking water intakes, NPDES permit discharges, landfills, mines, land application sites, landfills, Toxic Release Inventories, and hazardous waste sites are available from DNRs web page. The address is www.dnr.state.ga.us/dnr/environ. Additional spatial data from other non-EPD sources is necessary for a complete assessment. Other spatial data is available from the Department of Community Affairs and the Regional Development Commissions. Also base map data is available for the Georgia GIS Clearinghouse at www.gis.state.ga.us. Other spatial data may be available from the USEPA or local city and county governments. All spatial data

locations need to be verified, if possible, by EPD or the delegated partners.

However, some unknown potential pollution sources may not be available from existing GIS or non-spatial data. In that circumstance, EPD expects those delegated partners, as well as those public surface water systems whose assessments will be conducted by EPD, to assist in the collection and /or verification of potential pollution sources. EPD recommends measures that are practical and cost effective (e.g. on site inventories using Global Positioning Equipment or off of a 7.5 minute USGS Quad sheet).

When practical, the locations of all potential pollution sources will be compiled into a single GIS database for each intake or wellhead source. Documentation of data sources for the potential pollution sources will need to be included (i.e. metadata, EPD, DCA, etc.) A blended approach using different scales of GIS maps or occasional paper maps (preferably 7.5 minute USGS Quadangle sheets) is allowable as long as the paper map is documented as a data source. A map scale of 1:24,000 or better (1:12,000) is preferred for analysis however; the presentation of GIS data can be at a lesser scale (1:100,000). EPD recommends the use of ArcView, ArcInfo or any other ESRI compatible software for the assessment project.

3.0 Groundwater Assessment

Georgiaš Wellhead Protection Program (WHPP) and the Monitoring Waiver Initiative are EPA approved programs designed to assess and identify potential pollution sources of underground drinking water supplies (wells and springs) for community and non-community groundwater sources. Georgiaš WHPP was approved by the USEPA, Region 4, on September 30, 1992 and became effective under Georgiaš Rules for Safe Drinking Water on July 1, 1993. The program is being managed by EPDš Geologic Survey Branch with assistance from the Water Resources Branchš Drinking Water Program. Georgia conducts the WHPP for local government, community public water systems only.

The Monitoring Waiver Initiative is similar to the WHPP in terms of assessing groundwater sources for potential contamination. However, the focus of the Monitoring Waiver Initiative is to conduct assessments in order to issue waivers for certain contaminants. Although the Monitoring Waiver Initiative issues waivers to both local governments and non-governmental public water systems, EPD plans to use the assessments for the non-governmental, community and non-community public water systems for SWAP. EPD proposes to utilize assessments from these programs to satisfy SWAP requirements for groundwater sources.

3.1 Wellhead Protection Program

The following discussion is a summary of the EPD Wellhead Protection Program (WHPP). A copy of the Georgia WHPP approved by USEPA is found in the appendices of reference documents.

EPD is developing WHPP Plans for every well or spring used as a source for a community public water supply serving local governments (municipality, county, or an authority). The WHPP Plans are being developed on a schedule to coincide with a community water system's drinking water operating permit. In order for a community water system operating permit to be renewed, a WHPP Plan must be on file with EPD.

A WHPP Plan consists of five main parts;

1. An identification and location of a Control Zone (CZ) for each well or spring;
2. An identification and location of required Management Zones;
3. An inventory of potential pollution sources in the designated wellhead protection areas;
4. A management plan for potential pollution sources identified in the inventory; and
5. If available, a contingency plan that is submitted by the water system describing how alternate sources will be provided in the event a well becomes inoperable.

There are various methods used to delineate wellhead protection zones. The methods are the Modified Fixed Radius Method, the Heath Method, the Florida Volumetric Method and Watershed Mapping for Karst Areas.

Once wellhead protection management zones have been identified and delineated for local governmental water sources, within those zones, EPD will not issue permits for certain potential pollution sources, such as landfills, land applications sites, and underground injection wells. In addition, EPD requires more stringent protective measures be taken for certain activities within wellhead protection areas.

3.2 Monitoring Waiver Initiative Program

The Monitoring Waiver Initiative is designed to reduce the chemical monitoring and associated cost of the monitoring requirements by exempting public water systems from some of the costly monitoring requirements. Potential pollution risk to the water source is assessed taking into account the local and regional geology, the water systems monitoring history and the number and type of potential pollution sources within the monitoring waiver review area. The monitoring waiver review area is determined in the same manner as the Outer Management Zone (OMZ) of the Wellhead Protection Area and the same site contaminant inventories are conducted.

3.3 Delineation of Assessment Areas

EPD uses both the wellhead protection management zones and the monitoring waiver review areas as the delineated assessment area.

3.4 Potential Contaminant Source Inventory for Wells

EPD will inventory obvious potential pollution sources within the delineated assessment areas. The following table contains the pollution source list used for both the Wellhead Protection Program and the Monitoring Wavier InitiativeProgram. The list represents potential pollution sources that could contaminant groundwater.

Potential Pollution Sources for Groundwater

AGRICULTURE
A01 Agricultural Fields
A02 Agriculture Waste Impoundments
A03 Animal Burials
A04 Animal Feed Lots
A05 Commercial Animal Enclosures
A06 Fertilizer/Pesticide Storage
A07 Grain Storage Bins
A08 Irrigation Wells
A09 Pesticide Mixing Areas
A10 Other

BUSINESS AND INDUSTRY
B01 Asphalt Plant
B02 Auto Repair/Body Shop/Salvage Washes
B03 Auto/Truck/Boat/Equipment Dealers
B04 Business using Solvents/Paints
B05 Car Wash
B06 Chemical Production/Mixing/Storage
B07 Deicing Applications
B08 Electroplaters/Metal Finishers
B09 Fleet Service Facility
B10 Gasoline Station Service Bay
B11 Golf Courses/Nurseries
B12 Industrial Facilities
B13 Laundromats/Dry Cleaners
B14 Machine Shops
B15 Photo Processors
B16 Power Generating Facilities
B17 Printers
B18 Refineries
B19 Refinishing
B20 Salvage Operations
B21 Stockpiles
B22 Wood Chemical Treatment Facilities

FUEL STORAGE
F01 Above Ground Storage Tanks
F02 Fuel Storage Facility
F03 Oil/Gas Pipeline
F04 Underground Storage Tanks
F05 Other

HAZARDOUS MATERIALS
H01 Facilities Handling Hazardous Waste
H02 Hazardous Waste Disposal
H03 Hazardous Waste Management Units
H04 Radioactive Disposal and Storage
H05 Other

INJECTION AND INFILTRATION
I01 Abandoned Wells
I02 Domestic Wells
I03 Drainage Canals
I04 Holding Pond/Lagoon
I05 Infiltration Galleries
I06 Injection Wells
107 Neighboring Polluted Wells
I08 Salt Water Intrusion/Upconing
I09 Sinkholes Modified/Natural
I10 Storm Water Runoff/Infiltration
I11 Swamps/Wetlands/Flood plain
I12 Urban Runoff
I13 Other

KNOWN POLLUTION
P01 Accident Spill Locations
P02 Hazardous Waste Sites
P03 Other

LANDFILLS
L01 Construction Waste Landfills
L02 Industrial Waste Landfills
L03 Municipal Solid Waste Landfills
L04 Others, Active or Abandoned

SEWAGE AND WATER TREATMENT
S01 Domestic Septic Systems
S02 Lift Station
S03 Non-Domestic Septic Systems
S04 Sewage Treatment Plant
S05 Sewer Lines
S06 Treatment Lagoons/Ponds
S07 Waste Water Treatment Basin
S08 Water Treatment Facilities
S09 Other

TRANSPORTATION
T01 Access and Secondary Roads
T02 Airports
T03 Major Highways and Railroads
T04 Transportation Corridors
T05 Other

WASTE DISPOSAL SITES
W01 Abandoned Disposal Site
W02 Abandoned Drums
W03 Cesspools
W04 Drum Storage/Disposal/Recycling
W05 Dumps
W06 Garbage Transfer Stations
W07 Land Application Systems
W08 Open Pit Burning
W09 Recycling Facilities
W10 Sludge Application
W11 Sludge Producing Facility
W12 Waste Piles
W13 Other

OTHER
O01 Atmospheric Pollution Percolation
O02 Abandoned Cars/Vehicles

B23 Other		O03 Cemeteries
	MINING AND CONSTRUCTION	O04 Electrical Transformers
	M01 Borrow Pits	O05 Military Base/Depot
	M02 Construction Excavations	O06 Utility Corridors
	M03 Detonation Sites	O07 Utility Poles
	M04 Mining Operations	O08 Vehicle Parking Areas
	M05 Quarries/Underground Mines	
	M06 Other	

Table 3

3.5 Significant Potential Pollution Sources

All potential pollution sources found within the assessment area will be considered significant.

3.6 Susceptibility Determination for Wellhead Protection Program

Georgia's wellhead protection program is conducted in accordance with "The Georgia Wellhead Protection Plan (GWHPP)," which was approved by USEPA's Region IV Administrator by letter dated September 30, 1992. EPD's Rules for Safe Drinking Water adopts the provisions of the GWHPP for cities, counties and authorities. GWHPP predates SWAP, but includes the key elements of susceptibility determinations as described in Chapter 2, Section II.B.3 (b) of EPA's August 1997 final guidance document for SWAP. Specifically, the approach used in the GWHPP contains the three key elements of a susceptibility determination as defined on page 2-18 of the guidance document, which states in part, "Such a determination, therefore, would likely take into account *(1)* hydrologic and hydrogeologic factors, *(2)* inherent characteristics of the contaminants (e.g., toxicity, environmental fate and transport); and *(3)* characteristics of the potential source of the contaminant (location, likelihood of release, effectiveness of mitigation measures)." The italicized numbers are added for emphasis. The following discussion addresses each of the three key items.

3.6.1 Hydrologic and Hydrogeologic Factors

EPD recognizes significant differences in the characteristics of Georgia's aquifers regarding risks for use as source waters. These differences are accommodated in the GWHPP by a) identifying the major aquifers or aquifer groups for wellhead protection purposes, and b) specifying the assessment areas, or methodology for determining assessment areas, for each aquifer. The major aquifers are as follows: 1) unconfined aquifers in the crystalline rocks of the Piedmont and Blue Ridge Physiographic Provinces; 2) unconfined karst areas of the Valley and Ridge and Coastal Plain Provinces; 3) confined aquifers of the Coastal Plain Province; and 4) unconfined or partially-confined aquifers of the Coastal Plain Province. The risk that a well may become contaminated by a release of a potential contaminant is typically greatest in the immediate vicinity of the well and decreases with distance from the well, as described by various formulas or models. This characteristic of risk is incorporated in determining

the susceptibility to contamination of wells in each of Georgia's aquifers.

The Management Zone is an assessment area whose shape is determined by the hydraulic characteristics of the aquifers and wells involved. In addition, the Management Zone is subdivided into the two following segments based on considerations of relative risk (susceptibility): an Inner Management Zone (IMZ) and an Outer Management Zone (OMZ). The OMZ for a well in Piedmont-Blue Ridge crystalline rocks is a circle with its radius determined by the well's pumping rate and a formula referred to as the modified Heath formula. The OMZ of a well in an unconfined or partially confined aquifer in the Coastal Plain is a circle whose radius is determined from hydraulic characteristics of the well and a formula referred to as the volumetric flow equation. The OMZs for a well in the karst areas of the Valley and Ridge and Coastal Plain Province is an irregularly-shaped area determined by geologic mapping according to methodologies developed by EPD. There is no OMZ for confined Coastal Plain aquifers, as there is little likelihood of a near-surface release of a potential contaminant reaching the aquifer and well through the upper confining layer.

The OMZ can extend hundreds or even thousands of feet from a well, depending on the characteristics of the aquifer and well. EPD recognizes a greater risk may exist for a given quantity released from potential pollution sources located near the well as opposed to the outer reaches of the OMZ. Consequently, IMZs are established by EPD to provide additional protection measures near those wells serving cities, counties and authorities (see Characteristics of Contaminant Sources). The IMZ is a circle around a well whose radius depends on the relative risk of the aquifer involved. The IMZ for all wells constructed in an unconfined aquifer in the Coastal Plain or Piedmont-Blue Ridge Provinces is a circle of 250 feet. The radius for IMZs of all wells in a karst aquifer is 500 feet. The IMZ radius for all wells in confined Coastal Plain aquifers is 100 feet.

EPD considers and protects against additional risks in the area immediately surrounding the wellhead, referred to as the Control Zone (CZ). The CZ, regardless of aquifer type, is a circular area having a radius of 15 feet from a well bore for impervious surfaces and 25 feet for pervious surfaces. Protections for CZs are provided by the following regulatory provisions and practices:

- Well-permitting provisions of the Rules for Safe Drinking Water, which contain provisions for well casing and grouting, and other well-construction standards.

- Georgia's Water Well Standards Act, which, in part, requires water-well drillers to be licensed and bonded, and sets standards of well construction. This act includes by reference the construction standards of public-supply wells included in the Rules for Safe Drinking Water. The bonding provision may be used to attain compliance if construction standards are not met for public (and non-public) water-supply wells. EPD administers the Water Well Standards Act.

- Requirements and prohibitions for protecting control zones, as described in the section, Characteristics of Contaminant Sources.

- Observing the condition of wellheads during preparation of each system's Wellhead Protection

Plan. For instance, the presence, absence and condition of a concrete pad around each well casing is observed and noted in the Wellhead Protection Plans, along with EPD recommendations for improvements.

Table 4 presents a summary of the distinctions between the various assessment areas. Relative values of susceptibility are assigned, as shown in the column titled Susceptibility Ranking. The Highest Susceptibility Ranking is assigned to the Control Zone because the shortest hypothetical pathway for a potential contaminant to reach the well screen (or open-hole segment of the well) is in the CZ; because of the potential for tampering with the well; and because of the potential for inadvertent introduction of chemicals into the well. The IMZ is ranked High for all aquifers, except confined aquifers, because the IMZ has potential pathways to a well's screen that are longer than for the CZ; the IMZ for confined aquifers have a ranking of Medium because near-surface releases actually reaching the aquifer are less credible for confined aquifers than for other aquifer types. The OMZ for all but confined aquifers are ranked Medium; the area outside a confined-aquifer IMZ is ranked Low, as is the area outside OMZs for all other aquifer types. The formulas and parameters used to delineate OMZs are approximate, and there may be some level of risk of pollution for sources outside of OMZs. Consequently, the areas outside of OMZs (IMZ for confined aquifers) are ranked as having a Low Susceptibility Ranking, rather than having no susceptibility for pollution.

Well Susceptibility

Assessment Area/Aquifer	**Outer Perimeter, Radial Distance From Well**	**Susceptibility Ranking**
Control Zone All Aquifers	25 feet for pervious surface materials 15 feet for impervious surface materials	Highest
Inner Management Zone		
Confined	100 feet	Medium

Unconfined		
---Karst	500 feet	High
---Fractured crystalline rock	250 feet	High
---Unconfined Coastal Plain	250 feet	High
Outer Management Zone		
Confined	Not Applicable	Low (Beyond the Inner Management Zone)
Unconfined		
---Karst	Determined by geologic mapping	Medium
---Fractured crystalline rock	Calculated by modified Heath Method	Medium
---Unconfined Coastal Plain	Calculated by volumetric methods	Medium

Table 4

3.6.2 Characteristics of Potential Contaminants

The key characteristic of a potential (significant) pollution source (PPS) is location, specifically the location of potential pollution sources relative to the CZs, IMZs and OMZs of individual wells. No distinction is made between PPSs within a particular management zone based on degrees of toxicity or other characteristics, and consequently no potential source is eliminated from consideration of various protections that may be available to State and local entities. Characteristics related to toxicity, biodegradation, other processes of natural attenuation, and other factors affecting contaminant fate and transport are addressed to a large degree by three assessment areas (CZs, IMZs and OMZs), the dimensions of which are tailored to the hydrogeologic characteristics of the aquifer and hydraulic characteristics of the well.

Potential contaminants include several organic and inorganic chemicals, pathogens and radioactive isotopes. Facilities normally associated with these materials are listed in section A.3.4. The GWHPP specifies that each such facility within the CZ, IMZ and OMZ be identified and located on a map. In practice, an EPD representative tours the CZ, IMZ and OMZ of each well in a system to visually identify each facility of each category section A.3.4. The EPD representative determines the location

of each facility (and well) with the use of a Geographic Positioning System (GPS) instrument. A few items, such as individual creosoted telephone/power poles, are noted as to general location and are not individually located by GPS measurements. Each such facility or item is considered a potential pollution source (PPS), a term synonymous with "significant source of contamination," as used in the EPA guidance document. A PPS inventory is prepared for each well; the inventory distinguishes between PPSs located within CZs, IMZs or OMZs. A map is prepared for each system showing the locations of each well in the system, the boundaries of the IMZ and OMZ for each well, and the locations of the potential pollution sources along with identifying designations. The base maps used are USGS 7.5-minute quadrangle maps, which are at a scale of 2000 feet to the inch. This information is included in a Wellhead Protection Plan prepared by EPD for each system and submitted to the system owner.

3.6.3 Characteristics of Contaminant Sources

The three assessment areas (CZ, IMZ and OMZ) based on relative risk or susceptibility is the primary framework within which EPD and local governments may provide protections for well water, including contaminant-source factors. Protections can be made based on the desire and authority available to the well owner for implementing protections and to factors such as contaminant-source characteristics. Examples of how EPD contributes to protection by employing source characteristics include the following provisions provided by EPD's rules for community public water systems serving municipalities, counties or authorities:

- EPD will not issue permits for the following facilities or operations within the IMZ or OMZ: landfills, land disposal of hazardous wastes, land-application of wastewater or sludge, and underground injection wells.

- The CZ will be fenced; only those chemicals used in water treatment will be stored in the CZ.

- EPD requires new agricultural waste impoundments and new wastewater treatment basins located within an IMZ or OMZ to have impermeable synthetic liners.

- EPD will not issue approval for a new well or spring where the following potential pollution sources are known to be within the IMZ: underground storage tanks, animal feedlots, poultry enclosures and animal enclosures.

Each water system's Wellhead Protection Plan encourages the local government to enact ordinances that provide additional protection. EPD cooperates with efforts of local governments, non-profit service organizations, and others in encouraging local ordinances that protect the environment. For instance, EPD assists the Georgia Rural Water Association with its EPA-sponsored program to

provide model ordinances to local governments regarding wellhead protection.

3.7 Vulnerability Assessment for Monitoring Waiver Initiative

The individual source vulnerability assessments prepared by the Monitoring Waiver Initiative are designed to satisfy the requirements of many EPD requirements including SWAP. The core of the vulnerability assessment is described in section A.3.6. It also includes the three elements of delineation, inventory and susceptibility.

Methods used to establish the outer management zone radius and the control zone are also described in section A.3.6. All pollution sources inventoried include those that are inventoried by the Well Head Protection Program (Section A.3.4); hence, the core susceptibility determination is also the same. Once this is accomplished, vulnerability considerations may take into account additional factors.

4.0 Surface Water Assessments

The assessment of a surface water intake requires the delineation of the surface area that drains to the intake (i.e. the watershed), an assessment area, an inventory of significant potential pollution sources and a susceptibility determination. **The original assessment area methodology, potential pollution source inventory and susceptibility determination methodology from the proposed Source Water Assessment and Protection Implementation Plan dated January 29, 1999 (light green cover) has been changed based upon additional recommendations from the Advisory Committees, Subcommittee for Surface Water Intakes, the Regional Development Commissions and local officials.**

4.1 Delineation of Surface Water Intake Drainage Areas

EPD will delineate the topographic boundary of the watershed that drains to surface drinking water intakes using GIS spatial data currently being developed by USGS. The USGS is under contract with the Georgia GIS Clearing House and EPD to complete the 1:24,000 12-digit hydrologic unit code (HUC) theme for the entire State. All of these HUC units are manually delineated then either scanned or digitized into Arc/Info, a geographic information system (GIS) software program. EPD proposes to use the completed HUC units to define the outer boundaries and upper reaches of the watershed and then delineate the lower watershed boundaries near the intake. The final product will include individual surface water supply watershed GIS coverages at a scale of 1:24,000. These surface water supply watersheds will include areas that overlap into other state boundaries. These products will be reviewed and approved by the EPD's Geologic Survey Branch and will meet the FGDC Content Standards for Digital Geospatial Metadata. EPD has chosen to meet FGDC requirements in anticipation the water supply intake watersheds will be used for compliance and outreach activities by different programs within EPD.

4.2 Delineation of Assessment Areas

The entire watershed that drains to a surface drinking water intake is considered the Source Water Protection Area (SWPA). However, USEPA realizes that for the purpose of inventorying potential pollution sources and determining susceptibility the State can identify smaller areas or segments of the watersheds and buffer zones for a cost and time effective analysis. EPD has decided to utilize these smaller Assessment Areas to identify and inventory the potential pollution sources, determine susceptibility and possibly initiate protection approaches. USEPA recommends using models when available but will approve site-specific Assessment Areas based upon what is reasonable, implementable, practical, cost effective, common sense and accepted by EPD's Advisory Committees. However, USEPA has not specified models that would be appropriate.

4.2.1 Assessment Area Delineation Methodology (Minimum Requirement)

The Assessment Area Delineation Methodology was developed on the recommendations provided by the subcommittee for surface water intakes. The assessment area methodology is based upon protection distances within the EPD Rules of Environmental Planning Criteria: Criteria for Water Supply Watersheds (391-3-16.01). These rules are part of the Georgia Planning Act of 1989, which encourages local governments to develop 20-year comprehensive plans. As part of this comprehensive plan, protection measures of stream corridors are to be in place within a 7-mile radius from a drinking water intake or water supply reservoir based upon the size of the water supply watershed (greater or less than 100 sq. miles). While protection (in the form of best management practices) is specified for this 7-mile radius, these criteria do not specify an assessment for potential pollution sources. Therefore EPD proposes using this 7-mile distance as part of the assessment area methodology for the SWAP plans. The 7-mile radius will make up the Inner Management Zone (IMZ) in which the most intense potential pollution source survey will take place. However EPD does not believe the 7-mile radius is sufficient for the complete inventorying of potential pollution sources. Therefore an Outer Management Zone (OMZ) will be established for the next 13-mile radius (total 20 miles). Within the OMZ a lesser inventorying of potential pollution sources will take place. Since many drinking water intake watersheds are larger than a 20-mile radius, the watershed area upstream of the management zones (Non-Management Zone (NMZ)) of the watershed will be inventoried but only by reference to the appropriate Georgia River Basin Management Plan.

EPD has concluded it is inappropriate to try and apply one reservoir delineation methodology upon the many different type reservoirs in the State. Since intakes can be located in different areas of reservoirs, impacts from potential pollution sources can be different. (Example: An intake in the upper headwaters of a large reservoir will probably not be as impacted by a potential pollution source near the impoundment). Therefore EPD plans to base the delineation on the size of the reservoir and the location of the intake. The delineation itself will be either the 7/20-mile management zones, the ½ buffer around the lake or a combination of the two. Intakes located on smaller reservoirs will have the delineation begin from the impoundment using the 7/20-mile management zones. However for

those intakes located in larger multi-purpose reservoirs, the delineation will be 7/20-mile management zones, the ½ mile buffer or a combination of the two based upon the location of the intake. EPD wants the delineation to be flexible to allow for inventorying of potential pollution sources.

Those delegated partners with intakes on the larger reservoirs will specify, in the scope of work, the type of appropriate delineation or propose a new delineation based upon scientific data. EPD will work closely with these delegated partners to devise a delineation methodology appropriate for the reservoir.

4.3 Water Sample Data

In order to establish a base line of water quality, EPD plans to require and conduct a limited amount of surface water sampling. However most of the water quality data EPD plans to use will come from past data from 305b, 303d reports, sample data from the Domestic Wastewater Watershed Assessment and any other additional information EPD may have.

4.3.1 *Cryptosporidium* Sampling

Cryptosporidium parvum in drinking water has become a national concern. Therefore, EPD will conduct raw water sampling for the surface water sources and groundwater under direct influence sources as resources and testing methodologies are further developed. Results from the sampling will be made available to the owners of the public water systems and will be included in the source plans.

4.4 Potential Pollution and Contaminant Source Inventory

Table 5 was formulated by the Subcommittee to be used as a guide for identifying potential pollution sources. The first column contains all potential pollution sources that must be located, identified and susceptibility determined within the IMZ (7-mile region). The second column contains all potential pollution sources that must be located, identified and susceptibility determined within the OMZ (20-mile region). The last column represents the potential pollution sources that are references in the River Basin Management Plans. These sources need to be listed in the plan and referenced to the appropriate River Basin Management Plan. While the following list is required, it does not limit public water system officials from listing other types of potential pollution sources that may be of concern (smaller industries, land use types). An additional guidance list is found in the appendices of reference documents. EPD affirms that non-point source pollution from different types of land uses are an important potential pollution source that should be addressed. Therefore non-point source pollution is addressed in the Susceptibility Determination Methodology.

Potential Pollution Sources for Surface Water

IMZ (7-mile Radius)	OMZ (20-mile Radius)	NMZ (Non-Management Zone)
• Agricultural Waste Lagoons • Airports • Confined Animal Feedlot • Garbage Transfer Stations • Hazardous Waste Facilities • LAS Permit Holders • Landfills • Large Industries which utilize hazardous chemicals • Large Industries which have bulk chemical and petroleum storage • Large Industries which have federal categorical standards • Large Quantity Generators • Lift Stations • Marinas • Military Bases • Mining • NPDES Permit Holders • Non-sewer areas • Oil Pipelines • Power Plants • Railways adjacent to or crossings over streams • Roads adjacent to or bridges crossing over streams • Sewer Pipelines adjacent to or crossing streams • Sewer Areas • Wastewater Plants • Water Plants	• Agricultural Waste Lagoons • Hazardous Waste Facilities • LAS Permit Holders • Landfills • Large Industries which utilize hazardous chemicals • Large Industries which have bulk chemical and petroleum storage • Large Industries which have federal categorical standards • Lift Stations • Mining • NPDES Permit Holders • Oil Pipelines • Power Plants • Railways adjacent to or crossings over streams • Roads adjacent to or bridges crossing over streams • Sewer Pipelines adjacent to or crossing streams • Wastewater Plants • Water Plants	Reference by River Basin Management Plan: • LAS Permit Holders, • Landfills • Mining • NPDES Permit Holders

Table 5

4.5 Significant Potential Pollution Sources

Significant potential pollution sources will be determined using the susceptibility determination methodology. (Section 4.6)

4.6 Susceptibility Determination for Surface Water Sources

The following section will discuss the susceptibility determination methodology for surface drinking water sources. The main focus of the susceptibility determination methodology is to determine overall susceptibility of the source water prior to being withdrawn in the drinking water intake. Susceptibility is defined as "the potential for a Public Water System to draw water contaminated by inventoried sources at concentrations that would pose concern." The determination would take into account the "toxicity, environmental fate and transport" of the contaminant and the "location, likelihood of release and effectiveness of mitigation" for the potential pollution sources.

EPD's susceptibility determination methodology was designed with significant input from the stakeholder group, technical advisory committee, and citizens advisory committee members. This method produces a qualitative measure (high, medium, low) that enables those delegated to do assessments, and the state, to determine easily and quickly the level of susceptibility the surface water intake has to potential pollution sources upstream.

The susceptibility determination methodology contains two main parts with a supplement guidance section in order to satisfy the USEPA SWAP requirements. The two main parts are release potentials of a contaminant and the risk the contaminant would be to the surface source water intake. Release potential is the potential for a contaminant to reach source water and eventually the surface water intake. Risk is in the event the contaminant does reach surface water and the drinking water intake, how great is the risk to the drinking water supply. The combination of the scores from release potential and risk, with the supplemental guidance (Section A.4.6.3), make up the overall source water susceptibility. This overall score accounts for the type of water quality that could be present at a drinking water intake prior to being withdrawn into the intake. The overall source water susceptibility score is done to satisfy the USEPA requirements as specified in the SWAP Guidance. The final overall source water susceptibility score will be published in the Consumer Confidence Report.

4.6.1 Release Potential

The method for determining the release potential include different categories for consideration that have weight measures for High, Medium, and Low priority ranking. Depending on the source and/or the contaminant(s), one or more of these categories may be appropriate for consideration in evaluating the release potential. This is provided as minimum guidance and additional categories may also be appropriate depending on the specific situation or pollutant source being evaluated.

Determine the distance from surface water. Potential pollution sources within the assessment area that are in closer proximity to surface water pose a greater threat to raw water quality than do those sources that are further away.

Estimate the volume of the release. Potential pollution sources in the assessment area are not actual pollution sources until an actual release to the environment occurs. The amount of a possible release should be estimated using good judgement. The size of the receiving stream in relation to the release volume is also an important consideration.

Estimate the duration of the release. This is important because a sudden release may result in a pulse of material versus a constant release of material that may result in dilution of the material. Sudden releases are usually accidental spills or storm events but both may pose a threat to the drinking water supply.

Determine the ease of travel/transport. General topography, the presence of defined channels or other considerations that would enhance or mitigate the ease of travel/transport of the potential pollutant to surface water are important considerations. Designed containment and other engineering controls will reduce ease of travel. Travel via overland flow and/or possible run-off conveyances to surface water such as drainage ditches, etc. will be much easier than travel through the soil via groundwater.

Release Potential Categories for Surface Source Water

Category	Ranking
Distance from surface water	High –less than or equal to 500 ft Low –further than 500 ft
Volume of release	High –greater than 10,000 gallons Medium –greater than 1000 gallons and less than 10,000 gallons Low –less than 1000 gallons This guidance is general in nature and consideration must be given to size of the receiving stream
Duration of release	High –on-going unpermitted releases, high likelihood of an unanticipated one time catastrophic event Medium –on-going, permitted releases, chronic small events, likelihood of continued releases Low –little likelihood of a release, no reported releases
Ease of Travel/Transport	High –hilly topography, many run-off conveyances, overland flow very likely, few or no structural controls in place Medium –moderate topography or number of run-off conveyances, overland flow likely, use of some structural controls Low –generally flat topography, travel primarily through soil or via groundwater, highly volatile substance or substances that adhere to soils, overland flow not likely and structural controls in place

Table 6

4.6.2 Risk

As with determining release potential, the method for determining the risk to the surface water intake include different categories for consideration that have weight measures for High, Medium, and Low priority ranking. Depending on the source and/or the contaminant(s), one or more of these categories may be appropriate for consideration in evaluating the risk potential. This is provided as minimum guidance and additional categories may also be appropriate depending on the specific situation or pollutant source being evaluated.

Determine the contaminant(s) of concern. Is the contaminant biological, physical, or chemical contaminant (see Section A.2.5)?

Determine the distance from the surface water intake. Potential pollution sources within the assessment area that are in closer proximity to the surface water intake pose a greater threat to raw water quality than do those sources that are further away.

Determine the toxicity. The more toxic, the higher the risk posed to the drinking water supply and public health.

Risk Categories for Surface Source Water

Category	Ranking
Distance from surface water intake	High –within -7 miles upstream Medium –between 7 and 15 miles upstream Low –between 15 and 20 miles upstream
Toxicity	High –acute, pathogens Medium –chronic, chemicals Low –secondary, taste, odor

Table 7

4.6.3 Supplemental Guidance in Assessing Regulated Pollutant Sources and Non-Point Sources

Along with the general categories listed above, EPD proposes additional guidance to supplement the assessment of two different categories of potential pollutant sources: Regulated Pollutant Sources and Non-Point Sources.

Regulated Pollutant Sources include those facilities which EPD, monitors and/or regulates (NPDES Permits, LAS Permits, Landfills, Hazardous Waste Sites) In determining susceptibility about these potential pollution sources, information will need to be collected from EPD and collected from the individual sources.

Supplemental Guidance for Regulated Pollutant Sources

Point Source	Potential	Risk
Landfills, Dumps	High –abandoned/closed landfills, history of groundwater contamination, uncharacterized waste Medium –open dumps, inert waste, no groundwater contamination Low –contained landfills, no groundwater contamination, in compliance	Based on waste categorization
Hazardous Waste Large Quantity Generators and/or TSD Facilities, Superfund Sites	High –history of spills, unremediated sites, not following corrective action plan Medium –periodic noncompliance, partly remediated sites, generators or sites with permits (even in compliance) Low –compliance with regulations, few or no releases, fully remediated sites	Based on type of operation and volume of materials handled
NPDES Permit Holders, LAS Permit Holders	High –chronic permit violations, waste lagoons (especially unlined), chronic sewer overflows and/or bypasses Medium –periodic permit violations, moderate number of sewer overflows and/or bypasses Low –compliance with permit conditions, few sewer overflows and/or bypasses	Based on regulated pollutants

Table 8

Non-Point Sources includes potential pollution in runoff from various land uses in the watershed. These land use categories have been selected to be consistent with EPD's River Basin Management Planning Initiative and include Urban, Agriculture, and Forestry. These land use categories will provide minimum guidance for the differentiation on non-point sources. Susceptibility will be determined by type of land use in the assessment area and if information is available showing use of best management practices or buffer zones.

Supplemental Guidance for Non-Pont Sources

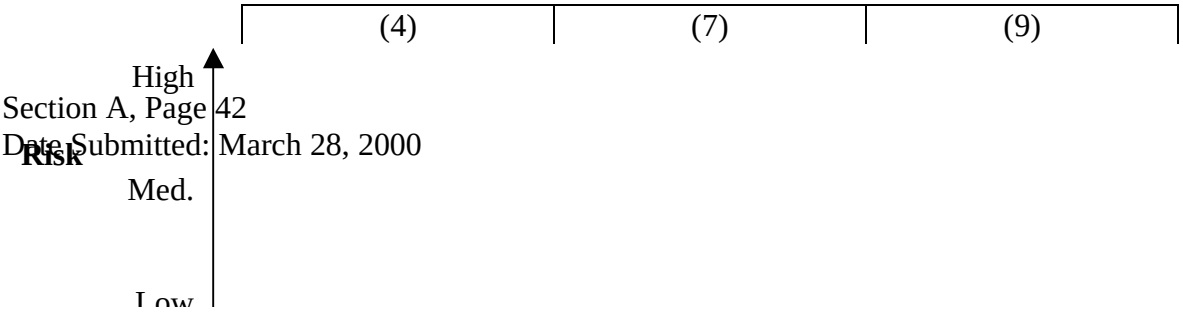
Non - Point Source	Potential	Risk
Agriculture, Urban, Forestry	High – no BMP, high pesticide use, high livestock density, high density of forestry activities, high percentage of impervious surface, hilly topography, abandoned mines, visible signs of erosion or other water quality violations Medium - BMP in place but not always properly implemented, moderate livestock density, moderate density of forestry activities, moderate percentage of impervious surface, moderate topography, some buffers in place Low – BMP in place and properly implemented, low livestock density, low density of forestry activities, low percentage of impervious surface, generally flat topography, buffer zones in place	High – Immediate proximity of surface water, high toxicity and/or volume Medium – Near main stem or major tributary, moderate volume and/or toxicity Low – No surface water in close proximity, low or little volume and/or toxicity

Table 9

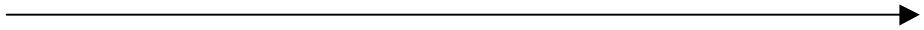
Each category has a simple susceptibility determination methodology that takes into account the release potential and the risk to the intake of each individual source. Therefore, in the end, there will be a priority ranking that will form the overall level of susceptibility of the surface water intake.

4.6.4 Susceptibility to Individual Pollutant Sources

After determining the overall potential and risk using the weighted measures along with good judgement, each source should be plotted on a chart in relation to the other sources with the axes representing the potential and risk as shown below:



High Risk Low Potential	High Risk Medium Potential	High Risk High Potential
(2) Medium Risk Low Potential	(5) Medium Risk Medium Potential	(8) Medium Risk High Potential
(1) Low Risk Low Potential	(3) Low Risk Medium Potential	(6) Low Risk High Potential



Low Medium High

Chart 1 **Release Potential**

After all sources are charted, they should be prioritized as follows:

High Priority: Contaminant Sources located in Grid Squares 7, 8 and 9
Medium Priority: Contaminant Sources located in Grid Squares 4, 5 and 6
Low Priority: Contaminant Sources located in Grid Squares 1, 2 and 3

High priority would be the pollutant sources to be addressed first in order to have the maximum impact on reducing the susceptibility of the drinking water intake to potential adverse effects.

4.6.5 Overall Source Water Susceptibility Score

The overall susceptibility of the intake can be determined as follows:

High Susceptibility	40% or more of the sources chart in grid squares 7, 8 and 9
Medium Susceptibility	20% or less of the sources chart in grid squares 7, 8 and 9 **and** 40% or more of the grid squares chart in grid squares 4, 5 and 6
Low Susceptibility	20% or less of the sources chart in grid squares 7, 8 and 9 **and** 20% or less of the sources chart in grid squares 4, 5 and 6

Table 10

4.6.6 Surface Source Water Susceptibility Example

The owners of a surface water intake have identified five potential pollutant sources within the assessment area. After collecting information about each source and analyzing the data, the following table was created listing each source and pertinent information related to the release potential, the risk, and the supplement guidance:

Surface Source Water Susceptibility Example

Potential Source	Release Potential	Release Risk
Confined Animal Feeding Operation (swine)	• Engineered Waste Lagoon within 500 feet of surface water **(high)** • Volume estimated to be approximately 3000 gallons **(medium)** • No known or reported releases **(low)** **Overall Release Potential – Medium**	• 10 miles upstream of intake **(medium)** • Moderate Toxicity **(medium)** **Overall Release Risk - Medium**
Chemical Manufacturing Facility	• Bulk Storage Facility further than 500 feet from surface water **(low)** • Less than 1000 gallon release **(low)** • Engineering controls in the form of containment in place **(low)** • Stormwater BMPs in place and implemented **(low)** **Overall Release Potential – Low**	• 5 miles upstream from surface water intake **(high)** • Volatile organic chemicals stored **(medium)** **Overall Release Risk – High**
Local Landfill	• Further than 500 feet from surface water **(low)** • Landfill lined with no reported releases **(low)** • Engineering controls in place to minimize run-off **(low)** Using Supplemental Guidance for Regulated Pollutant Sources: • Facility permitted and in compliance, no groundwater contamination **(low)** **Overall Release Potential – Low**	• No surface water in close proximity **(low)** • Solid waste only, no hazardous or organic waste **(low)** • 25 miles upstream of intake **(low)** **Overall Release Risk - Low**
Urban Area	Using Supplemental Guidance for	Using Supplemental Guidance for

	Non-Point Sources: • High percentage (>20%) of impervious surface **(high)** • Hilly topography **(high)** • Within 7 miles of intakes **(high)** **Overall Release Potential – High**	Non-Point Sources: • Immediate proximity of surface water **(high)** • Stormwater system discharges directly to surface water **(high)** • Moderate volume/toxicity **(medium)** **Overall Risk Potential - High**
Wastewater Treatment Plant Outfall	• Within 500 feet of surface water **(high)** • Routine permitted discharge to surface water **(medium)** • One time large spill event greater than 1000 gallons **(medium)** • Overland flow likely **(medium)** Using the Supplemental Guidance for Regulated Pollutant Sources: • Periodic permit violations and history of bypasses **(medium)** **Overall Release Potential – High**	• Located 6 miles upstream of intake **(high)** **Overall Release Risk - High**

Table 11

The pollutant sources are then prioritized using the following chart:

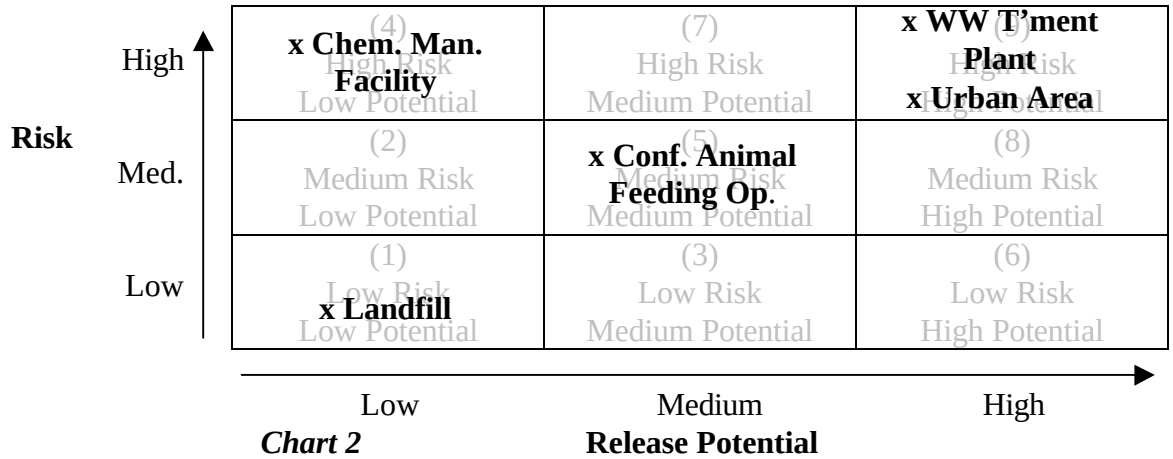


Chart 2

This yields the following results:

High Priority:	Non-point source run-off from the Urban Area and the Wastewater Treatment Plant
Medium Priority:	Confined Animal Feeding
Low Priority:	Local Landfill and Chemical Manufacturing Facility

Since greater than 40% of the sources charted in grid squares 7, 8 and 9, the overall source water susceptibility score would be **High**. This score would be published in the Consumer Confidence Report.

4.7 Legal Authority Evaluation

EPD, with assistance of the Georgia Water Campaign, will conduct a legal authority evaluation to assist local governments in the development of a foundation for local watershed protection programs. The evaluation will include a collection of range of typical local ordinances used (or that could be used) in Georgia for addressing various aspects of watershed protection measures, and an evaluation of the strengths and weaknesses of a range of ordinances. The Georgia Water Campaign will develop model ordinances for use in watershed protection programs. They will also conduct a constitutional, legislative and legal review of the measures and ordinances to determine whether or not local governments have the authority to implement such protection measures and programs, and report the findings to EPD.

5.0 Groundwater Under the Direct Influence of Surface Water

Groundwater Under the Direct Influence of Surface Water (GWUDI) is defined as any water beneath the surface of the ground with either: significant occurrence of insects or other microorganisms, algae, or large diameter pathogens such as *Giardia lamblia* or significant and relatively rapid shifts in water quality characteristics such as turbidity, temperature, conductivity, or pH which closely correlate with climatological or nearby surface water conditions.

The EPD is currently conducting investigations to determine those public groundwater sources that are under direct surface water influence. These determinations are based on evaluations of information from system records, site inspections, and water quality analysis. Water quality analysis includes Microscopic Particulate Analysis (MPA), a technique that examines groundwater for the presence of living biological surface water indicators. Water sources are tested using a special sampling device that non-destructively captures indicators such as plant debris, algae, protozoa, cyanobacteria, living diatoms, nematodes, rotifers, crustaceans, insects, insect parts, spores, pollen, and human pathogens such as *Amoeba*, *Giardia cysts*, and *Cryptosporidium*. A significant occurrence of indicators would mean that a groundwater source is under the direct influence of surface water (GWUDI).

Sources found to be GWUDI are given the options of taking corrective measures to remove the influence, finding a new source, or adding filtration and other additional treatment as required. Most of the sources found to be GWUDI are poorly protected springs, wells located in karst regions, wells in flooded river basins, poorly constructed wells, and old wells that have failing casings or grout. Most groundwater sources found to be under the direct influence of surface water have either been taken out of service or have added the necessary surface water treatment including filtration. However, at least 12 groundwater sources, that have been found under the direct influence of surface water, are still active and currently under enforcement action to correct the problem.

5.1 Delineation of Assessment Areas

The delineation of sources found to be GWDUI will consist of a wellhead zone delineation and surface watershed delineation mentioned in sections 3.3 and 4.2.1.

5.2 Potential Contaminant Source Inventory for GWUDI

The potential pollution and contaminant source list for both groundwater and surface water. The same lists are found in section A.3.4 and sections A.4.4.

5.3 Significant Potential Pollution Sources

Significant potential pollution sources will be determined using the susceptibility determination methodology. (Section A.4.6)

5.4 Susceptibility Determination

The susceptibility of the GWUDI source to potential pollution sources will be based upon a combination of sample history, the distance from the potential pollution source and the nature of the potential pollution source, as well as the methodology defined for surface water sources.

6.0 Coordination Efforts With Bordering States

States that border Georgia with common watersheds and aquifers include Alabama, Florida, South Carolina, North Carolina and Tennessee.

6.1 Alabama and Florida

EPD is working with Alabama and Florida on several water resource and water quality issues. Since January 1992, Alabama, Florida, Georgia, and the U. S. Army Corps of Engineers have been cooperating partners in an interstate water resources management study. The study area encompasses the Alabama-Coosa-Tallapoosa River system and the Apalachicola-Chattahoochee-Flint River system. The ACF/ACT Comprehensive Study documents address several water resources aspects of the specific basins. Although this study does not directly concern nonpoint source pollution activities, there is a commitment from each state to recognize and maintain water quality in the associated compacts dated November 20, 1997.

Florida, Georgia and South Carolina are cooperating partners in an interstate groundwater information and policy development exchange as outlined in the State of Georgia's "Interim Strategy for Managing Salt Water Intrusion in the Upper Floridan Aquifer," dated April 23, 1997. The data exchange and policy development updates are to occur annually, at a minimum, to effect technological advances. The State of Florida's lead agency is the St. John's River Water Management District and South Carolina's lead agency is the South Carolina Department of Health and Environmental Control. The coordinated effort is to affect interstate saltwater quality and water supply measures.

Also, the Cities of Columbus, Georgia and Phenix City, Alabama are cooperating on a regional source water assessment project effort in conjunction with the middle Chattahoochee River Watershed Study.

6.2 South Carolina

Georgia and South Carolina are primary partners in the Savannah River Basin Watershed Project convened by USEPA. The project provides a forum for exchange of technical information and joint development of strategies for improved management of the basin's resources. The goal is to cooperatively manage the resources of the basin to conserve, enhance, and protect the ecosystem in a way that allows the balancing of multiple uses (Nonpoint Source Management in Georgia, April 1998). Georgia and South Carolina have applied for a USEPA grant to coordinate SWAP for shared source water. The Savannah River Basin Watershed Project has been suggested as a mechanism to accomplish SWAP initiatives. See the above discussion (6.1) for ground water issues with South Carolina.

Georgia and South Carolina are also partners of an eight-year, 15 million dollar groundwater study that will define the extent to which saltwater has intruded into the Floridan aquifer along the Georgia/South Carolina coast. The study will also investigate and recommend scientifically based structural and non-structural water management strategies which might be employed to forestall further saltwater intrusion.

6.3 Tennessee

The State of Tennessee and Georgia have not entered into any formal agreement of coordination. However, communication of ideas and issues were discussed at a recent July 1998 Region IV SWAP meeting. Both States are favorable in proceeding with coordination of SWAP for shared border river basins.

6.4 North Carolina

The State of North Carolina and Georgia have not entered into any formal agreement of coordination.

7.0 Explanation of Allocated Resources to Complete Assessments

The 1996 SDWA Amendments authorizes a Drinking Water State Revolving Fund (DWSRF) program where the U.S. EPA awards capitalization grants to states. The states provide low cost loans and other types of assistance to eligible public water systems to finance the costs of infrastructure needed to achieve or maintain compliance with the SDWA requirements, and to protect public health.

The Act also authorizes states to provide funding for certain non-project activities, called Set-Asides, provided that the amount of that funding does not exceed certain ceilings. States are required to describe, in their Intended Use Plans, the amount of funds that they will use for these activities. States may use up to 15% of the capitalization grant amount for these activities, provided not more than 10% of the capitalization grant amount is used for any one activity.

EPD is using funds in the 15% category to assist community water systems to assess the areas around their water sources for potential pollution sources. The following projects are being, or will be funded using DWSRF in contracted and proposed contracted partnership projects: (1) Columbus Water Works (Middle Chattahoochee); (2) Georgia Rural Water Association (Edie Creek Watershed); (3) Atlanta Regional Commission (Big Creek); (4) Atlanta Regional Commission with Metro Atlanta Public Water Systems; (5) the Northeast Georgia Regional Development Commission (Upper Alcovy River Basin).

The states are also allowed to use 10% of its capitalization grant to provide funding for certain activities including administration and provision of technical assistance through source water protection programs. Funded activities for development and implementation of EPD's SWAP and SWP programs are described below.

EPD is using the capitalization grant to fund six (6) full time positions and capital equipment. Functions associated with these activities and associated costs include the following:

1. Develop EPD's source water assessment strategy and program with public and stakeholders

input.
2. Oversee the implementation of SWAP.
3. Accelerate the WHPP for local governmental public water systems (PWS).
4. Assist PWS by identifying areas of groundwater contamination affecting or potentially affecting PWSs.
5. Increase public awareness of the need for the protection of drinking water sources.

EPD supports the availability of Drinking Water State Revolving Funds (DWSRF) over the next decade to assist local governments in implementing and maintaining source water protection programs (SWPP). Other coordinated efforts underway to accomplish the goals of SWAP and SWPP for certain regions involve the Unified Governments Watershed Initiative for TMDLs for the City of Dahlonega area watershed, Yahoola Creek. All coordination efforts will be channeled through the comprehensive Watershed Planning document For Local Government. This program encourages local governments to prepare at least one watershed plan that can address all elements of the various EPD watershed assessment and protection programs and initiatives in coordinated manner.

8.0 Description of Coordination with Federal, State, and Stakeholder Organizations

EPDs coordination with federal, state, and stakeholders is described in depth in *Nonpoint Source Management In Georgia: An Update of the Georgia Nonpoint Source Management Program, Draft Revision April 1998*. Agencies cooperating with EPD to prevent, control, and abate Georgia's water resources from nonpoint source pollution include: the Georgia Soil and Water Conservation Commission; Georgia Soil and Water Conservation Districts; USDA Natural Resources Conservation Service; Agriculture Water Management Coordinating Committee; Georgia Forestry Commission; University of Georgia Cooperative Extension Service; Georgia Forestry Association; USDA Forest Service; Association of County Commissioners; Georgia Municipal Association; Regional Development Centers; and the U.S. Army Corps of Engineers.

9.0 Description of State's Reporting of Progress to EPA

The State will update USEPA on a set schedule as agreed upon between EPD and USEPA.

10.0 Distributing Assessment Plans to Public

In accordance with the Georgia Open Records Act, SWAP plans will be available in public files at EPDs Atlanta office, and from the water systems. Additionally, there are a number of other ways SWAP plans may be made available to the public such as customer mailings and web site postings. SWAP information and possibly specific public water system SWAP plans may be posted on the EPD Internet address **http://www.dnr.state.ga.us/environ/**. In accordance with the USEPA State

Implementation Guidance for the Consumer Confidence Report Rule," a summary of the SWAP report including the name and location of the sources, the potential pollution sources and known contaminants, the overall susceptibility determination rankings, and information where the public could get a copy of the SWAP plan should be included in the Consumer Confidence Reports.

11.0 Plan for Updating Assessments

EPD will correlate the updating of assessments with the expiration of the Permit to Operate a Public Water System. Source water protection measures will be incorporated into these permits based on the findings of its assessment(s).

12.0 Source Water Protection Plans

Once assessments are completed, EPD expects information will be put to use in Source Water Protection Plans. The local governments who have completed or implemented their watershed protection plans (based upon EPD Rules for Environmental Planning Criteria, Section 391-16-.01 Criteria for Water Supply Watersheds,) will satisfy most of the SWPP requirements. However, the public participation requirements will still need to be satisfied as well as any issues identified as part of the assessments.

EPD will attempt to identify ways that the appropriate party with authority can take the next logical step towards actual protections measures. Maximum flexibility is afforded to each local government and system owner to provide protection within the resources and schedules they recommend. EPD will incorporate into the system owner's operating permits as appropriate and only to the extent of legal authority to implement that is available to the system owner.