Total Maximum Daily Load

Evaluation

for

Seven Segments of

the Chattahoochee River

in the

Chattahoochee River Basin

(PCBs in Fish Tissue)

Submitted to:

The U.S. Environmental Protection Agency
Region 4
Atlanta, Georgia

Submitted by:
The Georgia Department of Natural Resources
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Atlanta, Georgia

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1.0 INTRODUCTION

1.1 Background

The State of Georgia assesses its water bodies for compliance with water quality standards criteria established for their designated uses as required by the Federal Clean Water Act (CWA). Assessed water bodies are placed into three categories, supporting, partially supporting, or not supporting their designated uses, depending on water quality assessment results. These water bodies are found on Georgia's 305(b) list as required by that section of the CWA that defines the assessment process, and are published in *Water Quality in Georgia* every two years.

Some of the 305(b) partially and not supporting water bodies are also assigned to Georgia's 303(d) list, also named after that section of the CWA. Water bodies on the 303(d) list are required to have a Total Maximum Daily Load (TMDL) evaluation for the water quality constituent(s) in violation of the water quality standard. The TMDL process establishes the allowable loading of pollutants or other quantifiable parameters for a water body based on the relationship between pollution sources and instream water quality conditions. This allows water quality-based controls to be developed to reduce pollution and to restore and maintain water quality.

The State of Georgia has identified the following segments in the Chattahoochee River Basin as either partially supporting or not supporting their designated use due to the issuance of fish consumption guidelines because of polychlorinated biphenyl (PCB) contamination (see Table 1).

Table 1. 303(d) Listed Segments for Fish Consumption Guidelines (PCBs) in the Chattahoochee River Basin

Listed Segment	Location	Miles	Status
Chattahoochee River	Morgan Falls Dam to Peachtree Creek (Fulton/Cobb Co.)	12	Partially Supporting
Chattahoochee River	Peachtree Creek to Utoy Creek (Fulton/Cobb Co.)	9	Not Supporting
Chattahoochee River	Utoy Creek to Pea Creek (Fulton/Douglas Co.)	14	Not Supporting
Chattahoochee River	Pea Creek to Wahoo Creek (Fulton/Douglas/Coweta/Carroll Co.)	21	Not Supporting
Chattahoochee River	Wahoo Creek to Franklin (Coweta/Carroll/Heard Co.)	21	Partially Supporting
Chattahoochee River	Oliver Dam to North Highland Dam (Muscogee Co.)	2	Partially Supporting
Chattahoochee River	North Highland Dam to Upatoi Creek (Muscogee Co.)	12	Partially Supporting

1.2 Watershed Description

The Chattahoochee River originates in the southeast corner of Union County, in north Georgia, within the Blue Ridge Mountains. The river flows southwest to Lake Sidney Lanier (Lake Lanier), then through the Atlanta metropolitan area to West Point Lake on the Alabama border.

At this point, the Chattahoochee forms the border between Georgia and Alabama. It continues flowing south through Walter F. George Reservoir and converges with the Flint River in Lake Seminole, at the Georgia-Florida border. The outflow from Lake Seminole forms the Apalachicola River in Florida, which ultimately discharges to the Gulf of Mexico. The Chattahoochee River Basin contains parts of the Blue Ridge, Piedmont, and Coastal Plain physiographic provinces that extend throughout the southeastern United States. The listed segments are located in highly developed watersheds that are mostly urban (see Figure 1).

1.3 Impacts of PCBs

The following general background on the impact of PCBs on fish consumption is taken from the EPA fact sheet entitled "Fact Sheet; PCBs Update: Impact on Fish Advisories" (EPA-823-F-99-019) (EPA, 1999).

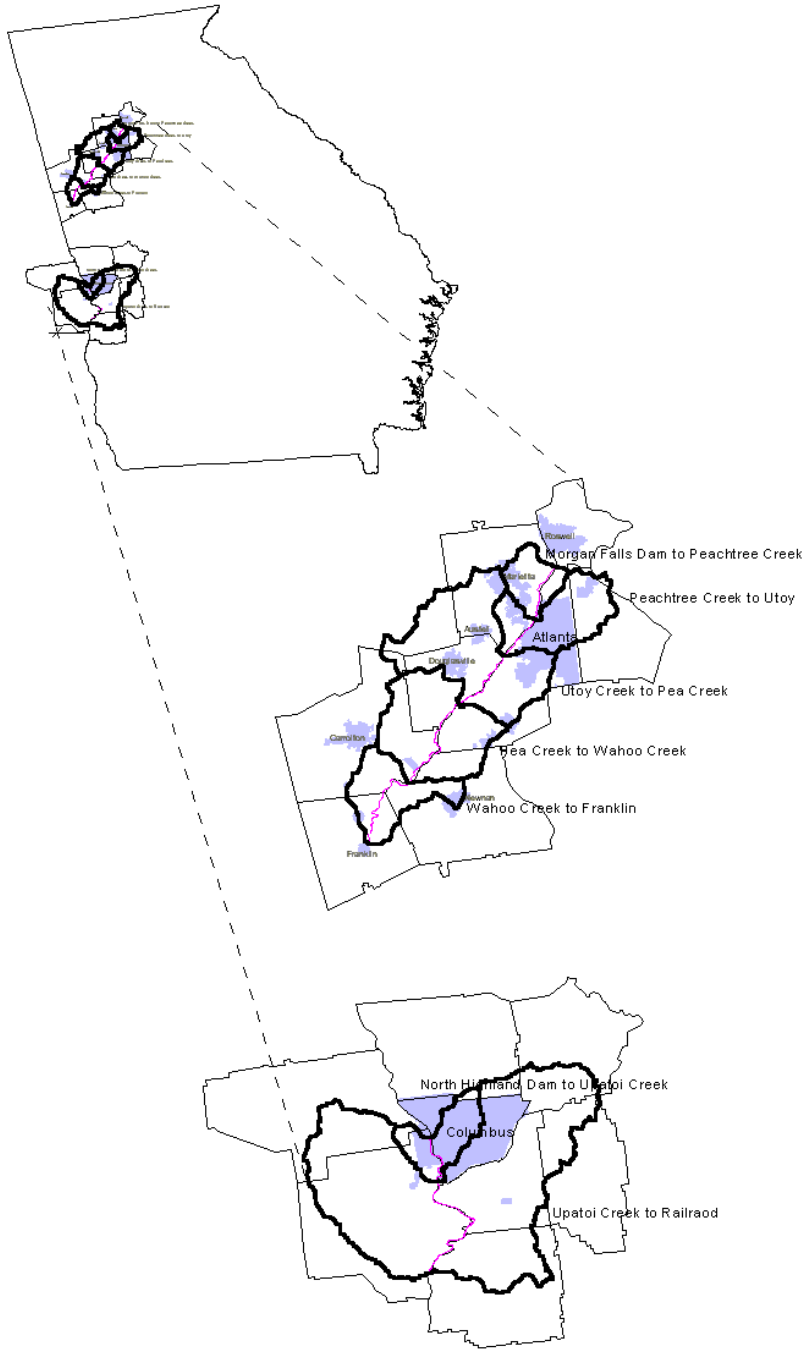
> PCBs are a group of synthetic organic chemicals that contain 209 possible individual chlorinated biphenyl compounds. These chemically related compounds are called congeners and vary in their physical and chemical properties and toxicity. There are no known natural sources of PCBs. Although banned in the United States from further production in 1979, PCBs are distributed widely in the environment because of their persistence and widespread use. PCB mixtures found in the environment are different from the commercially produced PCB mixtures (known as Aroclors in the United States) because of differences in chemical properties, persistence, and bioaccumulation among the different congeners. The most common analytical method used to detect PCBs in the environment is based on Aroclor analysis; however, congener-specific methods have been developed and currently are being tested. PCB exposure is associated with a wide array of adverse health effects in experimental animals. Experimental animal studies have shown toxic effects to the liver, gastrointestinal system, blood, skin, endocrine system, immune system, nervous system, and reproductive system. In addition, developmental effects and liver cancer have been reported. Skin rashes and a severe form of acne have been documented in humans; however, other effects of PCB exposure in humans are not well understood. EPA has classified PCBs as probable human carcinogens (Group B2). As of 1998, 37 states have issued 679 fish advisories for PCBs. These advisories inform the public that high concentrations of PCBs have been found in local fish at levels of public health concern. State advisories recommend either limiting or avoiding consumption of certain fish from specific waterbodies or, in some cases, from specific waterbody types (e.g., all freshwater lakes or rivers).

1.4 Water Quality Standard

The water use classification for the Chattahoochee River is fishing. The fishing classification, as stated in Georgia's *Rules and Regulations for Water Quality Control,* Chapter 391-3-6-.03(6)(c), is established to protect the "propagation of fish, shellfish, game and other aquatic life; secondary contact recreation in and on the water; or for any other use requiring water of a lower quality."

Georgia's instream criterion for polychlorinated biphenyls (PCBs) is established for all waters and is deemed to be necessary and applicable to all waters of the State. Georgia's Water Quality Standard for PCBs is expressed in Georgia's *Rules and Regulations for Water Quality Control*, Chapter 391-3-6, Revised October 2001. Georgia Regulation 391-3-6-.03(5)(e)(iv) states that "Instream concentrations of the following chemical constituents listed by the U. S. Environmental Protection Agency as toxic priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended) shall not exceed criteria indicated below under annual

average or higher stream flow conditions". The State water quality instream target of 0.00017 μg/L



TMDL Evaluation - Fish Consumption Guidelines (PCBs) Chattahoochee River Basin	Figure 1. Chattahoochee River Watersheds

is protective of the FDA action level for fish consumption. This level is also protective of the DNR fish consumption advisory action level. It should be noted that there is also a standard for PCBs of 0.014μg/L to protect against aquatic toxicity during 7Q10 conditions. This TMDL is also protective of that standard.

2.0 AVAILABLE MONITORING DATA

PCBs have been detected in fish tissue collected from the Chattahoochee at various locations. Fish tissue analyzed in 1991 and 1994 triggered various fish consumption guidelines of one meal per week or one meal per month as listed in the 2002 *Guidelines for Eating Fish from Georgia Waters* (Georgia Department of Natural Resources, 2002). Specific species cited included Carp, Striped Bass and Channel Catfish.

Some of the data that was collected and used to list these segments is ten years old. Once a segment is listed it remains listed until the same species of fish is collected and tested from the same vicinity in the same segment. If a different species of fish is analyzed and not contaminated, the segment remains listed.

The following fish consumption guidelines were included in the 2002 update of " Guidelines for Eating Fish from Georgia Waters: "

1. Morgan Falls to Peachtree Creek for Carp (one meal per month) - 12 miles
2. Peachtree Creek to Franklin for Striped Bass (one meal per month) - 65 miles
3. Oliver Dam to Upatoi Creek for Channel Catfish (one meal per week) - 14 miles

The 1991 and 1994 fish tissue had PCB concentrations ranging from 0.13 mg/kg to 0.67 mg/kg. The concentration of 0.67 mg/kg is the most conservative value. This value will be used in the TMDL development. The TMDL will provide a value or average mass per day that can be discharged, as well as a calculated percent reduction. This information will be used to estimate the required percent reduction needed to meet the criteria.

3.0 SOURCE ASSESSMENT

A source assessment characterizes the known and suspected sources of PCB in the watershed for use in a water quality model and the development of the TMDL. The sources of PCB in this watershed are unknown, but they may be from either point sources or nonpoint sources. Both will be addressed in this TMDL.

Title IV of the Clean Water Act establishes the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES permit program requires permits for the discharge of "pollutants" from any "point source" into "waters of the United States" (40 CFR 122.1). Basically, there are two categories of NPDES permits: 1) municipal and industrial wastewater treatment facilities, and 2) regulated storm water discharges.

In general, industrial and municipal wastewater treatment facilities have NPDES permits with effluent limits. These permit limits are either based on federal and state effluent guidelines (technology-based limits) or on water quality standards (water quality-based limits). PCBs are toxic priority pollutants and their use and discharge is not permitted in any of the listed segments. There are no permitted point source discharges with any existing allocation of PCBs.

Some storm water runoff is covered under the NPDES Permit Program. It is considered a diffuse source of pollution. Unlike other NPDES permits that establish end-of-pipe limits, storm water NPDES permits establish controls. Currently, regulated storm water discharges include those associated with industrial activities, including construction sites five acres or greater, and large and medium municipal separate storm sewer systems (MS4s).

Storm water discharges associated with industrial activities are currently covered under a General Storm Water NPDES Permit. This permit requires visual monitoring of storm water discharges, site inspections, implementation of Best Management Practices (BMPs), and record keeping. There are numerous industrial and construction sites in these watersheds.

Storm water discharges from MS4s are very diverse in pollutant loadings and frequency of discharge. At present, all cities and counties within Georgia that had a population of greater than 100,000 at the time of the 1990 Census are permitted for storm water discharge. This includes 60 permittees, 45 of which are located in the greater Atlanta metro area, including Fulton County. MS4 permits require the prohibition of non-storm water discharges (i.e., illicit discharges) into the storm sewer systems, and controls to reduce the discharge of pollutants to the maximum extent practicable, including the use of management practices, control techniques and systems, and design and engineering methods (Federal Register, 1990). A site-specific management plan outlining appropriate controls is referenced in the permit, but it is a separate document.

Combined sewer systems convey a mixture of raw sewage and storm water in the same conveyance structure to the wastewater treatment plant. These are considered a component of municipal wastewater treatment facilities. When the combined sewage exceeds the capacity of the wastewater treatment plant, the excess is diverted to a combined sewage overflow (CSO) discharge point. A potential PCB source in the listed segments has been attributed to contamination from urban runoff from Metropolitan Atlanta and CSOs. Other possible sources could include movement of contaminated bedload sediment, soil erosion, air deposition, and other nonpoint source discharges.

4.0 TMDL DEVELOPMENT APPROACH

An important component of TMDL development is to establish relationships between source loadings and instream water quality. In this section, the numerical modeling techniques used to develop the TMDL are discussed.

Georgia has a human health-based water quality standard for PCB, which is based on the average stream flow. This standard, if met, should protect against contaminated fish tissue. This standard is several orders of magnitude less than the detection limit. A mass balance equation is used to calculate the TMDL. The TMDL for the Chattahoochee River equals the annual average flow multiplied by the water quality standard.

Water column PCB concentration data does not exist or is not measurable because it is below the detection limit. However, the fish tissue concentration is known and there is a published bioaccumulation factor for PCBs in fish tissue (EPA 4440/5-80-068, October 1980). The water column concentration that resulted in the fish tissue contamination can be estimated using the equation shown below.

$$WC = TC/BCF$$

Where WC = Water column concentration (mg/L)
TC= Fish tissue concentration (mg/kg)
BCF = EPA bioaccumulation Factor (31,200 L/kg)

This equation can be used to calculate the estimated water quality concentration that resulted in a fish tissue concentration of 0.67 mg/kg. This value will be compared to the standard in order to estimate a required percent reduction.

$$WC = 0.67 \text{ mg/kg} / 31{,}200 \text{ L/kg}$$
$$WC = 2.1X10^{-5} \text{mg/L}$$
$$WC = 2.1X10^{-2} \mu\text{g/L}$$

This calculated concentration is used to calculate the current load. The calculated current load is compared to the TMDL to determine the percent reduction required.

5.0 ALLOCATION

A Total Maximum Daily Load (TMDL) is the amount of a pollutant that can be assimilated by the receiving waterbody without exceeding the applicable water quality standard. A TMDL is the sum of the individual waste load allocations (WLAs) and load allocations (LAs) for nonpoint sources and natural background (40 CFR 130.2) for a given waterbody. The TMDL must also include a margin of safety (MOS), either implicitly or explicitly, that accounts for the uncertainty in the relationship between pollutant loads and the water quality response of the receiving water body. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measures. For PCBs, the TMDLs are expressed as mass per day and as a concentration.

A TMDL is expressed as follows:

$$TMDL = \Sigma WLAs + \Sigma LAs + MOS$$

The TMDL calculates the WLAs and LAs with margins of safety to meet the stream's water quality standards. The allocations are based on estimates that use the best available data and provide the basis to establish or modify existing controls so that water quality standards can be achieved. In developing a TMDL, it is important to consider if adequate data are available to identify the sources, fate, and transport of the pollutant to be controlled.

TMDLs may be developed using a phased approach. Under a phased approach, the TMDL includes: 1) WLAs that confirm existing limits and controls or lead to new limits, and 2) LAs that confirm existing controls or include implementing new controls (EPA TMDL Guidelines). A phased TMDL requires additional data be collected to determine if load reductions required by the TMDL lead to the attainment of water quality standards.

The TMDL Implementation Plan will establish a schedule or timetable for the installation and evaluation of point and nonpoint source control measures, data collection, assessment of water quality standard attainment, and if needed, additional modeling. Future monitoring of the listed segment water quality will then be used to evaluate this phase of the TMDL, and if necessary, to reallocate the loads.

The following sections describe the various PCB TMDL components.

5.1 Waste Load Allocations

The waste load allocation (WLA) is the portion of the receiving water's loading capacity that is allocated to existing or future point sources. Waste load allocations are provided to the point sources from municipal and industrial wastewater treatment systems that have NPDES effluent limits.

State and Federal Rules define storm water discharges covered by NPDES permits as point sources. However, storm water discharges are from diffuse sources and there are multiple storm water outfalls. Storm water sources (point and nonpoint) are different than traditional NPDES permitted sources in four respects: (1) they do not produce a continuous (pollutant loading) discharge; (2) their pollutant loading depends on the intensity, duration, and frequency of rainfall events, over which the permittee has no control; (3) the activities contributing to the pollutant loading may include various allowable activities of others, and control of these activities is not solely within the discretion of the permittee; and (4) they do not have wastewater treatment plants that control specific pollutants to meet numerical limits.

The intent of storm water NPDES permits is not to treat the water after collection, but to reduce the exposure of storm water to pollutants by implementing various controls. It would be infeasible and prohibitively expensive to try to control pollutant discharges from each storm water outfall. Therefore, storm water NPDES permits require the establishment of controls or BMPs to reduce pollutants from entering the environment.

There are no permitted point source dischargers with existing allocations for PCBs. Thus, the wasteload allocation (WLA) for PCBs is not applicable at this time. There are however, several major point sources, as well as permitted combined sewer overflows (CSOs), in this watershed. It is known that wastewaters can contain trace levels of chemicals, including PCBs. However, the current detection limit for PCBs is below the current water quality standard. There may come a time when PCBs in discharges or storm water can be measured. If individual wasteload allocations for PCBs are needed for specific permits, the wasteload allocations can be calculated by multiplying the design flows by the human health criteria (0.00017μg/l).

5.2 Load Allocations

The load allocation (LA) is the portion of the receiving water's loading capacity that is attributed to existing or future nonpoint sources or to natural background sources. Nonpoint sources are identified in 40 CFR 130.6 as follows:

- Residual waste
- Land disposal
- Agricultural and silvicultural
- Mines
- Construction
- Saltwater intrusion
- Urban storm water (non-permitted)

The nonpoint sources can include air deposition, non-permitted stormwater runoff, movement from sediment bedload into the water column, and decaying aquatic organisms. These mechanisms are very complicated and difficult to quantify.

Nonpoint sources should be at concentrations equivalent to or less than the water quality standard for PCBs. Thus, the load allocation (LA) allows for no loads that cause or contribute to an instream mixed water column PCB concentration above 0.00017 μg/l.

5.3 Seasonal Variation

Seasonal variation is not applicable to this TMDL because there are no known point or nonpoint sources. The water quality standard is based on human health guidelines and is targeted to be met at flows greater than or equal to the annual average flow. PCBs will accumulate in fish tissue throughout the year. The mechanism causing higher concentrations of a pollutant in the water column during low flows could be offset by the suspension of particles during heavy flows and rain.

5.4 Margin of Safety

Water column data for PCBs does not exist or has not been detected in the Chattahoochee River. The State was very conservative in listing all segments upstream of the points listed in Georgia's *Guidelines for Eating Fish from Georgia Waters* all the way up to Atlanta. It is also

very conservative to develop a TMDL based on fish tissue concentrations of 0.13 mg/kg to 0.67 mg/kg, which are far below the FDA action level of 2.0 mg/kg. This TMDL will use this conservative assumption that the water column throughout all listed segments has no assimilative capacity for PCB loadings at concentrations above the water quality standard of 0.00017 μg/L.

5.5 TMDL Results

The TMDL for the Chattahoochee River equals the annual average flow at Atlanta (approximately 2570 cfs) multiplied by the water quality standard (0.00017 μg /L). This TMDL is summarized in Table 2.

Table 2. TMDL Allocation

Parameter	WLA	LA	MOS	TMDL
PCBs	$\Sigma(Q_{WLA} * 0.00017$ μg/L)	$1.07X10^{-3}$ kg/day – $\Sigma(Q_{WLA} * 0.00017$ μg/L)	Implicit	$1.07X10^{-3}$ kg/day

5.6 Load Reduction

The calculated water column concentration that resulted in the fish tissue contamination is estimated to be $4.5 X 10^{-3}$ μg/L. This results in a load of $1.04 X 10^{-2}$ kg/day. The required load reduction is shown in Table 3.

Table 3. Calculated Load Reductions

Parameter	Current Load	TMDL	Percent Reduction
PCBs	0.13 kg/day	$1.07X10^{-3}$ kg/day	99.2%

6.0 RECOMMENDATIONS

6.1 Monitoring

The State should continue with its monitoring program of fish tissue in Georgia's waters. Atmospheric sources of PCBs are still being studied and quantified. Hazardous waste incinerators are suspected of being some of the larger sources of atmospheric PCBs on a national level.

6.2 Reasonable Assurance

There currently are no NPDES permitted discharges of PCBs to the listed segments. If a permit were to be issued in the future, an allocation to a point source discharger does not automatically result in a permit limit or a monitoring requirement. Through its NPDES permitting process, Georgia will determine whether the permitted dischargers to the listed segments watersheds have a reasonable potential of discharging PCB levels equal to or greater than the allocated load. The results of this reasonable potential analysis will determine the specific type of requirements in an individual facility's NPDES permit. As part of its analysis, the EPD will use its EPA-approved 2001 NPDES Reasonable Potential Procedures to determine whether monitoring requirements or effluent limitations are necessary.

If effluent limitations are determined to be necessary for any future facilities, they should be established in accordance with Georgia Rules and Regulations for Water Quality Control, Section 391-3-6-.06(4)(d)5.(ii)(b)(2). This regulation establishes that to protect against chronic effects, an effluent limitation should be imposed as a monthly average limit. To protect against acute effects, an effluent limitation should be imposed as a daily maximum limit. Additionally, if effluent limitations or monitoring requirements are determined through a reasonable potential analysis to be necessary for any future facilities, it is recommended that concentration limits or concentration monitoring requirements should be imposed in addition to any loading limits or monitoring requirements.

6.3 Public Participation

A thirty-day public notice was provided for this TMDL. During that time the availability of the TMDL was public noticed, a copy of the TMDL was provided as requested, and the public was invited to provide comments on the TMDL.

7.0 INITIAL TMDL IMPLEMENTATION PLAN

EPD has coordinated with EPA to prepare this Initial TMDL Implementation Plan for this TMDL. EPD has also established a plan and schedule for development of a more comprehensive implementation plan after this TMDL is established. EPD and EPA have executed a Memorandum of Understanding that documents the schedule for developing the more comprehensive plans. This Initial TMDL Implementation Plan includes a list of BMPs and provides for an initial implementation demonstration project to address one of the major sources of pollutants identified in this TMDL, while State and/or local agencies work with local stakeholders to develop a revised TMDL implementation plan. It also includes a process whereby EPD and/or Regional Development Centers (RDCs), or other EPD contractors (hereinafter, "EPD Contractors"), will develop expanded plans (hereinafter, "Revised TMDL Implementation Plans").

This Initial TMDL Implementation Plan, written by EPD and for which EPD and/or the EPD Contractor are responsible, contains the following elements.

1. EPA has identified a number of management strategies for the control of nonpoint sources of pollutants, representing some best management practices. The "Management Measure Selector Table" shown below identifies these management strategies by source category and pollutant. Nonpoint sources are the primary cause of excessive pollutant loading in most cases. Any wasteload allocations in this TMDL will be implemented in the form of water-quality based effluent limitations in NPDES permits issued under CWA Section 402. [See 40 C.F.R. § 122.44(d)(1)(vii)(B)]. NPDES permit discharges are a secondary source of excessive pollutant loading, where they are a factor, in most cases.

2. EPD and the EPD Contractor will select and implement one or more BMP demonstration projects for each River Basin. The purpose of the demonstration projects will be to evaluate by River Basin and pollutant parameter the site-specific effectiveness of one or more of the BMPs chosen. EPD intends that the BMP demonstration project be completed before the Revised TMDL Implementation Plan is issued. The BMP demonstration project will address the major pollutant categories of concern for the respective River Basin as identified in the TMDLs. The demonstration project need not be of a large scale, and may consist of one or more measures from the Table or equivalent BMP measures proposed by the EPD Contractor and approved by EPD. Other such measures may include those found in EPA's "Best Management Practices Handbook," the "NRCS National Handbook of Conservation Practices," or any similar reference, or measures that the volunteers, etc., devise that EPD approves. If for any reason the EPD Contractor does not complete the BMP demonstration project, EPD will take responsibility for doing so.

3. As part of the Initial TMDL Implementation Plan the EPD brochure entitled "Watershed Wisdom -- Georgia's TMDL Program" will be distributed by EPD to the EPD Contractor for use with appropriate stakeholders for this TMDL. Also, a copy of the video of that same title will be provided to the EPD Contractor for its use in making presentations to appropriate stakeholders on TMDL Implementation Plan development.

4. If for any reason the EPD Contractor does not complete one or more elements of a Revised TMDL Implementation Plan, EPD will be responsible for getting that (those) element(s) completed, either directly or through another contractor.

5. The deadline for development of a Revised TMDL Implementation Plan is the end of August 2004.

6. The EPD Contractor helping to develop the Revised TMDL Implementation Plan, in coordination with EPD, will work on the following tasks involved in converting the Initial TMDL Implementation Plan to a Revised TMDL Implementation Plan:

   A. Generally characterize the watershed;
   B. Identify stakeholders;
   C. Verify the present problem to the extent feasible and appropriate, (e.g., local monitoring);
   D. Identify probable sources of pollutant(s);
   E. For the purpose of assisting in the implementation of the load allocations of this TMDL, identify potential regulatory or voluntary actions to control pollutant(s) from the relevant nonpoint sources;
   F. Determine measurable milestones of progress;
   G. Develop monitoring plan, taking into account available resources, to measure effectiveness; and
   H. Complete and submit to EPD the Revised TMDL Implementation Plan.

7. The public will be provided an opportunity to participate in the development of the Revised TMDL Implementation Plan and to comment on it before it is finalized.

8. The Revised TMDL Implementation Plan will supersede this Initial TMDL Implementation Plan when the Revised TMDL Implementation Plan is approved by EPD.

Management Measure Selector Table

Land Use	Management Measures	Fecal Coliform	Dissolved Oxygen	pH	Sediment	Temperature	*Toxicity*	*Mercury*	*Metals (copper, lead, zinc, cadmium)*	PCBs, toxaphene
Agriculture	1. Sediment & Erosion Control	_	_		_	_				
	2. Confined Animal Facilities	_	_							
	3. Nutrient Management	_	_							
	4. Pesticide Management		_							
	5. Livestock Grazing	_	_		_	_				
	6. Irrigation		_		_	_				
Forestry	1. Preharvest Planning				_	_				
	2. Streamside Management Areas	_	_		_	_				
	3. Road Construction &Reconstruction		_		_	_				
	4. Road Management		_		_	_				
	5. Timber Harvesting		_		_	_				
	6. Site Preparation & Forest Regeneration		_		_	_				
	7. Fire Management	_	_	_	_	_				
	8. Revegetation of Disturbed Areas	_	_	_	_	_				
	9. Forest Chemical Management		_			_				

Land Use	Management Measures	Fecal Coliform	Dissolved Oxygen	pH	Sediment	Temperature	*Toxicity*	*Mercury*	*Metals (copper, lead, zinc, cadmium)*	PCBs, toxaphene
	10. Wetlands Forest Management	–	–	–		–		–		
Urban	1. New Development	–	–		–	–			–	
	2. Watershed Protection & Site Development	–	–		–	–		–	–	
	3. Construction Site Erosion and Sediment Control		–		–	–				
	4. Construction Site Chemical Control		–							
	5. Existing Developments	–	–		–	–			–	
	6. Residential and Commercial Pollution Prevention	–	–							
Onsite Wastewater	1. New Onsite Wastewater Disposal Systems	–	–							
	2. Operating Existing Onsite Wastewater Disposal Systems	–	–							
Roads, Highways and Bridges	1. Siting New Roads, Highways & Bridges	–	–		–	–			–	
	2. Construction Projects for Roads, Highways and Bridges		–		–	–				
	3. Construction Site Chemical Control for Roads, Highways and Bridges		–							
	4. Operation and Maintenance-	–	–			–				

Land Use	Management Measures	Fecal Coliform	Dissolved Oxygen	pH	Sediment	Temperature	*Toxicity*	*Mercury*	*Metals (copper, lead, zinc, cadmium)*	PCBs, toxaphene
	Roads, Highways and Bridges								_	

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