TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT

For Toxicity in a Tributary to the Little River

Putnam County, Georgia

Oconee River Basin
(HUC 03070101)

February 27, 2002

EPA
United States
Environmental Protection
Agency

Region 4
serving the southeast

Executive Summary

The State of Georgia's 2000 Section 303(d) list identified a tributary to the Little River, from the City of Eatonton to the tributary's confluence with the Little River, in the Oconee River basin as not supporting its designated use for the parameter toxicity. The only point source discharger to this watershed is the Eatonton West Water Pollution Control Plant (WPCP). The source(s) of toxicity in the watershed are unknown. The Total Maximum Daily Load (TMDL) established for this water requires that effluent from the point source as well as waters originating from nonpoint sources shall not exhibit any toxicity. The TMDL is expressed in terms of chronic toxicity units and can be summarized as follows:

Tributary to the Little River Toxicity TMDL Summary

Parameter	Wasteload Allocation	Load Allocation	Margin of Safety	TMDL
Chronic Toxicity	Eatonton West WPCP (1.0 TU_c)	0.0 TU_c	Implicit	1.0 TU_c

Under the authority of Section 303(d) of the Clean Water Act, 33 U.S.C. 1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the U.S. Environmental Protection Agency is hereby establishing a TMDL for toxicity for the protection of aquatic life in the Tributary to the Little River watershed.

Original signed by
Beverly H. Banister, Director
Water Management Division

February 27, 2002
Date

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Introduction

The Environmental Protection Division of the Georgia Department of Natural Resources (GAEPD) 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; fully supporting, partially supporting, or not supporting their designated uses depending on water quality assessment results. These water bodies are found in GAEPD's 305(b) report 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 waters in GAEPD's 305(b) report that have been identified as partially supporting or not supporting their designated uses are assigned to GAEPD's §303(d) list. These water bodies are considered to be water quality limited and cannot meet their designated use standards. Water bodies on the §303(d) list are required to have a TMDL established for each water quality parameter where designated uses are not being fully attained. 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 ensure water quality standards are attained.

On its 2000 §303(d) list GAEPD has identified 3 miles of a tributary to the Little River, from Eatonton to the tributary's confluence with the Little River, as not supporting its designated uses for the parameter toxicity. GAEPD originally listed this water in 1992 and has cited the United States Environmental Protection Agency (EPA) as its data source for the basis of the §303(d) listing of this water. However, EPA has no records of any toxicity information associated with the tributary to the Little River nor does it have any toxicity information associated with the only point source discharger to this watershed (i.e., the Eatonton West Water Pollution Control Plant (WPCP)). Considering that failed toxicity tests are the basis for every other water in Georgia that has been listed for toxicity, it is assumed that the determination of toxicity for this water is based on the results of toxicity tests on the tributary to the Little River and/or Whole Effluent Toxicity (WET) tests conducted on the Eatonton West WPCP's effluent.

Watershed Description

The tributary to the Little River watershed is located in the Oconee River basin in central Georgia in Putnam County. The watershed is part of the Southern Outer Piedmont ecoregion of the Southeastern Temperate Forested Plains and Hills. The tributary to the Little River originates in the northwestern part of the City of Eatonton a nd flows for approximately 5 miles before its confluence with the Little River (see Figure 1). In addition to urban parts of the watershed, the tributary flows through forested areas and some agricultural areas.

The West Eatonton WPCP is the only point source discharger of wastewater in the watershed and it is operating under a National Pollutant Discharge Elimination System (NPDES) permit issued by GAEPD. The City is currently permitted to discharge up to 0.39 million gallons per day (MGD) of wastewater to the tributary to the Little River. Based on the information currently available to EPA and GAEPD, it is unknown whether the effluent from this facility has ever been tested for chronic toxicity or acute toxicity.

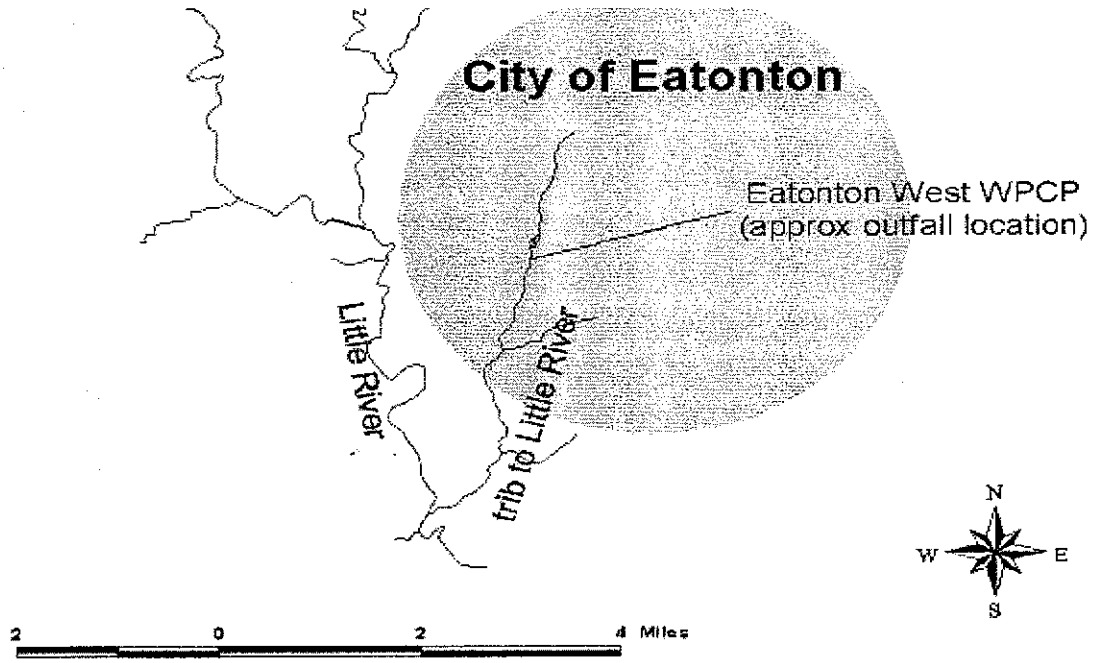

Figure 1. Tributary to Little River Watershed

The 7-day, 10-year minimum (7Q10) statistical flow value associated with the tributary to the Little River, upstream of the point of discharge from the WPCP, is 0.26 cubic feet per second (cfs). If the receiving water of the WPCP effluent was not toxic, the 7Q10 flow could potentially be used in a dilution calculation to determine the allowable level of toxicity from the WPCP. For the tributary to the Little River, however, it is not certain whether the receiving waters of the WPCP's discharge are toxic from other sources. Therefore, the 7Q10 flow will not be used in the TMDL calculation.

Target Identification

The water use classification for the tributary to the Little 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 "[p]ropagation 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."

Protection against toxic releases is called for under the CWA Section 101(a)(3), which states that "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited." In addition, CWA Section 303(c) requires States to develop water quality standards to protect the public health or welfare, enhance the quality of water, and serve the purposes of the CWA. In turn, water quality standards are composed of the designated use of the receiving water, water quality criteria (numeric or narrative) to protect the designated use, and an antidegradation statement.

GAEPD has established narrative criteria for toxicity which applies to all waters of the State. Georgia Regulation 391-3-6-.03(5)(e) of Georgia's Rules and Regulations for Water Quality Control states that "[a]ll waters shall be free from toxic, corrosive, acidic and caustic substances discharged from municipalities, industries or other sources, such as nonpoint sources, in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life."

This TMDL for the tributary to the Little River is being developed to provide protection against chronic toxicity. As it is explained in more detail in the TMDL Results section of this report, protection against chronic toxicity will inherently provide protection against acute toxicity. In accordance with EPA's Technical Support Document For Water Quality-based Toxics Control, an instream chronic toxicity not exceeding 1.0 chronic toxic units (TU_c) is representative of no

chronic toxic effects. Therefore, this TMDL is being developed such that the chronic toxicity of the tributary to the Little River does not exceed 1.0 TU_c.

Linkage Between Numeric Targets and Sources

The basis for GAEPD's inclusion of the tributary to the Little River on its §303(d) list for toxicity is unknown. It is conservatively assumed that the Eatonton West WPCP as well as nonpoint sources in the watershed are potential causes or contributors of toxicity to the impaired water. Therefore, allocations will be established to ensure that the point source does not discharge any level of toxicity and that waters originating from nonpoint sources do not exhibit any level of toxicity.

The No Observed Effect Concentration (NOEC) represents the highest tested concentration of an effluent at which no adverse effects are observed on the aquatic test organisms during a WET test. EPA's Technical Support Document For Water Quality-based Toxics Control (TSD) defines the TU_c associated with an effluent discharge as being equal to 100 divided by the NOEC. For example, an effluent discharge with a NOEC of 50% reflects a TU_c of 2.0. Considering that there may be toxicity associated with nonpoint sources in the tributary to Little River watershed, dilution of receiving waters is not considered in the allowable NOEC for the Eatonton WPCP. In addition, EPA's TSD suggests that the TU_c associated with a stream that exhibits no toxicity before it receives any wastewater is equal to zero (i.e., $TU_c = 0$).

Total Maximum Daily Load (TMDL) Calculation

A TMDL is comprised of the sum of individual wasteload allocations (WLAs) for point sources, and load allocations (LAs) for both nonpoint sources and natural background levels for a given watershed. In addition, the TMDL must include a margin of safety (MOS), either implicitly or explicitly, that accounts for the uncertainty in the relation between pollutant loads and the quality of the receiving water body. Conceptually, this definition is denoted by the equation:

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

The TMDL is the total amount of pollutant that can be assimilated by the receiving water body while achieving water quality standards.

For some pollutants, TMDLs are expressed on a mass loading basis (e.g., pounds per day). In accordance with 40 CFR Part 130.2(i), "TMDLs can be expressed in terms of ... mass per time, toxicity, or other appropriate measure(s)." In addition, NPDES permitting regulations in 40 CFR 122.45(f) state that "All pollutants limited in permits shall have limitations...expressed in terms of mass except...pollutants which cannot appropriately be expressed by mass." For the toxicity TMDL for the tributary to the Little River, the Total Maximum Daily Load is expressed in terms of chronic toxicity units.

Wasteload Allocation

Considering that there may be toxicity associated with nonpoint sources in the tributary to the Little River watershed, dilution of receiving waters is not considered in the allowable NOEC for the Eatonton WPCP. As a result, the NOEC for the effluent from this facility must be 100%. Therefore, the wasteload allocation can be expressed as follows:

$$WLA = 100 / NOEC = 100 / 100 = 1.0\ TU_c$$

Load Allocation

EPA's TSD suggests that the TU_c associated with a stream that exhibits no toxicity before it receives any wastewater is equal to zero (i.e., $TU_c = 0$). Although nonpoint sources may be causing or contributing to the toxicity impairment of the tributary to the Little River, the specific potential nonpoint sources are unknown. Therefore, a gross load allocation to the nonpoint sources is established as 0.0 TU_c.

Margin of Safety

In accordance with section 303(d)(1)(c) of the CWA, the margin of safety (MOS) shall account for any lack of knowledge concerning the relationship between effluent limitations and water quality. There are two basic methods for incorporating the MOS:

1. Implicitly incorporating the MOS using conservative assumptions to develop allocations; or

2. Explicitly specifying a portion of the total TMDL as the MOS; using the remainder for

allocations.

In order to account for the lack of knowledge concerning the relationship between the sources of toxicity and the water quality in the tributary to the Little River, the most stringent allocations possible are given to both the point source and the nonpoint sources. The MOS is implicit through this approach as it ensures that neither the wasteload allocation nor the load allocation allow any level of toxicity, regardless of the sources of toxicity.

Seasonal Variation

The wastleload allocation and the load allocation apply regardless of the specific time of year or the particular environmental conditions in the watershed. Therefore, the TMDL provides for year-round protection of water quality.

TMDL Results

This TMDL can be shown to be protective of an instream chronic toxicity of 1.0 TU_c for the tributary to the Little River as follows:

$$\text{instream toxicity} = \frac{\text{upstream toxicity x upstream flow + effluent toxicity x effluent flow}}{\text{upstream flow + effluent flow}}$$

$$= \frac{0.0\ TU_c \times \text{upstream flow} + 1.0\ TU_c \times 0.39\ MGD}{\text{upstream flow} + 0.39\ MGD}$$

$$= \frac{1.0\ TU_c \times 0.39\ MGD}{\text{upstream flow} + 0.39\ MGD}$$

The above quantity can never exceed 1.0 TU_c regardless of the magnitude of the upstream flow.

Table 1 - TMDL SUMMARY

Parameter	WLA	LA	MOS	TMDL
Chronic toxicity	Eatonton WPCP (1.0 TU_c)	0.0 TU_c	Implicit	1.0 TU_c

Maintaining protection against chronic toxicity in the tributary to the Little River will inherently maintain protection against acute toxicity. To understand this, one must recognize that the above allocations require that there shall be no observable toxic effects from the point source and no observable toxic effects from any nonpoint sources. If there are no observable toxic

effects, it is inherent that there will be no acute or lethal effects. The above TMDL protects against both chronic and acute toxicity.

Implementation

EPA recognizes that a TMDL improves water quality when there is a plan for implementing the TMDL. However, CWA section 303(d) does not establish any new implementation authorities beyond those that exist elsewhere in State, local, Tribal or Federal law. Thus, the wasteload allocations within TMDLs are implemented through enforceable water quality-based effluent limitations in NPDES permits authorized under section 402 of the CWA. Load allocations within TMDLs are implemented through a wide variety of State, local, Tribal and Federal nonpoint source programs (which may be regulatory, non-regulatory, or incentive-based, depending on the program), as well as voluntary action by committed citizens. See New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs), dated August 8, 1997.

EPA believes it is useful during TMDL development, if time is available, to gather information that would facilitate TMDL implementation. For example, the TMDL may identify management strategies that categories of sources can employ to obtain necessary load reductions. EPA believes, however, that TMDL implementation – and implementation planning – is the responsibility of the State of Georgia, through its administration of the National Pollutant Discharge Elimination System (NPDES) point source permit program and through its administration of any regulatory or non-regulatory nonpoint source control programs.

A consent decree in the case of Sierra Club v. EPA, 1:94-cv-2501-MHS (N.D. Ga.), requires EPA to develop TMDLs for all waterbodies on the State of Georgia's current 303(d) list that are not developed by the State that year, according to a schedule contained in the decree. That is, EPA and the State work cooperatively to develop all TMDLs for a given set of river basins each year, with all river basins in the State covered over a 5-year period. On July 24, 2001, the U.S. District Court entered a n order finding that the decree also requires EPA to develop TMDL implementation plans. EPA disagrees with the court's conclusion that implementation plans are required by the decree and has appealed the July 24, 2001, order.

In the absence of that order, EPA would not propose an implementation plan for this TMDL. The Agency is moving forward, however, to comply with the obligations contained in

the order. EPA has coordinated with the Georgia Environmental Protection Division (EPD) to prepare an initial implementation plan for this TMDL and has also entered into a Memorandum of Understanding (MOU) with EPD, which sets out a schedule for EPD to develop more comprehensive implementation plans after this TMDL is established. The initial plan provides for an implementation demonstration project to address one of the major sources of pollution identified in this TMDL while State and/or local agencies work with local stakeholders to develop a revised implementation plan.

EPA understands, pursuant to the July 24, 2001, order, that it continues to have responsibilities for implementation planning if for any reason EPA cannot complete an implementation plan for this TMDL as set out in the MOU. If the July 24, 2001, order is vacated, EPA would expect to support efforts by the State of Georgia to develop an implementation plan for this TMDL.

Implementation of the wasteload allocation for this TMDL will be conducted by GAEPD through its NPDES permitting process. Concerning the establishment of appropriate NPDES permitting requirements for the facility included in the wasteload allocation, it is important to note that the allocation does not automatically result in permit limits or monitoring requirements. GAEPD will determine through its NPDES permitting process whether the Eatonton WPCP has a reasonable potential of discharging chronically toxic effluent. The results of this reasonable potential analysis will determine the specific type of requirement(s) for this facility's NPDES permit. As part of its analysis, the State's NPDES permitting group will use its most current EPA-approved NPDES Reasonable Potential Procedures and Whole Effluent Toxicity Strategy to determine whether chronic WET monitoring requirements or limitations are necessary.

In accordance with EPA guidance, a Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE) process may be used to identify and reduce contaminants in municipal and industrial wastewater that cause toxicity. Detailed information concerning this process is described in the following EPA documents:

- Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
- Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (EPA/600/2-88-070)
- Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants

(EPA 833-B-99-002)

- Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition (EPA/600/6-91/003)
- Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity (EPA/600/R-92/080)
- Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity (EPA/600/R-92/081)
- Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I (EPA/600/6-91/005F)

The TIE/TRE process may be used by the Eatonton WPCP if there is a need to identify and reduce contaminants in its effluent that cause or contribute to toxicity.

Concerning implementation of the load allocation, EPA has coordinated with GAEPD to prepare this initial TMDL implementation plan for this TMDL. 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 best management practice (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 category of contribution of the pollutant(s) of concern for the respective River Basin as identified in the TMDLs of the watersheds in the River Basin. 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, and 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 an 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, 2003.

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.

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		–			–				
	10. Wetlands Forest Management	–	–	–		–		–		

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

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