TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT

For Toxicity in the Tributary to Tobesofkee Creek

Lamar County, Georgia

Ocmulgee River Basin
(HUC 03070103)

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EPA United States Environmental Protection Agency

Region 4 serving the southeast

Executive Summary

The State of Georgia's 2000 Section 303(d) list identified an unnamed tributary to Tobesofkee Creek, from the headwaters to the tributary's confluence with Tobesofkee Creek, as not supporting its designated use for the parameter toxicity. The listing of the tributary to Tobesofkee Creek for toxicity was based on whole effluent toxicity tests conducted on effluent discharged from the William Carter Company. 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:

TMDL SUMMARY

Parameter	Wasteload Allocation	Load Allocation	Margin of Safety	TMDL
Chronic toxicity	William Carter Company (1.0 TU_c)	0.0 TU_c	Implicit	1.0 TU_c

On July 14, 2001, the William Carter Company sent the State of Georgia a letter indicating that the wastewater treatment facility has ceased operations. Although the NPDES permit for the facility allows the Company to continue discharging and a wasteload allocation is provided by this TMDL, it is anticipated that there will be no more discharges from this facility beyond June 2001.

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 Tobesofkee Creek watershed.

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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 waters 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 Total Maximum Daily Load (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 identified 2 miles of the tributary to Tobesofkee Creek, from its headwaters to the tributary's confluence with Tobesofkee Creek, as not supporting its designated uses for the parameter toxicity. GAEPD originally listed this water for toxicity in 1994 and the potential causes of impairment on its 2000 list are described as the industrial wastewater discharged from the William Carter Company. Georgia listed the tributary to Tobesofkee Creek as being impaired from toxicity on the basis of the results of whole effluent toxicity (WET) tests conducted on effluent from the William Carter Company in February 1994. In addition to toxicity, the tributary to Tobesofkee Creek is also included on GAEPD's 2000 §303(d) list for the parameter biota. On June 30, 2001, GAEPD proposed a TMDL for the tributary to Tobesofkee Creek to address the biota impairment.

Watershed Description

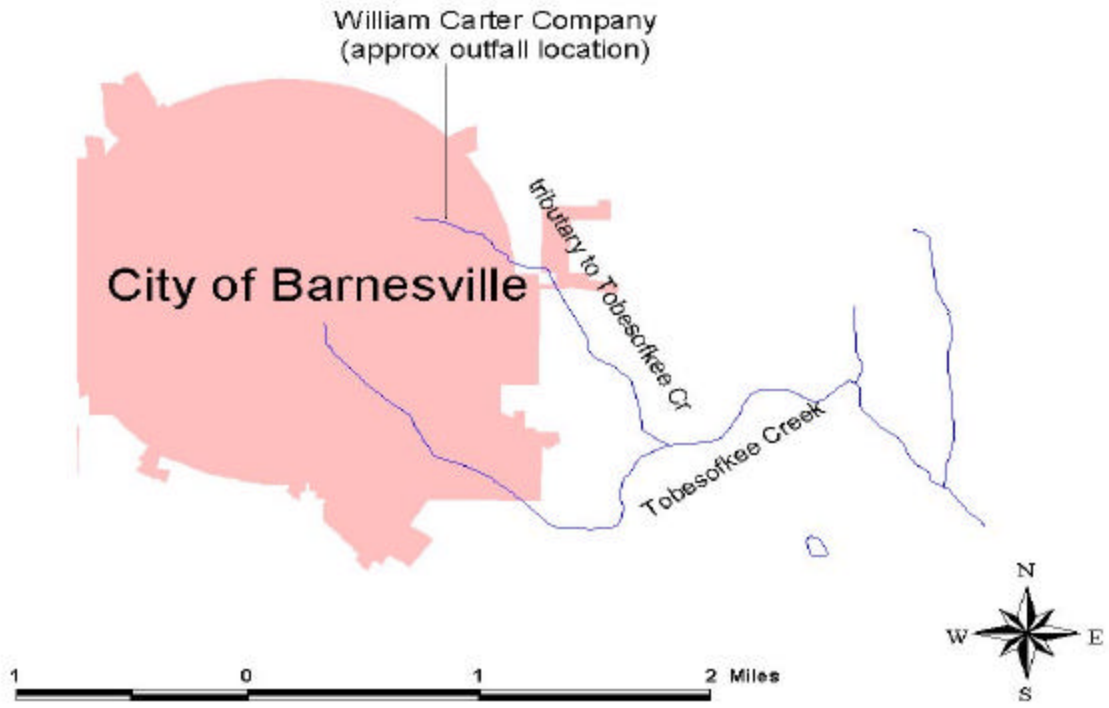
The tributary to Tobesofkee Creek is located in the Ocmulgee River basin in central Georgia in

Lamar County. The watershed is part of the Southern Outer Piedmont ecoregion of the Southeastern Temperate Forested Plains and Hills. The tributary to Tobesofkee Creek originates in the northeastern part of the City of Barnesville and flows through urban and forested areas for approximately 2 miles before its confluence with Tobesofkee Creek (see Figure 1).

Through June 2001, the William Carter Company had been operating under a National Pollutant Discharge Elimination System (NPDES) permit issued by GAEPD and had discharged an average of 1.6 million gallons per day (MGD) of wastewater to the tributary to Tobesofkee Creek. The facility ceased to discharge beyond June 2001. This was the only point source discharger to this water.

The 7-day, 10-year minimum (7Q10) statistical flow value associated with the tributary to Tobesofkee Creek is 0.0 cubic feet per second (cfs). There is no indication that nonpoint sources ever caused or contributed to the toxicity in this water.

Figure 1 - Tributary to Tobesofkee Creek Watershed



Target Identification

The water use classification for the tributary to Tobesofkee Creek 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 that 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 Tobesofkee Creek 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 Tobesofkee Creek does not exceed 1.0 TU_c.

Linkage Between Numeric Targets and Sources

GAEPD's inclusion of the tributary to Tobesofkee Creek on its §303(d) list for toxicity is based on the results of toxicity tests conducted on the treated effluent from the William Carter

Company in February 1994. Allocations are being established to ensure that the point source cannot 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. In addition, it is important to note that 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., $TU_c=0$). Therefore, a simple mass-balance equation reflecting critical low flow conditions can be used for the TMDL development.

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 Tobesofkee Creek, the Total Maximum Daily Load is expressed in terms of chronic toxicity units (TUcs).

Wasteload Allocation

Under critical low flow conditions, the toxicity wasteload allocation (WLA) for the William Carter Company is as follows:

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

Load Allocation

The existing toxicity contribution to the tributary to Tobesofkee Creek from nonpoint sources is assumed to be nonexistent. The load allocation is set equal to the existing level of toxicity from the nonpoint sources, and will therefore remain at the level of 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 the allocated pollutant loads and water quality. There are two basic methods for incorporating the MOS:

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

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

The MOS for this TMDL is implicit because of the conservative assumptions and methods used to develop the wasteload allocation and the load allocation. That is, the most stringent allocations possible are given to both the point source and the nonpoint sources, therefore ensuring the elimination of any uncertainty about the relationship between the allocated toxic loads and water quality.

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 Tobesofkee Creek as follows:

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

$$= \frac{0.0\ TU_c \text{ x upstream flow} + 1.0\ TU_c \text{ x } 1.6\ MGD}{\text{upstream flow} + 1.75\ MGD}$$

$$= \frac{1.0\ TU_c \text{ x } 1.6\ MGD}{\text{upstream flow} + 1.6\ MGD}$$

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

Table 1 - TMDL SUMMARY

Parameter	Wasteload Allocation	Load Allocation	Margin of Safety	TMDL
Chronic toxicity	William Carter Company (1.0 TU_c)	0.0 TU_c	Implicit	1.0 TU_c

Maintaining protection against chronic toxicity in the tributary to Tobesofkee Creek 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 has always recognized that implementation of TMDLs is important, since a TMDL improves water quality when the pollutant allocations are implemented, not when a TMDL is established. 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. Neither the Clean Water Act nor EPA's current regulations require a TMDL to include an implementation plan.

A consent decree in the case of Sierra Club v. EPA, 1:94-cv-2501-MHS (N.D. Ga.) requires the State or EPA to develop TMDLs for all waterbodies on the State of Georgia's current 303(d) list according to a schedule contained in the decree. On July 24, 2001, the district court entered an 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. The Agency is moving forward, however, to comply with the implementation obligations contained in this order.

On July 14, 2001, the William Carter Company sent GAEPD a letter indicating that the wastewater treatment facility has ceased operations. Although the NPDES permit for the facility allows the Company to continue discharging and a wasteload allocation is provided by this TMDL, it is anticipated that there will be no more discharges from this facility beyond June 2001.

In the event that the William Carter Company does not cease its discharge to the tributary to Tobesofkee Creek, implementation of the wasteload allocation for this TMDL will be conducted by GAEPD through its NPDES permitting process. The issuance of the NPDES permit for the facility impacted by the wasteload allocation of this TMDL would be done in accordance with the State's July 2, 2001 "Basin Permitting Strategy." In accordance with this Strategy, NPDES permits for the facility impacted by this TMDL would be issued within 18 months of the date the TMDL is established. Therefore, in the event the William Carter Company does not cease its discharge, it is anticipated that the NPDES permit for this facility would be issued by July 25, 2003.

Concerning the establishment of appropriate NPDES permitting requirements for the William Carter Company in the event it does not cease its discharge, it is important to note that the wasteload allocation would not automatically result in permit limits or monitoring requirements. GAEPD would determine through its NPDES permitting process whether the William Carter Company had a reasonable potential of discharging chronically toxic effluent. The results of this reasonable potential analysis would determine the specific type of requirement(s) for this facility's NPDES permit. As part of its analysis, the State's NPDES permitting group would use its most current EPA-approved NPDES Reasonable Potential Procedures and Whole

Effluent Toxicity Strategy to determine whether chronic WET monitoring requirements or limitations would be 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)

In the event that the William Carter Company does not cease discharging, the TIE/TRE process could be used if there was to be a need to identify and reduce contaminants in its effluent that cause or contribute to toxicity.

As stated in the Watershed Description section of this report, there is no evidence that there are any nonpoint sources that cause or contribute to toxicity in the tributary to Tobesofkee Creek. Therefore, it is assumed that the load allocation established by this TMDL is currently being attained and there is no need for further implementation of the load allocation.

References

1. Carter's (i.e., William Carter Company). Letter to "Tom" of the Industrial Wastewater Unit of the Georgia EPD. July 14, 2001.

2. Environmental Protection Division of the Georgia Department of Natural Resources. *Memorandum from David L. Bullard to Alan W. Hallum regarding the "Basin Permitting Strategy."* Atlanta, GA. July 2, 2001.

3. Environmental Protection Division of the Georgia Department of Natural Resources. *Letter with attachments regarding the final update of the Georgia 2000 303(d) list.* Atlanta, GA. June 8, 2001.

4. Environmental Protection Division of the Georgia Department of Natural Resources. Letter and attachments regarding "Reasonable Potential procedures and Whole Effluent Toxicity Strategy." May 30, 2001.

5. Environmental Protection Division of the Georgia Department of Natural Resources. Rules and Regulations for Water Quality Control, Chapter 391-3-6. Atlanta, GA. July 2000.

6. USEPA. Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 833-B-99-002. August 1999.

7. USEPA. Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/600/R-92/080. September 1993.

8. USEPA. Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/600/R-92/081. September 1993.

9. USEPA. Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents,

Phase I. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/600/6-91/005F. May 1992.

10. USEPA. Technical Support Document for Water Quality-based Toxics Control. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/505/2-90-001. March 1991.

11. USEPA. Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/600/6-91/003. February 1991.

12. USEPA. Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/600/2-88-070. April 1989.