

# **TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT**

For Toxicity in Mineral Springs Branch  
Coweta County, Georgia  
Chattahoochee River Basin  
(HUC 03130002)

February 2003



## Executive Summary

The State of Georgia's 2002 Section 303(d) list identified a 3-mile segment of Mineral Springs Branch, downstream from the William L. Bonnell Company, Inc. Waste Treatment Facility (WTF) discharge point, as partially supporting its designated use for the parameter toxicity. The listing of Mineral Springs Branch for toxicity was based on the results of whole effluent toxicity tests conducted on treated effluent from the William L. Bonnell Company WTF. The Total Maximum Daily Load (TMDL) established for this water requires that effluent from the point sources in the Mineral Springs Branch watershed 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 L. Bonnell Company WTF (1.0 TU <sub>c</sub> ) Mineral Springs WPCP (1.0 TU <sub>c</sub> )	0.0 TU <sub>c</sub>	Implicit	1.0 TU <sub>c</sub>

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 Marburg 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 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 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.

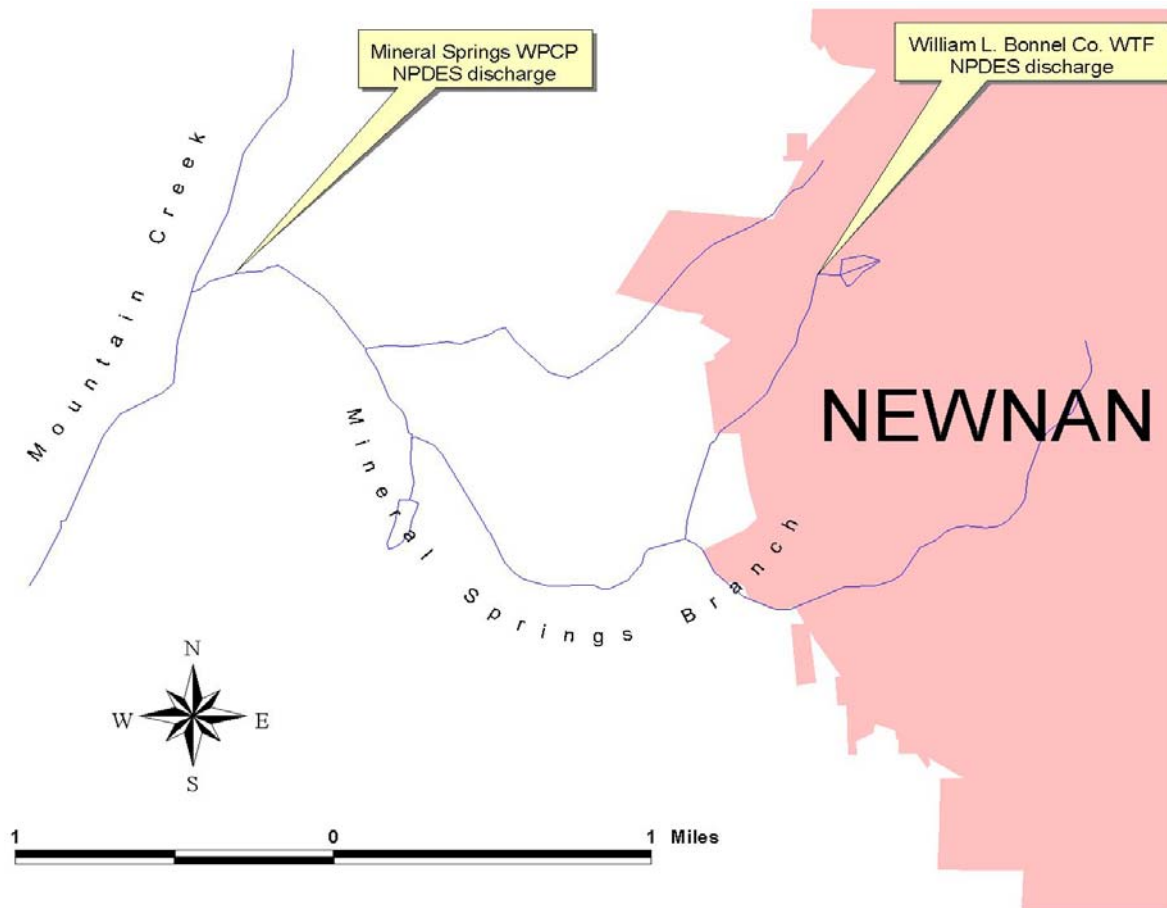
On its 2002 §303(d) list GAEPD has identified a 3-mile segment of Mineral Springs Branch, from the discharge point of the William L. Bonnell Company Waste Treatment Facility (WTF) to the confluence with Mountain Creek, as partially supporting its designated uses for the parameter toxicity. In addition to toxicity, this water is also included on GAEPD's 2002 §303(d) list for the parameter biota. GAEPD proposed a TMDL to address the biota impairment on June 30, 2002.

The evaluated causes of Mineral Springs Branch's impairment are described on GAEPD's 2002 list as an industrial point source and urban runoff. However, Mineral Springs Branch was listed for toxicity solely on the basis of the results of whole effluent toxicity (WET) tests conducted on effluent from the William L. Bonnell Company WTF. The inclusion of urban runoff as an evaluated source of impairment was intended by GAEPD to only describe the biota impairment (i.e., not the toxicity impairment) of Mineral Springs Branch. There is no evidence that nonpoint sources in the Mineral Springs Branch watershed cause or contribute to the toxicity impairment of the 303(d)-listed segment.

## Watershed Description

Mineral Springs Branch is located in the Chattahoochee River basin in west-central Georgia in Coweta County. The watershed is part of the Southern Outer Piedmont ecoregion of the Southeastern Temperate Forested Plains and Hills. Mineral Springs Branch originates in the western part of the City of Newnan and flows through forested, residential, urban and commercial areas for approximately 4 miles before its confluence with Mountain Creek. Mineral Springs Branch receives wastewater discharged from the City of Newnan's Mineral Springs Branch Water Pollution Control Plant (WPCP) and the William L. Bonnell Company WTF (see Figure 1).

**Figure 1 – Mineral Springs Branch Watershed**



The two point source dischargers to Mineral Springs Branch are operating under National Pollutant Discharge Elimination System (NPDES) permits issued by GAEPD. The William

L. Bonnell Company WTF discharges an average of about 0.8 million gallons per day (MGD) of wastewater to Mineral Springs Branch. WET tests conducted by GAEPD on the wastewater from this facility in May 1995 indicated chronic and acute toxicity in the effluent. In addition, WET tests conducted on effluent from this facility in May 2002 also indicated chronic and acute toxicity. The City of Newnan's WPCP discharges up to 0.75 MGD to Mineral Springs Branch, but there is no information to indicate that its effluent has ever been tested for toxicity.

The 7-day, 10-year minimum (7Q10) statistical flow value associated with Mineral Springs Branch is 0.0 cubic feet per second (cfs). In addition, there is no indication that nonpoint sources ever caused or contributed to the toxicity in this water.

## Target Identification

The water use classification for Mineral Springs Branch 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 Mineral Springs Branch 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 Mineral Springs Branch does not exceed 1.0  $TU_c$ .

## Linkage Between Numeric Targets and Sources

The basis for GAEPD's inclusion of Mineral Springs Branch on its §303(d) list for toxicity is the information concerning WET tests conducted on the treated effluent from the William L. Bonnell Company WTF. Allocations for this TMDL are being established to ensure that the point sources do not discharge any level of toxicity and that waters originating from nonpoint sources continue not to 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.,  $TU_c = 0$ ).

## 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:

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

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 Mineral Springs Branch, the Total Maximum Daily Load is expressed in terms of chronic toxicity units.

## Wasteload Allocation

Under critical low flow conditions, the toxicity wasteload allocation (WLA) for the William L. Bonnell Company WTF and the Mineral Springs Branch WPCP are each established as follows:

$$\text{WLA} = 100 / \text{NOEC} = 100 / 100 = 1.0 \text{ TU}_c$$

## Load Allocation

EPA's TSD suggests that the  $\text{TU}_c$  associated with a stream that exhibits no toxicity before it receives any wastewater is equal to zero (i.e.,  $\text{TU}_c = 0$ ). Therefore, in order to ensure protection of water quality standards, a gross load allocation to the nonpoint sources is established as 0.0  $\text{TU}_c$ . Considering that there is no evidence that any nonpoint sources in the watershed cause or contribute to the toxicity in Mineral Springs Branch, it is assumed that this load allocation is currently being maintained.

## 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 sources 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 wasteload 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 protects Mineral Springs Branch from toxicity as summarized in the table below:

**Table 1 - TMDL SUMMARY**

<b>Parameter</b>	<b>WLA</b>	<b>LA</b>	<b>MOS</b>	<b>TMDL</b>
Chronic toxicity	William L. Bonnell Company WTF (1.0 TU <sub>c</sub> ) Mineral Springs WPCP (1.0 TU <sub>c</sub> )	0.0 TU <sub>c</sub>	Implicit	1.0 TU <sub>c</sub>

Maintaining protection against chronic toxicity in Mineral Springs Branch 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 sources 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.

## NPDES Permitting Process

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 facilities included in the wasteload allocation, it is important to note that the allocations do not automatically result in permit limits or monitoring requirements. For the two point sources included in the wasteload allocation, GAEPD will determine through its NPDES permitting process whether these dischargers to

Mineral Springs Branch have a reasonable potential of discharging chronically toxic effluent. The results of these reasonable potential analyses will determine the specific type of requirement(s) for each of these facility's NPDES permits. 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 facilities that discharge to Mineral Springs Branch if there is a need to identify and reduce contaminants in their effluent that cause or contribute to toxicity.

## References

1. 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, Georgia. July 2, 2001.
2. Environmental Protection Division of the Georgia Department of Natural Resources. *Letter with attachments regarding the final update of the Georgia 2002 303(d) list.* Atlanta, GA. March 27, 2002.
3. 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.
4. 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.
5. 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.
6. 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.
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