TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT

For Toxicity in Cabin Creek

Spalding and Butts Counties, Georgia

Ocmulgee River Basin
(HUC 03070103)

January 25, 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 Cabin Creek, from the headwaters to its confluence with the Towaliga River, as not supporting its designated use for the parameter toxicity. The listing of Cabin Creek for toxicity was based on the results of whole effluent toxicity tests conducted on treated effluent from the City of Griffin's Cabin Creek Water Pollution Control Plant (WPCP) and Springs Industries. The Total Maximum Daily Load (TMDL) established for this water requires that effluent from the point sources 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	Griffin Cabin Creek WPCP (1.0 TU_c) Springs Industries, Inc. (1.0 TU_c) I-75 South Mobile Homes – Jackson (1.0 TU_c)	0.0 TU_c	Implicit	1.0 TU_c

In April 2000, the State adopted rules and regulations for water quality control that provide a site-specific temporary exception for Springs Industries concerning the requirement for compliance with the water quality-based chronic whole effluent toxicity criteria in Cabin Creek. Specifically, Georgia Rule 391-3-6-.06(4)(d)(vii) allows Springs Industries a temporary exception (or variance) to this criteria and it applies from its point of discharge downstream to the Walkers Mill Road crossing of Cabin Creek. On January 10, 2002, EPA approved of Georgia's temporary exception to the water quality-based chronic whole effluent toxicity criteria for Springs Industries. Therefore, National Pollutant Discharge Elimination System (NPDES) permit requirements for Springs Industries may be determined in accordance with this temporary exception and can differ from the wasteload allocation for Springs Industries provided by the TMDL.

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 Cabin Creek watershed.

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Date

Table of Contents

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 2000 §303(d) list GAEPD has identified 16 miles of Cabin Creek, from its headwaters near Griffin to the Creek's confluence with the Towaliga River, as not supporting its designated uses for the parameter toxicity. This water was originally listed for toxicity in 1992. In addition to toxicity, this water is also included on GAEPD's 2000 §303(d) list for the parameters biota, fecal coliform, and dissolved oxygen. GAEPD proposed the biota and dissolved oxygen TMDLs on June 30, 2001. EPA proposed a fecal coliform TMDL for Cabin Creek on August 30, 2001.

The potential causes of Cabin Creek's impairment are described on GAEPD's 2000 list as an industrial point source and urban runoff. However, Cabin Creek was listed for toxicity solely on the basis of the results of whole effluent toxicity (WET) tests conducted on effluent from the City of Griffin's Cabin Creek Water Pollution Control Plant (WPCP) and effluent from industrial wastewater discharged from Springs Industries, Inc. During discussions EPA had with GAEPD following the August 30, 2001 proposal of this toxicity TMDL, GAEPD clarified that

nonpoint sources in the Cabin Creek watershed are believed to only impact fecal coliform and biota impairment. There is no evidence that nonpoint sources cause or contribute to toxicity impairment.

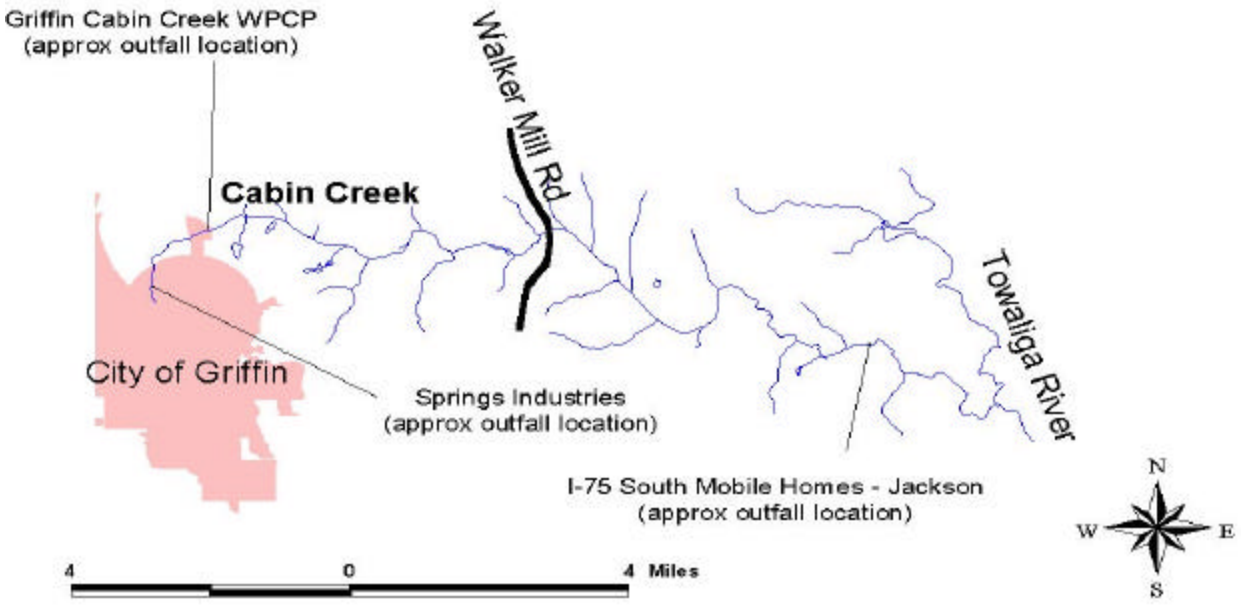
Watershed Description

Cabin Creek is located in the Ocmulgee River basin in central Georgia in Spalding and Butts Counties. The watershed is part of the Southern Outer Piedmont ecoregion of the Southeastern Temperate Forested Plains and Hills. Cabin Creek originates in the northern part of the City of Griffin and flows through urban, agricultural, and forested areas for approximately 16 miles before its confluence with the Towaliga River. Cabin Creek receives wastewater discharged from the City of Griffin's Cabin Creek WPCP and Spring Industries, Inc. which are located near the headwaters. In addition, Cabin Creek receives wastewater discharged from the I-75 South Mobile Homes near Jackson (see Figure 1).

The three point source dischargers mentioned above are all operating under National Pollutant Discharge Elimination System (NPDES) permits issued by GAEPD. The Griffin Cabin Creek WPCP discharges up to 1.5 million gallons per day (MGD) of wastewater to Cabin Creek. WET tests conducted by GAEPD on the wastewater from this facility in January 1993 and July 1995 indicated chronic toxicity in the effluent. Springs Industries discharges an average of about 0.86 MGD to Cabin Creek and has been documented as discharging wastewater exhibiting chronic toxicity as far back as 1992. The I-75 South Mobile Homes near Jackson discharges up to 0.03 MGD to Cabin Creek, 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 Cabin Creek, just upstream of the Griffin WPCP, is 0.18 cubic feet per second (cfs). If the receiving waters of the point sources were known not to be toxic, the 7Q10 flow could potentially be used in a dilution calculation to determine the allowable level of toxicity from each of the point sources. However, as part of the margin of safety for this TMDL, the dilution from the 7Q10 flow of the stream is not included in the TMDL calculation.

Figure 1. Cabin Creek Watershed



Target Identification

The water use classification for Cabin 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 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 Cabin 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 Cabin Creek does not exceed 1.0 TU_c.

In April 2000, the State adopted rules and regulations for water quality control that provide a site-specific temporary exception for Springs Industries concerning the requirement for compliance with the water quality-based chronic whole effluent toxicity criteria in Cabin Creek. Specifically, Georgia Rule 391-3-6-.06(4)(d)(vii) allows Springs Industries a temporary exception (or variance) to this criteria and it applies from its point of discharge downstream to the Walkers Mill Road crossing of Cabin Creek. On January 10, 2002, EPA approved of Georgia's temporary exception to the water quality-based chronic whole effluent toxicity criteria for Springs Industries. For the purposes of this TMDL, the applicable water quality standards for Cabin Creek are those described in the above paragraphs. However, NPDES permit requirements for Springs Industries may be determined in accordance with this temporary exception and can differ from the wasteload allocation for Springs Industries established in this TMDL.

Linkage Between Numeric Targets and Sources

The basis for GAEPD's inclusion of Cabin Creek on its §303(d) list for toxicity is the information concerning WET tests conducted on the treated effluent from the Griffin Cabin Creek WPCP and Springs Industries. GAEPD conservatively assumed, as documented in its 2000 §303(d) list, that the toxicity impairment extended to the mouth of Cabin Creek (i.e., at its confluence with Towaliga). 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 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., $TU_c=0$).

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 Cabin Creek, the Total Maximum Daily Load is expressed in terms of chronic toxicity units.

Wasteload Allocation

As part of the margin of safety for this TMDL, dilution of receiving waters is not considered in the allowable NOEC for the point sources. As a result, the NOEC for the effluent from each facility must be 100%. Therefore, the wasteload allocation for each point source 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., $TU_c = 0$). Therefore, in order to ensure protection of water quality standards, a gross load allocation to the nonpoint sources is established as 0.0 TU_c. Considering that there is no evidence that any nonpoint sources in the watershed cause or contribute to the toxicity in Cabin Creek, 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. As a result of not using the dilution of the 7Q10 flow in the wasteload allocation calculation, the TMDL provides the maximum amount of protection against toxicity to Cabin Creek. 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 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 is protective of an instream chronic toxicity of 1.0 TU_c for Cabin Creek as follows:

Table 1 - TMDL SUMMARY

Parameter	WLA	LA	MOS	TMDL
Chronic toxicity	Griffin Cabin Creek WPCP (1.0 TU_c) Springs Industries, Inc. (1.0 TU_c) I-75 South Mobile Homes – Jackson (1.0 TU_c)	0.0 TU_c	Implicit	1.0 TU_c

Maintaining protection against chronic toxicity in Cabin 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 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.

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.

Implementation of the wasteload allocation for this TMDL will be conducted by GAEPD through its NPDES permitting process. The issuance of NPDES permits for facilities impacted by the wasteload allocation of this TMDL should be done in accordance with the State's July 2, 2001 "Basin Permitting Strategy." In accordance with this Strategy, NPDES permits for the facilities impacted by this TMDL shall be issued within 18 months of the date the TMDL is established. Therefore, it is anticipated that the NPDES permits for the facilities impacted by this TMDL will be issued by July 25, 2003.

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 Springs Industries, as described in the "Target Identification" section of this document, NPDES permitting requirements may be affected by the temporary exception to the water quality-based chronic whole effluent toxicity criteria. For the other two facilities included in the wasteload allocation, GAEPD will determine through its NPDES permitting process whether these dischargers to Cabin Creek have a reasonable potential of discharging chronically toxic effluent. The results of this reasonable potential analysis 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 Cabin Creek if there is a need to identify and reduce contaminants in their effluent that cause or contribute to toxicity.

As stated in the Introduction section of this report, there is no evidence that there are any nonpoint sources that cause or contribute to toxicity in Cabin 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. 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 2000 303(d) list.* Atlanta, GA. June 8, 2001.

3. Environmental Protection Division of the Georgia Department of Natural Resources. Letter and attachments regarding "Reasonable P otential 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. *Letter to Alan W. Hallum of the Georgia Environmental Protection Division from Beverly H. Banister regarding the approval of Georgia's Water Quality Standards revisions.* U.S. Environmental Protection Agency, Region 4, Atlanta, Georgia. January 10, 2002.

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.

APPENDIX

In April 2000, the State of Georgia adopted the following rule (i.e., Rule 391-3-6-.06(4)(d)(5)(vii)). This rule was approved by EPA on January 10, 2002.

"Permits issued or reissued after the adoption of this paragraph may include site specific temporary exceptions to the applicable water quality standards under Chapter 391-3-6-.03(5)(e) when the requirements of this paragraph are met and the temporary exception is specifically authorized herein. Where a discharger cannot meet applicable limits for whole effluent toxicity because of a water quality based whole effluent toxicity criteria, site specific temporary exceptions may be allowed on effluent dominated receiving streams under 7-day, 10-year minimum stream flow (7Q10) conditions provided that it has been demonstrated that the permitted discharge will comply with all chemical specific and other applicable water quality criteria, that the receiving stream will support a balanced indigenous population of aquatic life, and that controls more stringent than those required by Section 301(b) and 306 of the Federal Act for achieving whole effluent toxicity criteria would result in substantial and widespread adverse economic and social impacts to the affected communities. These site specific exceptions shall be applicable only to the wastewater discharge as permitted at the time the exception is authorized with no changes in process or wastewater characteristics that would adversely affect water quality in the receiving stream or adversely affect the ability of potential new pollution abatement technologies to attain compliance with the whole effluent toxicity criteria. These site specific exceptions shall be reviewed consistent with 40CFR131.20 at least once in every 3-year period. If it is determined that feasible new pollution abatement technologies or alternatives have become available to allow compliance with whole effluent toxicity criteria, these site specific exceptions may be revoked and the NPDES permits modified to require implementation of such pollution abatement technologies or alternatives as soon as reasonably practicable. Along with this permit modification will be a requirement for the permittee to comply with the water quality based whole effluent toxicity criteria after installation of these technologies. The following discharges and stream segments are hereby granted temporary exception from water quality standards for water quality based whole effluent toxicity criteria:

Springs Industries Griffin Finishing Plant, NPDES Permit No. GA0003409, discharge to Cabin Creek in the Ocmulgee River Basin in Spalding County from the point of discharge downstream to Walkers Mill Road."