

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

*For COPPER in the*

**Eastanollee Creek**

**&**

**Hartwell Reservoir**

(HUC 03060102)

Stephen County, Eastanollee Creek Basin, Georgia



**Approval Page**

**For Copper TMDL in**

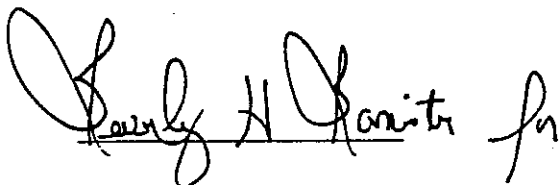
**Eastanollee Creek and Lake Hartwell**

Georgia's final 1998 Section 303(d) list identified Eastanollee Creek as not supporting its designated use as fishing water, with the pollutant of concern being Copper. Hartwell Reservoir was also identified for not meeting its use designation as a fishing stream due to Copper. The impairment decision was based on older copper samples and analytical methods. Recent sampling by EPA Region 4 indicates that copper is no longer causing impairment in Lake Hartwell. This is collaborated by the improved treatment at the two point source dischargers of copper in the watershed.

TMDL Calculation and Wastload Allocation

Pollutant	TMDL (kg/day)	WLA (kg/day)	LA for Future Growth (kg/day)	MOS
Copper - Eastanollee Creek	0.50	0.084	0.416	Implicit
Copper - Lake Hartwell	12.6	0.42	12.18	Implicit

Approved by:



Robert F. McGhee, Director

Water Management Division

FEB 28 2000

Date

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## Table of Contents

Introduction.....	4
Problem Definition.....	4
Target Identification.....	4
Background.....	5
Numeric Targets and Sources - Model Development.....	5
Critical Condition Determination .....	6
Total Maximum Daily Load (TMDL) .....	6
Margin of Safety .....	7
TMDL Calculation.....	7
Wasteload Allocation.....	8
Allowable copper wasteload allocation loading .....	9
Seasonal Variation .....	10
Reference and Administrative Record Index.....	14
Response to Public Comment on Proposed TMDL.....	15

## **Introduction**

Section 303(d) of the Clean Water Act (CWA) as Amended by the Water Quality Act of 1987, Public Law 100-4, and the United States Environmental Protection Agency's (USEPA/EPA) Water Quality Planning and Management Regulations [Title 40 of the Code of Federal Regulation (40 CFR), Part 130] require each State to identify those waters within its boundaries not meeting water quality standards applicable to the water's designated uses. Total maximum daily loads (TMDLs) for all pollutants violating or causing violation of applicable water quality standards are established for each identified water. Such loads are established at levels necessary to implement the applicable water quality standards with consideration given to seasonal variations and margins of safety. The TMDL process establishes the allowable loadings of pollutants or other quantifiable parameters for a water body, based on the relationship between pollution sources and in-stream water quality conditions, so that states can establish water-quality based controls to reduce pollution from both point and nonpoint sources and restore and maintain the quality of their water resources (USEPA, 1991).

## **Problem Definition**

Georgia's final 1998 Section 303(d) list identified Eastanollee Creek as not supporting its designated use as fishing water, with the pollutant of concern being Copper. Hartwell Reservoir was also identified for not meeting its use designation for fishing due to Copper. This TMDL is being finalized pursuant to the 1998 Georgia 303(d) list and the Consent Decree in the Georgia TMDL lawsuit, which requires TMDLs to be developed for all waters on the current 303 (d) list.

## **Target Identification**

The target level for the development of this Copper TMDL is the numeric criterion established in Georgia's Rules and Regulations for Water Quality Control, Chapter 391-3-6, Revised July, 1999.

Georgia Regulation 391-3-6-.03(5)(e)(ii)(5)(a) establishes the chronic criteria for dissolved copper as:

$$\text{chronic criteria for dissolved copper} = (e^{(0.8545[\ln(\text{hardness})] - 1.465)})(0.96) \mu\text{g/L}$$

where hardness is expressed as mg/L as CaCO<sub>3</sub>.

This regulation requires that instream concentrations of dissolved copper shall not exceed the chronic criteria indicated above under 7Q10 or higher stream flow conditions.

## Background

The Eastanollee Creek segments that are impaired are located directly downstream of the City of Toccoa, Georgia. The Eastanollee Creek segment is on the State of Georgia's §303 (d) list for violating the dissolved Copper standard for the State of Georgia. Currently, there are two sources of Copper in this listed segment. Eastanollee Creek is listed for copper impairment due to older data that were measured using now non-clean analytical methods that are now not recommended.

Hartwell Reservoir was also listed for copper impairment. The impairment decision was based on older copper samples and analytical methods. Recent sampling by EPA Region 4 indicates that copper is no longer causing impairment in Lake Hartwell. This is collaborated by the improved treatment at the two point source dischargers of copper in the watershed. Coats American, Inc (NPDES Permit# GA0002038) wastewater treatment facility has reduced its copper load into the watershed from a maximum of 94 pounds per year in 1995 to less than 0.1 pounds per year in 1998. The City of Toccoa Eastanollee Creek (NPDES Permit #GA000238) wastewater treatment facility discharge has reduced its copper load from a 9.5 pounds per year in 1996 to less than 0.2 pounds per year in 1998. See Table 2.

## Numeric Targets and Sources - Model Development

The steady-state model provides predictions for only a single set of environmental conditions. For permitting purposes, steady-state models are applied for "critical" environmental conditions that represent extremely low assimilative capacity. For discharges to riverine systems, critical environmental conditions correspond to drought upstream flows. The assumption behind steady-state modeling is that permit limits that protect water quality during critical conditions will be protective for the large majority of environmental conditions that occur.

## **Critical Condition Determination**

Copper will be considered a conservative substance in the TMDL calculation. The influence on the instream Copper concentration will be the permit design flow and the river flow. For the Eastanollee Creek watershed segment, the critical flow will be considered 0.45 cubic meters per second (cms). This flow represents the Seven Day Low Flow that occurs once every Ten Years (7Q10) on record for the Eastanollee Creek, which is required by Georgia State law for regulated waters. The Hartwell Reservoir TMDL will use the 7Q10 flow for Hartwell Reservoir (25.5 cubic meter per second, cms).

7Q10 low-flow characteristics of the Eastanollee Creek and Hartwell Reservoir were obtained from BASINS, accessing the Reach File 1 meta information.

## **Total Maximum Daily Load (TMDL)**

The TMDL is the total amount of pollutant that can be assimilated by the receiving water body while achieving water quality standards. The components of the TMDL are the Wasteload Allocation (WLA) and the Load Allocation (LA). The TMDL must also take into consideration a margin of safety and seasonality. The WLA is the pollutant allocation to point sources while the LA is the pollutant allocation to natural background and nonpoint sources.

Copper wasteload allocations for these two point sources have been established to meet water quality criteria in Eastanollee Creek. The Eastanollee Creek's 7Q10 minimum low flow, at the point of



discharge, was used to determine these wasteload allocations, as required by Georgia water quality standards.

Since Eastanollee Creek and Lake Hartwell were on the Georgia 1998 303(d) list of impaired waters, a TMDL must be established according to the Georgia TMDL Lawsuit Consent Decree. The TMDL is to meet Georgia's copper standard at the critical conditions of the 7Q10 low flow for Eastanollee Creek and Hartwell Reservoir.

### ***Margin of Safety***

The margin of safety (MOS) is part of the TMDL development process. There are two basic methods for incorporating the MOS (USEPA, 1991a):

1. Implicitly incorporating the MOS using conservative model assumptions to develop allocations, or
2. Explicitly specifying a portion of the total TMDL as the MOS; using the remainder for allocations.

The MOS is incorporated implicitly into this modeling process by selecting the critical 7Q10 low flow from the previous 20 years.

### ***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 in 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. The sum of these components must not exceed the water quality standard (WQS) for the pollutant of concern and for that watershed. Conceptually, this definition is denoted by the equation:

$$\text{TMDL} = \Sigma \text{WLAs} + \Sigma \text{LAs} + \text{MOS}$$



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

The allocation of Copper load to Eastanollee Creek watershed is given below.

$$\text{TMDL} = 0.5 \text{ kg/day Copper}$$

This is based on a water hardness of 45 mg/L (as CaCO<sub>3</sub>), the dissolved copper chronic water quality criterion of 5.737 µg/L and a watershed 7Q10 of 0.45 cms.

NPDES permitted point sources of Copper have been identified in this segment of the Eastanollee Creek, as the only source of copper in the watershed. The remaining load will be will be allocated to future capacity and MOS.

### ***Wasteload Allocation***

The WLA contributing to stream impairment is attributed to existing or future point sources of pollution. It is determined by multiplying the instream criteria concentration by a "dilution factor." In accordance with Georgia's Regulation 391-1-6-.06(2)(f)(1), the dilution factor for constituents and their chronic criteria listed in 391-3-6-.03(5)(e)(ii)(5)(a) is equal to the following:

$$\frac{\text{7-day, 10-year minimum stream flow at the point of discharge (7Q10) + discharger design flow}}{\text{discharger design flow}}$$

For the listed segment of Eastanollee Creek, the dilution factors applied to the two wastewater treatment facilities are:

$$\text{chronic criteria dilution factor : } (0.037 \text{ cms} + 0.13 \text{ cms}) / 0.13 \text{ cms} = 1.28$$

For water with a hardness of 45 mg/L (as CaCO<sub>3</sub>), the dissolved copper chronic water quality criterion is 5.737 µg/L.

The allowable chronic criteria wasteload allocations for the two wastewater treatment facilities are determined as follows:

$$\begin{aligned}\text{wasteload allocation} &= \text{criteria concentration} \times \text{dilution factor} \times \text{translation factor} \\ &= 5.737 \mu\text{g/L} \times 1.28 \\ &= 7.37 \mu\text{g/L} \text{ as a chronic concentration that can be expressed as} \\ &\quad \text{monthly average permit effluent limit}\end{aligned}$$

Using the design flow for the two wastewater treatment facilities, the chronic limit can be expressed as the allowable wasteload allocation copper loading to Eastanollee Creek as follows:

### ***Allowable copper wasteload allocation loading***

$$\begin{aligned}\text{allowable loading} &= \text{concentration limit} \times \text{design flow} \times \text{unit conversion factor} \\ &= 7.37 \mu\text{g/L} \times 3.0 \times 10^6 \text{ gallons/day} \times 3.785 \times 10^{-9} \text{ L} \cdot \text{kg}/(\mu\text{g} \cdot \text{gallons}) \\ &= 0.084 \text{ kg/day}\end{aligned}$$

The WLA component is 0.084 kg/day. This is based on the upstream water quality requirement to meet the copper criteria immediately below the NPDES point source discharges.

The LA or unallocated load for future growth is 0.416 kg/day (LA = TMDL - WLA). Note this is the additional allowable load that could be allocated at the bottom of the watershed while still meeting water quality standards. More stringent WLAs may be required for any new sources or new loads further up in the watershed.

The allocation of Copper load to Hartwell Reservoir was calculated by taking the 7Q10 flow times the allowable water quality standard based copper concentration (25.5 cms \* 5.737 ug/l) and the result is given below.

## Reference and Administrative Record Index

1. Better Assessment Science Integrating Point and Nonpoint Sources, BASINS, Version 2, User's Manual. EPA-823-B-98-006 (document in office file)
2. Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03, Water Use Classifications and Water Quality Standards (document in office file)
3. Sierra Club v. EPA & Hankinson USDC-ND-GA Atlanta Div. #1: 94-CV-2501-MHS (document in office file)
4. Compilation of Georgia's Current Modeling guidelines for the Development of Wasteload Allocations and NPDES Permit Limitations, January 1991 (document in office file)
5. STORET Water quality data (Excel spreadsheet – on disk)
6. Georgia EPD stream monitoring data (Excel spreadsheet – on disk)
7. Georgia NPDES permits (attached)
8. EPA Region 4 Lake Hartwell sample data for copper (report attached)
9. Excel spreadsheet with Lake Hartwell Water Quality data (Excel spreadsheet – on disk)
10. South Carolina data for Tugaloo Arm of Lake Hartwell (attached)

## Response to Public Comment on Proposed TMDL

### **COMMENT:**

There is no apparent wasteload allocation or reduction of any sort made to the South Carolina sources of copper presumably impacting the reservoir. There is no indication in the TMDL of whether there is existing copper in the water column or sediment, or from other unknown sources, which would cause an exceedance of the TMDL.

Eric E. Huber, EarthJustice Legal Defense Fund, 400 Magazine Street, Suite 401, New Orleans, Louisiana 70130-2453, November 8, 1999

### **RESPONSE:**

This TMDL was established as part of a Consent Decree settlement. EPA has collected recent data using clean sampling and laboratory techniques that indicate no water quality impairment due to copper in the Eastanollee Creek Arm of Lake Hartwell.

### **COMMENTS:**

The commenter request that the TMDL be withdrawn. Where applicable, recalculation should be done using defensible assumptions using all the available site-specific data.

J. David Dean, Technical Director, Water Quality, Ogden Environmental and Energy Services, and

Ian Lundberg, P.E., Principal, Resolve Environmental Engineering, 1395 South Marietta Parkway, Building 300, Suite 210, Marietta, Georgia 30061, November 12, 1999

### **RESPONSE**

This TMDL was established as part of the Georgia TMDL Lawsuit Consent Decree. EPA has collected recent data using clean sampling and laboratory techniques that indicate no water quality impairment due to copper in the Eastanollee Creek Arm of Lake Hartwell.

**COMMENT:**

Many of the assumptions used by EPA in developing this TMDL are extremely conservative, inconsistently applied, and irrational. Little or no attempt has been made to quantify the effects of the multiplicity of conservative assumptions upon the resulting TMDL. The conservative assumptions build in unknown, and conceivably very large, implicit margins of safety, and the commenters believe that TMDLs should be calculated as accurately as possible taking into account explicit margins of safety. The margin of safety should be quantified to the extent possible and communicated in the TMDL. Until this done, neither EPA nor the regulated community will know if established TMDLs represent an appropriate balance between environmental protection and the ability to use the resource.

J. David Dean, Technical Director, Water Quality, Ogden Environmental and Energy Services, and

Ian Lundberg, P.E., Principal, Resolve Environmental Engineering, 1395 South Marietta Parkway, Building 300, Suite 210, Marietta, Georgia 30061, November 12, 1999

**RESPONSE:**

Examples of inconsistencies and extremely conservative assumptions need to be described so that EPA may more accurately respond to this comment.

**COMMENT:**

According to EPA's own guidance, an acceptable margin of safety in aquatic ecosystems allows for the criterion to be exceeded once every three years. The TMDL should not be formulated, by applying large factors of safety, so that the criterion is never to be exceeded. This assumption ignores the margin of safety that EPA has built into the water quality criteria and makes the TMDL overly-conservative.

J. David Dean, Technical Director, Water Quality, Ogden Environmental and Energy Services, and

Ian Lundberg, P.E., Principal, Resolve Environmental Engineering, 1395 South Marietta Parkway, Building 300, Suite 210, Marietta, Georgia 30061, November 12, 1999

**RESPONSE:**

The State's water quality standards require that standards be met at or above the 7Q10 flow condition, therefore this is the flow condition used. The standards also supply a numeric value that must be attained. If there is an inconsistency it should be addressed through the standards process.

**COMMENT:**

The use of default translators, where 95% of all samples actually show lower dissolved metals concentrations than predicted using the standard translator, can result in errors of an order of magnitude or more in the TMDL. Site-specific translators should be used whenever possible. Effluent data for total suspended solids can be used to more accurately determine the translator.

J. David Dean, Technical Director, Water Quality, Ogden Environmental and Energy Services, and

Ian Lundberg, P.E., Principal, Resolve Environmental Engineering, 1395 South Marietta Parkway, Building 300, Suite 210, Marietta, Georgia 30061, November 12, 1999

**RESPONSE:**

The State's water quality standards require that standards be met at or above the 7Q10 flow condition, therefore this is the flow condition used. The standards also supply a numeric value that must be attained. If there is an inconsistency it should be addressed through the standards process.

**COMMENT:**

EPA has used a low hardness value in conjunction with low flow, making the assumption that the two are independent variables. The relationship between hardness and stream flow should be considered and a hardness value typical of low flow should be used in the TMDL determination. Hardness can easily vary by a factor of two between wet- and dry-weather flows.

J. David Dean, Technical Director, Water Quality, Ogden Environmental and Energy Services, and

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Ian Lundberg, P.E., Principal, Resolve Environmental Engineering, 1395 South Marietta Parkway, Building 300, Suite 210, Marietta, Georgia 30061, November 12, 1999

**RESPONSE:**

Limited data were available and a conservative approach was used. If additional data are supplied then the TMDL can be recalculated.

**COMMENT:**

The critical conditions used to develop a TMDL should match those used to derive the underlying water quality standard. Chronic water quality standards for protection of aquatic life are based on 96-hour toxicity tests, and are not to be exceeded more than once every three years. To match the TMDL to the underlying water quality standard, the exposure duration (i.e., design flow) should be 96 hours (four days) and the recurrence interval should be 1 in 3 years.

Therefore, the most appropriate critical low flow condition would be the 4Q3. Values of 4Q3 are as easily derived as 7Q10 values and should be used for developing TMDLs where low flow is the critical condition.

J. David Dean, Technical Director, Water Quality, Ogden Environmental and Energy Services, and

Ian Lundberg, P.E., Principal, Resolve Environmental Engineering, 1395 South Marietta Parkway, Building 300, Suite 210, Marietta, Georgia 30061, November 12, 1999

**RESPONSE:**

The State's water quality standards require that standards be met at or above the 7Q10 flow condition, therefore this is the flow condition used. The standards also supply a numeric value that must be attained. If there is an inconsistency it should be addressed through the standards process.

**COMMENT:**

The 7Q10 value used in the proposed TMDL is 16.57 cfs. The values in commenter's records indicate the correct value is 13.5 cfs. Commenter requests to see detailed data and studies used in determining the 7Q10 value in the proposed TMDLs.

Mr. Thomas Culbertson, Director, Friends of the Eastanollee Creek, Rural Route Two, Box 2392, Old Mill Road, Eastanollee, Georgia 30538, November 21, 1999

**RESPONSE:**

The 7Q10 was from the Reach File 1 database. This is a 7Q10 for the entire Eastanollee Creek watershed. The suggested 7Q10 may be for an upper section of the watershed. If these data are provided, we will review and correct as needed. Note that critical loading to the creek was from the point source discharges and the appropriate upstream 7Q10 of less than 1 cfs was used to develop their wasteload allocation and permit limit.

**COMMENT:**

It is documented in EPA and Georgia Environmental Protection Division (EPD) files that there are numerous other long-standing and chronic pollution problems with Eastanollee Creek; these problems include chronic toxicity, zero to extremely low fish population, sediment, foam, turbidity, coloration, biochemical oxygen demand, total suspended solids, and ammonia. It is essential that toxicity, sediment, and foam causing agents be addressed in the TMDL program and that these items be added to the § 303(d) list for Eastanollee Creek.

Mr. Thomas Culbertson, Director, Friends of the Eastanollee Creek, Rural Route Two, Box 2392, Old Mill Road, Eastanollee, Georgia 30538, November 21, 1999

**RESPONSE:**

The comment concerns a § 303(d) listing issue and is not directly relevant to the matter of the public opportunity for comment on numerous proposed TMDLs for waters and pollutants in the State of Georgia.



It is recommended that the commenter provide his written comments, along with supporting data and information, to the Georgia EPD for consideration in the development of their 2000 § 303(d) list.

**COMMENT:**

Request an urgent meeting with EPA to review concerns in more detail.

Mr. Thomas Culbertson, Director, Friends of the Eastanollee Creek, Rural Route Two, Box 2392, Old Mill Road, Eastanollee, Georgia 30538, November 21, 1999

**RESPONSE**

Request noted.

**COMMENT:**

In the Target Identification section of the TMDL, mention is made of both acute and chronic criteria, but it is not explained how the TMDL addresses both. Only one number is given for the criteria, but it is not stated that this is only the chronic, how the hardness assumption was determined, or how acute is being addressed.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The TMDL calculated the chronic limit because this was the most stringent limit and the most appropriate approach for a watershed based TMDL. However, when the permit limit is developed the acute value should be calculated and incorporated in the permit.

**COMMENT:**

In the Background section of the TMDL, it is mentioned that the creeks listed for violating the copper standard and the lake is no longer violating the standard based on recent data. The recent data to support this was not, but should be provided.

Waterbodies should be listed as water quality limited for copper if it has limitations (with treatment needs beyond secondary) and there exists a source or load of the pollutant expected to cause the limitation. If this is the case, then it was proper to list these waters and set TMDLs regardless of a current showing of violations.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

Data are available in the administrative record. The comment concerns a § 303(d) listing issue and is not directly relevant to the matter of the public opportunity for comment on numerous proposed TMDLs for waters and pollutants in the State of Georgia.

It is recommended that the commenter provide his written comments, along with supporting data and information, to the Georgia EPD for consideration in their 2000 § 303(d) list.

**COMMENT:**

In the Numeric Targets and Sources - Model Development section of the TMDL, are there any data regarding runoff, sediment, or fish copper to determine if low flow and point sources are the only concerns?

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The existing and readily available data were used. This data are available in the TMDL administrative record. Data regarding runoff, sediment or fish were not available and were not used in the TMDL. If the commenter has additional data, they are requested to provide for our review.

**COMMENT:**

In the Critical Conditions Determination section of the TMDL, are maximum flow and loads being used for permit flow?

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The permitted flows and loads were used in the TMDL.

**COMMENT:**

In the Critical Conditions Determination section of the TMDL, what is the basis for the lake flow used?

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The upstream 7Q10 flow into the lake was used in the TMDL.

**COMMENT:**

In the Critical Conditions Determination section of the TMDL, are both chronic and acute copper standards being addressed?

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The most critical value, the chronic limit, was calculated.

**COMMENT:**

In the TMDL section of the TMDL, mention is made of loads being established to meet criteria "after mixing." Are there any established mixing zones? Are the loads set to meet both criterion at all points in the waters - without mixing or averaging over a reach? Are the loads established in the TMDL and permits as daily maximums? The data in Table 1 are given as averages, and no daily maximums are given.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

No mixing zone was deemed appropriate. EPA regulations allow for TMDL to be expressed in the appropriate format. The most critical value, the chronic limit, was calculated.

**COMMENT:**

In the TMDL section of the TMDL, how was impairment corrected, or was just the sampling method corrected? The waters may still be WQLS for copper.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

Table 2 in the TMDL showed the point sources reduction of copper in Eastanollee Creek. Additionally, recent sampling by Region 4 indicates copper is no longer a cause of impairment in Lake Hartwell.

**COMMENT:**

The commenter encourages EPA to find a way to use an explicit MOS - such as a reserved percentage of the TMDL.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

Comment noted.

**COMMENT:**

In the TMDL Calculation section of the TMDL, it should be made clear that this is only for chronic copper and acute should be done also, or it should be explained if/how it is covered.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The most critical value, the chronic limit, was calculated.

**COMMENT:**

In the TMDL Calculation section of the TMDL, no load allocation was set, thus assuming no copper in sediments, runoff, or other sources. This needs to be justified or changed.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The existing and readily available data were used. These data are available in the TMDL administrative record. Data regarding runoff, sediment or fish were not available and were not used in the TMDL.

**COMMENT:**

In the Allocation of Responsibility and Recommendations section of the TMDL, it is stated that the remaining load is allocated to margin of safety, but this differs from the margin of safety section.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

This has been revised.

**COMMENT:**

In the Allocation of Responsibility and Recommendations section of the TMDL, there are possible typos. In sentence with "This is based on the upstream water quality (?) requirement to...", and in "...dischargers with copper... has(or have ?) a copper..."

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

Comment noted.

**COMMENT:**

In the Allocation of Responsibility and Recommendations section of the TMDL, it needs to be stated how the copper limits for the dischargers of 10 ug/l compare with the #/day, and explained if this is average or maximum.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

This has been revised to show the WLA portion of the TMDL is expressed as a monthly average chronic value.

**COMMENT:**

In the Allocation of Responsibility and Recommendations section of the TMDL, are the South Carolina discharges accounted for in the TMDL? Are their loads average or maximum as given?

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The TMDL was not being exceeded in the Lake, therefore no allocation or reduction of loads were needed or given. Table 3 expresses the loads as an average value.

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**TMDL = 12.6 kg/day Copper**

NPDES permitted point sources of Copper have been identified influencing Hartwell Reservoir. The WLA for Hartwell Reservoir is shown in Table 1. The remaining load will be allocated to future capacity and MOS, and are shown below in Table 1.

The Georgia NPDES point source dischargers WLA component to Lake Hartwell is 0.084 kg/day. The South Carolina NPDES point source discharges with copper in their NPDES permit limits are listed in Table 3, with a total monitored copper permit load to Lake Hartwell of 0.33 kg/day. The total WLA for Hartwell Reservoir is 0.414 kg/day. The LA for future growth is 12.18 kg/day (LA = TMDL - WLA).

**Table 1 TMDL Calculation and Waste Load Allocation**

<b>Pollutant</b>	<b>TMDL (kg/day)</b>	<b>WLA (kg/day)</b>	<b>LA for Future Growth (kg/day)</b>	<b>MOS</b>
Copper – Eastanollee Creek	0.50	0.084	0.416	Implicit
Copper – Lake Hartwell	12.6	0.414	12.18	Implicit

### ***Seasonal Variation***

The low flow condition represents the most critical design condition and will provide year round protection. For example, in the Eastanollee Creek, the long term mean flow of 2 cms results in a maximum instream concentration projected to be 1.5 ug/l, which is less than 25% of the water quality standard. For Hartwell Reservoir, the long term mean flow of 106 cms results in a maximum instream concentration is projected to be 1.5 ug/l, which is less than 25% of the water quality standard. There are no seasonal variations that impact the concentration of copper in the Eastanollee Creek and Hartwell Reservoir due biological activities.



**Table 2 Eastanollee Creek Point Source Discharge Concentration and Loading for Copper**

Station	Facility	Parameter	Year	Flow (MGD)	Avg. Conc. (mg/l)	Load (lbs/yr)
GA0002038	COATS AMERICAN INC	COPPER TOTAL (AS CU)	1991	1.471	0.0406	0.23
			1992	1.6477	0.0456	0.28
			1993	1.2815	0.0485	0.24
			1994	1.6087	4.6586	44.1
			1995	1.5455	16.0512	94.51
			1996	1.4373	12.0113	68.34
			1997	1.3276	0.0027	0.01
			1998	1.3712	0.004	0.02
GA0021814	TOCCOA- EASTANOLEE Creek	COPPER TOTAL (AS CU)	1991	0.9225	0.2067	0.37
			1992	1.3492	0.3	0.79
			1993	0.9918	0.3133	0.83
			1994	0.9615	0.2667	0.99
			1995	0.9739	0.0852	0.11
			1996	1.0045	0.94	3.49
			1997	1.0073	0.0134	0.05
			1998	1.0803	0.0457	0.18

**TABLE 3 South Carolinas' Point Source Discharge Concentration and Loading for Copper**

Station	Facility	Parameter	Year	Flow (MGD)	Avg. Conc. (mg/l)	Average Annual Load (lbs/day)
SC0000485	LAFRANCE/ MOUNT VERNO	COPPER TOTAL (AS CU)	1997	0.3624	0.2142	
			1998	0.3789	0.0681	0.22
SC0000515	DUKE ENERGY	COPPER TOTAL (AS CU)	1995	2.6348	0.0095	0.21
SC0020010	CLEMSON WWTF	COPPER TOTAL (AS CU)	1995	0.7478	0.0217	
			1996	0.7411	0.0267	
			1997	0.7231	0.0257	
			1998	0.7333	0.02	0.12
SC0035700	PENDLETON CLEMSON	COPPER TOTAL (AS CU)	1995	0.9523	0.0227	
			1996	1.0097	0.035	
			1997	0.9593	0.0204	
			1998	0.9999	0.02	0.17
Total S.C. 1998 Copper Load (Assumes the 1995 load from Duke Energy is the 1998 load)						0.72 #/day or 0.33 kg/day

# Eastanolee Creek TMDL Site Location Map

