

**STATE OF GEORGIA
TMDL IMPLEMENTATION PLAN
OCONEE RIVER BASIN**

**DISSOLVED OXYGEN
0% REDUCTION OF OXYGEN DEMANDING SUBSTANCE REQUIRED**

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TMDL Implementation Plans are platforms for establishing a course of actions to restore the quality of impaired water bodies in a watershed. They are intended as a continuing process that may be revised as new conditions and information warrant. Procedures will be developed to track and evaluate the implementation of the management practices and activities identified in the plans. Once restored, appropriate management practices and activities will be continued to maintain the water bodies.

This Implementation Plan is applicable to the following segments in the Oconee River Basin:

Impaired Waterbody	Location	Miles/Area Impacted
Bluff Creek	D/S Wiggins Road to Oconee River	4
Bottoms Branch	Tributary 5 to North Walnut Creek, Gainesville	1
Ochwalkee Creek (Okeewalkee Creek)	U/S Little New York Rd. to Oconee River	18
Pughes Creek	Indian Branch to Oconee River	8

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INTRODUCTION

Based on USGS (United States Geological Survey) water quality data collected in 1999 the preceding stream segments were determined to be impaired due to low dissolved oxygen levels and classified on the Georgia EPD 2000 Section 303 (d) List as not or partially supporting for fishing use. The data indicated that these impairments occurred during, and were limited to, summer months, low flow and high temperature conditions. Stream flows during periods of impairment were at, or below 7Q10 (the minimum 7-day average flow that occurs once in 10 years on the average), which is consistent with the 3-year drought experienced in Georgia from 1998 to 2000.

Since the observed DO impairments were clearly driven by persistent low flows and high temperatures, occurring over several months in the summer, a steady state modeling approach was adopted as appropriate for DO TMDL analysis. The two critical components of the TMDL are point sources/Waste Load Allocations (WLA) and nonpoint sources/Load Allocations (LA). WLA and LA represent the entire TMDL because Margin of Safety (MOS) is implicitly considered through conservative model assumptions. The steady-state Georgia DOSAG, developed by the GAEPD, provides a complete spatial view of a system, upstream to downstream, for understanding important differences in stream behavior at various locations throughout a basin.

DISCUSSION OF POLLUTANT

Naturally occurring low levels of dissolved oxygen are often the result of high organic (leaf litterfall, decomposing plants) loading, slow flows (due to minimum topographical relief) and elevated temperatures in a surface water system.

The data collected by the USGS in Georgia during 1999 showed that dissolved oxygen impairments were limited to small, headwater streams where the drainage areas are relatively small and dry weather flows are low, or zero. In the downstream reaches of larger watersheds where the flows are higher and not intermittent, and the assimilative capacity is therefore greater, the dissolved oxygen concentrations always met the minimum standard of 4.0 mg/l, and the daily average of 5.0 mg/l.

TMDLs for the stream segments listed above state that no load reductions are needed to meet water quality standards for dissolved oxygen. The applicable dissolved oxygen water quality standards for waters in the Oconee River Basin are as follows:

- Numeric – GAEPD. A daily average of 5.0 mg/l and no less than 4.0 mg/l at all times for waters supporting warm water species of fish. 391-3-6-.03 (c) (1). (GAEPD, 2000)

- Natural Water Quality – GAEPD. It is recognized that certain natural waters of the State may have a quality that will not be within the general or specific requirements contained herein. This is especially the case for the criteria for dissolved oxygen, temperature, pH and fecal coliform. NPDES permits and best management practices will be the primary mechanisms for ensuring that the discharges will not create a harmful situation. 391-3-6-.03 (7). (GAEPD, 2000)
- Natural Water Quality – EPA. Where natural conditions alone create dissolved oxygen concentrations less than 110 percent of the applicable criteria means or minima or both, the minimum acceptable concentration is 90 percent of the natural concentration. (USEPA, 1986).

Due to naturally occurring low dissolved oxygen in the impaired segments, the EPA natural water quality standard was appropriate to support the proposed allocations. If a model result showed a natural dissolved oxygen less than 5.0 mg/l the natural model result would define the DO standard to be applied. In this case the standard become 90 percent of the computed natural DO.

POLLUTANT SOURCES

The Oconee River Basin land use distribution associated with each of the listed impaired stream is typified by a relatively high percentage of forested and wetland uses combined with a low percentage of built up areas. In 1999, many streams in the basin were dry or had ponded areas and stagnant pools as a result of the 3-year drought in Georgia. The absence of rainfall during the summer months, the critical time period, stormwater did not contribute any washoff of materials into the streams. Any constituents that may have washed off disturbed land surfaces in previous months or years have either: (1) already flushed out of the system along with water column flow; or, (2) a portion may have settled out to become a part of the stream channel bottom. The historic washoff of settleable material could accumulate and exert an additional sediment oxygen demand (SOD) attributable to man's land disturbing activities.

The following sources of naturally occurring organic material have been identified:

- Adjacent wetland and swamps with organically rich bottom sediments; and,
- Direct leaf litterfall onto water surfaces and adjacent floodplains from overhanging trees and vegetation.

Leaf litterfall is a major contributor to the amount of dissolved organic matter in the stream water column and the amount of sediment oxygen demand being exerted. Many streams in southern Georgia are referred to as "blackwater" streams because of highly colored humic substances leached from surrounding marshes and swamps. The oxygen demanding effects of leaf litterfall are reflected here in two ways: (1) by lowering the DO saturation of water entering the channel from adjacent swampy areas caused by decaying vegetation; and, (2) by increasing SOD associated with vegetation decaying on the stream channel bottoms.

PLAN FOR IMPLEMENTATION OF TMDL

TMDLs for the stream segments listed state that no load reductions are needed to meet water quality standards for dissolved oxygen. Certain waters of Georgia have conditions where the dissolved oxygen is naturally lower and cannot meet the numeric criteria unless reductions in the natural nutrient and carbon loads are obtained. Since a reduction in natural forest or wetland contributions is not feasible, practicable or desirable, the EPA Dissolved Oxygen Criteria was instituted to identify target limits for TMDLs.

Georgia EPD and/or other agencies will address the impairment scenario represented by naturally low concentrations of dissolved oxygen with state-level controls and management measures. EPD will also encourage local governments and stakeholders to continue implementing management practices and activities that are already in place, including watershed assessments of pollutant sources and controls as well as water quality sampling and monitoring.

MONITORING PLAN

The GAEPD has adopted a basin approach to water quality management; an approach that divides Georgia's fourteen major river basins into five groups. Each year, the GAEPD water quality monitoring resources are concentrated in one of the basin groups. One goal is to continue to monitor 303(d) listed waters. The next monitoring cycle for the Oconee River Basin is in 2004 and will help further characterize water quality conditions resulting from the implementation of best management practices in the watershed.

EDUCATION/OUTREACH ACTIVITIES

The Environmental Protection Division will continue to provide guidance and education to the public on all water quality issues through outreach by the Water Protection Branch. Permitted discharges will be regulated through the NPDES permitting process. EPD is working with local governments, agricultural, and forestry agencies such as the Natural Resources Conservation Service, The Regional Developments Centers, the Georgia Soil and Water Conservation Commission, and the Georgia Forestry commission to foster the implementation of best management practices to address nonpoint sources. Public education efforts will be targeted to individual stakeholders to provide information regarding the use of best management practices to protect water quality.

REFERENCES

Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03,
Water Use Classifications and Water Quality Standards,
Revised December 2002.

GAEPD, 2001. Oconee River Basin Dissolved Oxygen TMDLs. June 2001.