

STATE OF GEORGIA
REVISED TMDL IMPLEMENTATION PLAN
FLINT 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 Flint River Basin:

Impaired Waterbody	Location	County	Miles/Area Impacted
Beaver Creek	Headwaters to Spring Creek	Crawford	11
Dry Creek	Headwaters, d/s Blakely, to Spring Creek	Early	12
Fish Pond Drain	U.S. Hwy. 84, Donalsonville to Wash Pond	Seminole	7
Flat Creek	Lake Peachtree to Line Creek, Peachtree City	Fayette	4
Spring Creek	SR62 near Arlington to Aycocks Creek	Early/Miller	22
White Oak Creek	Chandlers Creek to Bear Creek	Coweta/ Meriwether	14

INTRODUCTION

Based on USGS (United States Geological Survey) water quality data collected in 2000 Dry Creek, Fish Pond Drain, Spring Creek and White Oak Creek were determined to be impaired due to low dissolved oxygen levels and classified on the Georgia EPD 2002 Section 303 (d) List as partially supporting and not supporting for fishing use. The data indicated that the 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. Beaver Creek and Flat Creek were listed from historical DO data.

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 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.

The six (6) segments of the Flint River Basin listed were placed on the 303(d) list for low dissolved oxygen concentration based on water quality modeling results and not for measured dissolved oxygen concentrations below the water quality standard. Georgia Environmental Protection Division (GAEPD) maintains a database of current National Pollutants Discharge Elimination System (NPDES) Permits and GIS files that locate each permitted outfall. Monthly Discharge Monitoring Reports (DMRs) for 2000 were downloaded from the Permit Compliance System (PCS). Table 1 shows the eight point sources that discharge into or upstream of an impaired segment and NPDES permit limits for contributing point sources that were used for modeling.

Table 1			June 1999 Monthly Average Permit Limits			
			Flow (mgd)	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
NPDES Permit	Facility Name	Receiving Water				
GA0025585	Blakely WPCP	Baptist Branch Tributary to Dry Creek	1.315	5.0 (min)	20	2
GA0031968	Blakely Pond A	Blue Creek Tributary to Dry Creek	0.12	NP	30	NP
GA0031976	Blakely Pond B	Breastworks Branch to Dry Creek	0.12	NP	30	NP
GA0026204	Arlington Pond #1	Perry Creek Tributary to Spring Creek	0.10	NP	30	NP
GA0047252	Colquitt WPCP	Spring Creek	0.40	5.0 (min)	30	15
GA0026123	Donalsonville WPCP	Fish Pond Drain	0.40	NP	30	NP
GA0020371	Flat Creek WPCP	Flat Creek	0.90	5.0 (min)	20	20
GA0034614	Shenandoah WPCP	White Oak Creek	0.90	5.0 (min)	12	2

NOTE: NP = not currently permitted

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 2000 showed that dissolved oxygen impairments were limited to headwater streams where the drainage areas are relatively small and dry weather flows are low, intermittent, or zero. In larger watersheds where the flows are higher, 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 Flint 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, 2002)
- 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, 2002)
- 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 becomes 90 percent of the computed natural DO.

POLLUTANT SOURCES

The Flint River Basin land use distribution associated with Beaver Creek, Dry Creek, Flat Creek, Spring Creek and White Oak Creek is typified by a relatively high percentage of forested and wetland uses combined with a low percentage of built up areas. In 2000, many streams in the basin were dry or had ponded areas and stagnant pools as a result of the 3-year drought in Georgia. Due to 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. 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

For the six segments listed, one point source, Flat Creek WPCP (GA0020371), will remove the oxygen demanding load (BOD₅ and NH₃) from their discharge through a current design report and draft permit limits. Based on the assumption of a 17.4 mg/L permitted limit for NH₃, three additional point sources need to be reduced by 41%. They are Blakely Ponds A and B (GA0031968 and GA0031976) and Arlington Pond #1 (GA0026204). Also, the required 24% reduction for the Donalsonville WPCP (GA0026123) is assuming a 17.4 mg/L permitted limit for NH₃. The Colquitt WPCP (GA0047252) requires a 51% reduction, where the TMDL modeling specified reductions of 10 mg/L (30 to 20) in the BOD₅ and 10 mg/L in NH₃ (15 to 5) to the current permit limit to meet the instream water quality criteria. GA EPD will modify the waste load allocation (WLA) for these point sources during the NPDES permitting renewal process. The remaining point source does not need a reduction.

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 that divides Georgia's fourteen major river basins into five groups. This approach provides for additional sampling work to be focused on one of the five basin groups each year and offers a five year planning and assessment cycle. The Chattahoochee and Flint River Basins were the subjects of focused monitoring in 2000 and will again receive focused monitoring in 2005.

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 Development 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 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 February 2004.

GAEPD, 2003. Flint River Basin Dissolved Oxygen TMDLs. January 2003.