

# **Cleaning Up Georgia's Waterways**

## **Challenges In Clean Water Act Implementation In Georgia**

**Georgia PIRG Education Fund**

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The Georgia PIRG Education Fund is a 501(c)(3) organization dedicated to protecting the environment, the rights of consumers, and good government in Georgia.

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## Challenges In Clean Water Act Implementation In Georgia

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# INTRODUCTION

Georgia's waterways are very polluted.

- In 1999, 60% of the surface water tested in Georgia was found to be too polluted to be used for fishing, swimming, or drinking—much higher than the 40% national average.<sup>1</sup>
- In 2000, American Rivers named the Apalachicola-Chattahoochee-Flint (ACF) River Basin to their Ten Most Endangered Rivers list.<sup>2</sup>
- Four Georgia rivers are in the country's "worst 50" for discharges of cancer-causing chemicals.<sup>3</sup>
- In a state where rural subsistence fishermen are not uncommon, 33 lakes and 72 rivers have fish consumption advisories.<sup>4</sup>
- Alan Hallum, Chief of the Water Branch of the Georgia Environmental Protection Division says: "It is the policy of the state of Georgia that we do not recommend swimming in natural waters."

Even with this stark reality, there is hope.

In 1972 the federal Clean Water Act was passed to help restore America's precious water resources. With a goal of "fishable and swimmable" waters, the Act requires several provisions and mechanisms to meet this goal.

The Clean Water Act establishes minimum requirements for water quality and water management, delegating authority to individual states to meet or beat these minimum requirements. For more than twenty years, state and federal agencies have concentrated primarily on the permit process provision of the Act.

Under this provision, each polluter

with a discharge pipe must obtain a permit with limits establishing how much of each pollutant they can discharge. While this effort has been important in cleaning up some of our more polluted waters, another key provision of the Act has been largely ignored.

The Clean Water Act requires states to identify impaired waterways and come up with pollution budgets to restore and protect polluted waters. These pollution limits, called Total Maximum Daily Loads (TMDLs), establish the collective pollution levels a water body can withstand and still meet water quality standards.

In 1994, in an effort to halt growing water quality problems, several Georgia groups brought the U.S. Environmental Protection Agency (EPA) to court alleging that this provision was not being implemented and enforced properly. As a result of this lawsuit and subsequent court action, the EPA is required to force the Georgia Environmental Protection Division (EPD) to implement the TMDL program in Georgia. Since the TMDL process is ideally one of Georgia's most powerful tools for systematically identifying and improving impaired waterways, it is critical that the state of Georgia take its charge seriously.

To do this, the EPD must receive more funding for resources and trained personnel, expand its use of citizen data and statewide monitoring, involve the public, use the most stringent standards when setting TMDLs, and provide greater technical assistance to the Regional Development Centers to develop implementation plans.

Failing to do so not only subjects Georgia to the penalties of non-compliance of a federal court order; most importantly, it precludes Georgia's waterways from attaining the fishable and swimmable goals laid out by the Clean Water Act almost thirty years ago.

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# HISTORY OF THE TMDL PROCESS

## Georgia's Polluted Waterways

Direct industrial discharges to water, runoff from sprawling growth, factory-scale agriculture and forestry practices, and outdated sewer systems all contribute to the pollution of Georgia's water. These sources of pollution can be grouped into two types: point sources (direct discharges to water) and non-point sources, which do not have one specific point of entry to the water (such as runoff from lawns, parking lots, and construction sites).

An analysis of EPA Toxics Release Inventory data shows that toxic pollution in waterways is a severe and growing threat in Georgia. In 1999 alone, industries reported releasing approximately 7.5 million pounds of toxic chemicals into Georgia waters. While many other states have reduced the amount of toxic chemicals released to water, Georgia shows a trend of increasing pollution. Reported releases in the state were more than fourteen percent higher for 1999 than for 1998.<sup>5</sup>

Recent analysis of EPA Permit Compliance System data shows that in the last recorded fifteen-month period, 29 municipal facilities (24% of all "major" or "minor" facilities in the state) were in significant noncompliance with their Clean Water Act discharge permits. This is the sixteenth highest amount in the country.<sup>6</sup>

In 1997, more than 16 million tons of agricultural waste were released into Georgia waters.<sup>7</sup> The single largest source of this waste, over 5.2 million tons, was from poultry farms. Nitrogen and phosphorus in agricultural runoff can harm waterways by causing excessive growth of algae.

When these algae blooms die, the bacteria that consume them monopolize the oxygen available in the water. This lack of oxygen in the water can lead to massive fish kills and compromised natural systems.<sup>8</sup>

Sedimentation, a result of dirt running off into surface waters, is another area where enforcement of laws has been weak. Developers and industries get easy approval to build in protected buffer areas along waterways. Decreased buffer protection has a direct link with increased sedimentation.

More than thirty public reservoirs and more than seventy sections of rivers in Georgia have restrictions for fish consumption.<sup>9</sup> These advisories typically limit the number of meals per week or month a person should eat fish caught in these waters. In some cases, the state recommends that certain species not be eaten at all.

Mercury and other dangerous chemicals that persist in the environment enter the aquatic food chain and then are passed onto humans when they eat fish. These heavy metals and toxics lead to public health damage such as neurological and developmental deficiencies. These chemicals also damage ecological systems and wildlife, causing toxic contamination of fish and fish kills.<sup>10</sup>

Georgians have long recognized the threats to the state's water quality and support strong efforts to protect our waterways. According to a recent poll by the League of Conservation Voters Education Fund, eighty-nine percent of Georgia voters are concerned about water quality in their communities.<sup>11</sup>

Despite this public concern, decades of weak laws and even weaker enforcement have failed to address Georgia's water pollution problems and have actually made them worse.

## History of TMDL Development in Georgia

The EPA has the ultimate responsibility to ensure that all streams, rivers, lakes, estuaries, and other water bodies meet the provisions of the Clean Water Act. The EPA, however, frequently delegates responsibility for enforcement of the Act to state environmental protection bodies. Having been approved for delegation of this authority, the Georgia EPD is responsible for monitoring and regulating water pollution in the state.

Until a few years ago, one key provision of the Clean Water Act was almost entirely ignored by both state and federal agencies – the Total Maximum Daily Load (TMDL) provision. Even if all of the point sources on a particular water body meet their permit limits, water quality may still be inadequate due to the cumulative impact of point-source polluters and pollution from non-point sources. For this reason, the TMDL requirement provides a means to assess water quality, identify sources of pollution, and establish a pollution cap for all sources combined.

In 1994, Georgia Legal Watch (formerly the Georgia Center for Law in the Public Interest) sued the U.S. EPA on behalf of Georgia Environmental Organization, Coosa River Basin Initiative, Trout Unlimited, the Ogeechee River Valley Association, and the Sierra Club for failing to comply with the TMDL provision of the Clean Water Act for over sixteen years.<sup>12</sup>

In early 1996, a federal district court found that the EPA had failed to carry out its responsibilities under the federal Clean Water Act and the Administrative Procedures Act because TMDLs had not been developed as required by law. Later that year, the court ordered the EPA to complete TMDLs within five years. This order gave the EPA the option of either

completing 20% of TMDLs each year for five years or establishing TMDLs on a basin-by-basin schedule. The EPA, which had been asking for as much as twenty-five years, appealed this order to the Eleventh Circuit Court of Appeals, but ultimately negotiated a settlement with the district court. This settlement included a 7-year schedule for establishing the first round of TMDLs for Georgia basin by basin.

The settlement also required the EPA to complete several reports by December 1996, including evaluation of Georgia's list of impaired water bodies, development of a monitoring program, evaluation of sediment problems and responses in the Chattooga River Basin, and evaluation of the state listing process for waters impaired with toxics. The EPA was also required to immediately add approximately eighty water bodies to the list.

Georgia EPD had passed the River Basin Management Planning Act in 1992 that set in motion a process of writing basin-wide management plans for Georgia's five major river basins. After the settlement, this process was adopted as the framework for the development of TMDLs in Georgia.

In the first year of TMDL development, Georgia EPD and the EPA did not fulfill the requirements of the consent decree. EPA was to propose TMDLs in 1999 for waters in the Savannah and Ogeechee River Basins that were impacted by point sources of pollution. When Georgia Legal Watch learned that the EPA planned to establish only four TMDLs under this provision, they again took the EPA to court. The EPA ultimately agreed that more TMDLs were required. Another consent order was entered, requiring the EPA to meet its full obligations by establishing over fifty additional TMDLs in these first two river basins.

Even if all the point sources on a particular water body meet permit requirements, water can still be inadequate due to cumulative impacts.

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In early 2000, the Sierra Club (now separately represented by EarthJustice Legal Defense Fund) brought several additional claims against the EPA. These included the EPA's failure to establish certain TMDLs required by the court-ordered schedule, as well as EPA and EPD's failure to provide for implementation of the water quality standards established by TMDLs.

On TMDL establishment, the court ordered the EPA to establish the missing TMDLs. On implementation, the court accepted an offer by Georgia EPD to voluntarily submit implementation plans for the TMDLs developed and finalized by the EPA in 1998. These plans were to be developed by Georgia's Regional Development Centers (RDCs) with a deadline of April 2001.

In November 2000, Georgia Legal Watch challenged the EPA's failure to adhere to the TMDL schedule in the Savannah and Ogeechee Basin. They asked the court to require the EPA to establish TMDLs in one specific water body—Rocky Creek in Washington, Georgia—a creek the EPA tried to take off the list of impaired water bodies at exactly the time it was supposed to issue its TMDLs. This resulted in a strongly worded order, in which the court stated:

"The parties should be aware that the Court will not countenance any further delay in EPA's compliance with the Consent Decree, nor will there be any further extensions of time. Defendant and the state would be well advised to promptly devote the resources necessary to meet all the established deadlines. The adverse economic impact on the state for failure to do so will be severe, as there will be no tepid approach by the Court to enforcement of the Consent Decree."

## How the TMDL Process Works

The TMDL process involves four main steps:

1. Create a report summarizing all water quality problems.
2. List the waters that exceed or are expected to exceed established general water quality standards and are not fully suitable for the purposes for which they have traditionally been used.
3. Set detailed water pollution limits for those listed waters and allocate specific limits to identified sources.
4. Develop a plan for reducing pollution from various sources so that the limits and standards will be met in the future.

Section 305(b) of the Clean Water Act requires the State of Georgia to submit a water quality report to the U.S. Congress every other year. This report "provides an assessment of the water quality conditions of surface and groundwater in Georgia and includes a description of the nature, extent and cause of documented water quality problems."<sup>13</sup>

Section 303(d) of the Act calls on states to glean from their 305(b) report a list of waters that do not or are not expected to meet water quality standards for their designated uses.

This process involves two steps.

1. Determine the predominant use of the water body. The most common designations are fishing, drinking water, and swimming/recreation.
2. Compare water quality samples to established standards. These stan-

dards can be either numeric or narrative, and have different emphases for the to as the Impaired Waters List, is submitted by the states to their local EPA regional office for approval. The public usually has thirty days prior to this submission to comment on its contents.

In 2000, 303(d) lists were optional for states under a special exemption by the EPA. Because Georgia is required by court order to develop TMDLs based on current lists, however, the exemption did not apply to Georgia.

Using water quality sampling and models to estimate exposure levels, the state determines how much pollution a water body can handle and still stay within the water quality standards. This pollution level is the Total Maximum Daily Load.

Once water quality agencies establish these detailed standards, they must implement them with a plan and a timetable for reducing pollution from specific sources.

A single cycle of the TMDL process in Georgia operates on a five-year timeframe, and the starting point of this cycle is staggered for the various water basins so that different basins are in different stages of the process.

In the first year of Georgia's TMDL process, the state monitors waterways to identify all water bodies not meeting water quality standards for each pollutant to create the 303(d) list.

During years two and three, the state is required to set TMDLs for all prioritized water segments classified as "Water Quality Limited Segments," defined as "Any segment where it is known that water quality does not meet applicable water quality standards and/or is not expected to meet applicable water quality standards even after the application of the technology-based effluent limitations re-

quired by 301(b) and 306 of the Clean Water Act."<sup>14</sup> The state establishes TMDLs for each pollutant causing the water body to be impaired.

TMDLs are established by finding the sum of the following criteria for each impaired water body:

- **Load Allocation**—the existing or future nonpoint sources of pollution or natural background sources.<sup>15</sup>
- **Wasteload Allocation**—existing or future point sources of pollution.<sup>16</sup>
- **Margin of Safety**—the amount allotted to account for any unknown variables concerning the relationship between the limits being set and the water quality.<sup>17</sup>
- **Seasonal Variation**—variability of flow and other water conditions.<sup>18</sup>

In year four, the state determines the pollution levels for each pollutant discharger. From that allocation, a strategy for reducing the necessary amount of pollution from each source is established.

In the fifth year, individual pollution permits are revised and allowable pollution limits lowered to restore the waterway to health.

The TMDL program is the only existing regulatory tool that considers pollution discharges cumulatively, setting limits for the total pollution the water body can handle and ensuring that the individual permit limits do not collectively exceed that maximum pollution level. The TMDL program has incredible promise for Georgia and the rest of the nation. It will only be effective in protecting waterways, however, if impaired waters are thoroughly identified and reliable pollution budgets are established and enforced.

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# GEORGIA EPD'S INEFFECTIVE TMDL IMPLEMENTATION

The Total Maximum Daily Load program is one of the most technical and resource-intensive tools for protecting waterways.

It requires an extensive knowledge of the sources of pollution and the overall pollution goals in each individual permit being granted. Full implementation requires a comprehensive monitoring network to adequately identify the most seriously impaired waters, accurate identification of all sources of pollution impairing the waters, and the technical resources to implement the TMDLs that are established.

This would be challenging even under the most well-funded and technologically equipped agencies. The State of Georgia has historically made enforcement of environmental laws a low priority and has often underfunded the state EPD. This has led to understaffing and increased staff turn-over.\*

The EPD also has not taken full advantage of many of the resources available. Citizen monitoring programs and data have not been accepted as in other states, despite a critical need for such information to get a clear picture of the state of our water and threats to it.

The EPD has also handed the most critical aspect of the TMDL process, the implementation, to the state's Regional Development Centers (RDCs). RDCs are even less equipped than EPD to deal with the technical nature of the TMDL process or handle the work of the actual implementation. If Georgia is to protect

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**Schedule for TMDLs by River Basin as Established by Federal Court<sup>19</sup>**

Year	Altamaha Oconee Ocmulgee	Chattahoochee Flint	Coosa Tallapoosa Tennessee	Savannah Ogeechee	Suwannee Satilla Ochlocknee St. Mary's
1997				Monitor	
1998				Develop	Monitor
1999	Monitor			TMDL	Develop
2000	Develop	Monitor		Control	TMDL
2001	TMDL	Develop	Monitor	Implement	Control
2002	Control	TMDL	Develop	Monitor	Implement
2003	Implement	Control	TMDL	Develop	Monitor
2004		Implement	Control	TMDL	Develop
2005			Implement	Control	TMDL
2006				Implement	Control
2007					Implement

public health and the health of our waterways, state officials must pay serious attention to these deficiencies and improve them for subsequent rounds of TMDL development. TMDLs represent one of our best tools for restoring Georgia's waterways to fishable and swimmable standards, but that is only possible if the state adequately funds the program and uses all available resources to complete the process.

## Monitoring Shortfalls

Georgia EPD's water quality trend-monitoring program is the cornerstone of the state's TMDL process, providing the information needed to create the 303(d) list of impaired waters from which TMDLs are derived. This program falls short in several ways:

- Conflicts between the basin rotation schedule and the two-year 303(d) listing cycle create timing problems.
- There are not enough testing sites, and each site is not monitored frequently enough.
- The full range of harmful pollutants are not tested for.
- Despite a debilitating lack of data, the state is unwilling to accept quality assured citizen data provided by thousands of certified citizen volunteers from across the state.

Crippled by an insufficiently small budget of \$1.5 million dollars in 2001,<sup>20</sup> the EPD's trend-monitoring program is unable to adequately monitor the health and quality of Georgia's rivers and streams, severely diminishing the overall effectiveness of the TMDL program. To accurately assess the quality of Georgia's waters, the resource-strapped trend-monitoring program must receive a sub-

stantial budget increase and incorporate quality assured third party data into the program.

## Monitoring Frequency

The EPD's Water Protection Branch oversees the trend-monitoring program, which is charged with assessing the health and quality of Georgia's rivers and streams and provides information for the creation of the 305(b) report.

The EPD oversees the monitoring of a small number of sites, known as core sites, each year. As described above, all other monitoring in Georgia is done on a basin rotation schedule known as the River Basin Management Program (RBMP).

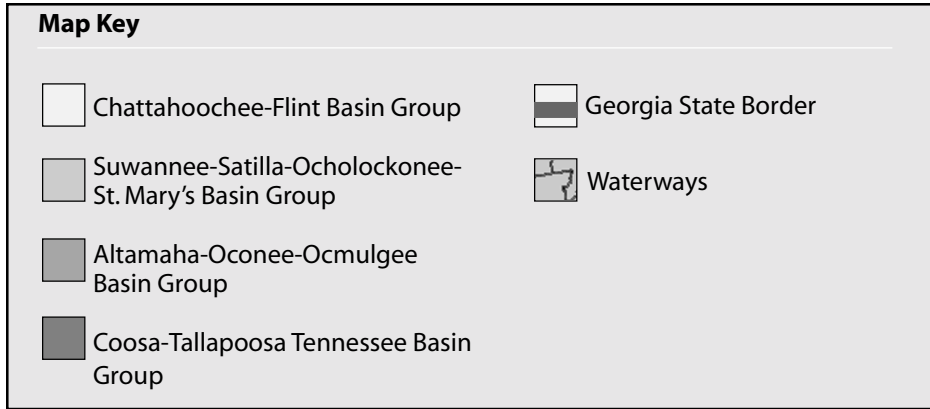
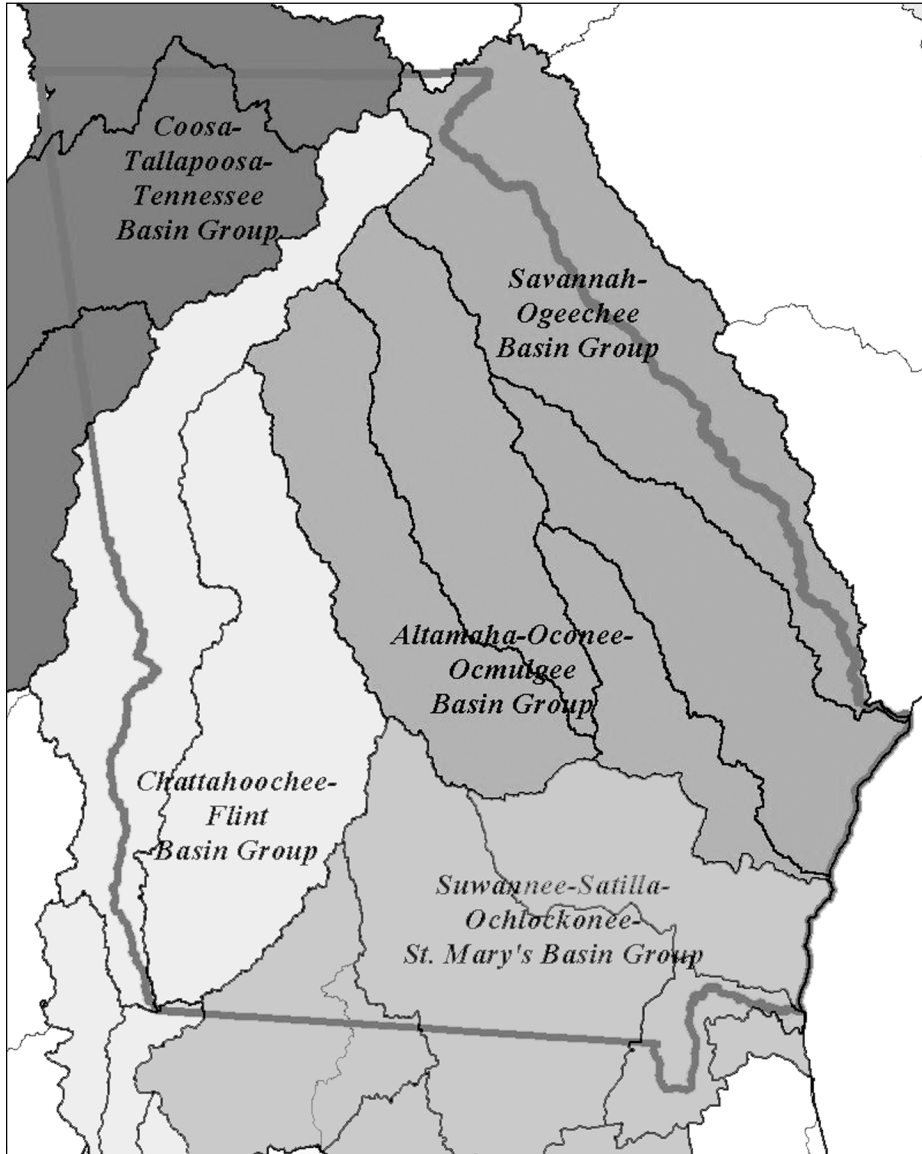
While this rotating basin system has the effect of providing focused coverage for the monitoring program, it also creates timing problems in relation to the EPA requirement to update 303(d) lists every two years.

The state submits its proposed list to the EPA in April of every even year. Because the trend-monitoring program's data collection continues through December of each year and has a slow compilation and review process, it is not completed in time to update the following year's 303(d) list. 1999 monitoring data, for example, is not used in determining the 2000 list.

This data lag is then magnified by the five-year basin rotation plan. If the water body is due for TMDL development the year after testing, the data will not be considered until the following time the basin becomes active five years later. The monitoring data will therefore not have led to any TMDL development for seven years. For example, 1999 monitoring in the Altamaha basin group was not included in the 2000 303(d) list. Since that

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# Map of Georgia's Watershed Systems



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basin was scheduled for TMDL development in 2000-2001, TMDLs will not be developed for newly impaired waters identified in the 1999 monitoring until the following round of development in 2005-2006.

In order to fix this problem, the data review process must be done more quickly to incorporate odd-year monitoring data into even year listings. Alternatively, the EPD and EPA could agree upon a later date in the even year for the 303(d) list due date.

### Monitoring Sites

The trend-monitoring program still only collects data for a very small percentage of the state's waterways, despite expansions in 2001. To date, the state of Georgia has collected water quality data for only 14% of the streams and rivers in the state. Only 9,990 of the state's 70,150 river miles in the state have ever been tested for any water quality parameter.<sup>21</sup> Until this year, almost all of the data collected for the trend monitoring program was done on a contractual basis with the United States Geological Survey (USGS). A promising change occurred in 2001 when EPD added 71 new sites monitored by the agency itself, bringing the total number of sites being monitored in the trend-monitoring program to 210.<sup>22</sup>

One disturbing trend is the shrinking number of core monitoring stations being monitored. The loss of seven core sites leaves only thirty core sites statewide that are monitored consistently year after year for water quality parameters. Core sites are the only method of measuring water quality trends on a year to year basis. While rotating sites in the active basin can provide important data, core sites are of paramount importance to the trend monitoring program.

With the expansion of the program this year the EPD clearly understands the importance of expanding their monitoring coverage, and 71 new sites is a good step. However, the EPD must dramatically expand the monitoring program beyond these improvements if substantial water quality gains are to be made via the TMDL program.

### Testing Inadequacies

While the trend-monitoring program monitors for basic chemical and physical parameters (temperature, pH, dissolved oxygen, fecal coliform, nutrients, some metals), it does not test for pesticides. A 1992-95 study of pesticides in Georgia's urban and agricultural watersheds conducted by the U.S. Geological Survey (USGS) as part of the National Water Quality Assessment Program found a range of harmful pesticides present in

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**GAEPD Trend Monitoring Program Testing Sites**

	Total Monitoring Stations Statewide	GAEPD Monitored Sites	USGS Core Monitoring Stations	USGS Monitoring Stations in the Active Basin
<b>1996</b>	119	0	37	82
<b>2001</b>	210	71	30	109
<b>Gain/Loss</b>	91	71	-7	NA*

\*Because of the change in size of the active basin from year to year, the number of stations in the active basin may vary year to year with no reflection on the performance of the monitoring program.

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Georgia's waterways. In a study of samples collected in an urban Atlanta watershed, eighteen herbicides and seven insecticides, including simazine, atrazine, and diazinon, were identified.<sup>23</sup> These and other pesticides have been linked to cancer and neurological, reproductive, and developmental damage in humans.<sup>24</sup> Several samples indicated concentration levels that are considered unsafe for human drinking water and aquatic life. Samples from an agricultural watershed in southwest Georgia indicated sixteen herbicides and four insecticides, including concentration levels of simazine that exceed the guidelines for protection of aquatic life.<sup>25</sup>

The results of the USGS sampling indicate the need for Georgia's monitoring program to regularly test for the presence of pesticides. The level of scrutiny in the testing process should be increased to provide the state with the ability to identify low levels of pesticides and other harmful toxic chemicals that can be extremely harmful even in trace amounts.

## Budget Constraints

The \$1.5 million annual budget for the trend-monitoring program is insufficient for the accurate assessment of the health and quality of Georgia's waterways. This lack of funding directly affects the number of sites monitored by the program, and therefore the quality of the program's assessment.

Due to budget constraints, the EPD only operates a small percentage of monitoring stations on its own, and contracts out to the USGS for the majority of monitoring procedures. The EPD compiles a list of proposed sites for USGS to monitor, which is almost always reduced in its final form for financial considerations. The state, in order to adequately and accurately assess the water quality of

Georgia's rivers and streams, must substantially increase the budget of the monitoring program to provide for more testing sites and higher quality and intensity of testing.

## Citizen Data

Despite the trend-monitoring program's inability to monitor many areas in the state and the existence of a successful citizen monitoring program, the EPD has so far excluded citizen monitoring data from the TMDL process. The EPD must harness this resource. By incorporating the information these citizens are collecting, they could greatly increase the spatial coverage and overall effectiveness of the trend-monitoring program.

Georgia's huge citizen monitoring network, the Georgia Adopt-A-Stream program, was established in 1993 and today has more than 7,000 volunteers statewide, with 225 local groups under its umbrella. At present these groups are monitoring water quality at more than 200 sites across the state. Data from these sites, which are different from those monitored by the EPD trend monitoring program, could vastly improve the EPD's overall knowledge of the health and quality of Georgia's rivers and streams.

The majority of citizen monitoring groups are associated with the Georgia Adopt-A-Stream program, which is funded by a federal grant and run out of the EPD office. In addition, 36 Community/Watershed Programs organize Adopt-A-Stream groups in their watersheds, counties, or cities. These local Adopt-A-Stream programs are funded by counties, cities, and nonprofit organizations and use the Georgia Adopt-A-Stream model, manuals, and workshops to promote non-point source pollution education and data collection in their areas. The state Adopt-A-Stream office

works closely with these programs to ensure that volunteers are receiving appropriate support and training.

EPA guidance for CWA section 303(d) dictates that states “must, in developing lists, assemble and evaluate all existing and readily available water quality-related data and information.”<sup>26</sup> In Georgia, the Georgia EPD almost exclusively uses data from its own trend-monitoring program. In addition, the state obtains some data from outside sources, including state and federal agencies, local and county governments, universities, and utilities. This leaves out a large quantity of data being recorded by certified citizen volunteers involved in the Georgia Adopt-A-Stream program.

EPD personnel follow written Quality Assurance/Quality Control (QA/QC) protocols based on EPA guidelines when gathering their own data.<sup>27</sup> Georgia EPD explicitly excludes citizen monitoring from 305(b) listing concerns due to QA/QC concerns. But EPD accepts water quality data from many other sources and has no procedures in place for evaluating the QA/QC procedures of these other water quality contributors.<sup>28</sup>

Citizen monitors in Georgia that are certified through the Adopt-A-Stream program also follow QA/QC protocols, though their standards are less stringent than those followed by the EPD. Certified citizen testers must take courses to ensure the accuracy of their tests, and must pass an exam with a score of 90% or better to receive certification. Adopt-A-Stream testers are not capable of testing for as large a range of parameters as the state can due to technological and financial restraints, but are still capable of assessing dissolved oxygen, pH, temperature, sediment load, nitrates, phosphates, and alkalinity, as well as doing some biological monitoring of macro-invertebrates.<sup>29</sup> Discrepancies between QA/QC protocols should not give the Georgia

EPD license to universally disallow citizen data from involvement in the TMDL process.

The Georgia General Assembly took a big step toward the inclusion of certified citizen data in March 2001 when HB 206 was signed into law. This new law requires the EPD to develop methodologies to incorporate data from all sources, into its decisions in the formations of the 305(b) and 303(d) lists by 2002. The law has the potential to dramatically improve the quality and quantity of water quality monitoring in Georgia.

However, the new law does not solve the discrepancy between the QA/QC protocols of the EPD and citizen monitors. Upon incorporation of citizen data, the EPD must find a way to maintain QA/QC standards while maximizing the quantity of citizen data input. If the QA/QC standards for citizen data involvement in the TMDL process are set too high, many citizen testers may not be able to meet the requirements due to technological or financial constraints. Georgia should follow in the footsteps of other states, like Kentucky, that have successfully incorporated citizen and other third party data into their water monitoring programs.

Kentucky is making efficient use of citizen data in the TMDL process. Kentucky classifies all data that comes from outside sources, whether it is from Kentucky Water Watch citizen monitoring data, universities, utilities, USDA, USGS, or other sources, as third-party data. This third-party data is all subject to QA/QC standards and is used to aid the state in 305(b) and 303(d) listing.

Only 30-40% of the citizen monitoring data collected meets the required QA/QC standards, but even that portion is a valuable resource for the cash-strapped Kentucky Division of Water. Other data collected by citizens that does not meet

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For proper monitoring and assessment of the TMDL or how to achieve

QA/QC standards is reviewed to identify problem areas that need further testing. Kentucky Water Watch has 500 monitoring stations in the state that supply data to the Kentucky Division of Water.<sup>30</sup> EPD could benefit from the implementation of a system similar to that in Kentucky.

Georgia should develop a QA/QC protocol for all third-party data and accept citizen data that meets the standards along with data from universities, utilities, and other government agencies. The QA/QC for third-party data would be in place for the listing of waters on the 305(b) and 303(d) lists for TMDL development. Citizens who are able to conduct testing under the tougher QA/QC protocol should be able to submit their data and have it valued equally with the data commissioned by the state. A second, less stringent level could also be used to allow citizens without the ability to meet the higher standards to provide data that would still be useful to influence EPD decisions on where to conduct more in-depth testing.

In order to establish such a system, the EPD and the trend-monitoring program will have to establish closer ties with the Georgia Adopt-A-Stream program. This should not be difficult since both are EPD programs housed in the Georgia EPD building. In addition, the EPD must compile a database of citizen monitoring results.

EPD will have other options when developing methodologies for incorporating citizen data. For instance, the EPD could maintain the present QA/QC structure, and use citizen data for those polluting substances for which the citizen data can meet those standards. The majority of citizen monitors can test for basic physical and chemical parameters. The EPD should be able to use this data to apply TMDLs to wa-

ters not previously on the 303(d) list that are discovered by citizen data to be impaired.

With the limited resources that the EPD has, it can use all the help it can get in this process. The agency has a vast, and vastly underutilized, resource at its disposal: the Georgia Adopt-A-Stream citizen monitoring groups. Whatever difficulty would arise in calibrating the programs or altering the respective QA/QC programs would be well worth the end benefits of more comprehensive data and cleaner water.

## Technical Shortcomings

Despite several years of constructive feedback on the Georgia TMDL program and numerous improvements, there are still several major technical shortcomings plaguing the TMDL process. First, in the case of several different pollutants, TMDLs are being set as monthly or even annual loads as opposed to Total Maximum Daily Loads. Loading limits averaged over a long time period fail to address problems of acute pollutant releases and their impacts. Second, many TMDLs are being set without a well-defined, conservative margin of safety (MOS), as required by EPA guidance. Finally, for many TMDLs proposed, there is no reasonable assurance that the water quality goals of the TMDL will be met or guidance on how to go about achieving those goals.

The success of the TMDL program relies fundamentally on the accuracy and comprehensiveness of the TMDL document. Without the use of daily limits, conservative and explicit margins of safety, and detailed, comprehensive implementation instructions, TMDLs will not succeed.

## Daily Loads vs. Annual Loads

The TMDL process, by definition, “establishes the allowable loading of pollutants or other qualifying parameters for a water body.” How this load is expressed is of paramount importance to its effectiveness. Many of the TMDLs created, especially those for mercury and sediment, are established as annual loads instead of daily loads.

Setting the TMDL as an annual load (how much of a pollutant the water body can handle in a year) as opposed to a daily load (the amount of a pollutant that can be allowed in any single day) leaves the water body vulnerable. A water body may experience a short increased load of a specific pollutant over a couple of days that causes major harm to the water body. When the total actual load for the year is calculated, this period of increased loading may not be considered a problem or may go unnoticed altogether. This would satisfy a TMDL calculated as an annual load, but fail to protect the water body. In such cases, no implementation plan would be put in place to curb the sources of short-term loading increases in the water body which can cause significant damage.

41 of the 58 proposed and finalized TMDLs in Georgia that the EPA published between August 2000 and April 2001 are determined as annual loads.<sup>31</sup> Only six are correctly set as daily values. The remainder were set as monthly loads or were set for pollutants that do not require time dependent load limits.

A typical value for a sediment TMDL is 90 tons/year/sq. mile, as in the TMDL for Stekoa Creek watershed in Rabun County. An acute event could send a large load of sediment into the creek in one day and do significant harm to the local fish population. When the total actual load for the year is calculated, Stekoa Creek may well still meet the annual target, and the fish kill would not be treated as a sedi-

ment problem.

EPA TMDL program officials have acknowledged the importance of expressing all TMDLs as daily loads. Proposed EPA regulations on TMDL development would prohibit the use of monthly or annual loads. The EPA Final Rule for TMDLs, issued in July 2000 but postponed in July 2001, states:

“EPA is not promulgating the language of proposed Sec. 130.34(b) that recognized that both the pollutant load and load reductions may be expressed as other than a daily value as appropriate to the characteristics of the water body and pollutant. This language allowed TMDLs to be expressed as monthly, seasonal, and annual averages as appropriate to the characteristics of the water body. EPA has decided not to include this provision in the final rule because EPA is concerned that it could be used to justify some TMDLs that do not in fact attain and maintain water quality standards in all seasons and for all flows.”<sup>32</sup>

## Margins of Safety

Georgia’s TMDLs do not explicitly state a value for the margin of safety (MOS). Instead, the MOS is usually included implicitly in the TMDL process. This continued absence of explicit, clearly defined margins of safety in TMDLs limits their effectiveness.

The margin of safety is key to the success of the TMDL. By definition, the TMDL is the estimation of the exact amount of a specific pollutant that a water body can handle and still meet water quality standards. If the TMDL is even slightly lenient, the allowable load will be too high. Although the TMDL may be satisfied, the water body would remain impaired. In order to meet water quality



standards for impaired waters, a conservative margin of safety must be implemented.

The Clean Water Act and federal regulations regarding TMDLs on this issue state, “A Margin of Safety is required to account for any lack of knowledge concerning the relationship between load allocations and water quality.”<sup>33</sup> Without an explicit MOS value, it is virtually impossible for anyone other than the author of the TMDL to evaluate the ability of the MOS to meet these criteria, or to offer recommendations or guidance on this topic. The present use of vague, implicit margins of safety leaves no room for public participation on this issue, and provides no assurance that the MOS is an appropriate, conservative value.

The TMDL for fecal coliform bacteria in the Spanish Creek watershed in the St. Mary’s water basin in Charlton County is one of many examples of the use of an implicit MOS. The TMDL reads, “The MOS was implicitly incorporated into the modeling process by selecting a critical time period and critical default values for each of the summer and winter seasons based on the results of a 10 year simulation.”<sup>34</sup> The vagueness of the description of the MOS provides no evidence that a conservative MOS is in place to ensure the effectiveness of this TMDL.

50 of the 58 Georgia TMDLs that the EPA published between August 2000 and April 2001 (86%) were established using a vague, implicit TMDL. Only eight provide clear, evaluative numeric values for the MOS.<sup>35</sup>

When creating TMDLs, the EPD and EPA must use clear, explicit, well-defined margins of safety that are easy to interpret in order to ensure the ef-

fectiveness of the TMDL and the protection of water quality.

## Implementation Plans

EPA guidance regarding implementation plans for TMDLs requires “reasonable assurance that the nonpoint source load allocations established in TMDLs (for waters impaired solely or primarily by nonpoint sources) will in fact be achieved. These assurances may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs. In the case of federal lands, these specific assurances should reflect applicable Memoranda of Agreement or other mechanisms to achieve implementation of needed management practices.”<sup>36</sup> Most of Georgia’s TMDLs fail to provide any of these components. Without a comprehensive implementation plan, the TMDLs have little chance of adequately protecting water quality in Georgia.

48 of the 58 Georgia TMDLs that the EPA published between August 2000 and April 2001 fail to provide implementation plans or reasonable assurance that once in place the TMDLs will result in the achievement of water quality goals.<sup>37</sup> Though the remaining ten do provide concrete methods of fixing the problems addressed, and some even indicate permit changes that will happen to fix the problem, even these fail to provide timelines, criteria and goals, or adequate monitoring plans for the TMDLs.

For example:

- The only recommendation in the TMDL for copper in Rocky Creek is that “a site-specific copper partitioning coefficient could be developed for Rocky Creek under low-flow critical conditions,” and

50 of the 58 Georgia TMDLs that the EPA published between August 2000 and April 2001 (86%) were published using vague, implicit TMDL. Only eight provide clear, evaluative numeric values for the MOS.<sup>34</sup>

that the TMDL should be revised again upon further study.<sup>38</sup>

- The entire “Recommendations” section of the TMDL for dissolved oxygen below dams for all 303(d)-listed river segments reads: “It is recommended that the appropriate federal and state agencies work together in developing an implementation strategy to provide higher oxygenated water from these dam releases. These strategies may include oxygenation or aeration of the water, redesigned spillways or other measures. Further ongoing monitoring needs to be completed to monitor progress and to assure further degradation does not occur.”<sup>39</sup>
- The Stekoa Creek watershed sediment TMDL has a more specific discussion of pollution sources and target levels, but only recommends that the watershed become a high priority and that “specific BMPs should be implemented.”<sup>40</sup>
- The TMDLs for mercury state that deposition of mercury into waterways from the air is a national and international problem, without giving even the broadest of recommendations for reducing emissions.

These recommendations fail to provide specific plans, a schedule, a monitoring plan, or measurable interim criteria. The recommendations provide little guidance for the state agency in charge of implementation and fail to provide reasonable assurance that excess pollution will be curbed.

TMDLs are not effective without adequate implementation. Upon creation of the TMDL, the authors should spend substantially more time on the recommendations and implementation plans so as to make the process as smooth and ef-

fective as possible. Otherwise good science may not result in good policy, and water quality will not improve.<sup>41</sup>

## Implementation Authority

One of the most striking limitations to successfully developing accurate and workable implementation plans for the 1998 TMDLs in Georgia has been Georgia EPD’s deferral to the state’s sixteen Regional Development Centers (RDCs) for implementation. The RDCs have been charged with coming up with implementation plans for the TMDLs affecting impaired water bodies or stream segments within their jurisdiction. While RDCs do offer a more local viewpoint from which to develop and implement pollution budgets and should be involved in the process, they have neither the resources nor the technical expertise to adequately carry out implementation on their own.

Initially, the mission of the Regional Development Centers was to provide technical assistance to local governments so that state and federal grant planning programs could be carried out.<sup>42</sup> Eventually, the mission was extended so that RDCs would “develop, promote and assist in establishing coordinated and comprehensive planning in the state ... and to prepare and implement comprehensive regional plans which will develop and promote the essential public interests of the state and its citizens.”<sup>43</sup>

The 1999 Joint Study Committee commissioned by the Georgia Legislature to evaluate the mission of the RDCs found:

“To date, RDCs have not achieved their primary planning responsibilities, although some are doing much better than others. Many RDCs have fragmented plans at best, and regional planning must be their primary duty, with

To date, RDCs have not achieved primary E planning a responsibility although some are doing better than others.

economic development, *program implementation*, and assisting local governments secondary.” (emphasis added)

RDCs have a history of being unsatisfactory agents for program implementation. Although ninety-six percent of cities and counties are utilizing RDC services, few governments are effectively implementing the regional plans that are created. The RDC boards are composed of two to five elected/appointed county officials or members of local businesses and an ex-officio, non-voting member. Participation is low, even though most of the boards have more than seven members. Actual RDC employees and members, therefore, have little control over how programs are planned and implemented. In fact, governments that are part of the RDC can withdraw if they do not approve of the regional planning.

The RDCs are so understaffed and underfunded that they are not able to establish implementation plans. RDC directors contend that because of the “lack of reliability in funding. . . RDCs must constantly seek out additional funds for basic operations.”<sup>44</sup> As a result, high employee turnover rates are prevalent and planning for the future is almost impossible. Over the past four years, funds for contractual agreements with the RDCs for planning and implementation have decreased by five percent each year.

Other funding sources—state and federal grants, local service contracts, and member dues—have also been dwindling because of poor performance, which in turn a direct result of reduced funding.

The basic funding structure for the RDCs creates a vicious cycle that makes a successful implementation scenario unlikely. Without the technical or financial resources needed, the TMDL program will be ineffective. However, without performance, the RDCs will not be allotted more money by the state legislature. In

1998, Governor Barnes vetoed a bill proposing that regional development centers receive \$600,000 for program implementation. For the 1998 TMDL implementation process, each individual RDC was issued their own contract and each RDC was allotted up to \$30,500, regardless of the number of TMDL plans required, for a total of \$488,000.<sup>45</sup>

The contracts between the Georgia EPD and the Regional Development Centers spell out the different responsibilities for each RDC. There are three different types of TMDL implementation plans, and some RDCs have two types. The highest priority implementation plans are for the segments included in the court order. These were completed and submitted to EPD in March 2001 in order for EPD to submit them to the judge by the April 19, 2001 deadline. The second type of implementation plans are for segments where TMDLs have already been prepared or have been recently proposed to the EPA. These were submitted in September 2001.

Lastly, for those RDCs not having court-ordered TMDLs or existing or recently proposed TMDLs, the EPD identified segments where TMDLs for fecal coliform (“if possible”) would be prepared in accordance with basin planning. These are not actual plans, but consist instead of implementation inventories of actions to be taken in anticipation of TMDL implementation. These were also submitted in September 2001.

There is also a great deal of variation among the number of segments requiring TMDL implementation plans in each RDC, as well as the number of people working on them. While most RDCs have only one person working primarily on this contract, there are a few that have additional resources and assistance. As shown in the table, the resources per TMDL plan are unevenly allocated. The Georgia Mountains RDC has the biggest respon-

each RDC was  
allotted up to  
\$30,500  
regardless of #  
TMDLs plan  
required.

sibility with twenty-two high priority TMDL plans that were due in March 2001. Other RDCs have only inventories that were due in September 2001.

The RDCs are understaffed for the important task of developing implementation plans. In order for the RDCs to be effective, they need more technical expertise, training, and funding. Although the EPA is ultimately accountable for the implementation of TMDLs, the Georgia EPD and RDCs must be given the resources they need.

Similarly, the state EPD is also underfunded. The state agency cannot successfully undertake such a resource-intensive project without proper financial and staff resources. In addition to increased funding overall for environmental protection programs, money must specifically be set aside for funding state-level technical personnel to complete this process. Last year, in his budget recommendations, Governor Barnes proposed sixty new positions at the EPD.

As a result, the water quality protection branch gained 21 new positions for a total of 107 positions, and was allocated a budget of \$8.5 million.<sup>46</sup> This was a step in the right direction, but greater resources are needed if the EPD can realistically be expected to meet its responsibility for protecting Georgia's waterways.

## POLICY RECOMMENDATIONS

### Monitoring

The Georgia EPD must expand its water quality monitoring programs, and accept quality-assured third party data in order to fully assess the health of Georgia's waterways. Although the EPD indicates that non-point source pollution is the largest contributor of pollution into

Georgia's rivers and streams, their primary focus is still on point source effluents. With this discrepancy and such a tiny fraction of Georgia's rivers and streams being tested, there are undoubtedly many impaired waters that have not yet been identified.

EPD should increase the extent and the quality of its monitoring:

- EPD should set goals for a target percentage of Georgia's waterways to be monitored each year, and the percentage of the entire state's waterways monitored in every five-year rotation period. Reasonable goals given appropriate efforts would be 5% of Georgia's waterways in a single year and 25% every five-year rotation period. The number of core and basin specific sites should expand accordingly, with the emphasis on core sites, as core sites are the true identifiers of water quality trends. The basin specific sites monitored each year should rise dramatically as well. Seventy-one new sites were added in 2001, and this growth should continue. Goals should be implemented by basin starting in 2002, with target percentages accomplished for each basin by the completion of the next five-year rotation period in 2006.
- EPD should increase the level of scrutiny in the testing process to provide the state with the ability to identify pesticides and other toxic chemicals that can be extremely harmful even in trace amounts.
- EPD should continue to expand its staff. The four new full-time monitors hired in 2001 is a positive move, and this trend should continue.
- EPD should increase its budget for water quality monitoring programs to facilitate expansion of the number of sites and quality of monitoring. Clean water cannot be achieved unless the EPD has the ability to

With such a tiny fraction of Georgia's rivers and streams being tested, there are undoubtedly many impaired waters that have not yet been identified.

effectively monitor and evaluate the health and quality of water in Georgia. \$1.5 million dollars per year is not enough money to do that job sufficiently.

EPD should effectively make use of water quality data collected by citizens:

- Georgia should develop a quality assurance/quality control plan (QA/QC) for all third party data and accept citizen data that meets the standards, along with data from universities, utilities, and other government agencies. The QA/QC for third party data should be in place for the inclusion of waters in the 305(b) report and on the 303(d) list for TMDL development. Citizens who are able to conduct testing under this QA/QC protocol should be able to submit their data and have it valued equally along with the data commissioned by the state.
- EPD should develop a second, less stringent QA/QC level to allow citizens without the ability to meet the higher standards to provide data that would still be useful to influence EPD decisions on where to conduct more in-depth testing.
- EPD should compile a database of citizen monitoring results.
- EPD should hold public meetings to solicit input from citizens on where to locate monitoring stations.

## Technical Solutions

The EPD and EPA, upon writing and establishing TMDLs, must work to improve the effectiveness of the TMDL documents. Both agencies should:

- Calculate all TMDLs with daily

allowable loading values as opposed to monthly or annual values. This will help protect water bodies from acute loadings of pollutants and increase the effectiveness of the TMDL program.

- Identify all margins of safety (MOS) explicitly with clearly defined, numeric margins of error that allow for outside review and public comment as to their conservatism, appropriateness, and effectiveness.
- Provide comprehensive implementation instructions and recommendations that guarantee reasonable assurance that water quality standards will be obtained. Follow the proposed EPA TMDL rule that requires “a schedule for implementation action and timeframe, a modeling and/or monitoring plan, and a description of interim, measurable milestones and criteria to be used to determine progress towards attaining water quality standards and when the TMDLs need to be revised.”

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