

# **Georgia's Statewide Water Management Plan: Recommendations to Protect Water Quality in Georgia**

Submitted by the Georgia Water Coalition  
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## **Introduction**

As Georgia's population grows, our state's water resources are being stretched further and further towards their limits, in terms of both quality and quantity. This paper focuses on water quality specifically and includes discussion of stormwater runoff, septic systems, land application systems, and total maximum daily loads. These issues all relate to a water body's ability to assimilate waste materials and pollutants, i.e. its assimilative capacity. Of the 14% of streams that are monitored in Georgia, 60% currently do not meet their designated use, reflecting the magnitude of the issue of degraded water quality in our state. Obviously, increased monitoring is going to be critical as we go forward with substate and river basin planning, so that we can measure progress towards cleaner water in Georgia for future generations. In addition, water quality protections must be adequately enforced by local, state, and federal authorities for them to be effective.

## **Stormwater Runoff**

### Introduction

Stormwater is the single largest source of pollution in urban streams. Industrial, municipal, and construction stormwater runoff are pervasive problems, particularly in Georgia's rapidly growing and heavily industrialized areas. Local governments have ordinances in place to address the issue of stormwater, but they are often inadequate and incomplete in terms of coverage and are not always enforced. We offer recommendations below as to what a model local stormwater ordinance should contain. We also discuss stream buffers as a particularly effective means to combat stormwater runoff into surface waters.

### Stream Buffers

Adequate stream buffers are the best method to protect streams from stormwater pollution and sedimentation. Buffers are areas of natural vegetation along rivers and streams that act as pollutant filters and that reduce stream bank erosion. They also protect drinking water quality in an economical way by reducing the cost of treating water. Georgia currently requires 25-foot buffers on warm-water streams and 50-foot buffers along trout streams, with larger buffers around and upstream from drinking water supplies.<sup>1</sup> In the face of a growing body of scientific data suggesting that buffers of at

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<sup>1</sup> Regulations promulgated under the Georgia Planning Act requires 150-foot buffers around drinking water reservoirs. See O.C.G.A. § 12-2-8; Georgia Comp. R. and Regs. 391-3-16-.01. They also require 100-foot buffers, with a further 50-foot impervious surface setback, for seven miles upstream of drinking water supplies.

least 100 feet are necessary, Georgia should consider larger buffers on all state waters.<sup>2</sup> New Jersey has 300-foot buffers on some of its waters; other states are beginning to take similarly aggressive steps to widen stream buffers.

### Recommendations

Georgia should consider a model stormwater ordinance for local governments to use. This ordinance should provide incentives to minimize impervious surfaces associated with new construction and include aggressive conservation planning as a tool to minimize stormwater migration off of a particular site. Following is a nonexhaustive checklist of some suggested components of a model stormwater ordinance:

1. Consider the total environmental impact of the proposed system.
2. Consider water quality as well as water quantity.
3. Be consistent with the local Plan of Development, and any existing watershed management plan.
4. Coordinate with erosion control measures and aquifer protection.
5. Minimize disturbance of natural grades and vegetation, and utilize existing topography for natural drainage systems.
6. Preserve natural vegetated buffers along water resources and wetlands.
7. Minimize impervious surfaces and maximize infiltration of cleansed runoff to appropriate soils.
8. Direct runoff to minimize off-site volume.
9. Reduce peak flow to minimize the likelihood of soil erosion, stream channel instability, flooding and habitat destruction.
10. Use wetlands and water bodies to receive or treat runoff only when it is assured that these natural systems will not be overloaded or degraded.
11. Provide a maintenance schedule for management practices, including designation of maintenance responsibilities.<sup>3</sup>

Additionally, EPD should aggressively enforce permits issued under the Clean Water Act and the Georgia Erosion and Sedimentation Act to ensure individual permittee compliance with permit limits. Finally, as stated above, Georgia should consider implementing wider stream buffers as the most economical way to ensure enough clean water and to reduce the risk of a stream exceeding its assimilative capacity.

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<sup>2</sup> See, e.g., J.L. Meyer et al., "Implications of Changes in Riparian Buffer Protection for Georgia's Trout Streams," University of Georgia Institute of Ecology (2005).

<sup>3</sup> See materials from the Nonpoint Education for Municipal Officials Network (NEMO) website, <http://nemonet.uconn.edu/>. The Etowah Habitat Conservation Plan work occurring through the University of Georgia also includes a model stormwater ordinance.

## Septic Systems

### Introduction

Georgia has roughly 1.5-2 million septic systems statewide, with approximately 40,000-50,000 new systems permitted each year.<sup>4</sup> Almost 40% of buildings in Georgia use septic systems, compared to the national average of 25%.<sup>5</sup> When septic systems are properly sited, designed, installed, and maintained, they effectively reduce or eliminate most human health or environmental threats posed by pollutants in wastewater. However, if septic systems are not properly sited, designed, installed, or maintained, they can pose significant environmental and human health risks as a result of pollutant discharge to surface water and groundwater. While failure at an individual septic site does not compare to a sewer system failure, there are large numbers of septic systems in Georgia, with more are being installed each year; therefore, the cumulative effects of septic failures can be significant. Areas with high densities of septic systems are most likely to be contaminated due to an overall increase in soil saturation, thereby impacting the soil's capacity to naturally filter septic effluent.<sup>6</sup>

### Regulatory authority

The Georgia Department of Human Resources ("DHR"), Division of Public Health, Environmental Health Section is the state agency charged with developing and enforcing the Georgia Onsite Sewage Management System Rules, which passed in February 1998.<sup>7</sup> The *Georgia Manual for On-site Sewage System Management* provides details for implementing these regulations. According to the regulations, DHR is responsible for regulating and permitting septic systems with a 1000-10,000 gallon tank capacity; tanks larger than 10,000 gallons are regulated by the Georgia Environmental Protection Division ("EPD"). Prior to the adoption of O.C.G.A. § 31-2-7, individual County Boards of Health were responsible for the regulation of septic systems.

The County Boards of Health still have certain duties under O.C.G.A. § 31-3-5, which are as follows: (1) specify locations where systems may be installed; (2) specify minimum lot size; (3) specify types of residences, buildings, or facilities which may use onsite sewage management systems; (4) issue permits for installation prior to installation; (5) inspect systems prior to completion of installation; and (6) provide ongoing maintenance of systems, except for non-mechanical residential systems.

In addition to County Boards of Health, district environmental health directors, who are housed in DHR district offices, assist with implementing regional planning and local management strategies. Additionally, each county health department employs

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<sup>4</sup> L.T. West, University of Georgia Department of Crop and Soil Sciences, personal communication, November 11, 2005. See also L.T. West and D.E. Radcliffe, comment letter "Fate of Wastewater Discharged by Onsite Systems," University of Georgia, November 22, 2005.

<sup>5</sup> *Id.*

<sup>6</sup> L.W. Canter & R.C. Knox, *Septic Tank System Effects on Ground Water Quality*, Lewis Publishers, Inc., 1985.

<sup>7</sup> See Georgia Comp. R. and Regs. 290-5-26, promulgated under O.C.G.A. § 31-2-7.

environmental health specialists to carry out the following responsibilities: (1) permit new installations; (2) inspect systems upon completion of installation; (3) inspect systems for repairs, loan closings, complaints, and additions; and (4) enforce repairs or replacements of failing systems.

### Septic system failures

Regular maintenance is vital to ensuring a properly functioning septic system. Septic tanks must be periodically emptied, or pumped, to remove the solids, or sludge, that accumulate at the bottom of the tank as part of this maintenance. Without regular maintenance, these solids will eventually fill the tank and move into the adjacent drain field where they clog pores and cause hydraulic failure of the system. When septic systems are old and not properly maintained, they will inevitably fail, contaminating both surface water and groundwater. Studies estimate that nearly 40% of onsite systems may be failing.<sup>8</sup> Septic system failures pose significant threats to drinking water quality and human health because these failures contaminate drinking water wells and cause disease and infection in people and animals.

### Contamination

We are concerned that as a result of improper siting, installation, maintenance, and sheer volume, septic systems could be significantly contributing to nutrient load in the watershed. Most contaminants come from septic drain fields and leaky sewer pipes. Household wastewater components that are potential contaminants of surface and groundwater include nitrogen, phosphorus, organic matter, suspended solids, pathogenic organisms, toxic organic compounds, and metals.

Nitrogen and phosphorus are particularly problematic for water quality, contributing to the eutrophication of lakes. Eutrophication can harm aquatic systems by leading to massive algal blooms. When algal blooms die off and decay, significant amounts of oxygen are consumed, sometimes to the point where fish and other animals die. Eutrophication can also lead to blooms of *Pfisteria*, a dinoflagellate documented on the East Coast that is linked to massive fish kills and releases toxins poisonous to humans. In addition to causing eutrophication, nitrogen is a basic chemical ingredient in the production of ammonium, which is itself toxic to many aquatic species. Furthermore, removal of nitrogen and ammonium from drinking water can be significantly expensive.<sup>9</sup> A recent study found a strong correlation between human population, septic system densities, and nitrate groundwater contamination.<sup>10</sup>

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<sup>8</sup> Id.

<sup>9</sup> D. Welsch, USDA Forest Service, *Riparian Forest Buffers: Function and Design for Protection and Enhancement of Water Resources* (1991), at [http://www.na.fs.fed.us/spfo/pubs/n\\_resource/riparianforests/index.htm](http://www.na.fs.fed.us/spfo/pubs/n_resource/riparianforests/index.htm).

<sup>10</sup> E. Nizeyimana et al., *Statewide GIS/Census Data Assessment of Nitrogen Loadings of Septic Systems in Pennsylvania*, 25 J. ENVIRON. QUAL. 346-354 (1996).

Human waste contributes to aquatic degradation because it carries pathogenic microorganisms and organic matter. Fecal coliform is often used as an indicator for the presence of pathogenic microorganisms. Organic matter is broken down by aerobic bacteria in water, which causes a rapid consumption of oxygen. High levels of organic matter with high biological oxygen demand (“BOD”) can consume all available oxygen in a waterway, killing fish and other organisms.

#### Factors contributing to septic system failure

Several factors contribute to the failure of septic systems. Each of these factors can be remedied through proper siting, design, installation, and maintenance. Poor maintenance is a major cause of septic system failure. Sludge and floating scum must be removed periodically to ensure proper functioning. Septic systems need to be inspected by a qualified professional at least every three years, and the septic tank should be pumped as recommended by the inspector. Septic tanks should also be pumped every three to five years, depending on the number of people in the household, the amount of wastewater generated, the volume of solids in wastewater, and the size of the septic tank. Currently in Georgia, regular inspections of tank installation occur prior to completion of installation; inspections after installation only take place for repairs, loan closings, complaints, or building additions. Inspections at property transfer and periodic inspections (every three to five years) are not required by state regulations. Regular inspections are the best and cheapest way to keep these systems functioning.

Lack of public education and understanding is another major factor contributing to septic system failure. According to the U.S. Environmental Protection Agency, the National Small Flows Clearinghouse, and other reputable sources, homeowner awareness is imperative to keeping a septic system functioning properly. Georgia regulations state, “The property owner shall be responsible for properly operating and maintaining the on-site sewage management system to increase the life expectancy and prevent failure.”<sup>11</sup> Homeowner education is necessary to achieving this result. Most counties distribute brochures through county health departments educating homeowners about proper maintenance. DHR has a homeowner’s guide to septic systems that can be printed from the Internet. In most places, this is the extent of education. Educated and responsible homeowners will more likely be diligent in ensuring that their systems are operated and maintained properly, which will reduce the number of failures and their adverse effects on surface water and groundwater.<sup>12</sup>

Another contributor to system failure is poor location and design. Septic systems are often placed in areas with unsuitable soils. Regions of North Georgia have soils with relatively high compositions of clay. Clay soils retain water, prolonging soil saturation. This can prevent adsorption of the effluent, which in turn, prevents adequate filtration in the drainage field. Sandy soils, like those along the Georgia coast, drain too quickly

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<sup>11</sup> Georgia Comp. R. and Regs. 290-5-26-.18.

<sup>12</sup> U.S. EPA, Office of Water, *Responses to Congress on Use of Decentralized Wastewater Treatment Systems*, EPA 832-R-99-001b (1997), at [http://www.epa.gov/owm/septic/pubs/septic\\_rtc\\_exec.pdf](http://www.epa.gov/owm/septic/pubs/septic_rtc_exec.pdf) (Contents and Executive Summary).

because of their low water retaining capacity. Coastal Georgia depends on groundwater, which could easily become contaminated without proper maintenance of septic systems. In addition to places with unsuitable soils, riparian buffers along waterways and areas that experience surface water runoff are inadequate places for septic systems due to the threat of drinking water contamination. Regarding design, septic tanks in Georgia installed prior to February 2000 only have a single compartment, whereas tanks installed after February 2000 have a double compartment and effluent filter to aid in removing solids.

The age of a septic system is another contributing factor to septic system failure. As described above, newly installed septic tanks have a double compartment; however, tens of thousands of septic systems were installed prior to February 2000 with only a single compartment. Also, Georgia now requires the completion of multiple hydraulic conductivity rate tests, or perc tests, along with an analysis of soil classification maps by trained specialists. These regulations will help with future siting concerns. Again, there are tens of thousands of older septic systems that were installed prior to these regulations. In addition, some old tanks are designed in a way that makes them inaccessible for maintenance. Another problem with old septic systems is that they were placed on properties intended for vacation houses, not full time residency. Many of these houses are now being occupied for longer periods of time than initially intended, affecting the functionality of the system. More significantly, houses are being torn down and replaced by larger houses on the property using the same septic system – a common occurrence as development continues around the lakes and other waterways in Georgia.

Other contributing factors include excessive water use and damage to the drain field. More wastewater entering the system than the system can handle can lead to overflow. Using water efficiently is a way to avoid this problem. Damaging the drain field can affect its ability to filter the effluent. Tree roots, paving, and parking over drain fields can all cause damage.

### Recommendations

The Georgia Water Coalition recommends the following guidelines to prevent septic system failures:

First, more aggressive educational programs concerning septic tank maintenance and operation are critical to prevent septic systems from failing. Educational programs could include seminars, presentations to homeowners, and videos. Educational materials are only useful if they reach the people who need them. U.S. EPA produces “A Homeowners Guide to Septic Systems,” which is a 15-page, user-friendly booklet in English and Spanish that explains the structure and function of septic systems, why maintenance is necessary, how to maintain the system, tips for water efficiency, causes of failures and how to identify failures, sources for additional information, and a simple list of dos and don’ts to keep septic systems working properly.<sup>13</sup> Georgia DHR produces a

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<sup>13</sup> See U.S. EPA, Office of Water, *A Homeowner’s Guide to Septic Systems* (2005), at [http://www.epa.gov/owm/septic/pubs/homeowner\\_guide\\_long.pdf](http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf).

homeowner's guide as well that can be downloaded from the Internet.<sup>14</sup> These are helpful guides, but not all homeowners have Internet access. Materials such as these should be provided as a matter of course to all homeowners on septic systems, as well as contact information for calling about scheduling inspections.

Second, regulations are needed that require routine maintenance and onsite system repair. For example, Douglas and Gwinnett Counties require homeowners with septic tanks to pump their tanks every few years.<sup>15</sup> However, most counties have no requirements for regular maintenance, inspection, or pumping. The current regulations expect unaware and uninterested homeowners to be responsible for maintaining their wastewater system. State and local officials should establish a schedule for inspections and clean-up and/or a fine schedule for homeowners who fail to maintain their septic systems, especially those who live around sensitive areas such as waterways. Tax credits could be offered for the replacement or upgrade of old septic systems.

Third, septic tanks or septic tank drain fields should not be placed within riparian buffers. As stated above, buffers are necessary to maintaining good water quality, and nutrient control depends on having continuous buffers along streams. For example, in Douglas County, an additional 200-300-foot setback is required for septic systems, in addition to the required 100-foot buffer.<sup>16</sup> A study by Hanson et al found that a 31-meter, or 102-foot, riparian buffer down-slope from a septic drain field lowered shallow groundwater nitrate concentrations by 94%, from 8 mg/L to 0.5 mg/L.<sup>17</sup>

Finally, planning is critically important regarding septic systems. The state should coordinate with universities or other research institutions that are currently researching septic systems to develop a comprehensive research and planning program to evaluate the impacts of septic systems on state waterways, considering factors such as unsuitable soils, ecological sensitivity, and water availability. This research should include identifying critical riparian areas in which existing land uses may pose threats to water quality, such as older homes with aging septic systems. It should also differentiate areas where septic systems might be a viable option versus areas where septic systems could have major impacts on water quality.

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<sup>14</sup> See Georgia Department Of Human Resources Environmental Health Section, A Homeowners Guide To On-Site Sewage Management Systems (2002), at <http://health.state.ga.us/programs/envservices/documents.asp>

<sup>15</sup> R. K. Quigley, *Septic Or Sewer? UGA, A-C To Flush Out Pros, Cons: Waste Study*, ATHENS BANNER HERALD, March 17, 2006..

<sup>16</sup> S. J. Wenger & L. Fowler, *Protecting Stream and River Corridors: Creating effective local riparian buffer ordinances*, Carl Vinson Institute of Government, University of Georgia (2000), at [http://www.rivercenter.uga.edu/publications/pdf/riparian\\_buffer\\_guidebook.pdf](http://www.rivercenter.uga.edu/publications/pdf/riparian_buffer_guidebook.pdf).

<sup>17</sup> G.C. Hanson, P.M. Groffman, & A. J. Gold, *Denitrification In Riparian Wetlands Receiving High And Low Groundwater Nitrate Inputs*, 23 J. ENVIRON. QUAL. 917-922 (1994).

## Land Application Systems

### Introduction

Land application systems (“LAS”) are designed to use the land to help treat wastewater effluent. Some are also used to treat sewage sludge. In a LAS, water is collected and discharged to a holding pond where solids settle out and the wastewater is aerated. The effluent is then pumped to areas known as sprayfields where it is land applied. The wastewater may be land applied on fields growing a cover crop, such as Bermuda grass, or on a forested area. Ideally, the plant matter growing on the fields will uptake the water, nutrients, and other contaminants retained in the water after pretreatment.

Additionally, some LAS are designed for areas of human contact. These systems are called Urban Water Reuse Systems and fall under the LAS permitting program of EPD. Wastewater must be treated to tertiary standards to be considered for a reuse system due to the likelihood of human contact. The water for these systems must have gone through three treatment processes prior to land application: 1) Biological oxidation/clarification; 2) Coagulation/Filtration; and 3) Disinfection. However, most LAS utilize only primary<sup>18</sup> and some secondary<sup>19</sup> treatment prior to land application.

### Environmental Ramifications

Since LAS use the land to complete the treatment of the wastewater (i.e., remove additional contaminants remaining after pretreatment), it is vital that the LAS be intensively managed to ensure that water leaving the site is completely treated by the land. Application rates, soil permeability, and topography affect the effectiveness of LAS. Over-application (applying more water than the soils and cover crop can uptake) often results in wastewater flowing over land to the nearest drainage without being completely treated. Highly permeable, sandy soils do not allow for adequate retention times for the plants to uptake the nutrients, and the wastewater rapidly leaches downward to the shallow groundwater table. LAS situated on steep slopes may result in significant runoff of the wastewater being applied. While LAS are considered non-discharging systems, published accounts and reviews of the discharge monitoring reports of permitted facilities demonstrate that partially treated wastewater from LAS may enter groundwater and eventually surface water.

In areas with sandy soils, the land may not hold the water long enough to ensure proper treatment. In the coastal plain of Georgia, monitoring wells on the down-gradient (downhill) portion of LAS routinely indicate increasing levels of nitrate. Nitrates are negatively charged ions that are easily leached out to groundwater since they are repelled by negatively charged soil particles, making soil absorption less likely. The maximum

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<sup>18</sup> Primary treatment is the removal of solids from wastewater.

<sup>19</sup> Secondary treatment is the removal of organic matter such as nutrients and other contaminants from wastewater. The EPA defines minimum secondary treatment by the removal of five-day biological oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS). LAS permits have pretreatment limits for BOD<sub>5</sub> and TSS. Some also require additional monitoring for nutrients, but permit limits on nutrients prior to application are rare.

contaminant level for nitrate is 10 mg/l, yet many LAS have down-gradient monitoring wells that exceed these limits. Surface water monitoring conducted in the vicinity of LAS generally indicates an increasing trend in nutrient levels downstream from these facilities. As a concrete example, algae blooms in the Canoochee River downstream from two LAS have been linked to groundwater contributions of nutrients from one of the LAS.<sup>20</sup> Additionally, there is significant concern that LAS may contaminate potential “shallow” drinking water wells off-site.

Saturation of sprayfields is a regular occurrence at many older LAS facilities. The older LAS are installing underdrain systems to drain water from the sprayfields more rapidly to surface water. The installation of an underdrain shortens the retention time of the wastewater in the soils, and may significantly reduce the effectiveness of LAS.

Another concern generated by LAS is the use of land to remove contaminants. Heavy metals and other persistent contaminants found in municipal and industrial wastewater are rarely removed during the LAS pretreatment process. These contaminants will either build up in the soils of the sprayfields or leach out to groundwater and ultimately to surface water, depending on soil pH.

### Trends in LAS

Throughout rural Georgia, small municipalities are being encouraged to move to LAS rather than install package plants or other, more advanced treatment facilities. Older LAS systems installed at municipalities are now installing underdrains to remove water from saturated areas of the sprayfields. The installation of an underdrain requires a NPDES permit.

### Legal/Regulatory Status

EPD has recognized that LAS discharge to groundwater. In the Basin Advisory Council discussion packet on maximizing returns, developed as part of the comprehensive statewide water planning process, the EPD recognizes, “...some portion of the effluent sprayed on to the large vegetated areas used for land application will find its way into streams through stream/aquifer interactions.” (See p. 12). Surface water monitoring, published reports, and discharge monitoring reports also indicate that LAS facilities discharge to surface water through groundwater/surface water interactions. Yet the permits issued to LAS facilities are not issued under the NPDES monitoring program; LAS permits are state-issued permits.

### Recommendations

Prohibiting LAS on significant groundwater recharge areas and areas of high pollution susceptibility would be a good first step in ensuring that LAS do not contaminate groundwater. To the maximum extent practicable, LAS should not be in

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<sup>20</sup> C.M. Brown, “Investigating Nitrogen Pollution in the Canoochee River, Evans County, Georgia.” Thesis, Georgia Southern University (2002).

place if they result in interbasin transfers, which could ultimately affect a stream's assimilative capacity. A strict prohibition against land applying wastewater during rain events should be incorporated into each and every permit. Violations of LAS permits should be enforceable either under the Clean Water Act or by enacting a citizen suit provision for violations of state-issued permits. Finally, LAS should be endorsed for Urban Water Reuse Systems only after the completion of tertiary treatment.

### **Total Maximum Daily Loads**

#### Introduction

A total maximum daily load ("TMDL") is a prescription for correcting impairments and for getting water bodies off the Clean Water Act's Section 303(d) impaired waters list. A TMDL is the sum of a particular pollutant from natural and anthropogenic point sources ("wasteload allocation") and nonpoint sources ("load allocation") within a watershed that reflects seasonal changes and also includes a margin of safety. Essentially, the TMDL is a cumulative "cap" reflecting all combined sources of a single pollutant that a water body can safely handle and still meet applicable state water quality standards.

Over 800 stream, river, and lake segments in Georgia require TMDLs because these water bodies do not fully support their designate uses for drinking water supply, recreation, fishing, wild and scenic rivers, or for coastal fishing. For each of these designated uses, specific water quality criteria exist for pathogens (for the most part fecal coliform bacteria), dissolved oxygen, pH, temperature, and nutrients. The largest category of TMDL for Georgia's waters is fecal coliform. The presence of fecal coliform bacteria in water bodies is an indicator of pathogens, or disease-causing organisms, as a result of contamination from human waste and waste from other warm-blooded animals. The following table illustrates the mileage and acreage of impaired waters in Georgia, along with the types of impairments our waters face:

State	Impaired	Sedimentation	Nutrients	Pathogens	Toxics/ Metals/ Inorganics	Toxics/ Organics	Mercury	Pesticides	Other
Georgia	Miles	149	16	2649	1918	1	250	76	5936
	Acreage	132	0	45411	123012	0	16196	225	229830

Adapted from EPA website: <http://www.epa.gov/owow/tmdl/303dcaus.html>

#### Georgia's TMDL Policy

The Georgia EPD has developed a three-tiered approach to address the level of effort and costs of developing TMDL implementation plans. Tier 3 plans are the least costly, are conducted by EPD personnel, and include streams that are impaired due to natural conditions as well as those that partially support designated uses. Tier 2 plans require more effort and are implemented by Regional Development Centers ("RDCs"). Tier 1 plans are the same as tier 2 but delve the furthest into nonpoint source identification for each type of pollutant, along with an identification of best management practices ("BMPs").

## Recommendations

The Georgia Water Coalition recommends that, as a first step, local governments and citizens be properly educated about the TMDL system and any implementation plans that are in place. Funding is also critical to the success of this program. In 2001, EPD had a budget of only \$1.5 million for water monitoring statewide, which is a major reason most Georgia stream miles are unmonitored. This lack of water quality monitoring can lead to a false sense of security about the quality of unknown water bodies. Monitoring should be enhanced to cover a broad range of pollutants, and it should be conducted at a reasonable frequency to ensure scientific accuracy. The State of Georgia should adopt a permit fee system similar to our Southeastern neighbors in order to generate revenue to administer the program. These fees should raise enough revenue to cover our budget gap of at least \$6.6 million. Ideally, these polluter fees should also be scaled to fairly reflect the amount and type of pollution.

In addition to enhanced monitoring, the implementation and enforcement of TMDLs should be conducted by EPD, with the proper funding to administer the program. Currently, implementation of TMDL plans is primarily in the hands of RDCs who lack staff and technical support to handle implementation work. Nor do these agencies have any incentives to perform; their constituent local governments tend to regard the TMDL program as a source of additional, unwanted costs and responsibilities. Implementation and enforcement need to be placed back in the hands of EPD. Furthermore, EPD's discharge permitting should accurately reflect any implementation plan that is in place; an aggressive waste load and load allocation strategy should be in place to ratchet back permits in a fair and efficient timeframe where that proves necessary to maintain and improve water quality. Finally, TMDLs and their implementation plans should be technically improved in order to ensure that daily pollution limits are set, all sources of pollution are addressed, a conservative margin of safety is set, seasonal variations are properly taken into account.