

## Acknowledgements

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### Special Contributions:

Georgia Environmental Protection Division, Georgia Adopt-A-Stream Advisory Board, Georgia Adopt-A-Stream Community Coordinators

### Writers/Editors

Georgia Adopt-A-Stream staff

Advice and some of the material in this manual was taken from the following documents:

*Volunteer Stream Monitoring: A Methods Manual* EPA 841-B-97-003  
Hach Company  
LaMotte Company  
EPA Rapid Bioassessment Protocols  
EPD Rapid Bioassessment Protocols  
Save Our Streams, Izaak Walton League of America

## Resources Available from Georgia Adopt-A-Stream

- Organization and technical support
- Website at [www.GeorgiaAdoptAStream.org](http://www.GeorgiaAdoptAStream.org)
- Online water quality data clearing house
- *Getting To Know Your Watershed* manual & workshop\*
- *Visual Stream Survey* manual & workshop \*
- *Macroinvertebrate and Chemical Stream Monitoring* manual & workshop \*
- *Bacterial Monitoring* manual & workshop
- *Amphibian Monitoring* manual & workshop
- *Adopt-A-Wetland* manual & workshop for freshwater wetlands
- *Coastal Georgia Adopt-A-Wetland* manual & workshop
- *Adopt-A-Lake* manual & workshop
- *Adopt-A-Stream Educator's Guide* & workshop
- *Rivers Alive 'Guide to Organizing and Conducting a Cleanup'*
- *'Life at The Water's Edge'* brochure on protecting, preserving and restoring local waterways
- *Georgia Adopt-A-Stream: It All Begins With You* video
- Train – The – Trainer workshops
- 'You Are The Solution To Water Pollution' posters and brochures
- Quarterly newsletters (available also in e-newsletter format)
- Confluence, our annual volunteer conference and award ceremony

\* Available in Spanish

## Getting Started with Georgia Adopt-A-Stream

Georgia Adopt-A-Stream (AAS) is a statewide volunteer water quality monitoring program. AAS is housed in the NonPoint Source Program in the Watershed Protection Branch of the Georgia Environmental Protection Division (EPD) and is funded by a United States Environmental Protection Agency (U.S. EPA) Section 319(h) Grant. Georgia Adopt-A-Stream encourages individuals and communities to monitor and/or improve sections of streams, wetlands, lakes or estuaries. Manuals, training and technical support are provided through Georgia EPD and more than 60 established Community Adopt-A-Stream organizers. Adopt-A-Stream Community Programs organize monitoring groups in their watershed, county or city. These local programs are funded by counties, cities and nonprofit organizations and use the Georgia Adopt-A-Stream model, manuals and workshops to promote nonpoint source pollution education and data collection in their area.

The goals of Georgia Adopt-A-Stream are easy to remember by thinking about the word “**ADOPT**”.

**A**wareness: Increase public awareness of the State’s nonpoint source pollution and water quality issues

**D**ata: Collect baseline water quality data

**O**bservations: Encourage volunteers to take observations of their adopted site and surrounding environment

**P**artnerships: Encourage partnerships between citizens and their local government

**T**ools and Training: Provide citizens with the tools and training to evaluate and protect their local waterways

### **Awareness**

Georgia Adopt-A-Stream has been tasked with the goal of increasing public awareness of the State’s nonpoint source pollution and water quality issues. We accomplish this through workshops, outreach materials such as newsletters, manuals and brochures, as well as our annual volunteer conference and by presenting at community events. We encourage our volunteers to also foster this goal, by building awareness within their own communities.

### **Data**

Georgia Adopt-A-Stream houses an online clearinghouse for volunteer water quality data for the State of Georgia. This water quality data is publicly accessible on our website at [www.GeorgiaAdoptAStream.org](http://www.GeorgiaAdoptAStream.org) and can be viewed at the city, county and watershed level to help citizens better understand the health of their local waterways. Volunteer monitoring data is used to educate the public and help local, state and federal agencies make informed decisions and to identify water quality impairments.

## Observations

Careful observations of our waterways can lead to success in protecting and improving its conditions. In addition to the data found on the datasheets, you may notice other details that are important to record when visiting your adopted site. Stay aware of baseline conditions so if anything changes in future visits, you will be able to tell and can act accordingly.

## Partnerships

Adopt-A-Stream encourages new groups to inform their local government about their activities and to create partnerships with local schools, businesses, watershed organizations and government agencies. These partnerships can enhance your program by providing support for your group through data interpretation, advice on restoration techniques, remediation, sponsorships and volunteer recruitment. We cannot emphasize enough the importance of beneficial partnerships to any volunteer monitoring group. If you need help establishing partnerships, we encourage you to contact your local coordinator/trainer or the AAS state office.

## Tools and Training

The Adopt-A-Stream program offers many levels of involvement including training, certification and monitoring. Some of our monitoring programs require the volunteer to obtain Quality Assurance/Quality Control certification (QA/QC), which is accomplished by attending a workshop and passing the QA/QC test. This certification allows the volunteer to enter data into the database. Our non-QA/QC programs offer a training workshop and manuals, but certification is not required. Manuals and support materials are provided for each monitoring type to guide volunteers through the monitoring process. To find out more about different levels of involvement, visit our website: <http://georgiaadoptastream.org>.

### **Adopt-A-Stream Certifications and Monitoring Programs For Freshwater and Coastal Waterways**

Watershed Assessments (Y)	Visual Monitoring (Q)
Macroinvertebrate Monitoring (Q)*	Amphibian Monitoring (bi-monthly)
Chemical Monitoring (M)*	Bacterial Monitoring (M)*
Freshwater Wetland Monitoring (Q)	Coastal Monitoring (M)*
Lake Monitoring (M)	Rivers Alive (annually)
Trainer Certification*	Adopt-A-Stream in the Classroom

\*=QA/QC programs    M=Monthly Sampling    Q=Quarterly Sampling    Y=Yearly Sampling

Currently, Adopt-A-Stream has thousands of active volunteers who monitor over 500 sites and our quarterly newsletter has over 8,000 subscribers. We invite you to join us to help protect Georgia's water resources.

## Water Quality in Georgia

*As outlined in Water Quality in Georgia, 2010-2011, Chapter 1, Executive Summary (Georgia Environmental Protection Division, Department of Natural Resources)*

Georgia is one of the fastest growing states in the nation. Between 2000 and 2010, Georgia gained 1.5 million new residents, ranking 4th nationally. The increasing population places considerable demands on Georgia's ground and surface water resources in terms of water supply, water quality, and in the assimilative capacity of rivers to receive wastewaters from industrial and municipal discharges. To address these demands, the General Assembly and Governor Perdue in February 2008 approved the implementation of the Comprehensive State-wide Water Management Plan in Georgia. The regional water plans are not themselves an end. The plans present solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities. The plans are based on consistent, statewide forecasts of needs and reflect the best available information on the capacities of Georgia's waters. More about these plans can be found at:

<http://epd.georgia.gov/georgia-305b303d-list-documents>.

The pollution impact on Georgia streams has radically shifted over the last several decades. Streams are no longer dominated by untreated or partially treated sewage discharges which resulted in little or no oxygen and little or no aquatic life. The sewage is now treated, oxygen levels have returned and fish have followed. However, another source of pollution is now affecting Georgia streams. That source is referred to as nonpoint and consists of mud, litter, bacteria, pesticides, fertilizers, metals, oils, detergents and a variety of other pollutants being washed into rivers and lakes by stormwater. Even stormwater runoff itself, if rate and volume is unmitigated, can be extremely detrimental to aquatic habitat and hydrologic systems. Nonpoint source pollution, although somewhat less dramatic than raw sewage, must be reduced and controlled to fully protect Georgia's streams. Structural and nonstructural techniques such as green infrastructure, pollution prevention and best management practices must be significantly expanded to minimize nonpoint source pollution. These include both watershed protection through planning, zoning, buffer zones, and appropriate building densities as well as increased use of stormwater structural practices, low impact development, street cleaning and perhaps eventual limitations on pesticide and fertilizer usage.

Another issue of importance is the reduction of toxic substances in rivers, lakes, sediment and fish tissue. This is extremely important in protecting both human health and aquatic life. The sources are widespread. The most effective method to reduce releases of toxic substances into rivers is pollution prevention, which consists primarily of eliminating or reducing the use of toxic materials or at least reducing the exposure of toxic materials to drinking water, wastewater and stormwater. It is very expensive and difficult to reduce low concentrations of toxic substances in wastewaters by treatment technologies. It is virtually impossible to treat large quantities of stormwater and reduce toxic substances. Therefore, toxic substances must be controlled at the source.

Nutrients also serve a very important role in our environment. They provide the essential building blocks necessary for growth and development of healthy aquatic ecosystems. However, if not properly managed, nutrients in excessive amounts can have detrimental effects on human health and the environment, creating such water quality problems as excessive growth of macrophytes and phytoplankton, harmful algal blooms, dissolved oxygen depletion, and an imbalance of flora and fauna. In Georgia, site specific nutrient criteria have been adopted for several major lakes and their tributaries. Some of these lakes are currently listed for chlorophyll a, which is the primary biological indicator in lakes for nutrient over-enrichment. TMDLs, based on watershed modeling, have been completed or are in development to address the nutrient issues for these lakes. Currently, the Georgia EPD is in the process of collecting the necessary data and information for use in developing nutrient standards for rivers, streams and other waterbodies in Georgia. Determining the relationship of nutrient levels and biological response is necessary in order to develop appropriate nutrient criteria.

It is clear that local governments and industries, even with well-funded efforts, cannot fully address the challenges of toxic substances and nonpoint source pollution control. Citizens must individually and collectively be part of the solution to these challenges. The main focus is to achieve full public acceptance of the fact that what we do on the land has a direct impact on water quality. Adding more pavement and other impervious surfaces, littering, driving cars which drip oils and antifreeze, applying fertilizers and other activities and behaviors all contribute to toxic and nonpoint source pollution. If streams and lakes are to be pollutant free, then some of the everyday human practices must be modified. The Georgia EPD will be emphasizing public involvement; not only in decision making but also in direct programs of stream improvement. The first steps are education and Adopt-A-Stream programs.

## Water Resources Atlas

State Population (2012 estimate)	9,383,941
State Surface Area	58,910 square miles
Number of Major River Basins	14
Number of Perennial River Miles	44,056 miles
Number of Intermittent River Miles	23,906 miles
Number of Ditches and Canals	603 miles
Total River Miles	70,150 miles
Number of Lakes Over 500 Acres	48
Acres of Lakes Over 500 Acres	265,365 acres
Number of Lakes Under 500 Acres	11,765
Acres of Lakes Under 500 Acres	160,017 acres
Total Number of Lakes & Reservoirs, Ponds	11,813
Total Acreage of Lakes, Reservoirs, Ponds	425,382 acres
Square Miles of Estuaries	854 square miles
Miles of Coastline	100
Acres of Freshwater Wetlands	4,500,000 acres
Acres of Tidal Wetlands	384,000 acres

*Water Quality in Georgia, 2010-2011, Chapter 3, Water Quality Monitoring and Assessment (Georgia Environmental Protection Division, Department of Natural Resources)*

# Introduction

## MACROINVERTEBRATE & CHEMICAL STREAM MONITORING

Welcome to Georgia Adopt-A-Stream; *Macroinvertebrate and Chemical Stream Monitoring*. This manual is intended for Adopt-A-Stream monitoring groups who have already registered with the program and are eager to take their monitoring activities to the next level. This manual describes methods for evaluating the physical, chemical, and biological parameters of your adopted stream or river.

*Getting to Know Your Watershed* focuses on map assessments and a watershed survey as evaluation tools. *Visual Stream Monitoring* introduces a diversity of low-cost, hands-on methods for analyzing the physical health of your adopted stream.

Different levels of involvement offer different levels of activity. At the most basic level, volunteers register with Georgia Adopt-A-Stream, conduct a watershed assessment and perform visual surveys of their adopted stream. Optional participation includes chemical, macroinvertebrate and bacterial monitoring, and/or a habitat enhancement project.

- |                                |                            |
|--------------------------------|----------------------------|
| • Watershed Assessment         | Once a year                |
| • Visual Monitoring            | 4 times a year (quarterly) |
| • Macroinvertebrate Monitoring | 4 times a year (quarterly) |
| • Physical/Chemical Monitoring | 12 times a year (monthly)  |
| • Bacterial Monitoring         | 12 times a year (monthly)  |
| • Habitat Enhancement          | One time project           |

Macroinvertebrate and chemical monitoring requires training. Training workshops are available through the Adopt-A-Stream State office as well as through our more than 60 local Adopt-A-Stream programs. Training includes an overview of the program, monitoring techniques and quality assurance tests.

These activities **help protect water quality and streams** because:

- Regular monitoring provides specific information about the health of your local stream.
- Both long-term trends and immediate changes in water quality can be documented.
- Macroinvertebrate monitoring will detect changes in water quality and habitat and provides an indication of overall stream health.
- Chemical monitoring, however, provides specific information about water quality parameters that are important to aquatic life – such as dissolved oxygen and pH.
- Habitat enhancement projects improve streambanks and/or the streambed. Habitat enhancement projects may stop a streambank from eroding, and therefore decrease the amount of sediment entering a stream or improve an in-stream habitat for fish to feed, hide and lay eggs.

## Quality Assurance Certification

Georgia Adopt-A-Stream's monitoring program is aligned with the protocols set forth in our Quality Assurance Project Plan (QAPP) that has been submitted to and approved by the United States Environmental Protection Agency (US EPA). This plan is the core of our monitoring program and it is essential that volunteer monitors follow these protocols to ensure the collection of credible data. Volunteers who wish to ensure that their data is of the highest quality, can become quality assurance quality control (QA/QC) certified. Quality assurance quality control certification is part of every chemical and macroinvertebrate training workshop. Data collected under a QA/QC plan can be entered into the Adopt-A-Stream database and is often used by local and state agencies to assess water quality conditions. To become a QA/QC volunteer, the following conditions must be met.

### Macroinvertebrate Certification

Volunteers must:

1. Attend a QA/QC macroinvertebrate monitoring workshop.
2. Demonstrate the ability to collect a macroinvertebrate sample.
3. Identify, with 90% accuracy, no less than 20 macroinvertebrates and correctly calculate the water quality index.
4. Pass the written test with a score of at least 80%.
5. Re-certify annually in order to submit QA/QC data.

### Chemical Certification

Volunteers must:

1. Attend a QA/QC chemical monitoring workshop.
2. Demonstrate testing methods that achieve results within duplicate precision of those obtained by a certified Adopt-A-Stream trainer.
3. Pass the written test with a score of at least 80%.
4. Volunteers must replace test kit reagents as they expire or become contaminated.
5. Re-certify annually in order to submit QA/QC data.

### Trainer Certification

Georgia Adopt-A-Stream has a trainer program for our chemical, macroinvertebrate, and bacterial monitoring programs.

#### Criteria for new trainers:

- Attend a macroinvertebrate (6-hours), chemical (5-hours), or bacterial (4-hours) Train-The-Trainer workshop and pass field and written tests. To attend a TTT workshop, one must have current QA/QC certification in the training of interest, have working knowledge of biology, chemistry, microbiology or a related field, and commit to conducting two workshops within a year. Train-The-Trainer workshops cover what it means to be a trainer, how to conduct a workshop, and how to work with volunteers.
- After attending the TTT workshop, a new trainer must do two co-trainings with another trainer who has been approved by the State Office. These co-trainings count towards the two workshops that a trainer commits to do within a year.

## **Safety and Health Checklist**

Your safety and health are of number-one importance to Georgia Adopt-A-Stream. There are several important things to remember when you are monitoring your adopted stream, river, lake or wetland. If you follow these “rules of monitoring” you will have a fun, enjoyable and accident-free experience.

### **Before visiting your site:**

- Develop a site emergency plan: (i.e. site location, nearest medical center, nearest phone, medical conditions of team members and their emergency contact, etc.).
- Check weather reports. Stop monitoring if a storm occurs while you are monitoring.
- Determine if you have safe, legal access to your site.

### **Rules to monitor by:**

- Your adopted site should be wadeable or accessible by a bridge. Do not monitor waters that are deeper.
- If at any time you feel uncomfortable about the condition of the waterbody or your surroundings, stop monitoring and leave the site.
- Monitor during base flow conditions. Do not monitor if the waterbody is at flood stage. Fast moving water is very dangerous. Never wade in swift or high water.
- Never cross private property without the permission of the landowner.
- Always bring your ‘Who to Call List’ found on the Adopt-A-Stream website.
- If you are sampling from a bridge, be wary of passing traffic. Never lean over bridge rails unless you are firmly anchored to the ground or the bridge with good hand/foot holds. If walking under a bridge, watch for objects knocked off the road from overhead.
- Look out for broken glass, poison ivy, snakes and biting/stinging insects.
- Never drink the water. Always wash or sanitize hands after monitoring.
- Do not monitor if the water body is posted as unsafe for body contact.
- Carry a first aid kit with you.
- Adopt-A-Stream recommends that you monitor with another person.
- Wear gloves while monitoring.

**If you observe any of the following at your sampling station STOP and refer to your 'Who to Call List' for the course of action.**

- STOP! If you observe closed or leaking drums near or in the water.
- STOP! If you observe a large quantity of dead fish or other organisms.
- STOP! If you observe a pipe discharging odd looking/smelling substance into the water.

**Monitoring in areas with high fecal coliform levels:**

The following conditions warrant concern for high fecal coliform levels; occurrence of heavy rain in the past 24 hours, muddy water, a leaking sewer line and/or the presence of a large number of animals in the water. If monitoring in these conditions please take the following precautions:

- If you have open or incompletely healed wounds, avoid any contact with water.
- Avoid swimming or other high contact activities for at least 24 hours after heavy rains, or if water is obviously muddy.
- Avoid stirring or disturbing sediment. There are higher survival rates of bacteria and potentially other pathogens in sediment.
- Avoid swimming or other high contact activities areas where fecal droppings from wildlife are obvious, large numbers of wildlife are present (ducks, geese), or domestic or companion animals are observed in the waterway or on shore (cows, dogs, etc.).
- Anyone with a compromised immune system should avoid any primary contact activities in waters that have elevated levels of fecal bacteria.
- Avoid contact with water for at least a week if recovering from gastrointestinal illness, especially children.

**Health Safety Contacts:**

**Georgia Department of Public Health**

404-657-2700

<http://dph.georgia.gov/contact-dph>

**Centers for Disease Control**

1-800-232-4636

<http://www.cdc.gov>