GEORGIA

*A*dopt-A-Stream

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Department of Natural Resources
Environmental Protection Division

Adopt-A-Stream Approves A New Core Parameter

In August, Adopt-A-Stream approved the use of conductivity as one of the four core parameters tested by Adopt-A-Stream volunteers. Conductivity will replace settleable solids in the standard core measurements. The four core parameters that we ask volunteers to measure each month are:

- Temperature (air and water)
- pH
- Dissolved Oxygen
- Conductivity

Conductivity is an inexpensive and relativity easy way to estimate the total dissolved solids in a sample and serves as an indicator of water quality problems. Conductivity in natural systems is affected primarily by the geology of the area through which the water flows. Streams that run through areas with granite bedrock such as in North Georgia tend to have lower conductivity because granite is composed of more inert materials that do not ionize (dissolve into ionic components) when washed into the water. On the other hand, streams that run through areas with clay soils tend to have higher conductivity because of the presence of materials that ionize when washed into the water.

While streams have natural sources that affect conductivity readings, anthropogenic (human caused) sources may also cause significant changes in conductivity. An overflowing sewer manhole or a leaky septic system, containing nitrates and phosphates can result in an elevated conductivity reading whereas an oil spill would reduce conductivity. Other sources that influence conductivity include:

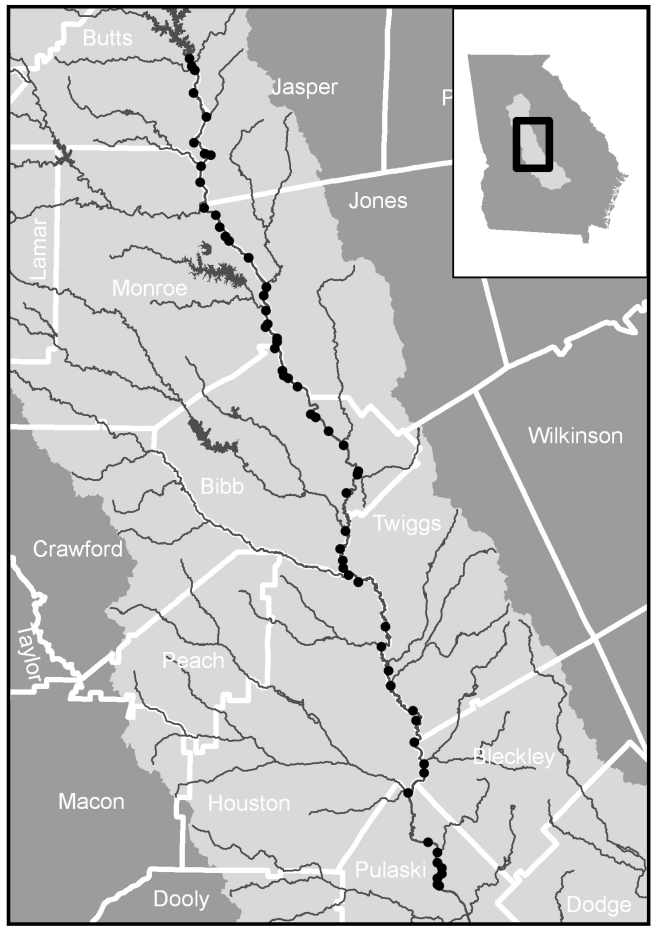
- Wastewater treatment discharge can raise conductivity
- Agricultural operations can release nutrient ions which raises conductivity
- Industrial effluent containing alcohols, phenols and other non-charged ions can lower conductivity

So, how do you determine if the conductivity in your waterway is normal for your area? It's rather easy. Using the Adopt-A-Stream approved conductivity meter (Oakton ECTester Low) and incorporating this measurement into your monthly monitoring program, you will be able to determine the baseline range for your waterway. By comparing these numbers to historical data in your watershed, you will be able to determine if conductivity in your waterway is in or out of balance. If conductivity is not in the normal range for your area, look at your annual watershed survey to reference potential sources of pollution. You can also track conductivity upstream to determine the source, using safe and legal access as you move upstream.

For more information relating to conductivity, please refer to your Adopt-A-Stream Biological and Chemical Manual. The Oakton ECTester Low and calibration standard (100 µs/cm) can be purchased through many scientific equipment companies for roughly $90.00.

A Week Long Journey on the Ocmulgee: Paddle Georgia 2007

On June 23, 2007, five Adopt-A-Stream Trainers (AAS) and over 260 Paddle Georgia participants set out on the Ocmulgee River to discover the wonders of this beautiful river. The Ocmulgee River, named "bubbling water" by the Creek Indians, is formed in north central Georgia, southeast of Atlanta, by the convergence of the South, Yellow, and Alcovy rivers as they flow into Jackson Lake. The Ocmulgee River flows south through Macon where it is joined by many small tributaries before it meets the Oconee River to form the Altamaha River which empties into the Atlantic Ocean. The map pictured on this page shows the section of the the Ocmulgee River we paddled during this trip.



On our journey, we followed 115 miles of the river from Monticello southward to Hawkinsville. Our goal was to gain a shapshot of the water quality in the Ocmulgee Watershed, while providing AAS chemical training to nearly twenty participipants. Once certified, these volunteers joined one of five research teams led by a certified Adopt-A-Stream trainer.

Each research team tested four basic parameters including dissolved oxygen (DO), pH, temperature and conductivity. In addition to the four basic parameters, we also tested for nitrates, ortho-phosphates, *Escherichia coli*, and turbidity.

Along the 115-mile paddle, our AAS volunteers took water samples from 78 sampling sites. The distance between sampling sites was relatively uniform and the water quality proved to be excellent with only a few notable exceptions. Dissolved oxygen remained relatively constant with only six values falling below the state standard of 5 mg/L. pH also remained constant with only three values falling just outside of the ideal range of 6.5 – 8.2. *E. coli* and conductivity both yielded a couple of points that fell outside of the background ranges. What could have caused these high readings and what are the implications for the wellbeing of the river and for human health?

Several factors can influence water quality data. The first and easiest to mitigate is human error in sampling techniques. In keeping with the EPA's water monitoring protocol, AAS ensures accuracy in water quality sampling by conducting duplicate tests for each water sample. Additionally, the trainers on the Paddle Georgia trip have ample experience with water quality sampling, which makes it less likely that they will execute tests incorrectly or accidentally contaminate their sample. So, assuming that all of the sampling and testing procedures were done correctly and that the results are accurate, what other factors could have influenced the results?

As stated in the AAS Biological and Chemical Stream Monitoring manual, "conductivity is a measure of the ability of water to pass an electrical current. Conductivity in water is affected by the presence of inorganic dissolved solids." In Georgia, conductivity may vary greatly due to multiple factors that can influence normal background levels, including local geology and water level. Values that fall above the established/background levels are considered elevated, and may indicate a change in water quality. On our trip down the Ocmulgee, we discovered a small stretch of river with elevated conductivity readings. Above Macon, the conductivity level ranged from

100-170 µs/cm. However, below Macon, conductivity ranged from 200-270 µs/cm. After some investigation, we discovered that the following could have influenced the higher conductivity readings:

- Treated wastewater discharge into the river (elevated alkalinity, calcium, sulfate and chloride)
- Nearby kaolin strip mines
- The local swampy floodplain containing tannins and lignins which can in turn affect the river's conductivity levels
- The Coastal Plain Red Uplands eco-region, contributing to the conductivity level through ion exchange

Unlike conductivity readings, which can be affected by several factors, *E. coli*'s only source is waste associated with warm-blooded animals. *E. coli* is a type of fecal coliform that is regarded as an indicator species, meaning that its presence indicates a degraded water supply. *E. coli* is not the most problematic bacteria present in water where bacterial colonies have been detected. However, its presence indicates that the water body under investigation may be hospitable to disease-causing bacteria. Overall, *E. coli* levels along the Ocmulgee were low, with three exceptions. Those three sites produced either elevated *E. coli* readings or readings which were well above federal standards for *E. coli*. While the state of Georgia has not established *E. coli* standards, the federal Environmental Protection Agancy (EPA) has set *E. coli* standards for recreational water, which range between 235-576 MPN/100 mL. The EPA standard for single samples of 235 MPN/100 mL states that 8 in 1000 swimmers could potentially become sick. It is important to note that the range corresponds to how frequently the water body is used for recreational purposes ranging from moderate to infrequent.

Two of the three sites where high *E. coli* readings were detected served as excellent examples of point source water contamination. The third site at the mouth of Beaverdam Creek had high *E. coli* readings representing nonpoint source pollution because there was no detectable, single, identifiable source of contamination. Of the point source sites, one, a wastewater discharge location, had a high reading of 410 MPN/100 mL. The water sample itself was taken directly at the discharge site before it could be diluted, so it gave a true reading of the amount of *E. coli* being released into the waterway by the treatment plant. A second high *E. coli* reading was found at the site of an open residential discharge pipe. The pipe, which is currently under investigation, was releasing wastewater directly into the river. The number of bacterial colonies yielded from this sample was too numerous to count. Such a high *E. coli* reading presents a very real human health risk. We are currently working in partnership with local governments to investigate the areas with high readings to eliminate the source of contamination.

Clearly, the Paddle Georgia trip served to demonstrate the importance of water quality monitoring. By monitoring water quality, we are able to identify environmental health concerns and work toward a healthier, cleaner environment. After analyzing all of the data, the AAS team has determined that water quality, as a whole along the Ocmulgee is excellent. The few degraded sites along the river are not representative of the river's water quality. Rather, they serve to highlight the importance of water quality regulation and water monitoring. By having strict regulations on water quality, we are assured certain standards that protect human health as well as the health of our environment. Remember: one of the best ways to gain understanding and appreciation of local waterways is get out there and start a monitoring program!

A special thanks goes out to our AAS trainers who worked long days to ensure that our volunteers were trained, all of our samples were processed, and that data was collected on all 78 sites. Our trainers included Steve Blackburn, Duncan Cottrell, Ruth Eilers, Harold Harbert, Kevin Smith and Allison Hughes. We would also like to thank all of our volunteers who were involved with the Paddle Georgia Research Team. Without their hard work and dedication, this would not have been possible. To learn more about this year's Paddle Georgia trip please, visit the Georgia River Network website at www.garivers.org.

Come join us as we paddle down the Flint River in 2008.

ADOPT-A-STREAM CALENDAR OF EVENTS

Workshops are taught by certified AAS instructors and provide stream monitoring training. Teachers may receive 1 PLU credit for participating. Please visit the AAS website under the Teacher Corner heading for more details. Please call to register.

What	Who	When	Where	To Register
October				
Chemical	South Georgia RDC	Oct. 17	Valdosta	229.333.5277
Intro/Bio/Chem	Elachee Nature Center	Oct. 19-20	Elachee Nature Center	770.535.1976
Chemical	Coastal Adopt-A-Wetland (MAREX)	Oct. 23	Richmond Hill	912.598.2348 ext. 2
November				
Biological	Fulton County AAS	Nov. 3	Fulton County	404.612.8006
Chemical	Coastal Adopt-A-Wetland (MAREX)	Nov. 8	Skidaway Island	912.598.2348 ext. 2
Chemical	Elachee Nature Center	Nov. 8	Elachee Nature Center	770.535.1976
Chemical	Georgia Wildlife Federation	Nov. 10	Covington	770.787.7887
Chemical	Gwinnett County AAS	Nov. 10	Buford	770.904.3505
Biological	Coastal Adopt-A-Wetland (MAREX)	Nov. 13	Skidaway Island	912.598.2348 ext. 2
December				
Chemical	Friends of Sweetwater Creek Park	Dec. 1	Douglas County	404.675.1635
Biological	Gwinnett County AAS	Dec. 15	Buford	770.904.3505

NOTE: Workshop times vary. Please call to get exact times and locations. Workshop information is updated weekly on our website at www.GeorgiaAdoptAStream.org

QA/QC Recertification: All QA/QC volunteers must renew certification on a yearly basis. This can be accomplished by participating in the second half of our regular chemical or biological workshop.

The Georgia Adopt-A-Stream Newsletter is published six times per year.
For more information about the Georgia Adopt-A-Stream program or to contribute to the newsletter, call or write to:

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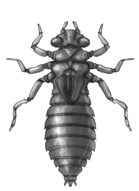
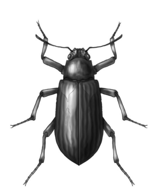
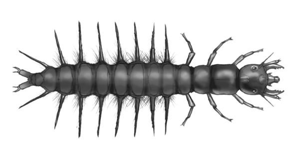


Dragonfly



Riffle Beetle



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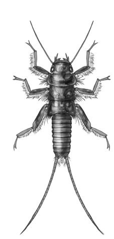
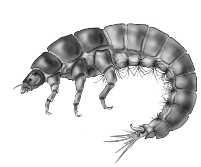


Stonefly



Net Spinning Caddisfly