Georgia Adopt-A-Stream Confluence Student Poster Competition

2016 Undergraduate Winners

A Comparison of Two Aquatic Invertebrate Collection Methods in the Rocky River Water System
Lara Gardner, Anderson University

This study compares the ability of artificial leaf packs and the D-net method to collect aquatic invertebrate taxa and use these taxa to assess water quality and taxonomic variety in a river system at Anderson University. The two methods were compared to see if leaf packs were another valid method for monitoring water systems in addition to D-net sampling, since leaf packs can give a long range sample of the aquatic environment. Leaf packs were placed at two sites in the Rocky River water system. One site was Cox Creek that feeds into the Rocky River, while the second site was downstream of the Rocky River and Cox Creek convergence. For the first collection method, artificial leaf packs were made using leaves on the dry bank of the two sites in order to simulate natural aquatic leaf packs. These leaf packs were then placed and picked up at alternate intervals. D-nets were used to collect natural leaf packs at the two sites at predetermined intervals. Both the leaf packs and the D-net collections were taken to the laboratory and aquatic invertebrate taxa were counted. Statistical and visual analyses were conducted to determine the differences in diversity of organisms and the water quality indicated by the organisms found in the two methods. There is a significant difference in the ability of the two methods to collect different taxonomic groups, but no significant difference in water quality assessment. Future studies must be done to improve and confirm the results of this study.

Establishing baseline water quality data sets for headwater areas of the Coosa River Basin, Rome, GA
Russell Maddrey, Berry College

In Rome, Georgia two rivers, the Etowah and the Oostanaula, combine in the city center to from the Coosa River, which flows across the border and into Alabama. Little testing has been done on these rivers and the water quality is relatively unknown to the general public and even city officials. This study seeks an answer to the health of the rivers systems that contain numerous endangered species and provide recreation and food/drink to members of the Coosa River Basin. Should the results reveal a problem, action can be taken on behalf of the health of the millions within the basin in both Georgia and Alabama. The water quality index is used as the determination of river health and safety. This comprehensive index takes into account dissolved oxygen, E. Coli count, pH, biochemical oxygen demand, temperature change, nitrates, phosphates, and turbidity. These values are then weighted and put into a single entity to give the health of the river, one hundred being the highest and 0 being the worst. Watering sampling of the Etowah, Oostanaula and Coosa over the span of six months and measuring for each of the water quality index criteria has produced a index number for each river. Samples were obtained using a bridgeboard and sampling bottles once a week. The WQI describes a river of good quality to be within the range of seventy to ninety. The Oostanuala on average has a index value of 70.1, the Etowah has a 77.55 and the Coosa is rated a 71.13. All these values are considered to be in a good standing on the water quality index but can tell a different story depending on the weather. Rain events cause the water quality of each river to drop by up to fifteen points, mostly do to an increased E. Coli and turbidity reading. This data suggests that runoff from the basin are highly concentrated in bacteria, most likely from pastures belonging to local farmers.

2016 High School Winners

Use of Carbon Nanoparticles for Aqueous Heavy Metal Remediation Yr2
Krystl Wood, Woodstock High School

The purpose of the experiment is to create a carbon nanoparticle filter to reduce the spread of heavy metal pollution in the environment. If anionic carbon nanoparticles are created by nitric oxidation of carbon soot and placed in an aqueous solution with predetermined amounts of heavy metals and run through a polycarbonate membrane, the result will be the reduction in the amount of heavy metals. The creation of the nanoparticles resulted from a variation of centrifuging, refluxing, and purifying the nanoparticles. The solution of heavy metals and nanoparticles were then filtered. The heavy metal concentrations before and after were tested and compared. Based on limited trials, the poly carbonate membrane and nanoparticles filter appears to be working. In the conducted trials, a reduction in heavy metals after filtering was noted. More trials are needed to support or reject the hypothesis.

Are There Dangerous Levels of Lead in Local Soil?
Ramie Williams, Eagles Landing Christian Academy

Lead is an extremely toxic and dangerous metal. It has been banned as an ingredient in many of the things around us. However, small amounts are still able to penetrate into the water and soil around us. If a person consumes or come in contact with large amounts of lead, he/she may experience many different side effects. Some of these side effects may be deadly. This experiment tests lead levels in local soil to determine if precaution should take place in these areas. When performing this experiment, small amounts of soil samples were taken from running water creeks in various areas. These areas included: creeks near local parks and near construction areas with urban runoff. The soil was then put out to dry. After this, a soil lead kit was used to determine the amount of lead remaining in the soil. In conclusion, there was greater lead in the soil that was near urban runoff areas.