WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2004SC10B

Title: Application of Emerging Technologies for Water Quality Monitoring and Data Transfer in the Saluda-Reedy Watershed

Project Type: Research

Focus Categories: Water Quality, Management and Planning, Education

Keywords: Water Quality

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Federal Funds: $28,240

Non-Federal Matching Funds: $56,621

Congressional District: Third

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Abstract

Field monitoring is a necessity in order to characterize the impact of human activities on environmental quality. Random, or even periodic, sampling strategies provide only snapshots of water quality and are of little use in watershed management. Emerging technologies offer the opportunity to both increase the spatial frequency of water quality monitoring and to speed the transfer of this information to decision makers, educators, and other stakeholders within the watershed. Key to the success of this new monitoring and data transfer technologies is the potential for increased reliability at a greatly reduced cost. This project will evaluate the two methods for data transfer from remote sensor locations and will also test the reliability and repeatability of a new low-lost turbidity sensor recently developed by the Honeywell Corporation. Data will be made available through a web portal that has been developed to transfer water quality data to watershed stakeholders.

Specifically, we will implement data transfer from established sensor water quality stations using the high-speed data network of a cellular phone provider and also test

meteor-burst data transfer technology used extensively by the Natural Resource Conservation Service (NRCS) for data transfer. The testing of this data transfer technology will require customization of existing computer program that stores and sends sensor data from the water quality station to a Clemson based server. Testing of the Honeywell turbidity sensor will take place at the same water quality station, where an existing turbidity sensor and manual sample schedule will allow for sensor evaluation. Sensor networks allow for multiple sensor pods to communicate and transfer data to one master pod that is connected to the Internet for data transfer.

Sensor technology is becoming less expensive, as exemplified by the new Honeywell turbidity sensor, and it is anticipated that sensor networks will become ubiquitous for applications ranging from homeland security to water quality monitoring. Key to the use of these sensors is the ability retrieve data in a near real-time fashion. Cell phone and meteor-burst data transfer techniques both offer promise, but need to be compared in a real-world environment. Results from this research will support both direct data transfer to watershed stakeholders as well as improve technical knowledge and will likely speed the adoption of this technology for water quality monitoring.

This is an excellent opportunity to compliment the equipment support we received by the American Distance Education Consortium (ADEC). Results of this project will also provide detailed information about cost-effective ways to transfer sensor data to the world-wide-web and will evaluate the efficacy of using emerging low cost sensor technology. It is anticipated that a simple sensor station for river turbidity, complete with data transfer hardware could cost hundreds, instead of the many thousands of dollars that is typically required.