



**Western Kentucky University
Technical Assistance Center for Water Quality
Center for Water Resource Studies**

**“Supporting Small Water Systems in
Meeting the Goal of Public Health Protection”**

<http://water.wku.edu>
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FFY04, 4th Quarter Report
July-September 2004**

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Introduction

Western Kentucky University has established a Technical Assistance Center for Water Quality for small water systems. The underlying goal of the Center is to assist small water systems in the protection of public health and the provision of safe drinking water. Assistance is provided to small water systems through the Utility Management Institute, a small systems circuit rider, a source water protection program, and information technology. All aspects of the Center are focused on capacity development of small water systems through the enhancement of managerial, technical and financial capabilities. Information presented in this report represents efforts during the fourth quarter of federal fiscal year 2004 (July 1-September 30, 2004).

Task 1: Utility Management Institute. The goal of the UMI is to develop and deliver a series of courses to be included in a “Utility Management Professional” certification program. This program is available to system managers, operators, and office managers of water systems serving rural areas and small municipalities with populations under 10,000.

Task 2: Small Systems Circuit Rider. The "Circuit Rider" approach to providing a combination of on-site technical assistance and training is nationally recognized as the most effective method of assisting small public water systems to comply with state and federal environmental regulations. The Circuit Rider program works in partnership with Kentucky Division of Water (DOW) to target the public water systems serving populations below 3300, with particular emphasis on systems serving less than 500 people. Our “Circuit Rider” approach works to target those small systems experiencing profound difficulties in complying with SDWA provisions in order to enhance protection of public health.

Task 3: Source Water Protection. The Source Water Protection Initiative has four major existing projects: Task 3A, the Source Water Protection Education Project, Task 3B, the Disinfection Byproducts and Haloacetic Acids (HAA's) Project, Task 3C, the Impaired Watershed Program, and Task 3D, Landuse and Source Water in Karst Regions.

Task 4: Database Management and Information Tools. The goal of this task is to provide products and services in the form of information and information tools in order to benefit small water systems, and in turn protect public health.

Work Progress

Task 1: Utility Management Institute

During the quarter, three courses in the UMI series were presented. On July 21-22, 2004, Human Resources Management for Utilities was conducted at the Carroll Knicely Conference Center in Bowling Green, Kentucky. Twenty-four (24) students participated in this two-day course. On August 11, 2004, Modern Technology and Utility Management was conducted at Pine Mountain State Resort Park in Pineville, Kentucky. Twenty-nine (29) students participated in this one-day course. On September 22, 2004, Public Relations in Utility Management was conducted at Jenny Wiley State Resort Park in Prestonsburg, Kentucky. Twenty-five (25) students participated in this one-day course.

There are now 169 individuals who have attended UMI courses. Fifty-one (51) individuals have now completed all six courses in the series to earn the Utility Management Professional (UMP) designation provided by WKU and KRWA. During the entire program year, we had thirty (30) new students begin in the program and we had twenty-one (21) earn the UMP designation. During the year, nearly 97% of the students who filled out course assessments rated the courses as being either “beneficial” or “very beneficial.” Copies of the assessments from the three courses conducted this quarter are included in Appendix B.

We are also working to adapt the UMI courses into a format acceptable for on-line computer classes as part of a consortium of State Rural Water Associations.

Task 2: Small Systems Circuit Rider

During the quarter, the Circuit Rider made forty-six (46) on-site visits to forty-three (43) small utilities in Kentucky and spent a total of eighty (80) hours providing on-site assistance. The types of assistance included leak detection, wellhead protection plans, GIS mapping, rate analysis, and a variety of other operational, management, and regulatory assistance.

For the year, a total of 165 on-site visits to eighty-one (81) different utilities were made. A total of 357.25 on-site hours were spent providing assistance to small utilities. More than 500 hours of off-site assistance were devoted to other technical assistance efforts to benefit small systems with wellhead protection planning, mapping, rate analysis, vulnerability assessments, emergency response planning, consumer confidence reports, and other areas of assistance.

The Circuit Rider also participated as a speaker at KRWA-sponsored training sessions on the subject of small system mapping. The Circuit Rider attended the most recent Pesticide Working Group meeting in September to continue his involvement with this important statewide group.

Also, during the quarter, the Circuit Rider attended a Watershed Roundtable meeting in Lexington, an EPA meeting on source water issues in Washington, D.C. and a Water Management Council meeting at Barren River Area Development District.

A highlighted example of technical assistance during the quarter is represented by the work being accomplished in the Big South Fork National Recreation Area which is located in southeastern Kentucky and northeastern Tennessee. The Circuit Rider is helping to coordinate efforts among various utilities in each state to protect water resources within this scenic region of the Southeastern United States.

Task 3: Source Water Protection Initiative

Work on the Source Water Protection Initiative’s four primary goals each achieved progress as described below. We continued to work with the Kentucky Department of Agriculture, Division of Pesticides regarding this work, and have completed data analysis in the agricultural Upper Iowa River watershed, Iowa, in collaboration with the Upper Iowa River Watershed Alliance. We completed work on the proposed internet educational modules associated with *Source Water*

Protection. With an extension from EPA, we have scheduled two workshops in the next quarter in collaboration with the (Kentucky) Barren River Area Development District, the Kentucky Rural Water Association, and other partners. We continued assisting with atrazine problems of several systems on the Rough River, and continued sampling at the Marion supply for atrazine.

Task 3A: Source Water Protection Education Project

We have completed the source water protection website <http://geoggeol.wku.edu/sourcewater>. In addition to the on-line modules, the website features links to other entities working to protect water quality, a reading room housing articles pertaining to water quality protection, and a glossary of more than 50 definitions of words relating to water quality and karst environments.

We have scheduled two workshops on Source Water Protection including *Source Water Protection Principles* and *Source Water Protection Programs and Stakeholder Networks* which will complete the four workshops in this year's program. An extension into the next quarter has been granted by EPA for these workshops, which will be held in December at the Barren River Area Development District in Bowling Green, Kentucky, in collaboration with the Kentucky Rural Water Association, WKU Hoffman Environmental Research Institute, the WKU College of Public Health, the Kentucky Pesticide Workgroup, and the Kentucky Department of Agriculture, Division of Pesticides (see Appendix C).

Task 3B: Disinfection Byproducts and Haloacetic Acids (HAA's) Program

We completed work on a series of mesocosm studies assessing the role of algal blooms in THM and HAA formation in the Ohio River. We altered light conditions to induce bloom formation in the tanks and then we tracked the THM and HAA formation potentials. These data are currently being analyzed and will be summarized in the next report.

We began a new THM project with a small water provider in central Kentucky. The city of Springfield Kentucky Water Treatment Plant (SWTP) experiences DBP problems in its plant and raw water distribution system. Chloroform is the most common of the THMs detected in the distribution at levels as 140 micrograms/L-1; levels in plant are usually lower but exceed the 80 micrograms/L-1 threshold. HAAs (reported as HAA5) are also commonly found above regulatory levels in the distribution system. SWTP has conducted some distributional and plant studies with their contractor and with the Kentucky Rural Water Association, which identified DBP in both the source waters and the distribution system. The WTP personnel have contracted with TetraTech to perform a study of their plant operations and distributional system to identify engineering solutions that may reduce their DBP problems. We are assisting the Springfield WTP by performing a profile analysis of HAAFP and THMFP in Willisburg Lake and in Springfield reservoir. This analysis consists of weekly to monthly sampling in both reservoirs to identify the potential sources of THMs and HAAs in the source water and their locations in the water column and help the SWTP develop management strategies to reduce the occurrence of these precursors in their plant.

We began planning for the symposium to be offered at the KWRRRI meeting in February 2005. Jim Kipp from the KWRRRI has contacted us and we will be organizing a drinking water symposium as part of the meeting. He will be letting us know about the symposium date so we can begin recruiting speakers.

Task 3C: Impaired Watershed Program

The efforts in this quarter continued in providing technical assistance to develop and promote source water protection through source water assessments, field investigations, on-site source water technical assistance, presentation of results, and creating frameworks that develop partnerships to assist small water systems. We continue to conduct assistance related to atrazine contamination of drinking water supplies in order to reduce the public health risk of this herbicide and others. A goal in this arena is to work with farmers, agricultural assistance providers, regulators and other stakeholders to determine best management practices that reduce levels of herbicides in drinking water supplies and to create partnership frameworks that help small water systems go from assessment to the implementation phase. Additionally, we continue to strive to publish and present results of the task in publications and at conferences of regional and national significance. A focus is to get information to the small systems and their communities.

We worked with the KY Department of Agriculture and others to present a Best Management Practices (BMPs) workshop in Bowling Green, KY. The workshop was conducted October 6, 2004. The workshop series is titled, "Pesticide and Nutrient BMPs: From the Classroom to the Field", and is focused on presenting farmers with BMPs that can be used to reduce pesticide and nutrient loadings into source water supplies. As part of the series, a CD and workbook have been produced and presented to each workshop participant.

Source water protection assistance is continuing in the Rough River Watershed, as we are working with the Grayson County and Leitchfield water systems to solidify a source water protection council. We have now received funding from EPA Region 4 for this work, and thus will be able to direct funds from this grant into new areas. This council is now composed of members of the local water systems, agricultural representatives, regulatory agencies, local universities, technical service providers, and farmers. The entities represented on the council to date are Grayson and Leitchfield water systems, the KY Dept. of Agriculture, USDA, Kentucky Division of Water, Western Kentucky University, University of Kentucky, Kentucky Rural Water Association, and Grayson and Breckenridge county farmers. To date we have had three organization meetings and have developed a framework for future partnerships that will assist in technical service, education, source water protection activities, and research to assess fate and transport of atrazine in the Rough River Basin. Currently, the Leitchfield water system has experienced atrazine levels above the MCL in finished water during the spring application season. It is the goal of the source water protection council to understand how atrazine is being transported into the water supply and to reduce atrazine levels in the finished water with the use of BMPs.

We have continued to sample and evaluate various pesticides/herbicides that are used in Kentucky and that may pose a health risk to communities that are served by small water systems. As a component of our source water program, we are continuing to participate in the Bayer CropScience Isoxaflutole State Water Monitoring Program. Previously, we have worked with the City of Marion to monitor atrazine concentrations in source waters and finished drinking water. Ongoing work includes the evaluation of alternative herbicides, such as isoxaflutole, that have been used as a replacement for atrazine.

We continued working with Kentucky Rural Water Association (KRWA) and their counterpart in Tennessee to form a utility-based and interstate source water protection advisory council for the Big South Fork of the Cumberland River. This effort assesses the utility-based model for source water protection that has already been successful in McCreary County, KY. By working with small water systems throughout the basin, we anticipate that we can develop a model for source water partnerships and protection at the interstate level. The success of this ongoing project is dependant upon the input of the small water systems and the communities that are served. The goal is to develop an advisory council that can integrate local concerns, local threats, and local input to reduce the threat of potential sources of contamination by proactive assessment and planning. As we found in McCreary County, having small water utilities as the central focus will be the key.

We will be presenting our results as part of the AWWA's 2004 Water Sources Conference and Exposition in West Palm Beach, FL in January, 2005, an international meeting. We have been invited by and are working with the AWWA source water protection committee to present in the Sunday Workshop, Best Management Practices for Source Water Protection. Our presentation will highlight effective methods for creating stakeholder partnerships and implementing programs for assessing results. On November 9th, 2004 we will be presenting at the APHA National Conference in Washington, DC. This presentation will discuss the development of source water protection partnerships in agricultural watersheds within Kentucky, results of these partnerships, and the key factors for developing successful partnerships for source water protection.

Task 3D: Landuse and Source Water in Karst Regions

Pat Kambesis has completed all fieldwork and analysis of data for the study of agricultural land use and groundwater quality in the Coldwater Cave groundwater basin in northeastern Iowa that has been described in the last several quarterly reports. She is currently completing a manuscript on this work that will be submitted to the peer reviewed journal *Environmental Geology*. Although in the original work plan we had proposed to submit two manuscripts to peer-reviewed journals, the completion of this one will make three.

During the quarter Ms. Kambesis met with Upper Iowa River Alliance group in Decorah, Iowa (August) to share results from the Coldwater Cave Groundwater Basin study. The information was also presented in letter format to the Iowa Department of Natural Resources to provide background information for a permit review for a hog confinement facility in the study area.

Additional Progress

Two manuscripts have been submitted to peer-reviewed journals regarding work completed under Task 3. They are:

Seadler, K.J. and C. Groves, in review, Atrazine contamination of a Kentucky drinking water source. Submitted to *Journal of Environmental Informatics* (refereed publication).

Anderson, M.S., C. Groves, and J. Meiman, in review, Transport of the herbicide Atrazine in Kentucky karst groundwaters. Submitted to *Environmental Geology*.

Task 4: Database Management and Information Tools

Effective internet communication cannot be achieved without adequate security measures in place. During the fourth quarter, a firewall was installed on all of the computers in the GIS lab. A virus scan, using Norton Antivirus software, was performed in August, and complete backups of the systems and data were completed in September.

Several information tools were distributed this quarter in the form of compact discs. Copies of the Emergency Response Plan Tool were given to KRWA for distribution to small water systems throughout the state through their circuit rider program. Copies of the National Tools CD were distributed at the NRWA Annual Leadership Forum and Technology Exhibit in Biloxi, Mississippi. These CDs include tools for helping small water systems with their Consumer Confidence Reports, Monthly Operating Reports, Sanitary Surveys, and Emergency Response Plans. The National Tools CDs also include a wholesale rate utility and a water loss calculator.

In addition to the distribution of CDs, these tools have been made available for download from the CWRS website, water.wku.edu. Quarterly progress reports and various drinking water maps were also posted to the website this quarter. Information regarding the maps and tools created through the Center has been posted on the TACNet website as well. These postings include a description of the technology, the media type, contact information, and the project URL.

Representatives of the Center for Water Resource Studies at WKU also attended several conferences this quarter in order to promote the Center's research. CWRS Director Dr. Andrew Ernest and former graduate student Katie Seadler attended the International Society for Environmental Information Sciences (ISEIS) Conference in Regina, Canada in July. The Center was also represented at the KY-TN AWWA Water Professionals Conference in Nashville, Tennessee in July and at the KRWA 25th Annual Conference in Louisville, Kentucky in August.

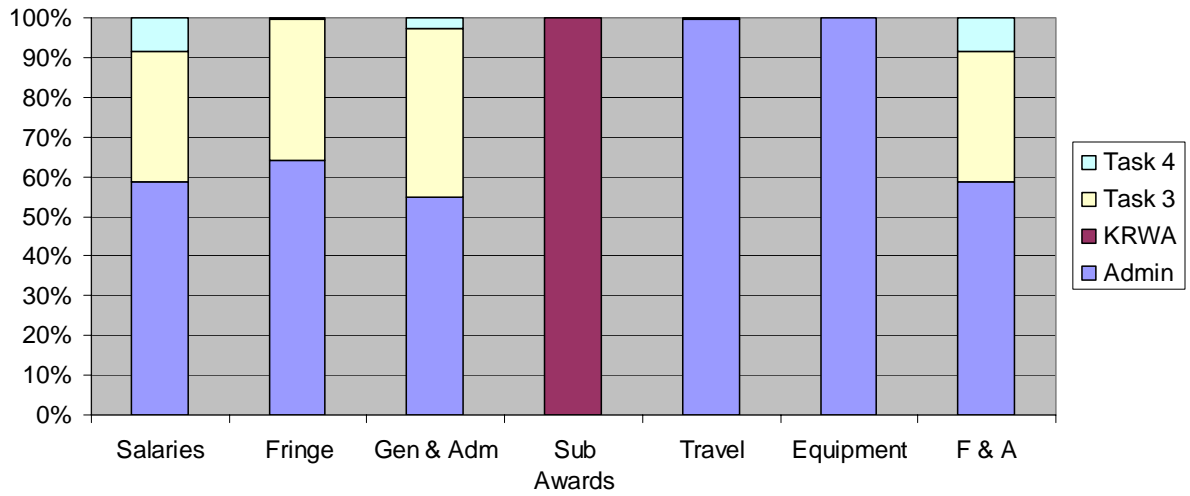
Summary of Expenditures

Total expenditures for this quarter were \$121,020.30. A breakdown of costs can be found in Appendix A.

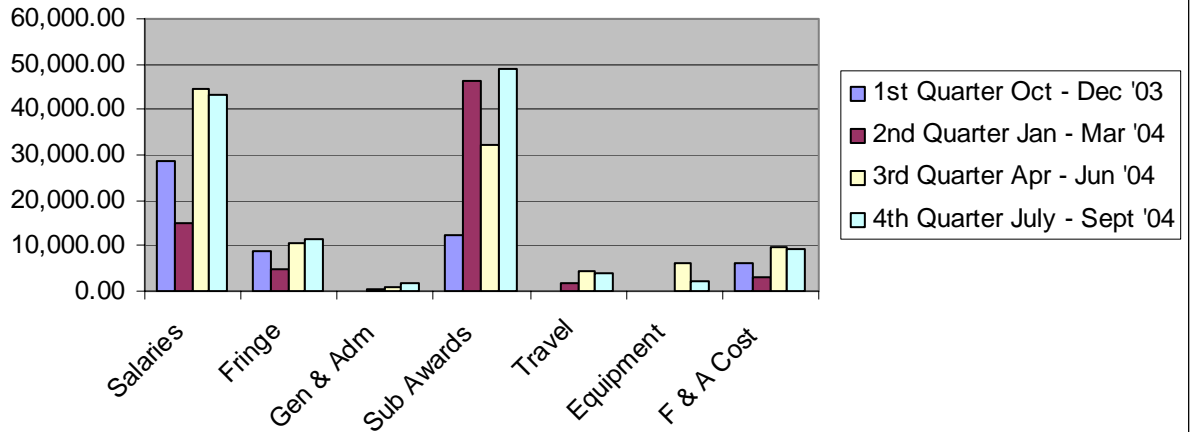
Appendix A

Expenditures

4th Quarter Expenditures July 1 - September 30, 2004



Comparison of Expenses by Quarter



Appendix B
UMI Course Assessments

Appendix C
Source Water Protection Workshop Flyer



Source Water Protection Issues for Kentucky



a four-part workshop series presented by the

Western Kentucky University Technical Assistance Center for Water Quality

in collaboration with

U.S. Environmental Protection Agency Barren River Area Development District
Kentucky Rural Water Association WKU Hoffman Environmental Research Institute
Kentucky Pesticide Workgroup Kentucky Department of Agriculture, Division of Pesticides

September 8 and 29, 2004, 9:00 a.m. to 3:00 p.m.

**Barren River Area Development District Office
177 Graham Avenue, Bowling Green, KY 42101**

September 8, 2004 (registration deadline September 1)

9:00-11:30 Part One: Source Water Protection Principles
11:30-12:30 Lunch (provided)
12:30-3:00 Part Two: Source Water Protection Programs and
 Stakeholder Networks

September 29, 2004 (registration deadline September 22)

9:00-11:30 Part Three: Land Use and Impacts to Source Water Quality
11:30-12:30 Lunch (provided)
12:30-3:00 Part Four: Kentucky's Karst Landscapes and BMP's

Cost: \$20 per day, includes workshop materials and lunch. Participants may attend one or both days. We are applying to the Kentucky Division of Water to offer Continuing Education Credit for these workshops.

Registration and Information: Hoffman Environmental Research Institute, Department of Geography and Geology, Western Kentucky University, 42101. phone: 270-745-4169. Please make checks payable to WKU Center for Water Resource Studies.