



**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”**

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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. 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 2005 (July 1-September 30, 2005).

Activities and Outcomes

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.

During the quarter, the course entitled "Human Resource Management for Utilities" was presented in Slade, Kentucky on July 13-14, 2005 at Natural Bridge State Resort Park. There were thirty-four (34) students participating in this course. "Modern Technology & Utility Management" was presented in Gilbertsville, Kentucky on August 10, 2005 at Kentucky Dam Village State Resort Park. There were thirty-eight (38) students participating in this course. "Public Relations in Utility Management" was presented in Carrollton, Kentucky on September 21, 2005 at General Butler State Resort Park. There were thirty-nine (39) students participating in this course.

The Utility Management Institute now claims a total of two hundred eleven (211) students. Eighty-one (81) of our students have now completed all six of the courses in the UMI Series and have been awarded the Utility Management Professional designation. Course assessments continue to show a high level of satisfaction with the training. Seventy-six (76) of the seventy-eight (78) assessors rated the session at the two highest levels, very beneficial or beneficial.

During the first quarter of FFY06, the UMI course entitled "Utility Management 101" will be presented in Cadiz, Kentucky on November 15-17, 2005 at Barkley Lake State Resort Park. New UMI brochures will be mailed next quarter to promote the program and advertise the UMI class schedule for 2006.

Small System 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 under 3,300, 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.

During the fourth quarter, the Circuit Rider position logged 602.75 hours. Of that time 42% of the total time was spent directly assisting systems or their personnel including 209.0 hours on-site working with systems, 33.0 hours developing plans and reports for systems, and 12.75 hours providing formal training and program outreach.

The majority of time this quarter was spent assisting systems with infrastructure mapping. Activities for technical assistance included GPS-GIS mapping, leak detection, source water protection and water quality monitoring. Compliance assistance included water system evaluation and monitoring plans, and management/financial assistance included water accountability and cost of service analysis.

Significant Contacts: This quarter provided several opportunities to assist water utilities. Two were particularly challenging and rewarding.

Gilley Hollow Water System – The Gilley Hollow Water System serves 24 water customers, and is located in Harlan County, Kentucky near the City of Cumberland. The system was formed 15 years ago after groundwater levels were lowered and water quality degraded due to coal mining. The residents of Gilley Hollow petitioned the City of Cumberland to provide water service. The city was unable to do so without annexing the community and even then would not have the financial resources to provide municipal services. The city agreed to wholesale water to the Gilley Hollow community if the residents constructed a distribution system. The residents contributed \$750 each along with labor to construct the system. Unbeknownst to the community, they were creating a regulated public water system with all of the same monitoring and reporting requirements as a municipal water distribution system. Needless to say, the system has been out of compliance since the day the water was connected. Over the years the financial and administrative burden has overwhelmed the residents.

The Circuit Rider became involved to resolve several compliance issues. During this time it was clear to the Circuit Rider that the City of Cumberland should absorb the Gilley Hollow System; however the residents of Gilley Hollow over the years had approached the city about this issue only to be turned down. The Division of Water also made numerous requests to local officials to take over Gilley Hollow but to no avail. Interestingly enough is that enforcement is a delicate issue since there is no legal entity to enforce against. The Circuit Rider performed a simple cost of service study for Gilley Hollow and determined that, if absorbed, the city would gain at least \$300 additional revenue monthly. At that point the Circuit Rider contacted the mayor and public works director about Gilley Hollow. After smoothing over some deep seated mutual differences a plan to absorb the system was negotiated. The Circuit Rider would inspect and map the system infrastructure, monitor pressure and have all residents complete the city’s water user agreement. After this was completed the city council still delayed the merger by requesting from the KY Division of Water assurances that the infrastructure meets their regulatory requirements and a release from liability for previous violations. The Circuit Rider was able to have the city council approve the merger contingent upon a favorable response from the KY Division of Water. The

city could then begin the initial meter reading and make provisions without delaying the merger for another month. The Gilley Hollow Water System is expected to be removed from the state's Drinking Water Program by the end of November.

Hurricane Katrina Relief – The call came in the morning of Friday, September 9, 2005 for two KRWA volunteers to assist in the hurricane Katrina relief effort and by Saturday morning Rural Water had in route the WKU Circuit Rider and a Source Water Protection Specialist. They were part of the team assembled from seven Rural Water Associations to assist systems in Louisiana with damage assessments and restoring water service. Between Rural Water, Health Departments, and U.S. EPA over 80 volunteers from across the country were assembled. The staging area was in Livingston Parish and the fairgrounds. Their 10-16 hour days began with a safety briefing and the day's objectives then volunteers were divided into working pairs, usually a Louisiana Rural Water Association staff member and another out of state person. Main concerns for personnel were heat stress, contaminated water, driving and electrical hazards. The first few days consisted of damage assessments. This work needed to be done but it was frustrating not helping the utilities with hands-on problems in which Rural Water is known. The Rural Water staff paired up with one another to provide on-site assistance while others continued with the assessments. The activities of the Rural Water teams included coordinating assistance with Parish, State, electric, and utility personnel in getting wells back on line, leak detection, line flushing, bacteria sampling, repairing chlorinators and cutting off water to damaged homes to reduce waste water loading to non-operational waste water systems and chlorine monitoring of tanker trucks used to supply cruise ships and point of use supplies. At all times the staff maintained supplies of water and MRE's for people in need. During that one week dozens of water systems were assisted in restoring water service and lifting boil water advisories.

During the next quarter, the WKU Small System Circuit Rider will continue to assist systems with operational and management problems. The Circuit Rider's time is expected to be spent on-site performing leak detection and water audits, assist systems with cost of service studies and demonstrating and training system personnel to use GIS-GPS technology to map and manage their utility. The Circuit Rider will continue to create educational opportunities for the communities we serve. Educational activities will focus on elementary, middle, and high school children and will emphasize the role small utilities play and the importance of good source water quality. This work will be coordinated with efforts within the WKU Center for Water Resource Studies.

Linking Aquatic Ecosystem Metabolism to the Formation of Drinking Water Contaminants: Implications for River and Reservoir Management

Work to assess the sources of DBPs in Springfield Water Company's drinking water is being completed this month. Assessments of inputs, outputs and internal generation of DBP precursors in their two source water reservoirs have been conducted for a little over a year. The sampling period was extended for two months in order to capture another turnover period. These may be very important times for DBP production. This data may allow for the development of a

predictive management tool to link DBP production with basic water quality parameters for Springfield. Preliminary data suggests that different management strategies will be needed for the different source lakes as sources of DBP precursors seem to vary among the watersheds.

An article on research and challenges associated with DBPs is being developed for the mid-winter issue of the KRWA journal *Waterproof*.

Procedures for Assessing Source Water Vulnerability to Suspended Sediment and Prioritizing Implementation of Best Management Practices in Karst Environments

The goal of this project is to develop procedures for small water systems in karst regions to:

- a) assess source water vulnerability to suspended sediment and sediment-associated contaminants, and
- b) prioritize the implementation of best management practices (BMPs) for reducing the load of suspended solids to source waters.

During this quarter, WKU representatives met with Greensburg Water Department to discuss the use of their historic raw water data in order to develop a description of the conditions that favor high suspended solids loading. Work continued on analysis of the source water area for Greensburg, including topographic and land use analyses.

The source water vulnerability analysis and review of BMP options is expected to be completed in the next quarter. A small-system guidance document will be developed in the first quarter of calendar year 2006. A journal article on the findings will also be prepared for publication during the first quarter of 2006.

Source Water Protection Education and Outreach

Since March 1999 to the present, the Department of Agriculture has been working with other State and Federal Agencies and the Pesticide Registrant Syngenta to review and discuss monitoring data from selected Community Water Supply Systems in the state as part of its stewardship efforts. Examples of some of these systems are the Lewisburg community system in Logan County and Marion community system in Crittenden County in Western Kentucky. Both are small community water systems located in small watersheds. They are high crop and pesticide use areas of the state. As a result of a Registrant Stewardship effort, the Workgroup Committee has become an established group that meets three times yearly to discuss pesticide water quality issues. The Workgroup has grown over the past five years, consisting of the Department of Agriculture, Division of Water, Rural Water Association, Kentucky Fertilizer & Agricultural Chemical Association, Inc., Corn Growers Association, Kentucky Farm Bureau, Division of Conservation, Western Kentucky University, USGS, and Syngenta. Now the NRCS and the Division of Water's Non-Point Source and Surface Water Branch are part of the Working Group, as well as the University of Kentucky's Extension.

Under the elected guidance of a member from the Rural Water Association, the workgroup has been instrumental in helping organize local meeting groups to deal with pesticide water quality problems and provide guidance and cost share to these communities. In addition, the Workgroup has become an important part of assisting the Department of Agriculture in making decisions associated with NPS 319 grants. At the present the Workgroup has not only focused on studying various monitoring data from different agencies and universities but also recommending actions associated with Best Management Practices and other Water Quality concerns such as pesticide management plans and educational outreach on pesticides and water quality issues.

A WKU representative attended the Kentucky Pesticide Workgroup meeting held at the Kentucky Department of Agriculture, Division of Pesticide's office in Frankfort on September 22, 2005. Included among the discussions were updates on monitoring data from Marion, Webster and Leitchfield water systems presented by Syngenta, and an update on WKU's Rough River atrazine data.

A WKU representative attended the Kentucky GIS Conference in Bowling Green, KY on August 23-24, 2005. She spoke with several water districts concerning their needs in GIS. During this quarter, ArcGIS Server 9.1, ArcSDE 9.1, and ArcIMS 9.1 were installed on the local server to be used in the development of GIS applications for rural water districts.

Water Analysis, Training, Education and Research Services

Water Analysis, Training, Education and Research Services (WATERS) is a consortium formed between Western Kentucky University and the National Park Service, Mammoth Cave National Park. The City of Bowling Green is currently in the process of joining WATERS.

Water Analysis: During the quarter, WATERS provided microbiological analytical services to fourteen (14) public water systems in Kentucky with populations less than 10,000. Seven (7) of these systems have populations less than 3,300. WATERS also provided the analyses for several of the parameters in the Reservoir Monitoring Study, and provides ongoing research analyses for the National Park Service.

Training: During the quarter, WATERS hosted its second outreach workshop in the community designed to train small water suppliers in proper collection, preservation, and transportation techniques of drinking water samples. This workshop was held in conjunction with KRWA's Annual Conference, which was held in Lexington, KY on August 22. The training was a success with ninety-four (94) attendees. Operators were offered Continuing Education Units (CEUs) for participation in the training. This training will help ensure few samples are rejected by any certified drinking water laboratory the small water supply employs for analysis of their required periodic distribution samples.

Education: WATERS currently employs four undergraduate students who are studying environmental sciences. One student, a biology major, is assisting with the crypto and giardia certification process. A second student, a chemistry major, is learning to conduct drinking water and wastewater analyses for small water systems. The other two students, a chemistry major and a geology major, conduct much of the research analyses in the laboratory. These students are

gaining hands-on work experience in the environmental field, and earn credit hours upon completion of their internships.

Research: WATERS maximizes each partnering agency's ability to further their research missions by the optimal utilization of research-grade instrumentation through the formalization of resource sharing. During the past quarter, the lab was involved in multiple research projects, including the Reservoir Monitoring Study, EPA assay for *Cryptosporidium* and *Giardia*, and National Park Service analyses.

Service: WATERS enables local, state and regional private and public sector entities to meet environmental management goals through the provision of high quality environmental data collection, management and analysis. This quarter, Jana Fattic, Operations Director of the lab, visited the EST Analytical Demonstration Laboratory in Fairfield, Ohio in order to learn new analytical techniques that can be applied in the WATERS Lab.

EPA Assay for *Cryptosporidium* and *Giardia*

Having passed the IPR, WATERS is now listed among the 56 viable labs in the USA for parasite testing under the LT2 Rule. Under the current status accountable for Ongoing Precision and Recovery Testing (OPR), three unknowns are received from the EPA every quarter for regular confirmation of competency, the next round of which is scheduled for October.

During this quarter EPA Method 1623 was performed a total of 25 times, including IPR, OPR, controls, and client samples. Required paperwork, including a Standard Operating Procedure specific to the lab's exact protocols, is currently being completed. If acceptable, a two-day on-site inspection will be scheduled by a representative of the EPA. After any potential corrections to the program are identified and corrected, the lab will be fully certified. That goal is expected to be reached during the next quarter and before the LT2 Rule monitoring requirements take effect.

Rule Based Decision Support System for Small Systems Management

A prototype software system, Small Watersystems Dynamic Expert (SWDE), has been developed, which provides its users with information about upcoming dates and deadlines and helps the users to approach changes in a systematic manner. This tool is available for download at our website, <http://water.wku.edu/products/index.html>.

Managers and staff of small water systems are the main target of the system. The prototype will be used to assess the usefulness and feasibility of such a system. This type of project is the first step towards the long-term goal of developing a dynamic system that supports the decision making processes of small water system managers.

A user of SWDE provides initial information about the small water system (such as size, type of water source, location, current compliance with rules) when the software program is used for the first time. SWDE will provide information about which reports are due when, information that must be included (e.g. MOR, CCR), which deadlines for rules (or phases of rules) are coming up, and what must be done to meet the deadline. The information SWDE provides is tailored to the

small water system and its specific needs. Information can be provided for short-term, medium-term, and long-term actions.

Electronic Based Reporting

A prototype web-based system has been developed, and is available for download at our website, <http://water.wku.edu/products/index.html>. This system will allow small water systems to report to the appropriate government agency electronically. Potential reports include Consumer Confidence Reports (CCRs) and Monthly Operating Reports (MORs). This can help save water systems time and money.

Web Page Design and Hosting

Many small water systems do not have the financial or technical resources to develop and host their own websites. The Center coordinated with ImageWest, a student-run marketing firm on campus, to develop a template that can be used by many of these systems to convey relevant information to their customers. An example of the template may be viewed at <http://water.wku.edu/ledbetter>. Based on the results of the surveys sent to the small water systems, three utilities were selected to have their web pages developed and hosted at no cost to the utility. This will allow for customers to reply by email to the water districts and view contact information and important information including CCRs. Additional development and hosting opportunities are available through the Center.

Center Coordination

Jana Fattic attended the KRWA Annual Conference in Lexington, KY on August 22-24, and the Water Professionals Conference in Covington, KY on September 12-14, where she represented the WATERS Laboratory by hosting a booth to promote low-cost Crypto and Giardia analyses for small water systems. She and Dr. Andrew Ernest also attended the Capacity Development Workshop at Region 4 EPA in Atlanta, GA on August 30-Sept. 1, 2005.

On July 26, Dr. Ernest participated in a panel discussion at the National Environmental Service Center Conference relating to drinking water, waste water and environmental issues for the Environmental Training Institute for Small Communities in Morgantown, WV. Dr. Ernest also attended planning meetings throughout the quarter at the Barren River Area Development District (BRADD) offices in Bowling Green, KY.