



A PROGRAM OF THE WEST VIRGINIA WATER RESEARCH INSTITUTE
FUNDED BY THE COLCOM FOUNDATION



IN THIS ISSUE

Water Quality Monitoring in the Lower Allegheny River and its Tributaries

For some time now, Dr. Beth Dakin has been concentrating on determining the ratios of strontium and magnesium in relationship to a standardized concentration of calcium. Of particular importance is the ratio of strontium to calcium, as strontium is known to occur in high concentrations of Marcellus Shale produced water as compared to the lower concentrations found in ground water. Not only can Dr. Dakin identify the presence of produced water, but she can also distinguish between sampling locations as each site has a unique "signature". These signatures are shown on the graph below.

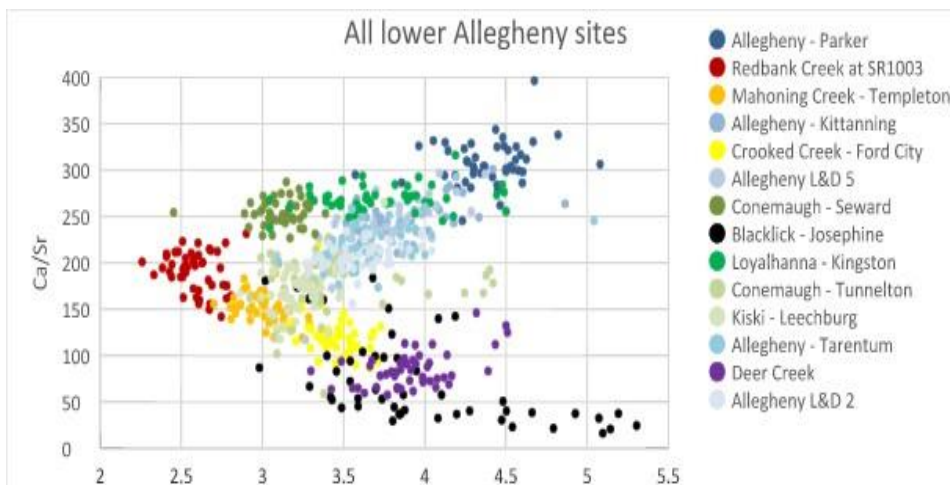
This graph and others like it were displayed on a poster, created by Dr. Dakin, at the Spring Technical Meeting of the PA/WV American Fisheries Society on February 9, 2017. The poster (*Water quality monitoring in the lower Allegheny river and its tributaries*) used Duquesne University's portion of the 3RQ data to determine the ratios present. 3RQ Research Partners viewed and discussed her results at the 3RQ Strategic Planning Meeting on March 16, 2017. Please see Dr. Dakin's interview on page 3 for more information about her work.



Staff Profiles

Get to know some of the vital members of the 3RQ team. We take a look into the careers of Drs. Dakin, Kabala, and Ziemkiewicz and their work with Three Rivers QUEST.

Page 2



Roundtable Review

If you didn't make it to one of our regional roundtables, here is what you missed and why you will want to mark your calendar for future events.

Page 5

Dr. Paul Ziemkiewicz: From Superstitions to Director of the West Virginia Water Research Institute

by Selina Prettnner

Dr. Paul Ziemkiewicz started his journey through science as a child in Pittsburgh. While fascinated by the natural world, he was like many children, afraid of ghosts, superstitions, and other unexplainable phenomena. His introduction to science as a way to distinguish fact from make-believe started at the Buhl Planetarium. This was a revelation; the instructors were smart, earnest scientists pointing the way toward a rational understanding of the world around us. "I wanted to look at a landscape and know the underlying forces that were at work all the time." This made the world a much more familiar place. His original career plan, based on watching Walt Disney and Lassie in the early 1960s was to be a forest ranger, riding around the West on a government horse, keeping an eye on national parks and forests. By the end of his first college course, though, he was disabused of any romantic notions and concluded that this was a largely administrative (boring) job and that a scientific track would be more interesting. After supporting his undergraduate education as a work-study during the school year and as a laborer in factories, farms, demolition jobs and sawmills during the summers he entered graduate school. Mercifully, the life of a graduate student was a lot easier though the pay was worse.

He first obtained a bachelor's in Biology from Utah State University followed by a master's in Range Ecology. He then received his PhD in Forest Ecology from University of British Columbia. He spent the first ten years of his career in Alberta, Canada mainly finding ways to reclaim mines to grow grain crops or forests. He was able to create mine reclamation solutions that the Alberta Government adopted. He even received the Outstanding Contribution to the Betterment of Land Reclamation while working in Canada.

He then moved to West Virginia to serve as the Director of the West Virginia Water Research Institute. Soil

reclamation was not as big of an issue in West Virginia but rather abandoned mine drainage and water quality were. This is when Dr. Ziemkiewicz's chemistry background was useful in figuring out the process of acid mine drainage formation and how to fix it. He was able to make sense of the issues and develop solutions through biology, chemistry and soil chemistry among other disciplines. In 2005, he was awarded the Environmental Conservation Distinguished Service Award from the Society for Mining, Metallurgy and Exploration for his work, and recently, he earned the Pioneers in Reclamation Award from the American Society for Mining and Reclamation.

In 2008 The Monongahela River in West Virginia was drifting toward salinity levels that exceeded drinking water standards. After a brief study supported by the U.S. Geological Survey, Dr. Ziemkiewicz recognized the chemical signature of the water; it suggested that treated water from active coal mines was being released into the river at the same rate regardless whether the river was high or low. While treatment removed metals and acid, the discharged water contained salts that were harmless in low concentrations, but a public health problem at high concentrations. Thus, during the dry periods in late summer and fall, dilution was inadequate and salt concentrations rose to unacceptable levels. The solution had to be one that did not interfere with the people who relied on the river for their drinking water while dealing with the coal industry's discharges. He developed a model that told the industry how much it could discharge through its treatment units based on river levels. This approach maintained salt levels in the river that have been below drinking water standards since January 2010. Two years ago, the USEPA and Pennsylvania agreed that the Monongahela River was no longer impaired with regard to salts. With the support of the Colcom Foundation, the project was expanded into Three Rivers QUEST (3RQ) and included the Allegheny

and Ohio Rivers. Duquesne University, Trout Unlimited, and Wheeling Jesuit University became part of the organization to monitor these rivers monthly and report upsets in water quality.

Dr. Ziemkiewicz keeps busy working on other projects. He attends conferences and lectures all over the country, but he also answers water inquiries via phone and email. Beyond that, he writes and reviews proposals for new projects, and works with state and federal officials on advisory committees. Dr. Ziemkiewicz's success is due to his persistence with identifying and resolving issues. It is easy to identify a problem, but finding a solution requires dedication and knowledge of the issue. His proudest moment was when he solved the Monongahela River salt issue. That required a balanced solution, which was accepted by the state and Federal agencies and implemented by the coal industry. The public, of course, was the main beneficiary.

Dr. Ziemkiewicz may not ride around on a horse like a character out of a western movie, but nonetheless, his career has been an adventure and has allowed him to travel the world and his favorite continent: North America. He has made an impact due to his life experiences and dedication to mine reclamation as well as water monitoring and management. While he keeps busy participating in conferences, writing proposals, and serving on state and federal advisory boards, he finds time to provide assistance concerned citizens, practitioners and fellow scientists. Dr. Ziemkiewicz provides a great example for those who seek adventure while making the world a better place.

Fish out of water finds its way back to the river with 3 Rivers QUEST

by Melanie Quain

3 Rivers QUEST (3RQ) is a water quality monitoring program that includes distinct and collaborative approaches to collect water quality data and information. 3RQ covers three river basins: Allegheny, Monongahela and Upper Ohio. The project comprises academic researchers, citizen scientists, and conservation groups who collect and analyze important water quality data.

Among these scientists swims the fish out of water, Dr. Stanley Kabala. Kabala plays a much different role than those who collect or analyze data for the project; he is now the lead on all funding opportunities for 3RQ. Kabala is always searching for opportunities to acquire more companies to get on board.

When asked how he got on board with 3RQ, Kabala jokingly said, "It just landed with me." According to Kabala, Dr. John Stolz, Duquesne University's Director of the Center of Environmental Research and Education (CERE), approached him with the project while he was working full-time at Duquesne, and persuaded him to write CERE's proposal for the project. He later ended up managing Duquesne's work in the project. "There was some logic to this," Kabala added, "because the community outreach component of 3RQ was a natural fit with my previous outreach to municipalities on stormwater management and greenhouse gas emissions inventories."

"3RQ has been a great way to get the communities involved in



Drs Kabala and Dakin filter water for testing. (Photo provided by TribLIVE)

establishing a program to create a baseline of the water quality in their areas," said Kabala. "It's also a pleasure working with a group of professionals who display every day their passion for the project."

If Kabala isn't busy thinking of ways to further grow the project, you might find him in a university classroom. He enjoys sharing his passion of policy, politics, and sustainable business practices with environmental students, hoping to spark a similar passion in his students. Kabala began working at Duquesne University as an adjunct professor in 1996; he eventually moved to a full-time position in 1997-98. His full-time duties included teaching, writing proposals, managing projects, and advising, all in his role as Associate Director in CERE from 2009 to 2014.

Kabala retired in 2014, but this hasn't slowed down his momentum. He continues to teach courses during every semester. In addition to Duquesne, Kabala also teaches at the University of Pittsburgh. In the past he has taught at Carnegie Mellon University, Saint Vincent College, the University of Cologne (Germany), the University of Varna (Bulgaria), and the Technical Universities of Cluj-Napoca

(Romania), Kosice (Slovakia), Miskolc (Hungary), and Upper Silesia (Katowice, Poland). Kabala believes that having a background in policy and sustainable practices is an asset to most businesses. It can increase productivity and reduce costs, attract investors and future employees, and improve the brand image and competitive advantage.

For those who are interested in getting involved in this field, Kabala had a few words of advice. "You need to put yourself out there, don't be afraid of meeting people or feeling shy," he said. "Track down networking and professional events; that's where you'll find experienced professionals. Internships are another—invaluable—way." Kabala made sure to mention the scope and diversity of Duquesne University's Master of Environmental Science and Management graduate program, "The program is solid," he said "You get both the organizational and business sides of environmental field. All of our graduates come out of the program ready for almost any kind of job in the field. It's hard to come across programs similar to this."

Dr. Beth Dakin's Field Work Proves Critical for Three Rivers QUEST Success

by Justin Mansberger

Ever since she was a small child, Dr. Dakin was always curious and amazed by zoos and the world around her. As a result, she was drawn to the field of conservation and the protection of natural resources. This love for animals and nature drove her to want to pursue her doctorate degree, and she began studying various chemical cues that animals release in the water that can affect the water quality of an ecosystem. This work fit perfectly into what 3RQ was trying to accomplish, and once the program spread into the Pittsburgh area from West Virginia, Dr. Dakin knew it was a perfect fit to continue her research.

Dr. Beth Dakin is one of many scientists currently working on Three Rivers QUEST (3RQ) with the goal of improving water quality around the area. Her career started when she received her B.S. in Biology from Virginia Tech and later went on to receive her Ph.D. from Georgia where she specialized in genetics. Currently, Dr. Dakin works in Dr. Porter's lab studying fish genetics. Before she worked at Duquesne University and 3RQ, she worked for over 10 years in the field. During her time as a field researcher, she used various chemicals in order to monitor conservation and evolution in various water ecosystems. A lot of her previous and current work involves using these chemical markers to compare fracking streams to non-fracking streams in order to see the effects fracking has on the ecosystem. Her fieldwork monitoring water chemicals provided Dr. Dakin with a good transition point to start working with water quality on 3RQ.

Dr. Dakin is one of two people that go into the field to collect and test samples of water from various sites. Currently, there are 14 total sites that they check each month and Dr. Dakin is

responsible for 8 of them. In addition to checking the sites, she coordinates and trains a graduate student who tests the rest of the sites each month. At each site, the water is tested with a YSI meter in order to check the temperature and pH. Then, she takes samples from the site and sends it off to the lab where it is processed and analyzed. This fieldwork is Dr. Dakin's favorite part of working at 3RQ because, "I have always enjoyed being outside and working in nature. The scenery and views combined with the low-stress sampling on nice days is one of the many reasons I have enjoyed working here."

In the lab, Dr. Dakin then analyzes the data and observes trends in the water quality to make sure it is up to standards. Also, meetings with members of 3RQ in West Virginia are required when there is new data/information that needs to be analyzed for any trends or similarities in water quality. This is a very important aspect of the program because it is crucial to compare data from different areas to make sure there are no widespread hazardous effects on water quality. As a result, all of the data gathered by team members goes into a database that analyzes water quality in the surrounding area. This database allows other people to look at and input their own data to create a larger sample size for water quality. This is another crucial aspect of 3RQ because it helps to create long-term monitoring of waterways.

In fact, long-term water quality monitoring is the main reason why the program started in the first place. The West Virginia Water Resource Institute established the program as a way to monitor the effects that fracking had on the water quality in the area. They analyzed the water quality data after fracking and compared it to the results

before fracking to monitor the effects. The program has evolved to include various other conditions that may have an effect on the water quality in the rivers. The lack of long-term monitoring is one of the biggest reasons water quality is a major problem across the world. She stated that, "In order to truly see the effects pollution is having on a waterway, we need to know the conditions and characteristics present before the disaster, which is why long-term monitoring is so crucial."



Dr. Beth Dakin

Currently, there are small volunteer groups who sample local waterways to help monitor quality in their area, but more sampling needs to take place to have a widespread impact. These groups input the data into the database, which helps create a larger sample size for baseline water qualities in the area. The database allows data sharing for these small groups of people, which in return drastically increases awareness by allowing people to observe trends in their area. The sharing of data and increased knowledge are some of the many positive effects she believes 3RQ is having on the surrounding communities, and she hopes to see the program continue to grow. The best piece of advice she can give for anyone concerned with the environment is to get out, volunteer, and get trained, because there are great opportunities in these local groups to spread awareness on the importance of maintaining high water quality.

Roundtable Review: The When, Where, Who, and What of Collaboration in Water Quality for the Ohio, Allegheny and Mon.

3RQ REACH Roundtable -
9 August 2017

Where Was It: Duquesne University
Pittsburgh, PA

Who Came: Representatives from grass-roots watershed organizations, Environmental Protection Agency (EPA), US Army Corps of Engineers (USACE), and university researchers from Wheeling Jesuit University (WJU), West Virginia Water Research Institute (WVWRI) and Center for Environmental Research and Education (CERE) at Duquesne University

What Was Discussed: Issues including turbidity, sediment, and non-point source Bacteria/Algae/Nutrient levels, testing parameters and equipment, and networking opportunities for water monitoring in the three river basins of the 3RQ region.

Kinzua Roundtable -
3 November 2017

Where Was It: Kinzua Bridge State Park
Visitors Center, Kane, PA

Who Came: Representatives from independent watershed groups, Allegheny National Forest, Duquesne University, West Virginia Water Research Institute, University of Pittsburgh at Bradford, Penn Soil RC&D Council, US Army Corps of Engineers, Penn State Extension and more.

What Was Discussed: General watershed issues, 3RQ programs, presentations from Bruce Dickson, Bob Volkmar, and Lisa Barreiro, and a summary of monitoring of the Northern Allegheny River Basin from 2013-17, and open discussion including storm water management, public outreach and education, collaborations, etc.

Monongahela Roundtable-
27 November 2017

Where Was It: WVU Westvaco Natural
Resources Center, Morgantown, WV

Who Came: Representatives from WVWRI, Friends of Deckers Creek, Mon Area Paddlers, Izaak Walton League, WVU Extension, Mountain Watershed Association, Upper Mon River Association, Mon River Towns, Access H2o, Three Rivers Waterkeeper, Northern WV Brownfields and 3RQ researchers.

What Was Discussed: Overview of 3RQ programs and goals, 3RQ topics specific to the Monongahela, education and the REACH 4Schools initiative, water monitoring, Brownfields, and AMD remediation. Site identification and opportunities for collaborative funding were also topics.



Participants in the 3RQ REACH roundtable on August 9 discussed concerns, ongoing projects, and progress in water quality