Creativity, Innovation, Groundwater

Groundwater Guardian Teams Across the Country Take Action to Protect Their Community’s Groundwater

by Sara Brock, Program Manager, The Groundwater Foundation

In 1994, the Groundwater Guardian (GG) program launched to provide support and encouragement for communities and teams of all types to begin groundwater awareness and protection activities, motivation to continue these efforts, and recognition for their achievements. After 24 years, teams are still making a huge impact in their communities through combinations of ongoing programming, creative new ways to distribute information, and finding new audiences who care about their drinking water source. In 2018, GG teams utilized 2,103 volunteers to complete over 17,800 hours of important groundwater education and outreach. Here are just a few highlights.

Celebrating 20 years as a GG team, Indianapolis-Marion County, Indiana regularly performs site visits to local businesses to educate owners and employees about the groundwater. Many of these businesses have been identified as potential contaminant sources. By focusing on education and creating a dialogue through face-to-face meetings, the team can be certain that business owners receive and understand information about groundwater, best management practices, and other resources offered by the Marion County Wellfield Education Corporation.

Businesses, in turn, have an avenue to communicate questions and concerns as well as receive recognition for ensuring

The Springfield, Oregon Groundwater Guardian team installed signs around the community's Drinking Water Protection Area to help people understand that groundwater is their drinking water source.
Half-Degree of Global Warming Could Have Big Impact on Water Availability

Approximately 117 million more people could face water shortages if global temperatures increase 2 degrees Celsius above pre-industrial levels compared to a 1.5-degree Celsius increase in temperatures, a new study suggests.

The world’s water cycle, including evaporation and precipitation, is expected to intensify with global warming, according to the study. This could affect the distribution of freshwater and constrain the global water supply, which poses risks to national food security, economic prosperity and societal well-being.

In a new study, published in *Geophysical Research Letters*, a journal of the American Geophysical Union, researchers examined how global freshwater could change under 1.5- and 2-degree Celsius increases in temperatures, targets set forth in the Paris Agreement.

Researchers used a newly-released model to determine a global assessment of water availability below normal conditions. The new model, called HAPPI experiments, is specifically designed to differentiate impacts between 1.5- and 2-degree Celsius warming targets.

Previous research found more people worldwide would suffer from water shortages when temperatures increase. The new study shows the benefit of maintaining global warming at 1.5 degrees Celsius. Limiting global warming at 1.5 degrees Celsius translates to a less severe decrease in water availability below normal conditions across most regions, including east and south Asia, east and west Africa and central Europe.

For a few regions, however, this limit would be ineffective. Southeast Asia, northern Asia, southern Africa, southern Europe, the Mediterranean, eastern Canada, Greenland, Iceland, Alaska and northwest Canada would experience worsening water availability below normal conditions under both 1.5 degrees Celsius and 2 degrees Celsius of warming.

“Notably, limiting global warming at 1.5 degrees Celsius instead of 2 degrees Celsius would constrain the number of people suffering water shortage induced by water availability below normal conditions in many regions,” second author Wee Ho Lim, of the Chinese Academy of Sciences and University of Oxford, said. “Nonetheless, such a limit is less effective in Alaska and northwest Canada, southeast Asia and the Amazon.”

The findings of the new study provide international policymakers with information about the societal impact of water shortages triggered by freshwater availability below normal conditions on global and regional scales, according to the study.

“Apparently, there’s going to be a spatial variation across different parts of the world,” Lim said. “When you look at the global average, you can see the increasing drought risk should we not try our best to limit our greenhouse gas emissions to maintain the warming at as low a temperature as possible.”

Find the full study at https://g00.gl/1jv1TX.

Groundwater Foundation Remembers Rex Marquart

Rex Marquart, longtime leader of the Rogers Foundation in Lincoln, Nebraska, passed away in June. He was 83.

The Groundwater Foundation has worked with the Rogers Foundation for many years on groundwater education for youth.

“Rex was a person who relished in doing good, kind deeds. And his work really made a difference,” said Groundwater Foundation Executive Director Jane Griffin. “Thanks to support of the Rogers Foundation, the Groundwater Foundation has reached tens of thousands of youth with groundwater education over the years.”

Rex loved his work, and did so until his passing. He worked for the Rogers Foundation, R.H. Rogers Investment, Ages Towne Parking and O’Shea Rogers Dealer/Capital Leasing for over 55 years.

As leader of the Rogers Foundation, Rex recognized the power of education and annually championed Groundwater Foundation programs. He truly cared about what was done.

“In conversations, Rex would always ask about our work and the progress we were making in educating youth about groundwater, and express his desire to do more,” said Griffin.

All summed up, Rex did much more than he probably realized. “As one of our longest and most loyal supporters, Rex was fundamental in creating the excellent youth education programs that we have in place at the Groundwater Foundation. It is thanks to support like his that we are now integrating groundwater education into science classrooms across the state,” said Griffin.

“His support will continue to make a difference for years to come. I will miss my periodic calls with Rex, and we will be forever grateful to him and the Rogers Foundation for the things they have made possible.”

Rex is survived by his wife, Kuulei; two children, five grandchildren, six great-grandchildren, as well as three siblings and many nieces and nephews.

Condolences may be left for Rex and his family online at www.bmlfh.com.
Protect and Prepare Your Well for Flooding

Heavy rainfall events are becoming more and more common, triggering devastating flooding. Hurricanes and strong thunderstorms have dumped massive amounts of rain on many parts of the U.S. recently, and experts fear it’s getting worse.

The National Groundwater Association reports that the 2018 Atlantic hurricane season has affected more than 660,000 private wells in the regions where Hurricanes Florence and Michael made landfall. These wells in North and South Carolina, Florida, Georgia, Alabama, and Virginia may have been affected by flooding, high water table connection to septic systems, flood debris damage, or related incidents. Areas potentially affected by high water tables from heavy rainfall can cause communication between septic systems and wells from saturated subsurface conditions that can create a significant health issue, similar to surface flooding with potential contaminants moving down wells and along well casings.

If you’re a well owner, you need to be prepared to deal with keeping your well safe before, during, and after flood and storm events.

1. **Prepare, Prepare, Prepare**

   When a storm is imminent, take some time to protect your wellhead and pump if they’re exposed to the elements. Covering or securing them can help protect them from any flying debris. If you don’t have a surge suppressor on your pump, now is a good time to add one. Power surges during and after storms can damage a well’s electrical components. Also, it’s a good idea to fill your tub and sinks with water before the storm - if you lose power this water can be used to wash hands and flush toilets - as well as stock up on bottled water for drinking.

2. **Ride Out the Storm**

   If your well loses power during the storm, make sure you turn off the pump at the circuit breaker and leave it off through the duration of the storm. Power outages can result in spikes/surges which can damage the well’s components. Stay away from the well during the storm to avoid electrical shock.

3. **After the Rain**

   If you didn’t have any flooding, examine your well equipment for damage. If you see any damage, contact a professional before you attempt to turn on or operate the pump.

   If your property has flooding, you’ll want to be extra cautious. Do not turn on the power! Don’t go near it for your safety and to avoid electrical shock. Wait until the water has receded before you approach the well. Don’t drink the water or use it for cooking or washing - use an alternative source like bottled water. Get in touch with a qualified water well contractor or pump installer to get your well up and going.

   Disinfection and wellhead repair may be needed, or even well relocation and elevation.

   For more information, refer to Wellowner’s Resources at wellowner.org/hurricane-resources.
the quality of groundwater for future generations.

Two amazing, long-time GG leaders are retiring, moving on from the program into new phases of their lives. Lisa Corbitt of Mecklenburg County, North Carolina (see article on page 9) and Catherine Chertudi of Boise, Idaho.

Chertudi is retiring from her position in the Environmental Division of Public Works but plans to stay involved with the Boise City GG team. Boise received its first GG designation in 1994, as part of the program’s pilot year, and has made meaningful and lasting outreach a significant part of their history. In May, teachers and students look forward to the annual Water Awareness Week which features classroom presentations, teacher training, and tours of the Boise WaterShed Environmental Education Center. In collaboration with the University of Idaho Extension Service, the Boise team also hosts workshops for residents demonstrating water efficient landscaping, fertilizer and pesticide use, and selecting appropriate plants for a mountainous climate. These popular programs are highly anticipated and well attended each year and the team plans to continue them as long as they are useful to the community.

It’s easy to get a new GG team involved in the program. This year, we welcomed three new teams to the GG network. The Nebraska Wildlife Federation, based in Lincoln, Nebraska, has installed six pollinator gardens, including several at local schools. The gardens are built and maintained with student involvement at every step and educator workshops equipped teachers with classroom-ready lessons to teach native ecosystems and the importance of the groundwater to all living things.

A new team from Tarpon Springs, Florida earned designation for promoting best management practices and conservation tips for areas struggling with salt water intrusion.

The third new team is the result of a Girl Scout Gold Award Project in Warner Robins, Georgia. The Girl Scout Gold Rain Garden, coordinated by the Go Fish Education Center and Girl Scouts, is designed to educate the public, students, and other Girl Scouts by providing a place to visualize the water cycle outside of normal lessons and curriculum.

With the increased visibility of groundwater in the media, the GG program helps communities capitalize on media exposure and provide learning opportunities to individuals who are fired up about protecting their drinking water. Springfield, Oregon has distributed 140 copies of a Pesticides Best Management Practices booklet to landscaping companies. Valparaiso, Indiana shares a calendar with residents about Household Hazardous Waste Collection events. Kalamazoo and Battle Creek in Michigan have teamed up to create an enormous PSA campaign that shows during the trailers in movie theaters, airs on the radio, and is displayed on various websites or at educational events.

Dozens of GG teams manage unique and creative websites, social media accounts, informational newsletters, mobile applications, and water festivals. The public seems more excited than ever about local water issues and it’s clear that GG teams are up to the task.

To find out more about what GG teams are doing and how you can join them, visit www.groundwater.org/groundwaterguardian.
Two distinguished groundwater professionals have been named as lecturers for the 2019 McEllhiney and Darcy Lecture Series.

**McEllhiney Lecture Series in Water Well Technology**

Established in 2000 to foster professional excellence, the William A. McEllhiney Distinguished Lecture Series in Water Well Technology honors the groundwater contractor and civil engineer from Brookfield, Illinois, who served as the founding president of the National Ground Water Association in 1948.

Each year a panel of groundwater contractors chooses an outstanding groundwater professional to share his or her professional insights and experiences with the industry.

**Gary L. Hix**

Industry veteran Gary L. Hix, RG, CWD/PI, will be the 2019 William A. McEllhiney Distinguished Lecturer.

Mr. Hix has been a fixture in numerous and varied capacities in the groundwater industry for nearly 40 years. A former licensed well water drilling contractor and registered geologist, Mr. Hix is actively involved in the National Ground Water Association and the Arizona Water Well Association. Throughout his career, he has been a contributing Water Well Journal® editor and has taught classes for the Bureau of Land Management and the University of Arizona Cooperative Extension Service.

Mr. Hix is semiretired but continues to share his groundwater knowledge through published articles, most recently publishing the e-book titled Domestic Water Wells in Arizona, A Guide for Realtors and Mortgage Lenders.

**McEllhiney Lecture Topics**

Mr. Hix will be presenting two lectures topics throughout the year – “Drilling Markets Change, So Must We” – Economic conditions and technology transformations spur changes in any market, and the water well construction and drilling arenas are not immune to these external changes. In this lecture Mr. Hix will discuss the need to develop a broader awareness of market changes and, more importantly, how to adapt.

He will also cover how groundwater professionals can best approach constantly changing conditions and structure their business operations to ensure profitability.

“Drilling Disasters and What We Can Learn” – Anyone who has worked on, or been responsible for, a drill site can most likely recall at least one drilling disaster. And depending on personal experience, disaster can refer to anything from installing incorrect materials on a job site to failing to recognize a situation that caused injury.

In this lecture, Mr. Hix will discuss how each of these experiences presents an opportunity to learn, to avoid similar distress in the future, and to contribute to business profitability and ongoing good will.

**Darcy Lecture Series in Groundwater Science**

Established in 1986, the Henry Darcy Lecture Series in Groundwater Science is named in honor of Henry Darcy of France for his investigations in 1856 that established the physical basis upon which groundwater hydrogeology is studied.

Each year a panel of scientists and engineers chooses an outstanding groundwater professional to share his or her work throughout the year with peers and students.

Dr. John Doherty, author of PEST, the widely used software package for groundwater model calibration and uncertainty analysis, will be the 2019 Henry Darcy Distinguished Lecturer.

Dr. Doherty has worked for more than 35 years in the water industry, first as an exploration geophysicist and then as a modeler. He has worked for both government and industry and held positions at numerous universities conducting extensive research and supervising post graduate students. Currently he owns Australian-based Watermark Numerical Computing that specializes in consulting, research, programming, and education on issues related to model deployment in support of environmental management and impact assessment.

**Darcy Lecture Topics**

Dr. Doherty will be presenting two lectures to groundwater professionals throughout the year – “Dancing with Models – The Importance of Model Partner Software” and “Starting from the Problem and Working Backwards.”

“Dancing with Models – The Importance of Model Partner Software” will explore how models can best serve the decision-making process. In doing so, it demonstrates the indispensable role that model-value-adding software should play in this process. The lecture also addresses some available packages, as well as an easy-to-use, public domain parallel model run manager with a nonintrusive model interface that allows rapid development of model partner software by any programmer.

“Starting from the Problem and Working Backwards” explores the belief that a model cannot tell you what will happen in the future, it can only tell you what will NOT happen in the future. Dr. Doherty will highlight why modelers must be educated in the mathematics and practice of inversion, uncertainty analysis, data processing, management optimization, and other numerical methodologies to effectively design and implement modeling strategies that process optimal environmental data.

**Find Out More**

To find out more about the McEllhiney Lecture Series, visit www.groundwater.org/mcellhiney. To find out more about the Darcy Lecture Series visit www.groundwater.org/darcy. •
Reuse of wastewater supplies can augment a quarter of the drinking water needs in some communities. Advanced technologies provide higher levels of treatment to ensure safe and consistent quality. Today, reuse water treatment options have evolved along with public acceptance, in part due to the lack of evidence for substantial health effects following decades of application. Concerns of uncertain regulatory needs, potential treatment failures and emerging contaminants with unknown health risks continue to be barriers to consumer acceptance, however.

**Sustainable Solutions**

Reuse of water supplies is necessary for many communities to meet future drinking-water needs as conditions of drought and increased demand continue to worsen. According to a 2012 report by the National Academies of Sciences, Engineering and Medicine, water reuse could substantially and sustainably offset predicted water shortages. The report further states that of the nation’s 32 billion gallons (121 billion liters) of municipal wastewater discharged per day, nearly a third is released to oceans or estuaries. Approximately eight percent of wastewater is reclaimed. While reuse of inland supplies may have the unintended consequence of affecting dependent ecosystems or downstream users, reusing coastal discharges alone could save an estimated 27 percent of the public water supply.

Recognizing the sustainable benefits of water reuse, California (and specifically the Los Angeles County Sanitation District) became a progressive initiator of augmented water supplies more than 50 years ago. Since the early 60s, acceptance of non-potable wastewater reuse for irrigation of parks, golf courses and cooling towers spread over time, but reluctance remained relative to using these resources for drinking water, despite growing development of more effective advanced treatment options.

Similar to municipal water sources, potable reuse waters require a multi-barrier approach to disinfection but the latter utilizes additional treatment steps, such as microfiltration, RO, advanced oxidation and UV-light disinfection. These technologies provide additional barriers for unregulated, emerging contaminants of concern, including endocrine disrupting compounds, 1,4- dioxane and NDMA. Increased monitoring for a wider variety of contaminants may also mean a problem is likely to be detected if present. Thus, the risk of drinking reuse water supplies may be lower than that from existing municipal supplies.

A 2012 survey found that 80 percent of American respondents strongly supported non-potable water reuse but only 30 percent supported drinking it (i.e., potable reuse). According to a more recent 2018 US EPA report, consumer confidence is shifting. Surveys in southern California indicate the public understands that treated reclaimed water is potentially of higher quality than current sources. Concern for future generations, the environment and water sustainability, as well as increased stakeholder information on the safety of advanced treated drinking-water supplies, have contributed to improved public opinion.
WATER REUSE OPTIONS

The term potable reuse includes both direct or indirect use of highly treated wastewater as a municipal drinking-water supply. The reuse water is often blended with other waters and passed through the standard drinking-water treatment system where still more treatment measures are employed.

Indirect water reuse involves the use of an environmental reservoir where the water is stored or mixed with existing supplies for subsequent drinking-water sources. The reservoir may be a groundwater aquifer, stream, lake or river. In the arid southwest region of Tucson, AZ, treated wastewater effluent is discharged into dry riverbeds (or washes) where the reuse water naturally recharges groundwater aquifers supplying drinking water to the community.

Direct potable-water reuse indicates the lack of an environmental buffer. Contaminated source-water supplies are therefore treated with engineered controls. In 1968, Windhoek, Namibia was the first city to initiate direct potable reuse throughout the community. The augmented supply routinely saved up to 35 percent of the potable water supply. Epidemiological studies of the Namibia population found no evidence of increased stomach ailments, jaundice or mortality. Additional studies in multiple international regions have also found no substantial evidence of increased cancer, death or infectious disease incidence. Other studies reported no differences in estrogenic, genotoxic or mutagenic effects in animal and cell bioassays. To the contrary, one study found that those drinking reclaimed water had slightly lower diarrheal disease than those consuming the conventional water supply.3

One problem with current study designs is that long-term, chronic effects were not fully tracked. Many health effects typical of some of the chemical contaminants in reuse water would take years to appear. Other limitations of previous study designs include small or poorly matched test and control populations and inability to detect low incidence of disease or milder health outcomes. More long-term research is needed but very costly to conduct. New applications of quantitative microbial risk assessment (QMRA) modeling approaches are being utilized to simulate scenarios of public health benchmark values to predict anticipated health outcomes and treatment efficacy needs. QMRA methods can predict health outcomes much more rapidly than epidemiological field studies but are also limited by the need for more data to accurately assess scenario assumptions.

CHALLENGES AND CONCERNS

A multitude of microbial pathogens are present in higher numbers in wastewater supplies, including viruses, bacteria, protozoa and helminths capable of causing human disease. In addition, a wide variety of chemical contaminants can be found in wastewater from industrial and domestic sources. Endocrine-disrupting compounds and pharmaceutically active compounds are two examples of emerging contaminants found in potable-reuse water sources that are not routinely removed via conventional wastewater treatment. In addition, treatment of wastewater adds additional contaminants of concern, such as DBPs.

Challenges include advanced treatment needs for diverse incoming water quality. As the source-water quality changes over time, the treatment train must also adjust to ensure any contaminants of concern are appropriately removed. More research is needed to determine the frequency of these events and the successful mitigation of changing needs. In addition, more research is needed to evaluate what level of protection for public health is afforded by regulatory standards for water reuse. Currently, no consistent federal standard exists across states specific to water reuse, although drinking water supplied to consumer taps is required to meet limits defined under the Safe Drinking Water Act (SDWA). (Contaminant-specific SDWA standards were developed based on anticipated levels in source waters and required treatment-technology efficacy to achieve a defined acceptable risk limit and may differ relative to reuse water quality.)

The multi-barrier treatment approach provides successive safety nets to mitigate a wide range of harmful drinking water contaminants, regardless of source. Systems can fail, however. Information on the frequency of failures in reuse treatment systems is limited and thus accurate assessments of risks over time are difficult to determine. Potable-reuse water sources promise to provide a more sustainable (and possibly safer) drinking-water supply compared to conventional sources. The use of a final barrier (i.e., POU treatment device), however, continues to be needed for minimizing exposure to the variety of contaminants that may escape the municipal treatment train, be introduced in the distribution system or grow in the premise plumbing.

REFERENCES


ABOUT THE AUTHOR

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The 1972 Clean Water Act has driven significant improvements in U.S. water quality, according to the first comprehensive study of water pollution over the past several decades by researchers at UC Berkeley and Iowa State University.

The team analyzed data from 50 million water quality measurements collected at 240,000 monitoring sites throughout the U.S. between 1962 and 2001. Most of the 25 water pollution measures showed improvement, including an increase in dissolved oxygen concentrations and a decrease in fecal coliform bacteria. The share of rivers safe for fishing increased by 12% between 1972 and 2001. Despite clear improvements in water quality, almost all of 20 recent economic analyses estimate that the costs of the Clean Water Act consistently outweigh the benefits, the team found in work also coauthored with researchers from Cornell University. These numbers are at odds with other environmental regulations like the Clean Air Act, which show higher benefits compared to costs.

“Water pollution has declined dramatically, and the Clean Water Act contributed substantially to these declines,” said Joseph Shapiro, an associate professor of agricultural and resource economics in the College of Natural Resources at UC Berkeley. “So we were shocked to find that the measured benefit numbers were so low compared to the costs.”

The researchers propose that these studies may be discounting certain benefits, including improvements to public health or a reduction in industrial chemicals not included in current water quality testing.

Cleaning up our streams and rivers

Americans are worried about clean water. In Gallup polls, water pollution is consistently ranked as Americans’ top environmental concern.

Since its inception, the Clean Water Act has imposed environmental regulations on individuals and industries that dump waste into waterways, and has led to $650 billion in expenditure due to grants the federal government provided municipalities to build sewage treatment plants or improve upon existing facilities.

However, comprehensive analyses of water quality have been hindered by the sheer diversity of data sources, with many measurements coming from local agencies rather than national organizations.

To perform their analysis, Shapiro and David Keiser, an assistant professor of economics at Iowa State University, had to compile data from three national water quality data repositories. They also tracked down the date and location of each municipal grant, an undertaking that required three Freedom of Information Act requests.

“Air pollution and greenhouse gas measurements are typically automated and standard, while water pollution is more often a person going out in a boat and dipping something in the water,” Shapiro said. “It was an incredibly data and time-intensive project to get all of these water pollution measures together and then analyze them in a way that was comparable over time and space.”

In addition to the overall decrease in water pollution, the team found that water quality downstream of sewage treatment plants improved significantly after municipalities received grants to improve wastewater treatment. They also calculated that it costs approximately $1.5 million to make one mile of river fishable for one year.

Comparing costs and benefits

Adding up all the costs and benefits - both monetary and non-monetary - of a policy is one way to value its effectiveness. The costs of an environmental policy like the Clean Water Act can include direct expenditures, such as the $650 billion in spending due to grants to municipalities, and indirect investments, such as the costs to companies to improve wastewater treatment. Benefits can include increases in waterfront housing prices or decreases in the travel to find a good fishing or swimming spot.

The researchers conducted their own cost-benefit analysis of the Clean Water Act municipal grants, and combined it with 19 other recent analyses carried out by hydrologists and the EPA. They found that, on average, the measured economic benefits of the legislation were less than half of the total costs. However, these numbers might not paint the whole picture, Shapiro said.

“Many of these studies count little or no benefit of cleaning up rivers, lakes, and streams for human health because they assume that if we drink the water, it goes through a separate purification process, and no matter how dirty the water in the river is, it’s not going to affect people’s health,” Shapiro said. “The recent controversy in Flint, MI, recently seems contrary to that view.”

“Similarly, drinking water treatment plants test for a few hundred different chemicals and U.S. industry produces closer to 70,000, and so it is possible there are chemicals that existing studies don’t measure that have important consequences for well-being,” he said.

Even if the costs outweigh the benefits, Shapiro stresses that Americans should not have to compromise their passion for clean water, or give up on the Clean Water Act.

“There are many ways to improve water quality, and it is quite plausible that some of them are excellent investments, and some of them are not great investments,” Shapiro said. “So it is plausible both that it is important and valuable to improve water quality, and that some investments that the U.S. has made in recent years don’t pass a benefit-cost test.”

Research funding was provided by the U.S. Department of Agriculture and a National Science Foundation Award.
Groundwater Guardian teams are often the result of the interest of a community's sparkplug - someone who is passionate, committed, and capable.

That's certainly been the case in Mecklenburg County, North Carolina, which was first designated as a Groundwater Guardian in 1998 under the leadership of Lisa Corbitt. Lisa was first introduced to the Groundwater Guardian program at a conference in Chicago in the fall of 1997. Hearing different Groundwater Guardian teams talk about what they were doing in their communities - water festivals, educational outreach, establishing regulatory requirements - inspired Lisa to get a team going in Mecklenburg County.

Mecklenburg County is an urban county home to over one million people. The County encompasses 546 square miles and includes the City of Charlotte as the county seat. Most people in the county get their drinking water through Charlotte’s municipal water source, Mountain Island Lake, a surface water source. Approximately 15% of the population relies on groundwater for drinking water, industrial water, or irrigation from an unconfined bedrock aquifer.

Lisa’s background as a Licensed Geologist and 31 years of working on groundwater issues in Mecklenburg County as a Hydrogeologist and Program Manager gives her a unique perspective on the County’s water resources. Though groundwater provides a small portion of the city’s water source, protecting it and raising awareness has long been a goal of the Lisa and her team. Over 1,800 groundwater contamination sites can be found in the county, ranging from a leaking home heating oil tank to a Superfund site.

The County’s programs and approaches have changed dramatically over the last 20 years. “In the beginning we were in the towns and schools educating high school students to teach elementary school students about the groundwater system through Aquifer Clubs, and annually we would have a Water Festival,” she says, which were great ways to reach students.

Then in 2005, the Mecklenburg County Groundwater Well Regulations were adopted. About the same time, the Learn and Serve Grant the team had been relying on stopped funding the type of educational programs they were offering, and the school system began implementing new restrictions on student involvement.

As a result, the team combined with other local efforts and shifted its focus to new water supply wells, identifying and sampling wells near contamination sites, and educating Water Well Contractors as well as Realtors. Team members are still able to participate in youth education efforts, such as classroom presentations, Science Olympiad, and Envirothon.

Looking to the Future

As Lisa nears her retirement in early December of this year, she’s laid the foundation for the efforts of the Groundwater Guardian team she’s led over the last 20 years to continue. “Mecklenburg County’s Groundwater Advisory Board was established in 2005 as a requirement of the Groundwater Well Regulations,” she explains. “As long as the regulations are in effect there will be a citizen advisory board,” which is part of the Groundwater Guardian team. Staff members from Mecklenburg County Groundwater & Wastewater have taken leadership roles in education outreach as part of the Groundwater Guardian team’s efforts.

As for her personal legacy? Lisa is humble: “One person does not leave a legacy. Each success we’ve accomplished is because we have had a great team working together.”

Over 30 years ago, she was hired to establish a groundwater program. The program has gone from zero to:

- Groundwater Well Regulations for permitting, repairing and abandoning water supply wells
- Requirements for areas of regulated groundwater usage
- Groundwater Contamination Database
- A program that identifies and samples wells within 1500 feet of a known contamination site (Mecklenburg County Priority List)
- A public portal for well and groundwater contamination information (Well Information System)
- A public portal for permitting and abandoning monitoring wells (MAPS)
- Combined Groundwater Program with the Onsite Wastewater Program to address an entire piece of property with groundwater in mind.

“**When one community is successful we are all successful.**”

Groundwater Guardian has been a memorable part of Lisa’s career. And the best part of it? “The building of collaborative relationships and friendships with people across the United States that care about protecting the groundwater resource,” she says. “We openly share ideas and information. We learn from each other on what works well and what does not work well. We encourage each other to use our ideas. When one community is successful we are all successful.”

When asked about her biggest successes, Lisa mentions the Mecklenburg County Priority List, which was established to ensure that residents are not drinking or at a risk of drinking contaminated groundwater and to ensure that an alternative water source is made available. The program has identified and resolved over 270 contaminated water supply wells. She also mentions the establishment of local Groundwater Well Regulations to ensure that new wells are constructed properly and are not located within 1000 feet of a known contamination site.

“It’s been rewarding to help individuals that have found out their well is contaminated and don’t know what to do next. I’ve had the opportunity to work beside them in making sure that they have a safe drinking water source,” she says.

After all, groundwater is the water we drink. And we thank Lisa for being an active partner through Groundwater Guardian and working to protect it for over 30 years.
Groundwater Week is December 3-6, 2018

For the 22nd time, the National Ground Water Association’s Groundwater Week will be held in Las Vegas, Nevada.

Scheduled for December 3-6, 2018 at the Las Vegas Convention Center, Groundwater Week is the groundwater industry’s biggest show, featuring educational opportunities, a packed exhibit hall with the latest from the industry’s manufacturers and suppliers, and opportunities to meet and network with groundwater professionals from around the world.

Some highlights from Groundwater Week 2018 include:
• Early/New Career Meet Up
• First Timer/New Member Orientation
• Master Groundwater Contractors Luncheon
• NGWA Welcome Party
• Keynote Presentation by actor, author, motivational speaker and retired U.S. Army soldier J.R. Martinez
• Awards of Excellence
• Exhibit Hall
• 2018 NGWA Darcy Lecture Farewell Presentation
• 2018 William A. McEllhiney Distinguished Lecture Series in Water Well Technology
• Coffee with NGWA Directors and CEO
• New Products Showcase
• NGWA Bookstore
• The Great Groundwater Foundation Scavenger Hunt

Groundwater Week also offers a full slate of educational offerings. Workshops, panels and more will offer professional development opportunities about business management, drilling operations and well construction, safety and compliance, groundwater monitoring, sustainable and available groundwater, water quality, water systems, and well maintenance and rehabilitation.

The Groundwater Foundation will be offering a workshop on Tuesday, December 4 about getting involved with its various programs and outreach efforts, including Groundwater Guardian and Groundwater Guardian Green Site.

In addition, a reception with a live and silent auction will be held on Wednesday, December 5 to benefit the Groundwater Foundation’s programs. If you’re interested in donating to the auction or to see current auction items, go to www.groundwaterweek.com/foundation-auction. If you’d like to donate an auction item, such as autographed memorabilia, gift baskets, professional services, unique experiences, etc., please contact Groundwater Foundation Executive Director Jane Griffin at jgriffin@groundwater.org.

To find out more about Groundwater Week, see a full schedule and description of events, or to register, visit www.groundwaterweek.com.