Flooding Affects Private Wells
Historic Flooding in the Midwest May Have Affected One Million Wells

The National Ground Water Association (NGWA), drawing on federal and state weather and emergency information, estimates that more than 300 counties in the Midwest have wells potentially impacted by late winter flooding. While the exact number of wells possibly affected by contaminated floodwater cannot be readily counted, Census Bureau data show over one million wells in these counties. This well estimate includes counties flooded in Illinois, Indiana, Iowa, Kansas, Kentucky, Minnesota, Missouri, Nebraska, South Dakota, and Wisconsin during the March 2019 winter storm.

NGWA says the number of wells potentially impacted could be substantial because a large portion of the Midwest affected relies on groundwater for rural and small municipal water supply. Household, farm, and small business wells situated in broad, sand and gravel valleys and glaciated rolling countryside could have been standing in water for several days, raising the potential for contamination if the wells aren't properly maintained. Exposure to E. coli, coliform, and other pathogenic microbes from human and animal fecal matter in floodwaters is a common health concern following a major flooding event. Floodwater can also carry other contaminants.

“Although the ground is frozen in March in most of this vast, productive agricultural region, wells can still be vulnerable,” said Chuck Job, NGWA.
Art Exhibit Showcases Groundwater

The LUX Center for the Arts in Lincoln, Nebraska received a sub-award from the Groundwater Foundation to build an arts curriculum around the importance of groundwater in our lives as part of the Recharging Groundwater Education project funded by the U.S. EPA. The four artists-in-residence at the LUX Center, Owen Buffinton, Elise Loomis, Maria Spiess, and Taylor Wollwine, participated in an educator training provided by the Groundwater Foundation, which refreshed the artists’ knowledge of groundwater concepts and identified parts of their curriculum that could be aligned with Nebraska’s Arts and Science Standards.

The two ceramics artists led a clay-based project with elementary students, while the mixed media and painting artists developed drawing and painting-based lessons for the same ages, all centered around groundwater.

The final projects, completed by K-5 grade students from Lincoln elementary schools, were displayed at an exhibition that opened in the LUX Wake Gallery on March 1, 2019 and ran through the month of March. The work of student artists Kassandra Alvis, Silvia Foss, Vasya Mironov, Masha Mironova, Jasmine Pham, Zoe Pham, Johnathan Reyes, Kyquel Snyder, Almond Watkins, and Graham Wilkinson was featured.

Dozens of gallery-goers visited the Recharging Groundwater Student Exhibition during its opening reception. Dozens of students also visited the exhibit as a part of classroom and club curriculum.

A large painting and a three-dimensional clay sculpture depicted the role of groundwater in the water cycle and in people’s daily lives. These projects were able to artistically show important groundwater concepts like the saturated zone, porosity, and groundwater flow as students demonstrated the many paths a water droplet can take through the water cycle.

The Groundwater Foundation’s name, logo, and educational tools that were utilized within the art curriculum were prominently featured next to the names of the artists and students who completed this amazing project.

Microplastics Found in Groundwater

While it is widely known discarded plastic debris and microplastic contamination is widespread in surface water and aquatic ecosystems worldwide, an eye-opening study indicates the presence of microplastics in the groundwater aquifers we use for drinking water as well.

Led by a team of eight researchers, including Walton R. Kelly of the Illinois State Water Survey, the study found microplastic contamination in groundwater through karst aquifers, or open limestone systems that constitute about 25 percent of global drinking water. In the study, 16 out of the 17 groundwater samples collected from springs and wells from two karst aquifers in Illinois contained both microplastics and other contaminants like pharmaceuticals and personal care products.

According to the research, the open nature of karst aquifers makes them vulnerable to the rapid transport of surface-borne contaminants in dissolved and particulate forms. In addition to being important drinking water resources, karst ecosystems are habitats for rare faunal species that may be susceptible to contamination.

“In addition to the consumption of the particles themselves, microplastics may also be substrates that adsorb other contaminants such as pharmaceuticals, metals, or pathogenic microbes. From an ecological point of view, karst groundwater often discharges from springs to surface water, meaning microplastic contamination may be transferred to and affect the vulnerable ecosystems within the karst systems,” said Kelly.

While the study focused on two aquifers in Illinois, Kelly hypothesizes microplastic contamination could be a broader issue. “Krat systems are...
found around the world, and in the United States they are prevalent in the Midwest, Southeast, and Texas, with Florida made up of nearly 100 percent karst systems. Because these are notoriously vulnerable to contamination, there's every reason to expect to find microplastics in other karst aquifers.”

The major question? What does this mean for human and ecosystem health? According to Kelly, this critical question needs to be further explored, citing a call for research in The Lancet Planetary Health titled Microplastics and human health — an urgent problem (found at https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(17)30121-3/fulltext).

As the research around microplastic contamination in karst aquifers and the potential health effects continues, Kelly says the ability for consumers to test or remediate microplastics in their water systems could be met with varying success.

“Some of these microplastics are actually visible to the naked eye; however, identifying and enumerating the contaminants is a specialized and time-consuming process with very few laboratories able to conduct this analysis for the public. Point-of-use filters could possibly remove any particles, but I don't personally know of any certified products on the market.”

According to Newsweek, since plastics started being manufactured around 1950, humans have created more than 8,300 million metric tons of them. Of that, around 6,300 metric tons is waste, and only nine percent has been recycled. As much as 79 percent has ended up in landfills or in the natural landscape, including surface waters.

In addition to Kelly, the research team included Samuel V. Panno, Illinois State Geological Survey and lead author; John Scott, Illinois Sustainable Technology Center; Wei Zheng, Illinois Sustainable Technology Center; Rachel E. McNeish, California State University; Nancy Holm, Illinois Sustainable Technology Center; Timothy J. Hoellein, Loyola University, Chicago; and Elizabeth L. Baranski, League of Women Voters of Jo Daviess County.

The full article “Microplastic Contamination in Karst Groundwater Systems” is available free for a limited time through the Wiley Online Library at https://onlinelibrary.wiley.com/doi/full/10.1111/gwat.12862.

EPA Issues Guidance on Clean Water Act Permitting Requirements

On April 15, the U.S. Environmental Protection Agency (EPA) issued guidance clarifying the application of Clean Water Act (CWA or the Act) permitting requirements to groundwater. EPA’s Interpretative Statement concludes that Congress excluded releases of pollutants to groundwater from the Act's permitting requirements and instead left regulation of those releases to the states and EPA's other statutory authorities.

EPA's Interpretative Statement provides certainty to states and the regulated community while recognizing long-standing protections for America's groundwater.

Consistent with Congress' vision for a strong federal state partnership to protect the country's groundwater resources, the agency's new guidance recognizes the state's leadership role in protecting groundwater and provides certainty to states and others who implement and enforce EPA's federal permitting programs. EPA's Interpretative Statement will help inform federal and state regulators with future National Pollutant Discharge Elimination System (NPDES) permitting and enforcement decisions.

States should continue to take an active role in regulating discharges to waters within their jurisdictions, as provided in state law and envisioned under the CWA. EPA will continue fulfilling its role in protecting groundwater and hydrologically connected surface waters as authorized by Congress through the Safe Drinking Water Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act.

Recent conflicting federal court decisions and the prior lack of clear agency guidance regarding whether NPDES permits are required for releases of pollutants to groundwater has caused uncertainty regarding how the agency and states should implement and enforce the NPDES permitting program. In February 2018, EPA requested public comment on whether the agency should revise or clarify its position on the issue. At the same time, the agency also undertook a comprehensive review of prior agency statements on the matter and performed a holistic analysis of the text, structure, and legislative history of the Act. Based on this analysis and careful consideration of public input, EPA concluded that Congress excluded releases of pollutants to groundwater from the Act's permitting requirements, regardless of whether there is a hydrological connection between the groundwater and a water of the United States.

In conjunction with issuing its Interpretative Statement, the agency is seeking additional public input regarding what may be needed to provide further clarity and regulatory certainty on this issue. The comment period will be open for 45 days after the Interpretative Statement is published in the Federal Register.

For more information visit https://www.epa.gov/npdes/releases-point-source-groundwater.
regulatory affairs manager who compiled this data. “Even slight flooding around a well can potentially carry contaminated water to the wellhead, and if the wellhead is cracked or faulty in any way, the well and water system could be compromised.”

Dr. Bill Alley, NGWA science director, also notes as temperatures rise, well owners should continue to monitor and test their systems.

“While frozen ground may not be saturated from storm water, warmer weather may allow flood waters to infiltrate and contaminate subsurface water during a thaw,” Alley said.

By comparison, NGWA estimated more than 730,000 wells were potentially affected by the Atlantic hurricane season in North Carolina, Georgia, South Carolina, Florida, Virginia, and Alabama. Following a flood, disinfection and wellhead repair may be common needs among well owners. Well relocation and elevation may also be useful and protective. As always, NGWA recommends water well system professionals be used to assess and service wells.

NGWA has a flooding resource center on its website (ngwa.org or wellowner.org). Included is information on how to protect well systems before and after a flooding event.

NGWA also has other resources contractors may find helpful in dealing with flooded water wells including the best suggested practice Residential Water Well Disinfection Following a Flood Event: Procedures for Water Well System Professionals and a Water Well Journal® article titled “Responding to Flooded Wells” at WellOwner.org/hurricane-resources.

NGWA is a not-for-profit professional society and trade association for the groundwater industry. Its members around the world include leading public and private sector groundwater scientists, engineers, water well system professionals, manufacturers, and suppliers of groundwater products and services. The Association’s vision is to be the leading groundwater association advocating for responsible development, management, and use of water.

REFERENCE
1. 1990 US Census Bureau Survey of Population and Housing (including wells – last census of wells in all counties); National Weather Service, Hazardous Weather Outlook (for individual states and regions), and State Emergency Management Information on state websites.

10 Flood-Impacted Midwest States Have 1 Million Wells in 300 Affected Counties

<table>
<thead>
<tr>
<th>State</th>
<th>Well Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin</td>
<td>281,141</td>
</tr>
<tr>
<td>Minnesota</td>
<td>254,922</td>
</tr>
<tr>
<td>Illinois</td>
<td>201,821</td>
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<tr>
<td>Iowa</td>
<td>153,517</td>
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<tr>
<td>Missouri</td>
<td>96,314</td>
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<tr>
<td>Nebraska</td>
<td>76,982</td>
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<tr>
<td>Indiana</td>
<td>24,257</td>
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<tr>
<td>South Dakota</td>
<td>11,900</td>
</tr>
<tr>
<td>Kentucky</td>
<td>9,994</td>
</tr>
<tr>
<td>Kansas</td>
<td>3,309</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,114,157</td>
</tr>
</tbody>
</table>
Routine maintenance and inspection of water wells can help protect water quality, ensure your well is operating properly, prolong the life of the well system, and protect your investment. Greatest of all these is the protection of groundwater and your health, as water quality issues can have adverse health impacts without any detectable indicators.

Small problems can often be identified by performing maintenance before they become costly, inconvenient situations. It’s similar to routine maintenance on your vehicle—if you have the oil changed at specified intervals, the engine will operate reliably much longer than if you don’t.

At a minimum, wells should be evaluated annually by a licensed or certified water well systems professional and include a flow test; visual inspection; a water quality test for coliform and anaerobic bacteria, nitrates, and anything else of local concern; checking valves; and electrical testing.

You should receive a written report following the annual checkup that describes recommendations and all laboratory and other test results. Keep this with all other well information.

Understanding Your System
Well owners should have a basic understanding of their well system. Start by maintaining records of any well logs. A detailed log of your well’s construction and the pump installation record are two important tools in troubleshooting and potentially fixing issues with your well and well pump in the future. Ask your well contractor for these records. A well log can provide information regarding the depth of the well, the type of casing used, grouting practices and intervals, static water levels, what type of pump test was performed and results, if the well is screened or not, and more.

You should also be aware of any filtration or treatment systems. Know if one is installed, what type of treatment method is used, and what the water is being treated for. Read the owner’s manual and keep a copy with your well records for when an issue arises.

Visual Inspection
Well owners should also conduct a regular visual inspection of the well to monitor its performance.

On the wellhead, inspect the casing’s general condition and if it extends at least 12 inches above ground. The well cap on top of the casing should be securely attached. Verify that any electrical connections are secure.

Survey the area above ground surrounding the well. Check the location relative to potential sources of contamination, flooding, and physical dangers. Maintain at least 50 feet between the well and any kennels, pastures, feeding areas, or livestock operations, and ensure a proper distance is maintained from buildings, waste systems, or chemical storage areas (including fuel tanks). Be sure the ground surrounding the wellhead is sloping away from the well to divert surface runoff.

Any growth of weeds, trees, shrubs, or grasses with root systems within 10 feet of the well should be physically removed. Avoid the use of chemicals or herbicides near the wellhead.

The well should not be in a roadway or driveway. If it is within close proximity to a roadway or driveway, it should be properly marked to avoid being hit by vehicles. Be conscious of any other potential threats to the wellhead—garages, ATVs, sledding hills, debris, dirt, surface water, fuels and chemicals (including fertilizers), and runoff water from kennels, pastures, or feedlots.

Well owners should visually inspect any above-ground pumping equipment. Ensure motors are properly cooled and vented, check for shaft seal leaks, and rust or other signs of weakened fittings.

Examine other above-ground well system wiring and parts such as pipes, connections, joint seals, gauges, pressure relief valves, and the water meter (if present). A water sample tap should be located near the pressure tank, high enough to easily collect a water sample.

Note the condition and accessibility of above- and below-ground storage tanks. Evaluate the condition of the control box and connections. Maintain water softeners, conditioners, and filtration equipment.

When to Call a Professional
A qualified water well professional should be consulted for any issues discovered during a visual inspection. When in doubt, call a water well systems professional, but especially:

- Anytime the well has to be opened (cap or well seal removed).
- If you experience taste or odor problems.
- If you experience turbidity or cloudiness (“dirty” looking).
- If there is a loss of capacity or pressure—the well is not producing as much water as previously produced, the pressure drops and surges, or the pump cycles on and off frequently.
- If a test is positive for total coliforms, anaerobic bacteria, or any positive test results indicating a potential health concern.
- If you find defects with your wellhead, the wellhead area, or the overall water system during your routine inspection.

Cleaning and disinfection should only be performed by a qualified water well systems professional—for your safety and the protection of your well system.

Find out more about proper well maintenance and much more online at www.wellowner.org.
Earlier this year, in the middle of one of the snowiest winters on record in the Groundwater Foundation's hometown of Lincoln, Nebraska, we received an order from the Groundwater Catalog for 10 Awesome Aquifer Kits and JUG (Just Understanding Groundwater) kits. I was instantly jealous of the kits, as they were headed off to say "Aloha" and help people understand groundwater in their new home of Hawaii.

For the last 33 years, Daniel Chang has been involved in environmental education and outreach, in one form or another, while working on drinking water and groundwater quality with the Hawaii Department of Health. Chang has been instrumental in getting groundwater education tools into the hands of educators. He understands the value of groundwater as a natural resource and its finite nature.

"If we contaminate or waste this resource, we cannot go out and get more, so we need to be good stewards, use it wisely, and protect it from contamination," he said.

"Education and outreach is one way to get the message out. Knowledgeable citizens and students are important in ensuring good quality water now and into the future."

The Awesome Aquifer Kit and Just Understanding Groundwater

The Just Understanding Groundwater (JUG) kit was developed by the Groundwater Foundation in the early 2000s to fill the need for an educational groundwater model that was portable, simple enough for younger students to use and understand, but customizable to be adapted for older students and even adults.

For years, Foundation staff had lugged its “ant farm” style groundwater flow model to events and demonstrations. While the flow model is an excellent teaching tool, it wasn’t practical to provide to educators for classroom use or to have many students using it at once.

As they say, "Necessity is the mother of invention." And the JUG was born.

Housed in a plastic jar, the JUG is a self-contained introductory aquifer science kit. It includes activity steps for basic experiments to demonstrate aquifer geology, water movement, water pumping, and contamination.

Several years later, and after working with students and educators across the country, the Groundwater Foundation saw the need for a similar product for more advanced groundwater discoveries, and created the Awesome Aquifer Kit (AAK) as part of an event for Science Olympiad competition.

The AAK has materials and instructions for advanced groundwater experiments, including groundwater’s role in the hydrologic cycle, groundwater contamination and remediation, and the physical properties of an aquifer. Its activities have been correlated to Next Generation Science Standards for even better integration into classrooms and beyond.

Groundwater Education in Hawaii

Although it’s surrounded by water as an island state, Hawaii relies on groundwater as its main source of water for drinking and irrigation. Over 500 million gallons per day of groundwater is used in the state to fulfill domestic, commercial, and industrial needs.

Groundwater provides about 99 percent of Hawaii’s domestic water and about 50 percent of freshwater used in Hawaii.1 Hawaii’s groundwater resources

Groundwater Education in Hawaii
Hawaii Department of Health Uses Awesome Aquifer Kits and JUGS as Part of Outreach Efforts
by Jennifer Wemhoff, Groundwater Foundation

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may appear plentiful, but much of the precipitation runs off to the ocean in streams or returns to the atmosphere by evapotranspiration.

Naturally, Chang wanted to help Hawaiians understand this resource.

“Working in the State’s Groundwater Protection Program, we would get calls from schools to talk about groundwater in Hawaii and needed a way to explain how groundwater works to students,” he said.

While looking for possible activities that he and his colleagues could use to present to students, he came across the AAK and JUG through the Groundwater Foundation catalog, and was excited about how the tools could be used.

“The interesting part of these kits was that they were simple, yet provided several activities that we could do to teach the students about groundwater,” Chang explained. He said they use both the AAK and the JUG to teach students groundwater basics such as:

• What is groundwater?
• How do we get groundwater?
• How is groundwater contaminated?
• How does recharge happen?

The kits have been used in a variety of educational settings that showcase their adaptability. From groundwater displays at Earth Day events and county fairs, Project WET educator trainings, special events like the annual Make-A-Splash Water Festival conducted by the Kauai Department of Water, to direct education in classrooms with students, the JUG and AAK are helping to spread the message about groundwater.

Notably, the Hawaii Department of Health provided funding to the state’s Project WET Coordinating Agency to purchase AAK and JUG kits that were provided to educators that attended the Project WET Educator’s Workshops for use in their classrooms.

“They’re making an impact.

“Students enjoy the different activities that we teach them using these educational tools,” Chang said. “Many of them ask us when we are coming back to do more activities with them.”

Other agencies have also embraced the kits as teaching tools, including Chang’s Hawaii Department of Health and the Kauai Department of Water, which Chang said has has spurred environmental education beyond groundwater.

He points out that in the recently completed Hawaii State Science and Engineering Fair, personnel from the Department of Health judged 20 projects related to drinking water and groundwater.

“This is a significant increase over the past 10-20 years when we were lucky to see just a handful of projects,” Chang said.

Looking Ahead

Chang has a long background in groundwater. His BS in Chemistry from the University of Hawaii led him to the Department of Health where he started doing hazardous waste and underground storage tank inspections and is currently the Section Supervisor for the Safe Drinking Water Branch.

He continues to look for new ways to bring groundwater education to people, including a Groundwater Café. “Learning can be accomplished in many ways,” Chang explains. “This year, we prepared and tested our Groundwater Café, which combined my knowledge of groundwater with my enjoyment of cooking to put together a method of teaching about groundwater.”

The Groundwater Café concept was conducted for a select group of staff from Department of Health’s Safe Drinking Water Branch and Hazard Evaluation and Emergency Response Office, and showed great promise.

“We hope to hold a Groundwater Café event for Groundwater Protection Day this September, as well as a regular feature of our Project WET Educator Workshops,” Chang said.

Chang knows his and his team’s work isn’t done when it comes to teaching people about groundwater. “While the State has made progress in our groundwater education and outreach efforts, there is still a lot more that needs to be done,” he said.

Chang is excited about continuing to find new ways to deliver groundwater education. He knows that new and creative ways of groundwater education come from reviewing existing ideas and activities, creative and innovative thinking, and the sharing of ideas.

“The Groundwater Foundation has been a great resource in our efforts,” Chang said.

Get your own Awesome Aquifer Kit, Just Understanding Groundwater kit, or other useful groundwater education products from the Groundwater Foundation’s online catalog—shop at www.groundwater.org/shop. Use promo code HAWAII to save 10% on catalog orders through July 31, 2019.

Reference
Pharmaceuticals Found at Low Concentrations in Groundwater
USGS Study Finds Groundwater in Areas With Fractured Rock Are the Most Vulnerable

The topic of pharmaceuticals and hormones in drinking water gets people’s attention, but if that drinking water is pumped from a well, those chemicals are less likely to be present, according to a new study by the U.S. Geological Survey. The results of the national study were published in the journal *Environmental Science and Technology*.

USGS scientists analyzed 103 pharmaceuticals and 21 hormones in samples from nearly 1,100 groundwater wells that tap drinking-water aquifers. Six percent of samples from public-supply wells and 11 percent of samples from wells used for domestic supply or other uses contained one or more pharmaceuticals or hormones. When detected, the chemicals were at low concentrations and not expected to have adverse human-health effects. Just one sample contained a pharmaceutical—hydrocortisone—at a concentration that exceeded its human-health benchmark.

This is the first large-scale, systematic study of the occurrence of hormones and pharmaceuticals in groundwater used as a drinking-water supply for an estimated 80 million people across the United States. The aquifers sampled provide about 60% of the groundwater used for drinking. Samples were collected prior to the water undergoing any type of treatment. The hormones and pharmaceuticals most frequently detected were not necessarily those most heavily used, but rather those that move through groundwater easily without adhering to soil, sediment, or rock. Samples from shallow wells, particularly those drilled into fractured crystalline rocks, were more likely to contain pharmaceuticals and hormones than samples from wells in other groundwater settings.

Overall, detection frequencies and concentrations for pharmaceuticals and hormones in groundwater were lower than those reported by other studies for pharmaceuticals and hormones in surface water, and similar to or lower than those for other types of organic chemicals, such as pesticides, in groundwater.

To keep pharmaceuticals out of water supplies and the environment, and to prevent accidental poisonings or abuse, the best way to dispose of these items is through local take-back options.

Over 320 pharmacies across Nebraska are part of the Nebraska MEDS Coalition and will take back unwanted or expired medications for proper disposal. Find one near you at www.leftovermeds.com.

The Groundwater Foundation is a proud member of the Nebraska MEDS Coalition.
Making a Difference
Longtime Groundwater Guardian Team Leader Set Out to Make a Difference in Her Community
by Jennifer Wemhoff, Groundwater Foundation

The term “sparkplug” has been used by the Groundwater Foundation for years to describe people who are the doers in their community—the ones who are passionate about an issue, have connections throughout the community, and are motivated to make change happen.

Catherine Chertudi of Boise, Idaho is one such sparkplug, which is evident by Boise’s 25 years in the Groundwater Guardian program under her leadership.

Chertudi has always had an interest in the environment. She earned a degree from Boise State University in Environmental Health and pursued graduate courses in the same field. She started her professional career with the Idaho Attorney General working on the first Superfund sites in the state. After working in the Water Bureau for the Department of Environmental Quality, she became the Groundwater Programs Coordinator for the City of Boise in 1990, where she worked on hazardous wastes and groundwater protection and remediation programs until she was promoted to supervise a new unit in Public Works responsible for trash, recycling, hazardous waste and groundwater programs in 1995.

In 1993, during the program’s testing year, Boise was approached by Bob Kuzelka to be part of the pilot group of Groundwater Guardian communities. The City had previously received a grant from the U.S. EPA wellhead protection program to begin evaluating wells and threats in a growing area of the city. “The grant put us on the Groundwater Foundation’s radar and they reached out to the city about our participation in the program,” Chertudi explained. She was thankful for the upward support she had from her supervisor, the Public Works Director, Mayor, and Council to start the Groundwater Guardian program in Boise.

The rest, as they say, is history, as Boise implemented groundwater programs year after year.

“Groundwater Guardian was a natural fit for our work in protecting and conserving groundwater resources in Boise—the program provided resources, connections and a format to organize and recognize our efforts,” she said.

Boise is a fast growing community with a vibrant downtown area, and is home to the state Capitol and state university. While the growth is good for the economy, it adds stress to infrastructure and the environment. Boise’s population is about 230,000, with more than 600,000 residents in the immediate area. Boise’s drinking water system is privately owned by Suez and is about 75% groundwater dependent.

The Boise Groundwater Guardian team implemented a number of lasting projects under Chertudi’s leadership with other local partners. One of her favorites—and one of the most challenging—was the cleanup of the Esther Simplot Park site. The project, which spanned five months and cost over $6 million, became a popular city park along Boise’s riverfront and included several groundwater-related issues that needed remediation. She was also involved in creating the largest residential compost collection program in Idaho.

Boise’s youth water education programs evolved into the Boise WaterShed Environmental Education Center, which is the first of its kind in the state. Located at the city’s largest water renewal facility, the Boise WaterShed Center was developed through a public/private partnership with the City of Boise and nonprofit groups. The Center’s educational exhibits cover a wide range of water management issues in the area. More than 15,000 visitors take part in educational activities at the center each year.

These and many other projects made up Boise’s Results-Oriented Activities (ROAs) each year.

Now that she has retired from the City, it’s important to Chertudi that the efforts she spearheaded continue, and plans to stay involved.

“I have volunteered my continued assistance and support of the program to city managers and will do what I can to assist with the continued efforts to protect and conserve groundwater resources in the community,” she said.

Thankfully, the City has kept good records of the Groundwater Guardian information. Cherudi provided a historical background to her supervisor about the program prior to her retirement, and assisted in assigning the continued responsibility to other team members.

Chertudi says the best part of being part of Groundwater Guardian has been the relationships she’s built with other teams across the U.S. “I met and learned from so many amazing people that I could call or email with questions or ask for ideas or help,” she said. “They made me better at my job and kept me enthusiastic and committed to the hard work we all do at a community level.”

“The best outcome of Boise’s participation in Groundwater Guardian


To find out how you can make a difference in your community and get involved as a Groundwater Guardian, visit www.groundwater.org/groundwaterguardian.
Give to Lincoln Day is May 30, 2019

The Groundwater Foundation’s hometown of Lincoln, Nebraska is once again celebrating the city’s nonprofit organizations with Give to Lincoln Day on May 30, 2019.

Susan Seacrest started the Groundwater Foundation in her Lincoln home in 1985, and the Foundation has called Lincoln home ever since. Lincoln is a great city - it has jobs, great schools, recreation, and much more. And it has hundreds of nonprofits that do great things for the city and beyond.

Groundwater is the water Lincolntes drink and something everyone needs to understand as their drinking water source. The Groundwater Foundation may be a national organization, but we also work locally in the Lincoln community with educators, youth, and community members to help everyone understand the resource and how they can take action to protect it now and for future generations.

On Give to Lincoln Day, every donation given to the Groundwater Foundation and other local nonprofits is made bigger by matching funds. Starting May 1 and running through Give to Lincoln Day on May 30, every donation helps the Groundwater Foundation earn a proportional share of a $450,000 challenge match fund provided by the Lincoln Community Foundation and their sponsors.

Even if you don’t live in Lincoln, you can help support the Groundwater Foundation’s work by making a donation as part of Give to Lincoln Day. Give online at www.givetolincoln.com/nonprofits/groundwater-foundation.