

## Recharging Groundwater Education Project Moves Forward

The Groundwater Foundation was awarded funding from the U.S. Environmental Protection Agency (EPA) Region 7 and the Nebraska Department of Environmental Quality (NDEQ) to move forward with Phase 2 of the Recharging Groundwater Education Project. Additional support has been provided by Central Nebraska Public Power and Irrigation District, Eagle Printing and Sign, and Midwest Laboratories.

In the project's first phase, The Groundwater Foundation developed educational toolkits featuring the Awesome Aquifer Kit for elementary and middle school level students and the Hydrogeology Challenge for high school students.

The project includes conducting professional development workshops to train educators in using these toolkits to directly involve students in problem-solving and critical thinking around local environmental threats to their water supply.

Feedback from educators that participated in phase I was positive, with most indicating they planned to utilize the tools and resources in their classrooms.

Partnering with the Nebraska Department of Education, the Nebraska Association of Natural Resource Districts, the Nebraska USGS Science Center, NDEQ, EPA Region 7, Valmont Industries, and Olsson Associates, the toolkits will be incorporated into statewide groundwater science curriculum that is aligned with Next Generation Science Standards (NGSS) and the Nebraska College and Career Ready Standards for Science (NE-CCRSS).

Informal educators, including Groundwater Guardian team members, will also have access to activities within the toolkits as well as have the opportunity to apply for sub-awards to carry out teacher trainings and mentorships in their own communities.

It is the goal of the Groundwater Foundation, its partners and participants that students gain career-related experience and be better prepared to address groundwater issues threatening their community in the future through this project.💧

## Memorials for Nebraska Farmer and Land Steward Honor The Groundwater Foundation

The Groundwater Foundation was privileged to be the beneficiary of memorials to the life of Loren Else, who passed away July 23, 2017.

Else, who was 85 and lived in Hebron, Nebraska, devoted his life to the earth and to his family. Else began his farming career with his father, Floyd, who was the first in the county to drill an irrigation well on his cropland. With a little bit of money and his undying passion for farming and improving all land under his care, he built a foundation on which his family continues to stand and grow.

Else's commitment to his community echoes that of the Foundation's. He believed that if something was important to you and your family, it was worth the investment of time and energy. He was an active member of local boards and organizations.

Else and his wife, Audrey, had four children, five grandchildren, and eight great-grandchildren.

The Groundwater Foundation is honored to have been the recipient of memorials to Loren Else, and thanks him and his family for the stewardship of the land and natural resources.💧

## Jane Griffin Appointed to National Advisory Council



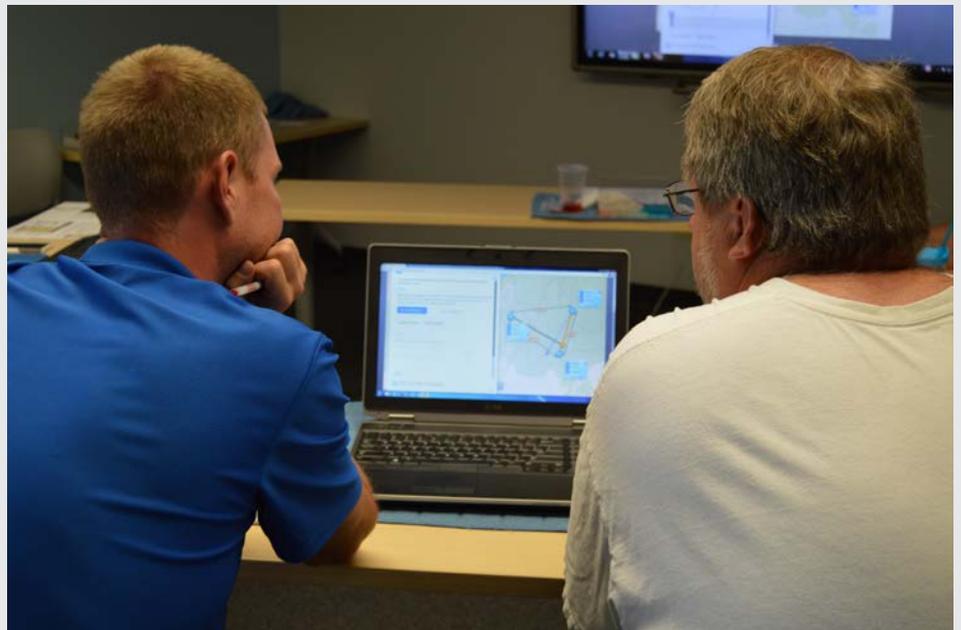
Groundwater Foundation President Jane Griffin was recently appointed to the National Environmental Education Advisory Council (NEEAC).

The Council is comprised of representatives from organizations other than the federal government who provide U.S. EPA with advice on environmental education. As a member of the Council, Griffin will provide EPA with a better understanding of the needs of schools, universities, state departments of education and natural resources and educational organizations.

"I look forward to sharing the knowledge gained from our experiences working with formal and informal educators," said Griffin.

The Council is composed of 11 members, representing different stakeholder perspectives, regions, and sectors. "I'm excited to work with this group of individuals in order to provide youth with meaningful educational experiences learning about our magical and delicate environment," Griffin said.

For more information about the NEEAC, visit [www.epa.gov/education/national-environmental-education-advisory-council](http://www.epa.gov/education/national-environmental-education-advisory-council).💧



▲ Educators learn how to utilize educational tools like the Hydrogeology Challenge in the first phase of the Recharging Groundwater Education Project. The project's second phase will expand teacher trainings and access to resources to formal and informal educators across Nebraska and provide sub-awards to communities to hold their own training sessions.

## Study Estimates about 2.1 Million People Using Wells High in Arsenic

A new study by the U.S. Geological Survey and Centers for Disease Control and Prevention estimates about 2.1 million people in the U.S. may be getting their drinking water from private domestic wells considered to have high concentrations of arsenic, presumed to be from natural sources.

"About 44 million people in the lower 48 states use water from domestic wells," said Joe Ayotte, a USGS hydrologist and lead author of the study. "While we're confident our research will help well owners understand if they live in an area of higher risk for arsenic, the only way for them to be certain of what's in their water is to have it tested."

Using a standard of 10 micrograms of arsenic per liter - the maximum contaminant level allowed for public water supplies - the researchers developed maps of the contiguous U.S. showing locations where there are likely higher levels of arsenic in groundwater, and how many people may be using it.

Nearly all of the arsenic in the groundwater tested for this study and used to map probabilities is likely from natural sources, and is presumed to be coming primarily from rocks and minerals through which the water flows.

The findings highlight the importance of private well owners working with their local and state officials to determine the best way to test and, if necessary, treat their water supplies.

"Fortunately, in most areas of the country and with appropriate safeguards, the majority of homeowners can get good quality drinking water from private wells," said Ayotte. "But this study is a good reminder that prudent, routine testing of the water, including its interaction with the water supply system, is an essential first step so homeowners and their families can confidently drink water from their faucets."

Using water samples from more than 20,000 domestic wells, the researchers developed a statistical model that estimates a region's probability of having high arsenic in domestic wells. They used that model in combination with information on the U.S. domestic well population to

estimate the population in each county of the continental United States with potentially high concentrations of arsenic in domestic wells.

"One of our study's basic assumptions is that the probability of high arsenic can be estimated by a statistical model. We also assume that the domestic water use population is represented by census information used in the study," said Ayotte.

Some of the locations where it's estimated the most people may have high-levels of arsenic in private domestic well water include:

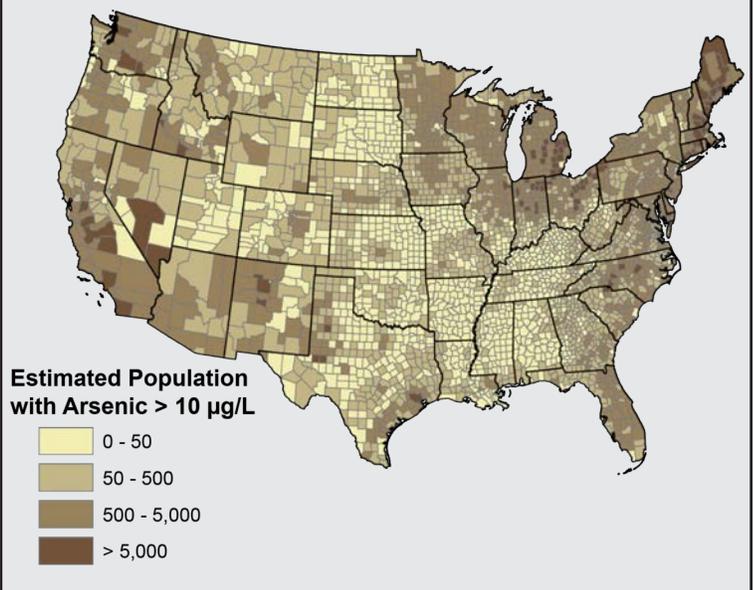
- Much of the West - Washington, Oregon, Nevada, California, Arizona, New Mexico
- Parts of the Northeast and Midwest - Maine, Massachusetts, New Hampshire, New Jersey, Maryland, Michigan, Wisconsin, Illinois, Ohio, Indiana
- Some of the Atlantic southeast coastal states - Florida, Virginia, North Carolina, South Carolina

"Although high-arsenic wells can occur in all 48 contiguous states, it is more prevalent in some states than in others," said Ayotte. "The study did not include Alaska and Hawaii."

The researcher provided a cautionary note that while the study provides state and county estimates, they are not intended to take the place of more detailed or local information that may already be available in some areas.

Long-term exposure to arsenic in domestic wells may cause health-related problems, including an increased risk of cancer. Testing and, if necessary, treating the water is an effective way

▼ This map shows estimates of how many private domestic well users in each county may be drinking water with high levels of arsenic. An estimated 2.1 million people throughout the U.S. may be drinking domestic well water high in arsenic.



of reducing or eliminating the concern. A CDC fact sheet ([www.epa.gov/sites/production/files/2014-03/documents/arsenic\\_factsheet\\_cdc\\_2013.pdf](http://www.epa.gov/sites/production/files/2014-03/documents/arsenic_factsheet_cdc_2013.pdf)) provides more information, as does the CDC's Agency for Toxic Substances and Disease Registry ([www.atsdr.cdc.gov/phs/phs.asp?id=18&tid=3](http://www.atsdr.cdc.gov/phs/phs.asp?id=18&tid=3)).

"Ultimately, this study should be helpful not only in assessing the likelihood of people being exposed to arsenic in domestic well water, but the results of the study may assist other researchers evaluate situations where adverse health outcomes such as cancers or adverse birth outcomes may be related to environmental factors," said Ayotte.

Public water supplies are regulated by the U.S. EPA, but maintenance, testing and treatment of private water supplies are the sole responsibility of the homeowner. About 44 million people in the U.S. get their drinking water from private wells, yet surveys indicate many homeowners are unaware of some basic testing that should be done to help ensure safe drinking water in the home.

The study, "Estimating the high-arsenic domestic-well population in the conterminous United States" by J.D. Ayotte, L. Medalie, S.L. Qi, L.C. Backer, and N. T. Nolan is available online in *Environmental Science and Technology* (<http://pubs.acs.org/doi/abs/10.1021/acs.est.7b02881>).

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