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## Our Superheroes: Groundwater Guardians

**Communities of All Types Take Action to Protect  
Their Groundwater**

*By Jennifer Wemhoff, The  
Groundwater Foundation*

**T**he Avengers. The  
Amazing Spider Man.  
The Dark Knight.

These are the superheroes we see filling up the screens and raking in millions of dollars this summer. They fight crime, they wear costumes, they have elaborate gadgets, and they save the world.

At The Groundwater Foundation, we have our own versions of superheroes.

They're in communities and places you've likely never heard of. They're in over half the U.S. states, and one in Canada. They're lead by everyday, committed citizens working to protect the water they drink and the water that grows their food. They're working collectively to help ensure sustainable groundwater for future generations. They too save the world.

Who are these superheroes? They're our Groundwater Guardians.

### **The Evolution of a Superhero**

Groundwater Guardians participate in the Foundation's program of the same name that



started in 1994. That first year, eight communities helped pilot the program and showed us just how super communities can be when it comes to their groundwater. What first started out as simply a network to connect groundwater protection efforts has grown into a group of superhero communities whose efforts together impact hundreds of thousands of people.

Close to 20 years later, we've worked with all kinds of superheroes through this program – utilities, schools, health departments, watershed groups,

scientists, turf managers, local governments, farmers, business owners, and many, many more.

The program supports, recognizes, and connects the communities as they undertake groundwater protection and education activities. Unlike the superheroes in the movies, there generally aren't throngs of screaming fans to thank Groundwater Guardians, so the motivation to continue to care about groundwater year after year comes from the recognition the program provides. Even

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### **Mission of The Groundwater Foundation:**

To educate people and  
inspire action to ensure  
sustainable, clean  
groundwater for future  
generations.

**Superheroes, continued on page 6** ►

# Groundwater Shorts

## EPA and Department of Veterans Affairs to Connect Veterans with Jobs in Water Sectors

The U.S. Environmental Protection Agency (EPA) and the U.S. Department of Veterans Affairs (VA) Vocational Rehabilitation and Employment Program announced today a memorandum of understanding to connect veterans with disabilities to career opportunities in the water and wastewater sectors -- such as at wastewater plants and drinking water facilities -- as part of EPA's Water Sector Workforce Initiative. This effort will be beneficial to both the environment and economy as clean water and job placement for veterans are top priorities of the Obama Administration.

The agreement allows EPA and VA to connect qualified veteran employees with staffing needs at water and wastewater utilities. EPA and the VA will work with water utilities, states and local VA counselors to promote water sector careers and resources for finding water jobs for veterans as well as educational programs to help veterans transition into careers in water industries.

"This agreement comes at the perfect time to address the predicted workforce shortages in the water and wastewater industries and the need for transitioning veterans into civilian jobs," said Nancy Stoner, acting assistant administrator for EPA's Office of Water. "EPA believes that well-trained and experienced water sector professionals are vital to ensuring sustainable, properly operated systems."

"VA has cultivated relationships with both public and private industry to ensure disabled veterans have opportunities to

find and maintain meaningful employment," said Under Secretary for Benefits Allison A. Hickey. "We are thrilled to forge this relationship with EPA to assist them with hiring veterans through our Vocational Rehabilitation and Employment Program."

More than one-third of all current water operators are eligible to retire within seven years and, according to the U.S. Department of Labor, employment for water and wastewater operators is expected to grow by 20 percent between 2008 and 2018, faster than the national average for all other occupations. EPA sees the need to invest now in creating a pipeline of future water sector professionals to fill these essential water sector careers.

VA's Vocational Rehabilitation and Employment Program assists more than 100,000 disabled veterans annually prepare for, find, and maintain meaningful careers. Veterans are an important target group for water and wastewater utility jobs because many veterans already possess training and technical skills that are directly transferable to careers in the water sector. There is a wide spectrum of water sector careers that veterans could be qualified for, including engineering, laboratory and water science, operations and maintenance, management and administration, communications, and public education. The Vocational Rehabilitation and Employment Program further supports veterans for the water workforce by providing necessary accommodations and additional training as needed.

Learn more about EPA's Water Sector Workforce initiative at [http://water.epa.gov/infrastructure/sustain/ws\\_workforce.cfm](http://water.epa.gov/infrastructure/sustain/ws_workforce.cfm).♦

## Groundwater Depletion May Threaten U.S. Food Security

The nation's food supply may be vulnerable to rapid groundwater depletion from irrigated agriculture, according to a new study.

The study, which appears in the journal *Proceedings of the National Academy of Sciences*, paints the highest resolution picture yet of how groundwater depletion varies across space and time in California's Central Valley and the High Plains of the central U.S. Researchers hope this information will enable more sustainable use of water in these areas, although they think irrigated agriculture may be unsustainable in some parts.

Three results of the new study are particularly striking: First, during the most recent drought in California's Central Valley, from 2006 to 2009, farmers in the south depleted enough groundwater to fill the nation's largest man-made reservoir, Lake Mead—a level of groundwater depletion unsustainable at current recharge rates.

Second, a third of the groundwater depletion in the High Plains occurs in just 4% of the land area. And third, the researchers project that if current trends continue some parts of the southern High Plains that currently support irrigated agriculture, mostly in the Texas Panhandle and western Kansas, will be unable to do so within a few decades.

California's Central Valley is sometimes called the nation's "fruit and vegetable basket." The High Plains, which run from northwest Texas to southern Wyoming and South Dakota, are sometimes called the country's

"grain basket." Combined, these two regions produced agricultural products worth \$56 billion in 2007, accounting for much of the nation's food production. They also account for half of all groundwater depletion in the U.S., mainly as a result of irrigating crops.

In the early 20th century, farmers in California's Central Valley began pumping groundwater to irrigate their crops. Over time, groundwater levels dropped as much as 400 feet in some places. From the 1930s to '70s, state and federal agencies built a system of dams, reservoirs and canals to transfer water from the relatively water-rich north to the very dry south. Since then, groundwater levels in some areas have risen as much as 300 feet. In the High Plains, farmers first began large-scale pumping of groundwater for crop irrigation in the 1930s and '40s, but irrigation greatly expanded in response to the 1950s drought. Since then, groundwater levels there have steadily declined, in some places more than 150 feet.

Bridget Scanlon, senior research scientist at The University of Texas at Austin's Bureau of Economic Geology and lead author of the study, and her colleagues at the U.S. Geological Survey and the Université de Rennes in France used water level records from thousands of wells, data from NASA's GRACE satellites, and computer models to study groundwater depletion in the two regions. GRACE satellites monitor changes in Earth's gravity field which are controlled primarily by variations in water storage.♦

# Don't Send Money Down the Drain

## Water Smart and Save Money This Summer

**M**ost homeowners overwater their yard, unintentionally wasting money every time they take out the hose or turn on the sprinklers. To raise awareness of the benefits of efficient watering practices, the Irrigation Association has named July Smart Irrigation Month.

Using an automated irrigation system is one of the best ways to keep your lawn and landscape beautiful and healthy, while minimizing water waste. Make time this summer to be sure you're getting the most out of your irrigation system, while keeping utility bills low and helping to protect the environment.

### Smart Start

Creating an efficient irrigation system requires specialized knowledge and understanding of irrigation design principles and local environmental conditions — something most weekend gardeners don't have. Complying with local installation codes is another consideration.

Even the best irrigation design won't perform well if installed incorrectly or using inferior components. Something as simple

as selecting the correct type of pipe can mean the difference between a system that lasts and one that requires ongoing repairs.

Hiring a certified or licensed irrigation professional and insisting on high-quality components is the smart way to make sure your system will operate at peak efficiency for years to come. Always get multiple bids, check references and confirm your preferred vendor is properly insured.

### Smart Planning & Planting

Guarantee long-term satisfaction with your irrigation system with up-front planning.

- Work with a certified irrigation designer or contractor who has experience in your local area.
- Consider local climate conditions, as well as your lot's exact features. Choose appropriate turf and plant species that have low water requirements.
- Group plants with similar water needs close together and separate lawn areas from planting beds.
- Plan your irrigation zones carefully. Be sure that your system will have enough capacity, now and in the future. The more irrigation zones you plan, the more you can tailor watering even if you modify landscaping.
- Consult with your local water provider to see if rebates are available for water-efficient products.
- Check the on-site water pressure and select appropriate sprinklers. Low or high water pressure can seriously affect sprinkler performance.
- Include "smart" controls that automatically adjust watering based on rain, soil moisture, evaporation and plant water use.
- Use quality components to minimize future maintenance needs and total lifetime cost of your system.

### Smart Installation

Use components that provide the greatest flexibility. Different plants have different watering needs, and these needs may change over time. Your system should allow you to apply the right amount of water for each type of plant by the most effective method.

- Include the right backflow prevention device as required by the plumbing codes for all irrigation systems. Backflow prevention devices prevent irrigation system water from contaminating the water supply.
- Install lines deep enough to protect them from damage from aeration and other lawn maintenance.

### Smart Scheduling & Watering

Today's irrigation controllers allow you to easily adjust your system's watering schedule to fit different watering needs.

- Schedule each individual zone in your irrigation system to account for sun, shade and wind exposure.
- Consider soil type, which affects how quickly water can be applied without runoff.
- Make sure you're not sending water down the drain. Set sprinklers to water plants, not your driveway, sidewalk, patio or buildings.
- Water at the right time of day. Watering when the sun is low, winds are calm and temperatures are cooler minimizes evaporation by as much as 30 percent. The best time to water is during early morning hours.
- Thoroughly soak the root zone (generally within the top six inches of soil for lawns), then let the soil dry. Watering too frequently results in shallow roots and encourages weed growth, disease and fungus.
- Reduce runoff by watering each zone more often for shorter

periods. For example, setting your system to run for three, 5-minute intervals with some soak time lets water infiltrate the soil better than watering for 15 minutes at one time.

- Adjust your watering schedule regularly to account for seasonal weather conditions, plant size and other factors. Regular adjustments keep plants healthy without overwatering.

### Smart Maintenance & Upgrades

Irrigation systems need regular maintenance to keep them working efficiently year after year. Damage from lawn equipment or improper winterization can cause leaks and other serious problems.

- Inspect the system for leaks, broken or clogged sprinkler heads or other damaged components.
- Check that sprinkler heads are high enough to clear plants that may have grown taller since the system was installed.
- Adjust spray patterns and positions to make sure they aren't watering "hardscapes" like sidewalks and buildings.
- Evaluate pressure and adjust as needed so sprinklers work optimally to distribute the water.
- Retrofit the system with a rain or soil moisture sensor to prevent overwatering. Rain sensors stop the system from operating when it rains; soil moisture sensors use long metal probes to measure moisture at the root zone and turn off the system when no additional water is needed. Weather-based controllers automatically adjust the irrigation schedule as weather conditions change.

Smart Irrigation Month is an initiative of the Irrigation Association, a non-profit industry organization dedicated to promoting efficient irrigation. Learn more at [www.smartirrigationmonth.org](http://www.smartirrigationmonth.org) ♦





# Is the Environment on Drugs?

## Unwanted Consumer Medications and Environmental Contamination

By Elizabeth Esseks, Nebraska Health and Human Services, and Cindy Kreifels, The Groundwater Foundation

In streams, groundwater and rivers across the United States, scientists are finding detectable concentrations of pharmaceuticals and other chemicals. These pharmaceuticals have entered the environment when medication residues pass out of the body and into sewer lines, when externally applied drugs are washed down the drain or when unused or expired medications are flushed or put in the trash.

The U.S. Geological Survey conducted a breakthrough study in 1999 of surface-water and groundwater samples from around the U.S. to check for the presence of materials such as pharmaceuticals, antibiotics, sterols, hormones and other compounds. At least one chemical was detected at low levels in 80 percent of streams and 93 percent of groundwater sampled. Low levels of steroids, nonprescription drugs and insect repellents were the chemical groups most frequently detected.

In recent years studies have shown that pharmaceuticals are being detected increasingly in the

environment at very low levels (less than one part per billion). The U.S. Geological Survey has developed the capability to analyze for approximately 70 pharmaceuticals in environmental samples. However, thousands of pharmaceuticals are used for human therapies and veterinary purposes. The U.S. Geological Survey is focusing environmental research on chemicals that are more likely to be of environmental concern. Research priorities currently include assessing

- Chemical loads of various sources including wastewater treatment plants, animal feeding operations, landfills and other industrial facilities;
- Ecological effects, including fish endocrine disruption in streams enriched with wastewater, and antimicrobial resistance in settings where antibiotics are released into the environment;
- The occurrence of pharmaceuticals in waters that are the source of drinking water;



- The comparative performance of varying water and waste treatment processes to remove pharmaceuticals and other chemicals.

While the U.S. Geological Survey is analyzing the occurrence and concentrations of these chemicals in our waters, the question remains: what risk does chronic exposure to the low levels of pharmaceuticals in the environment pose to humans or wildlife? Some scientists believe pharmaceuticals do not pose problems to humans since they occur at such low levels in water. Other scientists say long-term, chronic and combined exposures to pharmaceuticals could cause a physiological effect in humans. To some scientists the release of antibiotics into water bodies is a cause for worry as it may result in disease-causing bacteria becoming immune to treatment and drug-resistant diseases developing. However, scientists generally agree that aquatic life may be at the most risk considering that their entire life is spent in potentially

drug-contaminated waters. For example, antidepressants have been blamed for altering sperm levels and spawning patterns in marine life.

Endocrine disruption is one adverse health effect of concern. It may occur from exposure to very low levels of hormonally active chemicals such as ethinylestradiol found in birth-control pills. One form of endocrine disruption observed in environmental settings affects fish reproductive systems. Fish have been found to be “feminized” by exposure to a range of chemicals that act similarly to the natural hormone estrogen. Some ways in which feminization is observed in fish include (1) elevation in the percent of fish populations that are female; (2) changes in behavioral characteristics, such as nesting behavior or (3) the presence of male fish with female characteristics, such as the presence of female egg cells in testes or of a female egg protein in their blood. A wide range of hormonally active chemicals can contribute to endocrine disruption, including actual biogenic hormones, synthetic





hormones and other chemicals that mimic or block hormone function.

According to a report by researchers Christian G. Daughton and Thomas A. Ternes in "Environmental Health Perspectives," the amount of pharmaceuticals and personal-care products entering the environment annually is about equal to the amount of pesticides used each year.

With a growing and aging population as well as increased reliance on drug treatments, and development of new drugs, the problem with pharmaceutical contamination promises to also increase. Obviously drugs are necessary for the health and well-being of individuals, not to mention the optimization of livestock development. So how do we address this potential risk to our environment and our health?

The environmental studies conducted by the U.S. Geological Survey (USGS) and other scientists will answer part of the question about what risk pharmaceutical contamination presents to our environment and our health. Evaluating the potential risk to the public from pharmaceuticals in drinking water is the responsibility of the U.S. Environmental Protection Agency (EPA).

EPA is the federal agency charged with regulating

public drinking water systems. EPA establishes maximum contaminant levels, which are health-based levels of drinking water contaminants that public water systems may not exceed. Currently EPA regulates approximately 90 contaminants under the Safe Drinking Water Act, either by setting maximum contaminant levels or by requiring specific treatment for drinking water contaminants. When determining whether a newly identified drinking water contaminant should be regulated, EPA considers the following criteria: does the contaminant pose significant risk to human health; is the contaminant present in public drinking water supplies and is it present at concentrations that may lead to negative health effects; and will regulation of the contaminant reduce the risks to public health? Data to answer these questions is collected through EPA's Unregulated Contaminant Monitoring program.

Beginning in 2013, public water systems across the country will be required to monitor for 30 unregulated drinking water contaminants under the proposed Unregulated Contaminant Monitoring Rule 3 (the third iteration of testing under this program). The proposed list of 30 contaminants includes seven hormones that are found

in veterinary and/or human pharmaceuticals. After public water systems complete their monitoring, the data collected will be used to determine whether the 30 contaminants are present in drinking water and at what concentrations the contaminants are found in drinking water. If concern is high enough based on the monitoring data and additional laboratory-based toxicity studies, contaminants will be considered for future regulation.

Challenges faced by EPA, USGS and others doing research on the environmental and health effects of pharmaceuticals include the need to develop laboratory methods that are sensitive and reliable enough to measure low levels of pharmaceuticals accurately, the

puzzle of determining which chemicals are causing effects when multiple chemicals are present in the environment and the need to be responsive to public concerns while following established research and standard-setting procedures. Regulations for pharmaceuticals may be developed in the future, but too many questions remain about the presence and concentrations of these chemicals to make sound conclusions today. ♦

This article was originally published in the May 2012 edition of *Prairie Fire* newspaper. [www.prairiefirenewspaper.com](http://www.prairiefirenewspaper.com).

*Editor's Note: Part one of the Prairie Fire series, "Got Drugs," examined the societal challenge of unwanted and expired medications, and also appeared in the Spring issue of The Aquifer.*

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superheroes need a pat on the back and a “thank you” every now and then.

## Heroic Activities

Groundwater Guardians may not battle Lex Luther, the Joker, the Green Goblin, or other evil villains. Instead they battle misunderstanding of the resource, small budgets, and other challenges.

However, our superheroes are creative, resourceful, and innovative, and prevail by implementing a variety of activities in their communities.

A very small sampling of Groundwater Guardian superhero activities include:

- Boise, Idaho, a Groundwater Guardian since the program began in 1994, focuses on public education, particularly during National Drinking Water Week each May, and on the City’s website.
- Indianapolis-Marion County, Indiana educates business owners in the county that may be sources of potential groundwater contamination. These businesses are offered information and resources about best management practices, and a database of all potential sources of contamination is maintained and used in groundwater protection programs.
- Battle Creek, Michigan works with area school representatives to incorporate water quality information into curricula, and also works with adjacent communities to develop common language for groundwater protection ordinances.
- Las Vegas Valley, Nevada conserves water in the desert landscape by providing financial incentives to homeowners to replace turf with water smart landscaping.
- The Dayton, Ohio Multi-Jurisdictional Source Water Protection Program includes working with surrounding municipalities to use overlay zoning, monitoring, emergency response, and financial incentives for risk reduction activities. The group also holds

an annual water festival for over 4,000 students.

- Marshfield, Wisconsin implements the RxRound-Up Pharmaceutical Take-Back Program to collect unused or expired pharmaceuticals for proper disposal, including the establishment of a permanent drop off location.
- Barnstable County (Cape Cod), Massachusetts promotes water conservation and best management practices to summer residents. The TOUR (Tourism and Optimal Use of Resources) Program helps inform visitors about Cape Cod’s water resources and ways to conserve them.

## Superhero Responsibility

As Peter Parker, a.k.a. Spider Man said, “With great power comes great responsibility.” Groundwater Guardians understand that we all benefit from groundwater, and that means we all have the

responsibility to protect it. We all depend on groundwater every day, and in turn, groundwater depends on us.

Over the weekend I watched the animated superhero movie “The Incredibles” and heard Mr. Incredible say something that stuck with me:

“No matter how many times you save the world, it always manages to get back in jeopardy again. Sometimes I just want it to stay saved! You know, for a little bit? I feel like the maid; I just cleaned up this mess! Can we keep it clean for... for ten minutes!”

Isn’t that what we strive for with groundwater? We want to save it and have it just stay saved. But it’s a never-ending process – there’s always some new threat to groundwater, always more people to educate about its importance. Superheroes always manage to rally because they know their responsibility. Our Groundwater Guardian superheroes are the same!

For more information about the Groundwater Guardian program, please visit [www.groundwater.org](http://www.groundwater.org).



# September 11, 2012

## Protect Your Groundwater Day Set

**E**veryone can and should do something to protect groundwater. Why? We all have a stake in maintaining its quality and quantity. For starters, 95 percent of all available freshwater comes from aquifers underground. Being a good steward of groundwater just makes sense. Not only that, most surface water bodies are connected to groundwater so how you impact groundwater matters. Furthermore, many public water systems draw all or part of their supply from groundwater, so protecting the resource protects the public water supply and impacts treatment costs.

If you own a well to provide water for your family, farm, or business, groundwater protection is doubly important. As a well owner, you are the manager of your own water system. Protecting groundwater will help reduce risks to your water supply.

So on September 11, 2012, the National Ground Water Association (NGWA) wants you to mark Protect Your Groundwater Day and ACT.

### Groundwater Protection

There are two fundamental categories of groundwater protection: Keeping it safe from contamination and using it wisely by not wasting it.

Before examining what you can do to protect groundwater, however, you should know that sometimes the quality and safety of groundwater is affected by substances that occur naturally in the environment.

### Naturally Occurring Contamination

The chemistry of the groundwater flowing into a well reflects what's in the environment. If the natural quality of groundwater to be used for human consumption presents a health risk, water treatment will be necessary.

Examples of naturally occurring substances that can present health risk are microorganisms, radionuclides, and heavy metals.

Public water systems are required to treat drinking water to federal quality standards. However, it is up to private well owners to make sure their water is safe.

### Contamination Caused by Human Activities

Human activities can pollute groundwater, and this is where every person can help protect groundwater, both in terms of groundwater quality and quantity. Some common human causes of groundwater contamination are:

- Improper storage or disposal of hazardous substances
- Improper use of fertilizers, animal manures, herbicides, insecticides, and pesticides
- Chemical spills
- Improperly built and/or maintained septic systems
- Improperly abandoned wells (including water wells, monitoring wells, and wells used in cleaning contaminated groundwater)
- Poorly sited or constructed water wells

### Water Conservation

Americans are the largest water users, per capita, in the world. In terms of groundwater, Americans use 79.6 billion gallons per day — the equivalent of 2,923 12-oz. cans for every man, woman, and child in the nation.

Agricultural irrigation is the largest user of groundwater in America at 53.5 billion gallons a day followed by public water systems or private household wells at a combined total of 18.3 billion gallons per day. More efficient use of water in these areas could save a huge amount.

At the household level, the greatest amount of water used inside the home occurs in the bathroom. The remainder of indoor water use is divided between laundry and kitchen use, according to the U.S. EPA.

### ACT — Acknowledge, Consider, Take Action

On Protect Your Groundwater Day, NGWA urges you to ACT. Use this day to begin doing your part for protecting one of our most important natural resources — groundwater.

First, acknowledge the causes of preventable groundwater contamination. Recognize that there are hazardous substances found in our homes, and that most household water use occurs in a few areas around the home. If you own a water well, wellheads should be located a safe distance from potential contamination sources, septic system malfunctions can pollute groundwater, poorly constructed

or maintained wells can facilitate contamination, and improperly abandoned wells can lead to groundwater contamination.

Next, consider which apply to you. What specific hazardous substances are in and around your home? Where do you and your family use the most water? If you own a water well, is your wellhead a safe distance from possible contamination? Is your well/septic system due for an inspection? Are there abandoned wells on your property?

Finally, take action to prevent groundwater contamination. Store hazardous household substances properly in a secure place, use them according to the manufacturer's recommendations, and dispose of them safely. With water conservation, modify your water use and install water-saving devices. If you own a water well, move possible contaminants a safe distance from the wellhead, get current on your septic system inspection and cleaning, get your annual water well system inspection, and properly decommission any abandoned wells using a professional.

### For more information

To discuss groundwater protection and other related issues, follow NGWA's Facebook page ([facebook.com/NGWAFB](http://facebook.com/NGWAFB)).

For more information on Protect Your Groundwater Day, contact NGWA Public Awareness Director Cliff Treyens at [ctreyens@ngwa.org](mailto:ctreyens@ngwa.org). The Groundwater Foundation is a promotional partner of Protect Your Groundwater Day. ♦

[www.groundwater.org](http://www.groundwater.org) ♦ page 7



# Growing With Awareness

## Finding New Ways to Engage People about Groundwater

By Brian Reetz, The Groundwater Foundation

A student at Auburn High School looks inquisitively at a shower timer that has been placed on her desk. The five-minute shower timers are a part of the Growing Groundwater Awareness in Nebraska (GGAN) program that has been taking place across the state during past three years. “What are we supposed to do with this?” she asks. “How long of a shower do you normally take?” I ask her. “Thirty minutes,” she says. I give her a baffled look. “Well, let’s try to cut that back,” I say. A month later, I received a stack of letters from her and other students in her class. Her letter said:

I used my five minute shower timer, and I still use it. Using my shower timer helped me cut back ten to fifteen minutes on my shower. I used to shower for 30-35 minutes now I shower 20-25 minutes. I know it doesn’t seem like I cut back very much but, I know what cutting back by 10 minutes can do for the groundwater.

It is one of many successes (some small, some large) that the program has seen in communities across the state of Nebraska.

### What is it?

GGAN is an orchestrated campaign to generate awareness of and concern for Nebraska’s vital resource, groundwater. With funding from the Nebraska Department of Environmental Quality and the Nebraska Environmental Trust, the campaign enlightens, motivates and empowers citizens to play a

part in protecting groundwater through a deeper understanding of it and the proactive steps communities can take to ensure a safe, lasting supply. This is done in many ways but includes radio and television public service announcements, press releases and newspaper articles, and educating audiences by speaking at conferences and meetings of community leaders. The Groundwater Foundation meets with the leaders in their communities, presents to their city council, provides a variety of resources to the community, participates in community events and presents at businesses in order to engage the community in groundwater protection efforts. The communities involved have included Wayne, Crete, Minden, Lincoln, St. Paul, Fairbury, Auburn, Gothenburg, Chappell and Peru, Nebraska.

### What We’ve Done

With GGAN, we’ve engaged the statewide media in all forms. Press releases have been sent out to statewide media describing the project and about the work within communities. A tremendous partner during the project has been a local TV station, KOLN-KGIN TV (channels 10/11), who is running PSAs on both KOLN-KGIN and its sister station, MyTV, for the length of the project.

We developed a movie trailer to make viewers think about their groundwater and how they use it, which has appeared on screens throughout Nebraska. Another





big part of spreading awareness has been radio. Many stations across the state ran the spots that were created as PSAs. To supplement the PSAs, we also bought air time on select stations across the state and in individual GGAN communities to help spread the word. Spots were also purchased on Nebraska's public radio station, NET Radio. After working with NET Radio, we partnered with NET Television to create a spot which is being used throughout the state and encourages viewers to be mindful of both quality and quantity. It began airing in June of 2012. All of the media can be found on our website, [www.groundwater.org](http://www.groundwater.org).

Also, a section was created on the Foundation's website ([http://www.groundwater.org/pe/GGAN/lets\\_keep\\_it\\_clean.html/](http://www.groundwater.org/pe/GGAN/lets_keep_it_clean.html/)) to provide information to GGAN communities. Members of the community can find out about upcoming events, see photos and stories from the past events, and access various tools and resources, including the radio and television spots.

Webinars were also recorded and posted to the website. These educational webinars give community members more tools to help them all think long-term and have an easily accessible resource to reference. The webinars include:

- Wellhead Protection 101 ([http://www.groundwater.org/pe/webinars\\_whp101.html](http://www.groundwater.org/pe/webinars_whp101.html))
- Business Water Use ([http://www.groundwater.org/pe/webinars\\_business\\_water\\_use.html](http://www.groundwater.org/pe/webinars_business_water_use.html))
- Learning about Groundwater ([http://www.groundwater.org/pe/webinars\\_learning\\_about\\_gw.html](http://www.groundwater.org/pe/webinars_learning_about_gw.html))
- Groundwater 101 ([http://www.groundwater.org/pe/webinars\\_groundwater101.html](http://www.groundwater.org/pe/webinars_groundwater101.html))

It's also been important to be out and about in the state. We've presented at key conferences/meetings across Nebraska, from North Platte to Lincoln, Kearney to Valentine, Omaha to Nebraska City. In addition to presentations at conferences, when possible we've had booth space. We purchased a prize wheel which visitors spin and answer water-related questions. This "fun" approach effectively educated visitors about their source of water and gave them tips about what they can do to protect it in their own homes and communities.

A mini-toolkit was developed to encourage communities to become engaged in long-term, proactive groundwater protection efforts. It gives ideas on what people and communities can do to help and shares accomplishments of communities across the U.S. It also encourages them to become a part of

proactive protection programs, like Groundwater Guardian. To date more than 2,000 of these mini-toolkits have been distributed.

A full toolkit was also developed to give to members of participating GGAN communities facilitate long-term protection efforts. The full toolkit is given to four segments of the community (Community Leader, Schools, Concerned Citizen, Business) to specifically assist that segment in increasing groundwater awareness and protection efforts. These people are key partners to GGAN in each community as a resource to distribute information, ask questions within the community, and be involved in events. Each community now has a person in each of the four segments that understands how important long-term, proactive thinking is to protecting their drinking water resource.

Many communities in Nebraska have some sort of celebration of their history or heritage that brings hundreds, if not thousands of people to their community. These events are a great way to reach a group of people that usually don't hear about groundwater on a daily basis. For example, The Wayne Chicken Show has attendance of over 10,000 each year and we participated with a booth where people were educated by using the groundwater flow model and making water cycle bracelets.

## Lessons Learned

We learned that each community that we work with presents different challenges and comes with its own nuances. Many actions continue to take place in the GGAN communities and create the types of long-term efforts that GGAN was designed to generate. Since the start of the program, 32 new Groundwater Guardian Green Sites have been added in GGAN communities. Wayne has become a part of the Groundwater Guardian program. Chappell had its wellhead protection plan approved earlier this year while Wayne continues to work to get its approved.

We have also learned through working with each community that a cookie-cutter approach doesn't work; the process has to change and mold to each community to make it successful.

What does all this mean for long-term protection? Seeds were planted and cultivated in each of the communities for sustainable efforts to continue, whether through the Groundwater Guardian Green Site program, the Groundwater Guardian program or wellhead protection efforts.

For more information on the Growing Groundwater Awareness in Nebraska program, contact Brian Reetz, [bretz@groundwater.org](mailto:bretz@groundwater.org) or call 402-434-2740 ext. 111. ♦



▲ The Groundwater Foundation provided toolkits to participating communities to assist in increasing groundwater awareness and protection efforts. Toolkits were tailored to each community, and included specific information for various segments of the community, including community leader, schools, concerned citizen, and business.

► Many new Green Sites were recruited into the program as part of GGAN, like Bressler Park in Wayne, Nebraska.





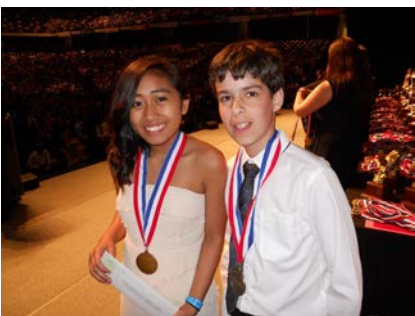
## Students Excel in Awesome Aquifers Competition

Choose the best definition for Wellhead Protection Area:

- A protected surface and subsurface zone surrounding a well or well field supplying a public water system to keep contaminants from reaching the well water.
- An area in which productive wells are drilled.
- The zone around a well in an unconfined aquifer that is normally saturated, but becomes unsaturated as a well is pumped.
- The land surface overlying the cone of depression.

(Answer: a)

On May 19, 60 middle school teams from all 50 states competed in the Awesome Aquifers event at the National Science Olympiad Tournament at the University of Central Florida in Orlando. Students tested their groundwater knowledge by answering questions, including the one above; building model aquifers; and demonstrating groundwater concepts with their aquifer.



Congratulations to the all of the teams who participated in the Awesome Aquifers event! The top six Awesome Aquifers teams from the National Tournament were: 6th place – Meads Mill Middle School, Northville, Michigan; 5th Place – Daniel Wright Junior High

School, Lincolnshire, Illinois; 4th Place – Solon Middle School, Cleveland, Ohio; 3rd Place – Winston Churchill Middle School, Charmingichael, California; 2nd place – Pilgrimage Homeschool, Gaithersburg, Maryland; and 1st place – Marie Murphy Middle School, Wilmette, Illinois. Each student from the 1st place team received a \$1,000 college scholarship to the college of their choice. The scholarship was provided by Rain Bird and Senninger Irrigation.

Jamie Kelley from The Groundwater Foundation and a team of volunteers from the USGS Florida Water Science Center in Orlando, the University of Central Florida, and Senninger Irrigation helped run and judge the competition.

Science Olympiad is a nonprofit organization dedicated to improving the quality of science education, increasing all students' interest in science, creating a technologically-literate workforce and providing recognition for outstanding achievement by both students and teachers. There are over 6,000 Science Olympiad teams from all 50 states who participate in Science Olympiad competitions. The National Tournament alone brings over 5,000 students, teachers, parents, and volunteers together every year.

The Groundwater Foundation has partnered with Science Olympiad since 2004 to provide the Awesome Aquifers event, the only Science Olympiad event focused on groundwater.♦

## Andy Belanger Joins Groundwater Foundation Board

The Groundwater Foundation is pleased to welcome Andy Belanger to its Board of Directors. Belanger is the manager of the Management

Services Division for the Southern Nevada Water Authority and Las Vegas Valley Water District. The Management Services Division provides analytical, administrative and government affairs support to senior management in support of the organization's goals.

Belanger began his career at the district in 1997. His accomplishments include community education regarding a sales tax ballot question for water infrastructure, the establishment of a Groundwater Management Program, and coordination of integrated resource planning citizen committees. Additionally, Andy has represented the organization at the Nevada State Legislature since 2001.

In 1998, he graduated magna cum laude from the Honors College at the University of Nevada, Las Vegas with a bachelor's degree in political science. He received his master's degree in the same field two years later. In addition to his academic degrees, Andy holds a certificate in public participation from the International Association of Public Participation.

"Andy brings a great deal of experience and expertise to the Board," said Groundwater Foundation President Jane Griffin. "We look forward to working with him to move the Foundation forward."

Others serving on The Groundwater Foundation Board of Directors include: Warren Arganbright, Arganbright Law Office, Valentine, NE; James Beaumont, Eustance & Horowitz, P.C., Walden, NY; Ann Bleed, Ann Bleed and Associates, Lincoln, NE; James Burks, Senninger Irrigation, Inc., Clermont, FL; Cathy Lotzer, Marshfield Utilities, Marshfield, WI; Chandler Mazour, Monsanto, Gothenburg, NE; E. Robert Meaney, Valmont Industries, Inc., Omaha, NE;

Lee Orton, Orton Law Office, Lincoln, NE; and Steve Seglin (ex-officio), Crosby, Guenzel LLP, Lincoln, NE.♦



## Thank You Donors!

On May 17, 2012, the Lincoln (Nebraska) Community Foundation held Give to Lincoln Day. Thanks to the generosity of our supporters, The Groundwater Foundation received \$3,631 from donors, earning \$647.80 from the \$200,000 challenge match pool, for a total of \$4,278.80.

The entire Give to Lincoln Day campaign raised over \$1.3 million for 187 Lincoln-area nonprofits.

The Groundwater Foundation has made its home in Lincoln since its founding in 1985, and was so grateful for the giving opportunity presented by the Lincoln Community Foundation and pleased with the generosity of its citizens.

Donations made on Give to Lincoln Day were matched with a proportional share of a \$200,000 challenge match pool of funds, provided by the Lincoln Community Foundation and their partner sponsors.

The Lincoln Community Foundation was founded in 1955 with the goal to secure gifts to perpetually enrich and improve the community of Lincoln and the lives of all its citizens. The Foundation works with donors large and small, who all want the Lincoln community to be successful forever.

For more information about Give to Lincoln Day, visit [www.givetolincoln.razoo.com](http://www.givetolincoln.razoo.com).♦





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