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Low Impact Practices

Western Nebraska Green Sites Implement Alternative Approaches to Maintenance

By Don Ogle, South Platte Natural Resources District Information and Education Coordinator, and member of the Groundwater Guardian Council

When you think of a "Green Site," what do you picture? Do you conjure images of a Waikiki resort? Pebble Beach? Such picturesque landscapes easily bring "green" to mind, and the Groundwater Guardian Green Site program recognizes the stewardship of many such sites across the country.

The Green Site program was developed primarily to encourage managers of highly-managed green spaces (golf courses, ball fields, education campuses, parks, etc.) to implement, measure, and document their groundwater-friendly practices related to chemical use, water use, pollution prevention, water quality, and environmental stewardship.

But in the semi-arid west, Green Sites have shown that "highly-managed" doesn't necessarily mean managing high inputs, but rather the opposite; alternative practices are used and pleasing results are still produced.

Two such sites lay near Sidney, Nebraska, in the state's southern panhandle. The area averages slightly more than 15 inches of rain annually and experiences temperature extremes that range from winter lows near 20 below zero to around 110 degrees in summer. The region is still recovering from an eight-year drought, which saw groundwater levels drop more than 30 feet in places.

As one can imagine, a lot of watering can be needed to maintain lawns and gardens in such a dry, demanding climate. But for some, the alternative is changing practices with a willingness to use minimal or alternative inputs to achieve results.

For Teri and Dan Wolff, practicing environmental responsibility at Ricky and Lucy's Country Greenhouse is second nature. For most of their adult lives, they have taken care to watch the impact of their actions toward both the earth and their bodies.

"It's our way of life. We were green before you ever heard of green," says Teri, who has for years fed her family from home gardens that were painstakingly cared for without the use of chemicals.

Those practices carried over eight years ago when the couple began to turn their old stone barn into their first greenhouse with the hope of building a business where customers would receive quality products that reflected care for environmental and personal health.

"You are what you eat," she says. "So we don't want to be putting a lot of chemicals into the ground and water that we wouldn't want to put into us."

Today, five greenhouses stand on the 10 acre property, surrounded by two acres of herb, flower, and fruit and vegetable gardens. In addition to supplying area gardeners with bedding plants that have never seen chemicals, Teri uses the herbs, fruits and vegetables

Impact, *continued on page 3* ▶

INSIDE

Mission of The Groundwater Foundation:
To educate people and inspire action to ensure sustainable, clean groundwater for future generations.

Groundwater Shorts

Elevated Nitrogen and Phosphorus Remain Widespread

Elevated concentrations of nitrogen and phosphorus, nutrients that can negatively impact aquatic ecosystems and human health, have remained the same or increased in many streams and aquifers across the U.S. since the early 1990s, according to a new national study by the U.S. Geological Survey.

"For years we have known that these same nutrients in high concentrations have resulted in 'dead zones' when they reach our estuaries, such as during the spring at the mouth of the Mississippi, and now we have improved science-based explanations of when, where, and how elevated concentrations reach our streams and aquifers and affect aquatic life and the quality of our drinking water," said Marcia McNutt, USGS Director.

USGS findings show that widespread concentrations of nitrogen and phosphorus remain two to ten times greater than levels recommended by the U.S. EPA to protect aquatic life. Most often, these elevated levels were found in agricultural and urban streams.

The study also found that nitrate is a continuing human-health concern in many shallow aquifers that are sources of drinking water. In agricultural areas, more than one in five shallow, private wells contained nitrate at levels above the EPA drinking water standard.

"Strategies designed to reduce nutrient inputs on the land will improve the quality of water in near-surface parts of aquifers; however, decades may pass before quality improves in deeper parts of the aquifer, which serve as major sources for public-supply wells," said Neil Dubrovsky, USGS hydrologist and lead scientist on this study. "Unfortunately, similar time delays for improvements are expected for streams that receive substantial inputs of groundwater."

A variety of sources can contribute nutrients to surface and groundwater, such as wastewater and industrial discharges, fertilizer and manure applications to agricultural land, runoff from urban areas, and atmospheric sources. Differences in concentrations are due to natural features and human activities.

USGS provides science for a changing world. Complete findings, as well as a USGS fact sheet, podcast, and graphics are available online at http://water.usgs.gov/nawqa/nutrients/pubs/circ1350/.

Americans Ready to Fix Nation's Water Infrastructure

ITT Corporation recently announced the results of its Value of Water Survey, a nationwide poll that included registered voters and industrial and agricultural businesses, and measures how the public values water and their level of awareness of the nation's aging water infrastructure. The results show that a majority of the American public desires reform and is willing to pay more now to ensure that they have access to clean water in the generations to come.

The survey found that nearly one in four American voters is "very concerned" about the state of the United States' water infrastructure. In fact, the nation's pipes, treatment and delivery systems – everything that gets clean water to homes and takes dirty water away – are crumbling under the combined pressures of population growth, urbanization and chronic underinvestment. Every day in America, 650 water mains break, or one every two minutes. According to the U.S. Geological Survey, these breaks and other leaks result in the loss of roughly 1.7 trillion gallons of water every year, enough to supply water to 68 million Americans, based on the American Water Works Association's average personal indoor use of 69 gallons per day per person.

The survey revealed that 63 percent of American voters are willing to pay an average of 11 percent more on their water bill each month to help ensure continued access to a reliable and consistent supply of clean water. In addition, a majority of industrial and agricultural businesses surveyed are willing to pay an average of seven percent more per month for the water they consume.

Most survey respondents also said that fixing our insufficient water infrastructure must be a national priority and is a shared responsibility between individuals, business and the government.

The survey also found that 95 percent of Americans rate water as "extremely important," more than any other service they receive, including heat and electricity.

To view the full results of the survey, visit www.itt.com/valueofwater.

U.S. Counties Face Water Shortages Due to Climate Change

More than 1,100 U.S. counties – a full one-third of all counties in the lower 48 states – now face higher risks of water shortages by mid-century as the result of global warming, and more than 400 of these counties will be at extremely high risk for water shortages, based on estimates from a recent report by Tetra Tech for the Natural Resources Defense Council (NRDC).

The report uses publicly available water use data across the U.S. and climate projections from a set of models used in recent Intergovernmental Panel on Climate Change work to evaluate withdrawals related to renewable water supply. The report finds that 14 states face an extreme or high risk to water sustainability, or are likely to see limitations on water availability as demand exceeds supply by 2050, including parts of Arizona, Arkansas, California, Colorado, Florida, Idaho, Kansas, Mississippi, Montana, Nebraska, Nevada, New Mexico, Oklahoma, and Texas. In particular, in the Great Plains and Southwest United States, water sustainability is at extreme risk.

The more than 400 counties identified as being at greatest risk in the report reflects a 14-times increase from previous estimates. For a look at county- and state-specific maps detailing the report findings go to http://www.nrdc.org/globalWarming/watersustainability/.

A summary of the report and related links are available at http://www.nrdc.org/globalWarming/watersustainability/.

The Natural Resources Defense Council (NRDC) is an international nonprofit environmental organization with more than 1.3 million members that work to protect the world's natural resources, public health, and the environment. Learn more at www.nrdc.org.

Impact, *continued from page 1*

for a variety of dried and fresh food products.

Chemical pest controls and fertilization would certainly save time in the operation, but Teri prefers their methods, which may result in an aching back more often, but leaves her no doubt that the environment, and in turn their products, are safe.

Weed management includes knowledge of the working end of a hoe and a lot of weed pulling. Insects are managed largely with hand picking, plus help from natural predators including lady bug releases. A flock of 35 guineas made short work of last summer's grasshopper invasion.

"The results may not be as quick – it's not an instant fix," Teri says. "But we also don't have the residues and other problems that come with the widespread use of chemicals."

Teri and Dan use care even with their natural inputs, such as earthworm castings, gypsum, fish emulsions and others.

"We really don't add nutrients any more than we have to," says Dan, who explains the heart of maintaining fertility has been the buildup of the soil over time.

Solid watering practices cap off the operation's stewardship. All plants are watered either with drip irrigation or by hand, "so we don't have any runoff," Teri says.

Participating in the Groundwater Guardian Green Site Program was a natural step for Teri, who willingly shares information on stewardship practices she employs. The Greenhouse first earned Green Site status in 2008.

"I think it has helped us by having a symbol," Teri says. "It's something that helps show people how much we care about our environment and our products."

Being an example of stewardship is also important to Sidney's other Green Site, the South Platte Natural Resources District (SPNRD). By legislative decree, the District's work is all about protecting natural resources.

Mitigating affects from drought and concern over leaching nitrates are behind much of the work performed at the SPNRD grounds, which serve as a demonstration and educational site for alternative landscape practices.

The site features two varieties of turf-type buffalograss and xeric flower beds. Another lawn area, filled with a cool season grass that advertises lower water use, is being watched for possible success as a drought-tolerant alternative. An arboretum with more than 20 varieties of trees and shrubs allows staff members to show results in varying water and care conditions.

When it comes to the landscape, particularly the grasses and flower beds, SPNRD's work began in the 1990s, when the region was gripped by drought. Seeing an additional need for water conservation in urban settings, SPNRD developed the Cash for Grass Program, patterned after a program in Nevada. It provided cost-share dollars for homeowners willing to remove cool season lawns and replace them with buffalograss, which uses less than half the amount of water. Xeriscapes were also allowed under the program as long as they replaced cool season lawn area.

As the program grew, so did SPNRD's own on-site applications, allowing more residents to see how the alternative products fared. Staff members also gained valuable practical knowledge regarding inputs and care.

Today, the main grounds boast more than 5,000 square feet of practices where those interested can see first-hand the practices they can use to save water and reduce chemical needs. Despite the site's success, discussion on the possibility of becoming a Groundwater Guardian Green Site led to the conclusion that it would not qualify.

The site was purposely designed with lower water use in mind. Buffalograss also requires less than half the amount of fertilizer as cool season grasses, and lawn insects really aren't much of a concern, so insecticides are not used at all.

Because of those inherent reductions in the inputs, Ryan Reisdorff, who heads SPNRD's Groundwater Guardian efforts, says "We didn't think it would qualify, because we don't have a lot to manage."

Program Manager Jennifer Wemhoff changed that, however, by explaining that even management with minimal inputs still fulfills program goals. After all, she reasoned, protecting groundwater is what counts, and lower water and fertilizer use cover two major areas of concern.

As with any other applicant, Wemhoff worked with SPNRD to show places where improvements could be made in practices, just as she will with anyone interested in the program.

"The biggest change we've made by participating in the program is documenting our plan and practices," Reisdorff says. "We knew we were taking care of things right and producing good results, but we see how the documentation not only helps our own management, but it will give us more concrete information to pass along to people willing to try these alternatives."

The Wolffs and SPNRD both found challenges in the Green Site application, but both agree the program is an important way to demonstrate their dedication to caring for their fragile and challenging environment.

They have proven that stewardship can be shown in different forms and the Groundwater Guardian Green Site Program is a way anyone, no matter what their method of practice is, can make a statement about the importance of caring for groundwater.

Now What?

Moving Water and Sanitation from Right to Practice

By Edward D. 'Ned' Breslin, CEO, Water for People

The United Nations General Assembly declared water and sanitation a human right on July 28. The non-binding resolution is the product of close to two decades of often heated discussion on whether humans have a right to clean water and a latrine. Activists have been pushing this issue in an effort to force the world to finally address the horror playing itself out in billions of people's lives every day, in all corners of the world. The hope is that this resolution will lead to action on the ground, and a dramatic improvement in the lives of women, children and men in Africa, Asia and Latin America.

The resolution specifically "declares the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of the right to life." It comments on the need to address the considerable gaps in access to water (over 880 million people) and sanitation (2.6 billion people) that lead to nearly two million deaths a year from water- and sanitation related diseases, primarily from diarrhea, and which primarily afflict children. And it stresses the need for governments and international organizations to "scale up efforts to provide safe, clean, accessible and affordable water and sanitation for all," a position the UN is expected to soon clarify. In sum, the resolution functions as a reminder to leaders of their commitments to achieving millenium development goals (MDG) targets to reduce, by half, the number of people without access to clean water and hygienic sanitation facilities by 2015.

The rights-debate, however, has always been complex, contentious and confusing at times, and moving from resolution to practice will prove difficult. My hope is that this resolution will lead to a fundamental reconsideration of sector practice that will truly transform lives overseas with sustainable water and sanitation provision, and not degenerate (as is very possible) into a simplistic call for more money.

Reconsideration is needed because there is growing evidence of water point failure and abandoned, disused latrines scattering the landscapes of Africa, Asia and Latin America. The International Institute for Environment and Development (IIED) suggests that a catastrophe is spreading across Africa—approximately 50,000 rural water points are broken and $215 to 360 million (USD) of investment wasted because of poor programming and careless implementation. IIED highlights troubling data from Mali, where 80 percent of the water points in the Menaca region are 'dysfunctional' and surveys from northern Ghana indicate that 58 percent of existing water points need repair. The Interhemispheric Resource Centre (IRC, Holland) makes the case that, "In the last 20 years, 600,000 to 800,000 hand pumps have been installed in Sub-Saharan Africa, of which some 30 percent are known to fail prematurely, representing a total failed investment of between $1.2 and $1.5 billion."

The challenge cannot simply be to secure more money from donor countries and international NGOs, and a push for greater scale. Instead, the emphasis must be on better results to ensure that all investments made toward water and sanitation rights do in fact transform lives in a lasting way. Water must flow forever and people must never go back to defecating in the open if we are truly to move from the rhetoric of rights to the reality of rights on the ground.

Reconsidered programming should thus focus on impact and results over time. It will force implementing agencies—whether

Practice, *continued on page 5* ▶

multilateral agencies such as the World Bank and UNICEF, bilateral agencies such as USAID, international NGOs such as Water For People, microfinance institutions engaged in the water and sanitations sector such as Opportunity International and others—to fundamentally shift their metrics from counting the number of annual beneficiaries they support (the current sector norm) to showing that investments made 5 to 10 years ago are still functioning, still providing water and sanitation services. It will no longer be acceptable to simply say we helped 600,000 people last year. A rights-based program will mean that we will have to show that our investments in water and sanitation in the past are still allowing people to exercise their rights to water and sanitation now and far into the future. This will be a dramatic shift and one that will help ensure the overused word 'sustainability' has as much of a place in the current dialogue as that of rights.

Most importantly, this resolution will need to look at rights and responsibilities in tandem. This is perhaps best illustrated in Bolivia, whose Ambassador to the UN, Pablo Solon, was clearly a key player in pushing this UN resolution through. Bolivia takes the issue of rights and responsibilities seriously, and our experience is they are applying it in practice. In Bolivia, Water For People has formed an impressive coalition with municipal governments, communities, local NGO and private sector partners. The former Mayor of the municipality Villa G Villarroel (Cuchumuela), David Valásquez, spearheaded an initiative to get every family, school and clinic within his municipality covered with improved water supplies and sanitation. The new mayor is continuing this effort. The government is paying 50 percent of all hardware costs, plus all the costs associated with municipal oversight and support (staff, transport costs, etc.). Communities are co-financing their water schemes as well, with the balance in funding coming from Water For People. We provide a bit of financial support to the municipality, but the bulk of this program is being paid for by the municipal government. They are the leaders—it is their program. Water For People is a catalyst but no projects are being laced with our logos. It's not our work.

As a result of this local effort, Cuchumuela is about to achieve its goals of full coverage in water supply. Sanitation is understandably lagging—expansion is slower even with communities and organizations that value sanitation. Our monitoring work showed that early efforts focused on building latrines with subsidies were ineffective and actually undermined sanitation development. So we (government, communities, local partners and Water For People) needed to rethink our sanitation program. New approaches are now being applied.

Seventy-seven percent of the area is metered so water wastage is being controlled. Communities not only paid for their water systems up-front (in cash) but also pay tariffs to ensure water keeps flowing. Bolivia is, in many ways, the darling of the anti-privatization movement, but nobody we work with thinks water should be free—a common mistake made by antiprivatization advocates. Government and communities pay, taking control of their water supplies and their futures. They aren't expecting, and aren't looking for, a handout.

Because of this, the government and local communities are rightly getting the credit for tackling water poverty in Cuchumuela. They are actively addressing their problems, not waiting for aid allocations from some distant foreign government. They are not sitting on their hands and waiting for someone to give them their water rights. They're taking responsibility, together, to meet the challenges.

As a result, downtimes are reduced so water is flowing, and tariffs are designed to eventually allow for the replacement of their systems, hopefully eliminating the need for any support from external agencies in the future. We have evidence of new households being connected to the water supply without any additional financial support from Water For People (combinations of family contributions and funds from tariffs managed by communities). Water extensions, as villages grow without additional support from us, is a major goal.

Bolivia is not alone and this should be celebrated. We have seen many local governments step up and assume their rightful responsibilities to the communities they represent. In South 24 Parganas, West Bengal, India, the government is now paying close to 75 percent of hardware costs for all projects financed in their district. They are also covering 51 percent of the training costs, and are committed to lasting results and a reduction in system failure. The government of Rwanda is a leader in this field as well, making considerable financial commitments to an ambitious district-wide program in Rulindo. Honduras and Guatemala are driving toward full coverage in a number of municipalities and financing significant parts of these investments. And communities worldwide are playing their part as well, with significant up-front payments for their water supplies and latrines.

The UN resolution will mean little if water stops flowing and latrines are abandoned, as is now the case. It will be transformative only if lasting impact moves from being a rhetorical catchphrase (and worse, a programmatic afterthought) to being at the forefront of water and sanitation sector programming in the future. It will become a reality when examples of co-financing and creative programming, like the examples provided above, become the norm worldwide. And it will really scale up when space is created for communities to not only demand that their rights to water and sanitation are met, but also call out sector role players who have come in and installed systems that fail, as is too often the case now. Together we can help usher in a new era of transparency and accountability around rights that (hopefully) will lead to better work and better results on the ground…and an MDG goal that doesn't stop at 2015.

Founded in 1991, Water For People is an international, nonprofit humanitarian organization that focuses on long-lasting, safe drinking water resources and improved sanitation facilities in the developing world. For more information, visit www.waterforpeople.org.

References

1. IIED Briefing, March 2009. http://www.iied.org/pubs/pdfs/17055IIED.pdf
2. IRC Source Bulletin, 56, May 2009

Recharge Report Returns

The Foundation's e-newsletter, the *Recharge Report*, has returned!

The Groundwater Foundation is more committed than ever to building groundwater awareness. In that spirit, the Foundation has reinstated the *Recharge Report*, which initially ran from 2000-2005. It provides another way to deliver up-to-date groundwater information to our friends in the protection of groundwater.

Recharge Report includes links to hot topics and recent water information in its Water Watch Section, along with news about Groundwater Foundation programs. It also features links to cool websites, suggestions for what readers can do to help protect groundwater, and a groundwater glossary to help understand important groundwater-related terms and concepts.

Recharge Report is distributed eight times a year, generally in the months when no Aquifer is distributed.

Sign up to receive the *Recharge Report* for free by clicking on the "Join Our Free Email Mailing List" icon on The Groundwater Foundation's website at www.groundwater.org.

Wellhead Protection Network to Kick Off 2011

The Nebraska Wellhead Protection Network provides an opportunity for agencies that support community wellhead protection programs to meet, discuss their work, identify community needs, and gain information related to wellhead protection. The Network has been active since 2001, funded by the Nebraska Department of Environmental Quality.

The Network will kick start 2011 with a Groundwater Education and Information Breakfast on January 11 at the Nebraska State Capitol. State Senators and their staff will be invited to attend an informal breakfast with an opportunity to speak to Network members, discuss water issues, and learn more about Nebraska's groundwater and various groundwater protection and education programs and projects. In addition, Network members will set up displays at the Capitol highlighting the State's groundwater and wellhead protection programs. These displays will be up the entire week educating everyone working or visiting the State Capitol building.

The Nebraska Wellhead Protection Network will hold an additional three meetings in 2011. Dates of these upcoming meetings will be determined throughout the year and will take place at various locations across the state. Potential topics include funding opportunities for wellhead protection projects, latest research on issues related to wellhead protection, raising public awareness of wellhead protection, and sharing innovative best management practices.

The Nebraska Wellhead Protection Network has over 250 members representing state and local environmental, natural resource, and public health agencies and organizations as well as community municipalities and utilities.

For more information about the Network, please visit http://www.groundwater.org/pe/newhp.html. If you would like to learn more about joining the Nebraska Wellhead Protection Network or receive meeting notices, please contact Jamie Oltman at 402-434-2740 extension 105 or joltman@groundwater.org.

Modeling the Social-Economic-Natural System in the Republican River Basin

A major source of water conflict in recent years has been the reduction in stream flows caused by groundwater pumping from adjacent areas. Although hydrologists have long conducted studies of the physical aspects of groundwater-surface water exchange, there have been relatively few social and economic studies of surface water-groundwater systems. Since 2007, a team of economists, engineers, and sociologists from the University of Illinois and Michigan State University has been working on a research project funded by the National Science Foundation. The focus of the study is to understand better the complex relationships between the physical, institutional, and economic aspects of groundwater use and associated impacts on stream flow. An important goal is to develop better models of surface water-groundwater systems that can be used to suggest policies that are acceptable, save farmers money and still allow legal stream flow obligations to be met.

The research uses a variety of spatial socioeconomic and hydrologic data and models from the Republican River Basin of Nebraska, Kansas, and Colorado. Technical objectives of the research are 1. to quantify the economic and social impacts of uncertainty in surface water-groundwater systems; 2. to evaluate how variability over space and time in hydrology, individual and social group behavior can affect decisions and the consequences of those decisions in surface water-groundwater systems; 3. to analyze the impacts of decision making processes on the development of socially acceptable surface water-groundwater management; and 4. to develop efficient and socially acceptable policies to manage surface water-groundwater systems in order to maintain stream flows.

The research team has documented the role of the unique hydrologic and agricultural history of the Republican River Basin in defining coalitions of actors with differing views on water management, as well as differing views on resolution of the current interstate dispute over stream flows. Results to date suggest that there are a number of opportunities to alleviate some of the most contentious water resource management problems. For example, preliminary results suggest that a targeted tradable permit system for groundwater pumping rights introduced to augment the existing water rights system could maintain or enhance the economic viability of irrigated agriculture in the Nebraska portion of the Republican River Basin while meeting stream flow requirements. The research team is currently extending its analysis by building a more complete model of groundwater-surface water interaction that can be used to help explore and support alternate water use decisions.

The project team includes Nicholas Brozović (Principal Investigator), John Braden, Ximing Cai, and Albert Valocchi, from the University of Illinois at Urbana-Champaign and Stephen Gasteyer at Michigan State University (Co-Principal Investigator). The Groundwater Foundation has also been involved in the project as a partner to provide feedback and project guidance.

Let's Keep It Clean!

By Jane Griffin, The Groundwater Foundation

Maybe you have seen this slogan on The Groundwater Foundation website, or in printed materials or signage at events. The "Let's Keep It Clean" slogan has been a driving force for the Foundation over the last eighteen months; in reality it has always been the driving force, but has become the "official" driving force just recently.

When you think about it, there could not be a better way to sum up the goals and objectives of Groundwater Foundation programs. While approaches may vary, the ultimate goal is for each of us to understand the impacts of our actions on groundwater and inspire best practices in our homes, at work and as a community to keep the resource clean.

In addition to its other programs, The Groundwater Foundation has implemented two new programs over the past 18 months, LEAP into Groundwater (LEAP) and Growing Groundwater Awareness in Nebraska (GGAN). These programs move individuals – students and adults, businesses and organizations – towards collectively keeping the resource clean.

LEAP into Groundwater

LEAP targets middle and high school students. It is a program that is divided into stages. First students Learn about groundwater and its characteristics by building an aquifer model. Second students Educate their peers, family or community by hosting a festival, open house, or other educational event. Next the students Act by implementing an activity, such as installing a rain garden, that will Protect the groundwater in their community for future generations.

The LEAP program has been introduced to a variety of learning environments – traditional classrooms, community learning centers, after school and environmental clubs, and other youth groups. Groundwater is often the forgotten element of the water cycle and usually does not receive in-depth learning in the regular curriculum. LEAP offers a hands-on approach to learning about groundwater and the critical role it plays in our lives.

Whether students are from an urban environment and receive their drinking water from municipal wells or from a rural area and rely on private wells for drinking water, the lessons they learn are applicable to their daily life. By building and experimenting with the aquifer models students quickly recognize that it is much easier to protect groundwater than trying to clean it up. This knowledge empowers them to share the information with others and to act responsibly and responsively.

Educators participating in LEAP noted the piqued interest in students, commenting that they "really went into discovery mode and started using their thinking caps."

What is always especially exciting about piloting new programs are the unexpected positive outcomes. For example, participating educators were inspired by the applicability of the lessons to other subject areas; one teacher had the students follow up with an art project to solidify the information the students learned when experimenting with the aquifer model.

Evaluations and assessments of the program are ongoing. The Groundwater Foundation will use the lessons it has learned throughout the pilot period to improve the program and its impact. This will include updating the program's manual, enhancing resources available on the LEAP webpage of the Groundwater Foundation website, and distributing the program to a larger audience. Look for more news about LEAP in upcoming editions of *The Aquifer* and the *Recharge Report*.

▲*Top: Students learn about groundwater by building aquifer models.*

Above: Participants at the Wayne Chicken Show discover how groundwater moves.

Clean, *continued on page 8* ▶

Clean, *continued from page 7*

Growing Groundwater Awareness in Nebraska

The GGAN program has an obvious goal – to grow awareness of the resource amongst people. But the program also focuses on leveraging the increased awareness to move people and communities into action.

To accomplish this, messages that clearly identify the direct link that each of us has to groundwater were developed. Next, a multi-faceted approach to sharing the message was implemented, including television, radio, and movie trailer advertisements (all of which are available on the Let's Keep It Clean portion of The Groundwater Foundation's website). Additionally there have been numerous printed articles, posts to social networking sites and presentations given to diverse groups across the state of Nebraska all centered around the message of keeping it clean.

Finally, the Foundation has worked directly with the communities of Crete, Minden, and Wayne, Nebraska. Groundwater Foundation staff has presented information to businesses and local government, participated in community events, and provided tools to schools to incorporate groundwater education in their schools.

Working with these communities to empower the citizens and the community as a whole to protect their drinking water has produced tangible results. Each of the target communities has had at least two sites designated as Groundwater Guardian Green Sites, started plans for hosting water festivals and/or for developing a wellhead protection plan, and more.

Crete, Minden, and Wayne will soon receive toolkits to help enable them to continue their groundwater protection efforts, and The Groundwater Foundation is gearing up for working with three more communities in Nebraska over the next months.

Additional activities such as school contests, business and community challenges, and more are being planned for Groundwater Awareness week in March 2011. Check The Groundwater Foundation's website for updates.

The work accomplished through these programs would not have been possible without the support of our funders. The Groundwater Foundation is grateful for the dedication and commitment that these funders have towards protecting groundwater. Special thanks to the Nebraska Department of Environmental Quality, the Nebraska Environmental Trust, and Water Systems Council for their ongoing support of the LEAP and GGAN. Thanks also to Bailey Lauerman and KOLN-KGIN 10/11 for their in-kind services for GGAN, and to the Rogers Foundation and the Woollam Foundation for their support of LEAP.

And the Winner Is...

J. Michael Jess to Receive Groundwater Achievement Award

J. Michael Jess has been selected to receive The Groundwater Foundation's 2010 Maurice Kremer Groundwater Achievement Award. The Kremer Award was established in 1985 to recognize Nebraskans who have made a substantive contribution to the conservation and protection of Nebraska's groundwater. Selection committee member and general manager of The Central Nebraska Public Power and Irrigation District, Don Kraus said "Few can match the depth of Mike's knowledge of and experience with Nebraska's water resources. His efforts over the years to improve the management, regulation and sustainability of the state's water resources, to promote a better understanding of the interrelationship between groundwater and surface water, and to protect the quality and quantity of groundwater make him a very deserving recipient of this award."

Jess' early career choices included assistant hydrologist for the Conservation & Survey Division at the University of Nebraska; first lieutenant (active duty) for the U.S. Army Corps of Engineers; and, staff hydrologist at the Illinois State Water Survey. In 1975, Jess returned to Nebraska to become the deputy director of the Nebraska Department of Water Resources, which later became the Nebraska Department of Natural Resources, where he was appointed director in 1981. During his tenure at the Nebraska Department of Natural Resources, Jess served as an Administrative Law Judge and arbitrated hundreds of water rights disputes. He also served as Nebraska's Commissioner for the U.S. Supreme Court decree in Neb v Wyo and for four interstate Compacts charged with apportioning river flows among Nebraska and adjoining states. While serving as Chairman of the Nebraska Boundary Commission, Jess successfully negotiated boundary Compacts with South Dakota and Missouri. In 1999, Jess held appointments with the Conservation & Survey Division and the Water Center at the University of Nebraska-Lincoln. He taught several undergraduate and graduate classes in the School of Natural Resources and at the Law School. His research interests included investigation of Nebraska's rivers and aquifer systems and the formulation and execution of policies which govern uses of water. Jess currently works as a consulting engineer specializing in an array of water resources matters such as identification and mapping of groundwater deposits and disputes over irrigation, and, drainage and property boundaries near rivers and lakes. In addition, Jess has published numerous articles about Nebraska water issues.

The Kremer Award is chosen by a selection committee appointed by The Groundwater Foundation Board of Directors. Selection committee members include: Jim Goeke, University of Nebraska Conservation and Survey Division; Jane Griffin, President of The Groundwater Foundation; Don Kraus, Central Nebraska Public Power and Irrigation District; Bob Kuzelka, University of Nebraska Environmental Studies; and Susan Seacrest, Founder and Former President of The Groundwater Foundation.

Jess was presented with the Kremer Award at the Nebraska Water Resources/Nebraska State Irrigation Association Conference November 21-23, 2010 at the Holiday Inn Convention Center in Kearney, Nebraska.

Please visit http://www.groundwater.org/aw/kremerbiographies.html for a list of past Kremer Award winners.

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The Groundwater Foundation is a nonprofit educational foundation dedicated to educating the public about the conservation and protection of groundwater.

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