



WISE WATER WORDS

The Newsletter of
the Nebraska Section



American Water Works Association

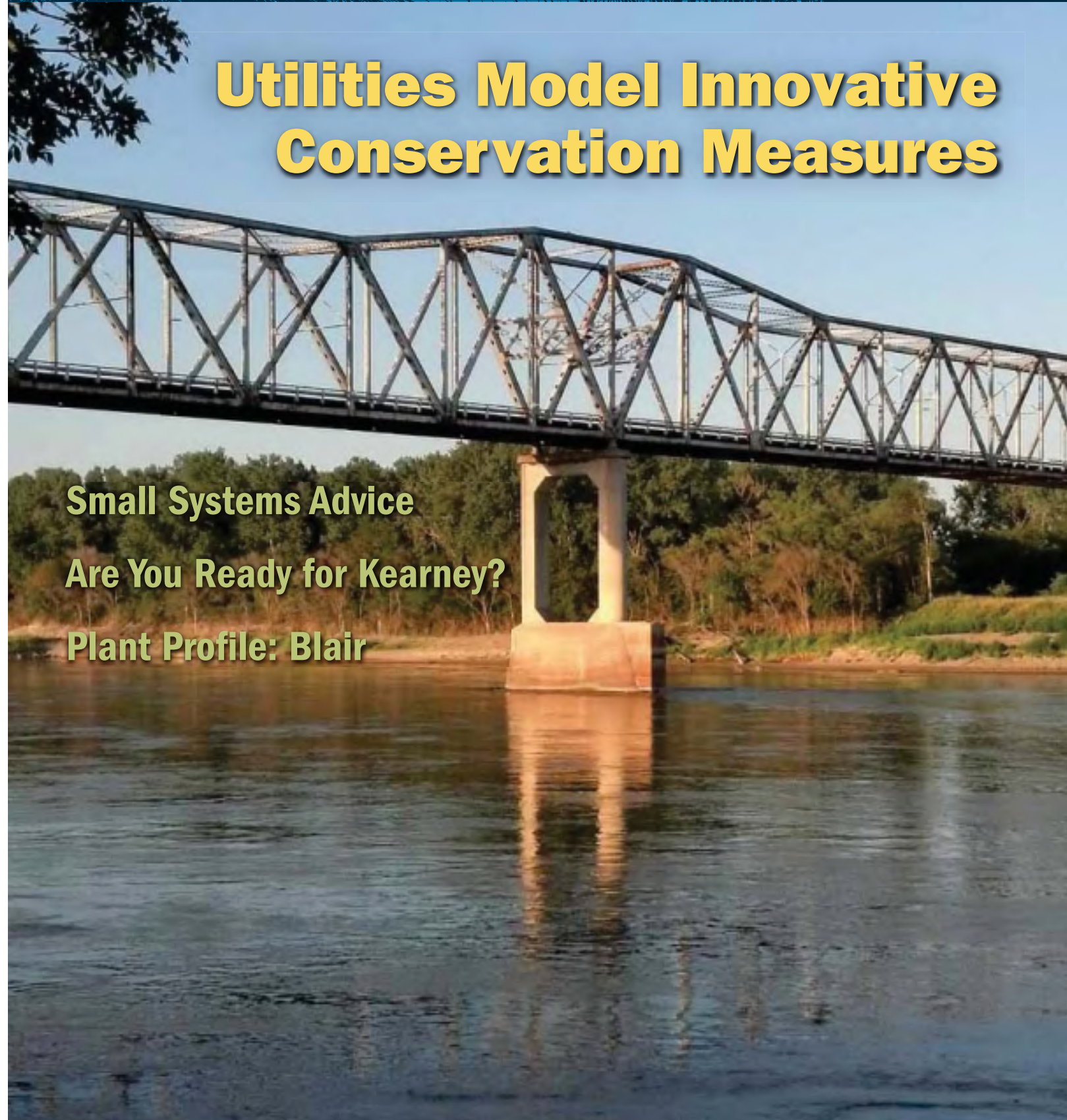
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FALL 2012

Utilities Model Innovative Conservation Measures

Small Systems Advice

Are You Ready for Kearney?

Plant Profile: Blair





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Table of Contents



3



9



12



WISE WATER WORDS

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2 Chair's Corner

Seems like too much water, or not enough.

by Rob Pierce

3 Director's Report

A peek at next month's conference in Kearney.

by Tony Bilek

4 Safety Spotlight

A safer workplace starts at the top.

by Brian Gongol

5 Water Reflections

What's your story?

by Brian Gongol

6 Systems Strategies

Are you running your utility like a business?

by Mary Poe

8 Nebraska News and Events

A look back at ACE12, officer nominations, and backflow models from DHHS.

11 Plant Profile: Blair

Meet your Blair water treatment plant.

12 Utilities Model Innovative Conservation Measures

Making a business case for conservation takes careful planning.

by Michelle Maddaus, Lisa Maddaus and William Maddaus

16 Certification Corner

Test your knowledge of water and wastewater treatment and operations.

17 Nebraska Marketplace

Ads from your friends and neighbors.

On the cover: The Missouri River flows by the bridge crossing that connects Decatur and Monona County, Iowa.
Photo: Brian Gongol.

Chair's Corner



From Too Wet to Too Dry by Rob Pierce, League of Nebraska Municipalities

This year has been a complete opposite of the last two years as Nebraska went from flooding issues along the Missouri River to very little if any rainfall statewide in 2012. Also, following a somewhat mild winter, the temperatures soon took a turn to the triple digits with little relief this summer. The drought conditions spurred increased water use not only in the agriculture fields but also in communities where customers attempted to salvage their lawns.

Using a moisture probe, one Nebraska Panhandle farmer south of Oshkosh tested his field, which revealed a zero moisture reading as deep as 4 feet. Continued lack of replenishment of our rivers

and lakes could cause capacity issues in 2013. This year, the city of Lincoln started with voluntary water restrictions but later went to mandatory restrictions as the water tables were not recharging adequately in their well fields.

For most communities, selling more water is good—but if the source capacity gets depleted, it could be a problem. If water systems need information on water use, conservation, or water-loss prevention practices, contact an AWWA board member or AWWA headquarters in Denver.

The Section continues to keep active, as some Section members participated in the “World O’ Water” event held in Omaha. The Water For People committee

sponsored a sporting clay shoot, which was a success. The WARN workshop had good attendance, highlighting a mock tornado disaster exercise involving several public and private water systems. The Section library has received a DVD with the opening presentation from ACE12 (contact me if you’d like to borrow the DVD). The video will be put in the Section library and will be available for members to check out.

This year, several board members and committee chairs got together for a retreat to brainstorm on areas of concern to be addressed in the future, ranging from membership, regulatory changes, source water, and capacity development, along with procedural changes such as updating the Section’s standard operating procedures. One of the highlights at the retreat was a presentation pertaining to soil moisture monitoring and efficient water usage.

Eric Lee and the Conference Planning Committee are putting the final touches on the 2012 Annual Conference, which looks to have an outstanding agenda. I would encourage members to sign up early, which helps us in planning meals and room sizes—and be sure to make your room reservations. I encourage members to take an active part in the association, and new committee members are always welcome. I look forward to seeing everyone again this year at the conference, and be sure to attend the Section business meeting!

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Director's Report



Lots to Look Forward to in Kearney by Tony Bilek, Mc², Inc.

Greetings, everyone. Hope this issue of Wise Water Words finds you well. Our annual conference is rapidly approaching. We are receiving many complimentary comments on changing to the new venue in Kearney. The Younes Convention Center offers very impressive accommodations for our technical sessions, exhibition, socials and banquets. The Board certainly welcomes any feedback you have. Your voice is critical to the improvement of conference content and logistics.

Our visiting national dignitary is Vice-President Reid Campbell, of the Atlantic Canada Section. Reid is the Director of Water Services for water, wastewater and stormwater utilities at Halifax, Nova Scotia. Reid is a very personable individual and would appreciate talking to anyone who would like to discuss water or wastewater issues that pertain to the national association as well as Section association issues. Please welcome Reid with warm Nebraska hospitality.

The Fall Conference planning committee has put together another fine technical program this year. Other activities in which we strongly encourage participation in are

- **Best Tasting Water Contest**—Fremont Utilities is the reigning state and national winner...the bar has been set!
- **Meter Madness**—Contestants will compete, assembling Badger flowmeters. Rules are available on the website. Contestants have two timed attempts at assembling meters. Time is added depending upon any leaks present and how severe the leaks are. The Section winner will win \$1,000 toward attending and competing at the National Meter Madness at ACE13 in Denver.
- **Top Ops, Non Ops**—These competitions are always a good time and also carry cash awards, CEU credits and bragging rights.
- **Water For People Poker Tournament and Raffle**—Again, cash prizes and fun to be had playing poker with friends



PHOTO: DARYL KOTTWITZ

and associates—all for a very noble cause...thank you Young Professionals! I hope to see many of you in Kearney this November.

Editor's note: For more details on the events at the Fall Conference, please visit awwaneb.org/fallconference.

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Safety Spotlight

Three Steps to Greater Safety by Brian Gongol, DJ Gongol & Associates

The public water business is deeply hands-on. Whether it's a matter of turning valves, maintaining pumps, replacing pipe or installing new equipment on a jobsite, it's hard to avoid getting your hands dirty at least once in a while—even if most of your days are spent behind a desk. For many operators, every day is a hands-on day.

That means we need to give more consideration to safety on the job than do people who work in many other businesses. Safety doesn't happen by accident: It requires deliberate attention and a thoughtful safety program.

Here are three vital elements of a safety program:

1. A management-level commitment to safety. It's pretty simple: If management doesn't buy into the plan, it will never get executed. Managers must (a) prioritize safety, (b) have an active plan for safety, and (c) live the plan. A dusty three-ring binder sitting on a shelf somewhere doesn't count—especially if everyone on the team sees managers driving without their seat belts, refusing (or forgetting) to wear hard hats and eye protection, and entering confined spaces without following the regulations. It's up to the leadership of any utility to demonstrate a firm commitment to safety first.

2. Clear definitions of responsibility. One of the things that makes the US

armed forces such a formidable power is that every role and every task is part of a clear assignment. In the world of water utilities, many of the steps we can take to ensure greater safety are either time-consuming or easy to forget. For precisely that reason, every step needs to be part of someone's specific individual responsibility. Who checks the fire extinguishers? Who inspects the breathing apparatus? Who's responsible for making sure everyone on a jobsite has the right safety equipment? There is a paradox in psychology called the "diffusion of responsibility," which says that the larger the number of people involved in a task, the more likely they are to assume that someone else has already taken care of what's important. Assigning specific responsibilities to individuals avoids the bystander effect—"Oh, I thought someone else had taken care of that."

3. Routine inspections. A good safety program has several layers. Engineers should design systems to avoid inherent risks. Manufacturers can build equipment to reduce hazards. Management should ensure that everyone knows their part in the safety plan. But everyone needs to know that they, too, are individually responsible for inspecting their work environment. Well-trained employees, guests, and visitors need to know specific items of concern of which they ought to be actively aware—a good rule of thumb is to make sure everyone has a mental checklist of the three to seven highest-risk items at a given site. Managers should add an additional layer of safety by inspecting periodically. The goal isn't to find fault or make employees and visitors feel like they're being hounded, it's to reinforce the commitment to safety first.

Editor's note: These items are very loosely adapted from an article on workers' compensation claims from the Louisiana Workers' Compensation Corporation.

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Water Reflections



How Are You Telling Your Water Story?

by Brian Gongol, DJ Gongol & Associates

If there's any way for the climate to behave any more erratically than it has over the last two or three years, I'd rather not have to find out. From the seemingly endless drought of the last decade to the extraordinary flooding of last year to this year's worse-than-the-Dust-Bowl conditions, we've been whip-sawed around in ways that have brought water issues to the forefront of public attention.

While none of us has the power to make the right amount of rain and snow fall at the right times, we do have the power to make sure that the public understands how the water cycle affects all of us.

Have you told the story of how it affects your water system (or the ones you work with)?

- Have you sent out bill stuffers describing this year's peak water demand as compared with previous years?
- Have you shared weekly updates on pumpage rates on Twitter?
- Does your website tell the story of where your raw water comes from?
- What about sharing a look at the bigger picture?
- Have you posted pictures of low river levels on Facebook?
- Have you sent a letter to the editor explaining how the drought is likely to continue into next year?
- Have you reached out to local media outlets to invite them to visit your facilities for a drought-related feature story?

We can't change what nature throws at us, but we can adapt and make plans for the future. And it's important for all of us in the water industry to make our situation known. These tasks aren't exclusive to municipal utilities, either—those of us in the many other roles in this sector (engineers, manufacturers, private operators, regulators and many others) should be eager to help tell the story, too.

The easiest way to appeal to the public is to take what people can see with their own eyes and turn it into something they can use:

- Most people probably had higher-than-normal water bills this summer, even if they were only trying to keep a few flower beds alive. We can tell them, based on pumpage rates, just how much extra water the entire community used this year.
- Lots of homeowners probably noticed cracks in the ground around their house foundations. We can explain how the same shifts in ground stress put pressure on water mains and other pipes—possibly weakening or compromising some.
- Anyone who traveled along I-80 this summer should have noticed the Platte running dry (or nearly so). But we can tell them about the groundwater levels they can't see, and explain how aquifers aren't getting recharged because of the drought.

Water professionals have a lot to tell our friends and neighbors, and in times of extraordinary events like this one, we really owe it to them to tell our story and engage them in understanding the solutions. Lots of things that may seem obvious to us are simply unknown to most water customers, and the work of explanation is up to us. Just like people are often more willing to take advice from their doctors and make meaningful changes when they face a health scare, so too are people in the general public likely to be more receptive to our messages about conservation and investment in our water infrastructure when both extremes—flooding and drought—are still fresh in their memories.

If you don't know where to start, check in with the public information committee or the education committee of your Nebraska Section AWWA. Both are well equipped to help communities of all sizes get under way with telling the important story of the public water infrastructure in Nebraska today.

MIXED MESSAGES:

Which of the following do you take away from this display in a hotel guest room?

1. Water is precious and expensive—it costs \$3 a pint!
2. Water conservation is important to protecting the environment—re-use your linens!
3. Sure, you could drink the tap water—but we have reservations about it, so you might want the bottled water instead!

It's no wonder so many consumers don't know how to value their public water supplies when even a simple hotel room presents so many conflicting messages.



Systems Strategies

Advice for Small Systems: Run Your Utility Like a Business

by Mary Poe, Nebraska Department of Health and Human Services

Wise Water Words: Dennis, as one of the Nebraska AWWA mentors for small systems, what are some of the issues or challenges that you see facing small water systems and their operators?

Dennis Watts, Water/Sewer Director, Norfolk: One item, as with the rest of the water industry, is the aging workforce. Another is that small systems' wage and benefit packages are not enough to keep operators working there.

Also, some of the systems do not run their systems as a business; they use their water funds to help out with parks and streets and things like that.

Another item we hear of is that some systems have a difficult time in getting the support of the city councils and board members when needing to put money into the system for upgrades and repairs.

Lastly, new regulations can be very expensive no matter what size system you are working with—large or small. This is another challenge for the systems.

WWW: You mentioned the aging workforce in the water industry. A recent Nebraska Section survey of water operators revealed that nearly half of the water operators in the state anticipated retiring within 10 years, so you are right about that. We've recently heard about a nationwide initiative by the EPA and the Department of Veterans Affairs to connect veterans with career opportunities in the water sector. Many veterans already possess the training and technical skills that are needed in water industry careers. How do you feel about incorporating this idea for small systems in Nebraska?

DW: I think it's a good idea to incorporate this idea for small systems. We would have to think about the best way to do it.

WWW: Do you have some ideas on what steps small systems can take to obtain the support of their councils and boards when infrastructure upgrades are needed?



DW: I think operators have to be very proactive. They should give new board members tours of their systems and let them know of issues that are in need of repair, as well as items they know will cause issues in the future—such as new regulations and possible new subdivisions. The biggest help is being proactive and letting them know the importance of water. This is an item I feel most systems do not do very well, including Norfolk.

WWW: So it sounds like the key here is to get the board and council members involved and help to educate them about what it takes to run a water system. That's a good plan. You mentioned earlier about running your water system like a business. What exactly does that mean? How do you run your water system as a business?

DW: I believe that in the water industry, we are basically selling the customer a product. Our product is water. You have to know the total cost of water. This would include electricity, wages, meter repairs, upgrades to the system and future needed projects and other expenses. You should keep your water funds separate and not fund other areas of the city such as streets and parks. When you purchase products or equipment, make sure you

get the best buy for the city's dollar. I tell my employees to spend the money as if they were spending their own money. Be a good steward of the monies that the citizens have put their trust in you to spend wisely.

WWW: Thanks for being a mentor to small systems. Is there anything else you'd like small system operators to know?

DW: Small systems should take advantage of Nebraska WARN, AWWA, and also Nebraska Rural Water. All of these groups have a lot to offer as far as technical resources and assistance in a lot of different ways. This could be manpower, materials or many other items.

Editor's note: Dennis Watts serves as a Nebraska Section AWWA mentor. He was honored with the Fuller Award in 2011.

Fill the news gap between editions of **Wise Water Words** with the Nebraska Section AWWA email update. Sign up at awwaneb.org/contact.

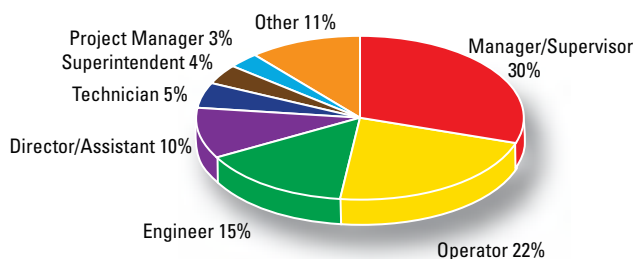


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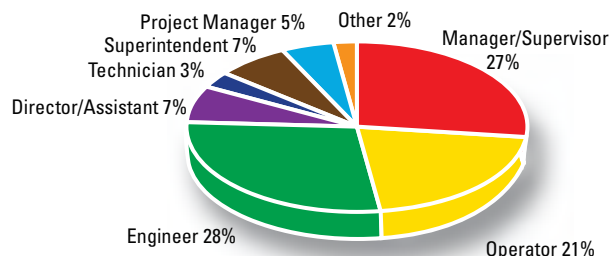
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Think water jobs. Think AWWA.

Nebraska News and Events

ACE12 Report by Rob Pierce, League of Nebraska Municipalities

The Nebraska Section of AWWA has one of the smallest memberships of any Section, but we left a noticeable footprint at the 2012 ACE. About 7 percent of our members (23 out of 328) made the trip to Dallas. Several Section members provided presentations, attended committee meetings or competed in the Top Ops and water taste testing competitions.

Participants were met by good old Texas humidity and warm temperatures. On Sunday there was an early registration and a “Sneak Peek” reception in the exhibit hall. Mike Wentink and I were graciously invited to join the Pacific Northwest Section’s festivities; their event had almost as many attendees as our Nebraska Section has members.

On Monday, the opening session began with a welcome by AWWA President Jerry Stevens, officially starting the conference and exposition. Jerry was followed by the featured speaker, journalist and political pundit Steve Roberts.

Of the 550 sessions at this year’s conference, several presentations were provided by Nebraska Section members. On Tuesday, Dale Jacobson, of SEH, participated as one of the speakers in the roundtable discussion titled “Washington D.C. to Dallas: An update on the Millennium Development Goals.”

Later that morning, Allison Potter gave a presentation on “Seeing is Believing: A Physical Small-Scale Model for Public Education About Common Cross-Connections and Backflow Prevention.”

In the afternoon, Craig Reinsch, of Olsson Associates, gave a presentation on “Radionuclides and Small-Town Treatment Decisions for Denton, Nebraska.”

On Wednesday, Dr. Bruce Dvorak and Mike Wentink presented on “State Needs and State Solutions for Information Dissemination.” Dr. Dvorak also commented that not only did he have current students but also several former students from Nebraska who presented papers at this year’s conference.

How Does Your Water Compete?

by Mary Poe, Nebraska DHHS

All water systems—big and small, treated and untreated, groundwater and surface water—are invited and encouraged to submit a sample of their water for inclusion in the water-tasting contest which will be held at the Fall Conference in Kearney on November 8. The winning public water supply will be presented with a plaque and will be nominated to compete in the National AWWA Best of the Best Taste Test. Show your confidence in the drinking water that you produce and plan to bring your sample to the Fall Conference. For more information contact Mary Poe at (402) 471-1003 or mary.poe@nebraska.gov.

Contest rules and past winners are available at awwaneb.org/committees/pi/watertasting.

The 2012 Top Ops Competition marked its 15th year and (I believe) Nebraska’s 4th year as competitors. This year’s team consisted of Greg Vacha of Columbus and Chuck Seuferer of Lincoln. Their respectable showing confirms that Nebraskans have knowledgeable operators maintaining their water systems.

We always knew the water was good in Nebraska, but congratulations go out to the Fremont Water Department for proving it in a big way. Their water sample was crowned “The Best of the Best” at the national taste test. Nebraska has done well in this competition, as only two years ago, the Lincoln Water System sample tied for third place. That makes for two top-tier finishes in just three years of participating in the national competition!

Dennis Watts, of the Norfolk Water Department, formally received his George Warren Fuller Award at a special breakfast presentation.

Metropolitan Utilities District was honored as a 100-year member of AWWA (since January 1, 1912) and the Beatrice Board of Public Works was honored for a half-century of membership (since January 1, 1962).

The 2013 ACE Conference will be held in Denver. With the conference so close, I would encourage Nebraska section members to try to attend, as it is a very worthwhile experience.

All Aboard!

Valparaiso’s utility superintendent, Greg Bouc, built the kiddie train shown here for use at a variety of local town celebrations. This photo is from Dwight Czech Days this past July (Greg is the “engineer” at the wheel). We applaud this kind of ingenuity, inventiveness, and community-mindedness—traits we think are representative of many of Nebraska’s water utility operators.



Demonstrate Backflow With New DHHS Models

by Mike Wentink, Nebraska DHHS

The Nebraska Department of Health and Human Services Division of Public Health now has small-scale models that are available as a tool to educate public water system owners, representatives and their customers about the importance of maintaining an effective cross-connection control program.

These models, developed through a contract between DHHS DPH and the University of Nebraska—Lincoln, were designed and constructed to realistically and visually demonstrate the occurrence of backflow through common cross-connections found in public water systems. In each model, examples of backflow due to backsiphonage and backpressure in the distribution system are represented. One veteran water operator put it like this: “Once the water is sold to the customer, the public water system does not want it returned to them through the same conveyance.”

The small-scale design of the models was chosen to allow easy setup and demonstration of backflow by one individual, and to make them easy to transport and store.

The conceptual design and construction of these models was presented at the 2012 American Water Works Association Annual Conference and Exposition in Dallas, Texas, and brought many inquiries from presentation attendees. Details and



description of the models can be found at <http://water.unl.edu/web/drinkingwater/backflow>.

If any public water system is interested in borrowing a model for education purposes, please contact your DHHS DPH Drinking Water Program field representative.

Officer Nominations

On June 18, a conference call was held by the Nebraska Section AWWA Nominating Committee (Teresa Konda, Tony Bilek, and Doug Woodbeck) to determine the nominees for the various seats that need to be filled for 2013. The Chairperson's seat will automatically be filled by the 2012 Chair-Elect Eric Lee. The Past-Chair seat will be automatically filled by the 2012 Chair, Rob Pierce.

The Nominating Committee's recommended nominees for the remaining seats are

- Chair-Elect: David Lathrop (11/2012 to 11/2013)
- Vice Chair: Doug Woodbeck (11/2012 to 11/2013)
- Treasurer: Ben Day (11/2012 to 11/2013)
- Secretary: Chad Roberts (11/2012 to 11/2014)
- Trustee: Eric (Rick) Melcher (11/2012 to 11/2014)
- Trustee: Jim Shields (11/2012 to 11/2014)
- Director: John S. Olsson (the new Director will assume this seat at ACE 2013 until ACE 2016)

Those with time remaining in their current positions are

- Trustee: Milo Rust (11/2013)
- Trustee: Mary Poe (11/2013)

Election of Officers will take place at the Annual Meeting,

in Kearney at the Younes Conference Center, on November 8 at 1:30 p.m. During the election, nominations may be made by the members from the floor for any elected seat, excluding the Chairperson and the Past-Chair.

Student Chapter Update: E-Week

by Xu Li, University of Nebraska—Lincoln

The student chapters of the Nebraska AWWA and WEA participated in the 2012 UNL E-Week, with displays and exhibits on April 13.

Michael Florek (student chapter president), Dorian Roffe-Hammond (secretary) and Allison Cole (treasurer) organized a water-tasting contest to promote drinking-water quality awareness among the visiting high school students. Water samples from six different combinations of sources and treatment processes were presented. More than 100 high school students participated in the event.

Ben Day and Craig Reinsch of Olsson Associates represented the Nebraska Section-AWWA at the event and facilitated the collection of water samples.

Nebraska News and Events

2012 Children's Groundwater Festival by Mike Schultes, JEO Consulting Group

The Nebraska Children's Groundwater Festival was attended by dozens of schools in central Nebraska. Four volunteers ran the AWWA station, educating the students on the value of groundwater.

The students were able to see and understand that their drinking water originates from groundwater wells for the majority of Nebraskans, and that any pollution that gets into our rivers, lakes and streams can ultimately get into their drinking

water. The students had fun selecting the food coloring and using the hand pump. One young man pumped so intensely that the hand pump broke.

The four Nebraska Section AWWA volunteers were

- Michael Schultes, JEO Consulting Group
- Bill Podraza, Miller and Associates
- Jenny Sidlo, Hastings Utilities
- Carlos Medina, Olsson Associates

Asset Management Workshop by Nick McElvain, Lincoln Water System

The EPA's Asset Management Workshop was hosted by the Nebraska Section AWWA on April 3 and 4. Presenters Steve Albee and Duncan Rose presented a case for asset management for the more than 90 attendees.

Topics included developing an asset registry, condition

assessments for the most critical assets, determining possible failure modes and evaluation of the probable replacement cost at the end of the useful life of capital equipment.

Thanks to education committee chair John Keith and his committee!



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Plant Profile

Facility Spotlight: Blair

Wise Water Words: Please give us an introduction to your plant, its size and its history.

Al Schoemaker, Blair Director of Public Works: The plant is located along the Missouri River, just north of Highway 30. Our treatment plant capacity is currently 17 mgd but is in the final design stage to expand it to 20 mgd. The WTP was constructed in 1978 and put on line in 1979.

WWW: How long has your community had municipal water service?

Schoemaker: Blair is over 100 years old and they have had a municipal water system for at least 90 years.

WWW: When was your last major upgrade or renovation?

Schoemaker: WTP was last expanded in 2008 and is scheduled to be expanded in 2012-13.

WWW: What is the oldest component of your water system?

Schoemaker: With all of the expansions since 1995, most things have been upgraded or changed out; however, most of the main building and facilities remain intact as they were built in 1978.

WWW: Tell us about your most senior employee.

Schoemaker: We actually have four of seven employees who have worked at the Blair WTP since it was put on line. Our WTP supervisor is Mark Adams, and he has the most knowledge of the operation; he has worked for the city for over 35 years.

WWW: Who is your newest employee?

Schoemaker: Our newest employee at the WTP is not new to the city, only new to the WTP. We typically train junior employees to work at either the city's WTP or WWTP before they are considered for openings at either plant. The plant positions are considered promotions and are highly sought-after by other public works staff. Our newest employee of the WTP is Jeff Combs, and he started working at the WTP in 2008 after our last expansion. He has been working for the city in the utilities department since 1999. He is one of six employees who work at the WTP. We are planning on expanding the number of staff at the WTP after the next planned expansion in 2013.

WWW: What is your most significant day-to-day challenge?

Schoemaker: Keeping up with the industrial demand of the Cargill campus, including water quality. Cargill and their partners have varying water-quality issues that can be challenging to meet with a municipal WTP.

WWW: What worries you the most about serving your community for the next 10 to 20 years?

Schoemaker: Blair takes source water from the Missouri River, so with the current growth of the community and the water system, Blair is in better position than many. The only significant challenge we are looking at as we move into the future is the availability of qualified staff to operate our WTP. Of the six employees we have now, four are at or near retirement age.



WWW: What message is the hardest one to communicate to your customers?

Schoemaker: The varying water quality because of the changes of the source water. However, we have been taking steps along the lines of pre-treatment to help reduce these problems with some success.

WWW: What is your favorite community event of the year? Does the water utility take part?

Schoemaker: The main event that uses water is the annual fire fights but compared to a daily industrial demand of 12.5 mgd there is really no event that compares. Water main breaks do not even influence the WTP.

WWW: What's special about your source water?

Schoemaker: Our changing water quality is a challenge, but the fact we have more supply than Blair can ever need is great.

WWW: When did you last make any major changes to your distribution system?

Schoemaker: Since I have been with Blair, I have been challenged with upgrading the water distribution system. When I came to the city in late 2000, the water system was rated a 5 by the ISO rating agency—which was of great concern to the city, commercial business owners and the fire department. Since then we have been making numerous water main upgrades, including new reservoirs and pump stations, to provide a water system that was given a rating of a 1 by the same ISO rating agency in 2007. We are currently working on the last of the upgrades of the system through an SRF program initiated by the ARRA funding in 2009. We are planning on being completed with the work covered by that loan in 2013, at which time we will have accomplished all of the water distribution system upgrades that have been identified.

WWW: What is the most important lesson you've learned as a utility in the last 12 months?

Schoemaker: That we are not protected by the Corps of Engineers from flooding of the Missouri River, as we once thought. We are now challenged to replace/repair all of the damaged facilities from that flood, and develop a revised emergency plan to include protection from future flooding.

Water Management

Many US water utilities are under intense pressure to reduce consumption. In addition, droughts and recessions have caused revenues to decline and conventional funding pathways to become more challenging. Now there are even more reasons to ensure planned water-use reductions are cost-effective. **BY MICHELLE MADDAUS, LISA MADDAUS, AND WILLIAM MADDAUS**

UTILITIES MODEL INNOVATIVE CONSERVATION MEASURES

VARIOUS METHODS CAN BE USED to evaluate water conservation measures that rely on conventional and new technology. Because relevant data often aren't available, water planners must rely on past experience, limited data, and engineering judgment to evaluate the cost-effectiveness of water-saving measures, including

- automatic meter infrastructure (AMI) systems
- green-building codes and standards
- new ordinances
- landscape and irrigation management
- recycled water
- programs that influence customer behavior and attitudes about water efficiency
- water-loss reduction

- high-efficiency fixtures
- water pricing

To achieve high levels of water efficiency—such as a 20 percent reduction in per capita use by 2020, the current target in California—many of the above measures will be needed. Utility managers want assurances that water reductions can be achieved and long-term benefits will outweigh costs. Benefit-cost ratios and program costs are helpful to inform decision makers, but it takes a detailed planning effort to prove conservation has a business case and is a reliable way to meet future water demands. Details of how to best create a long-range plan is presented in AWWA Manual of Water Supply Practices M52: *Water Conservation Programs—A Planning Manual*, authored by William and Lisa Maddaus.

Part of developing an effective water conservation plan is to evaluate potential measures that may be appropriate for the area. Such measures include (clockwise from top left) rain sensors for irrigation controllers, high-efficiency toilets, water recycling efforts, and new home ordinances that address water waste.



Water Management

POTENTIAL BENEFITS

A useful approach to evaluating whether a conservation program is worthwhile is to compare expected benefits and costs against anticipated problems associated with such a program. Some potential benefits of water conservation are described below.

Reduced Per-Capita Demand on the Supply Source. A reduction in water use will allow a larger population to be served by the water source. This is particularly important where aquifers are being depleted and limits on the amount of available surface water are being approached by growing communities. Reducing normal rates of water use can also help ensure an adequate supply will be available during a shortage.

Reduced Need for Facility Capacity. Reduced flows in the water and wastewater system may allow a water utility to eliminate, defer, or downsize construction of new facilities.

Reduced Costs for Utility and Customers. A reduction in water use lowers the costs of energy, pumping, and chemicals required for all stages of treatment and distribution. Cost savings can help defer increases in billing rates for consumers. In addition, when heated water is conserved, energy costs will be reduced in homes, businesses, and industry.

Environmental Protection. Reducing the rate of withdrawals from a stream, lake, or impoundment can help maintain flow rates and water levels needed to sustain source water quality and a healthy environment for native plants and animals.

MITIGATING POTENTIAL CHALLENGES

If not appropriately planned, a water conservation program can result in unforeseen consequences.

Revenue Changes Not Accounted for by the Utility. The most cost-effective way to provide high-quality water service is through implementing water conservation programs. Building new supplies or decreasing the amount of water used

doesn't necessarily mean a utility must increase rates more than would be required for system expansion or treatment process changes. Every conservation program should include a well-planned schedule that allows financial planners to project decreased revenue and ensure all financial obligations are met. Fortunately, decreased revenues are predictable and develop slowly and in small increments, usually 0.5–2 percent annually. A utility can offset water-rate increases during the normal rate-setting process over time.

Utility and Customer Program Costs. The cost for implementing a conservation program will likely be shared by the water utility and its customers. Program costs can vary, depending on the implementation method used, the program's size, and the scope of the program's evaluation. The long-term costs of each program component should be estimated ahead of time and included in annual budgets.

Possible Delay in Developing Additional Source Capacity. Appropriate planning for supply reliability includes considering conservation and long-range future water supply projects through an integrated planning process. Having a robust stakeholder involvement process ensures the utility and community are on the same page regarding future water needs and funding opportunities.

Possible Future Water Service Growth. Every utility has an obligation to serve water within its designated service area boundaries. Some perceive that the water saved by a conservation program may allow more people to be served by available water. As long as water supply reliability requirements are met, future water needs can be accommodated and additional customers may continue to be connected to the system.

Fast-Acting Changes When Dealing With Drought Conditions. If a drought occurs after a utility has a conservation program in effect, the situation can become challenging, because the easiest or least-cost

opportunities to save water already have been tapped. This situation emphasizes the need to update water demand forecasts and continue overall water supply planning beyond conservation efforts.

MODELING INNOVATIVE MEASURES

One methodology for modeling innovative conservation measures is broken into five basic steps, including collecting all relevant data, using the data and engineering judgment to estimate water savings and costs, entering that information into an evaluation software tool to conduct benefit–cost analysis, evaluating options, and implementing a plan.

Step 1: Collect Data. When starting to analyze a new conservation measure, general information must be collected. Questions such as those listed in Intake, page 2, are usually answered by utility staff members and managers.

Step 2: Estimate Water Savings and Costs. This step is usually conducted by a consultant, with review and discussion by the water utility.

- Site-specific data regarding water savings for new measures may be lacking.
 - Use information about another utility's savings.
 - Estimate costs based on analogies with other known measures.
- Materials costs (device, rebate, contractors, administrative costs) can be estimated.
 - Administrative costs, including staff time and program operation and maintenance can often be expressed as a percentage of materials cost (25–35 percent).

Step 3: Analyze the Data. Collected data are then entered into an evaluation tool that analyzes the benefit–cost information. It's important to use a proven evaluation tool that can tabulate annual water savings and costs, perform benefit–cost analysis, and allow choices in measures and program design.

End-use models are beneficial for analyzing measures for the following reasons:

Savings resulting from adopted conservation programs have ranged from 10 percent to 16 percent over 20–25 years.

- They can be calibrated for a specific utility's water billing data. Savings can be customized for an exact customer base and historical water-use patterns of the service area. The models are tied directly to historical water billing data.
- They calculate water savings and costs for a large number of conservation measures (40–50) for a long study period (30 years or more).
- They provide detailed information for individual conservation measures.
- They can cater to state or federal plumbing codes or legislation.

Step 4: Evaluate Program Options. It's often effective to compare the benefits and costs of increasingly more aggressive conservation programs to determine how far to push the "conservation envelope." This can be done by constructing three to five program scenarios. For example, the first program (i.e., Program A) has the fewest measures or a continuation of current efforts. More aggressive programs are constructed by adding measures with attractive benefit-to-cost ratios (Program B, C, and D). A final program can be made consisting of nearly all measures evaluated (Program E).

Step 5: Implement Plan. An implementation plan can be developed for utilities after they've selected their ideal program and individual measures. The implementation plan provides sufficient detail for the utility and its customers to understand the process of how to implement each measure and what actions are required to meet each measure's goals. The most successful programs work with partners to get additional budget or staff support. It's also vital to clearly record completed activities to help evaluate program performance and water savings.

CONSERVATION AND SAVINGS

As detailed in the Conservation Case Studies above, many water utilities are including innovative measures as part

CONSERVATION CASE STUDIES

COST-EFFECTIVE PROGRAMS PAY OFF

Case studies illustrate innovative measures under consideration by the Palm Beach County (Fla.) Water Utilities District; City of Santa Barbara, Calif.; and Marin (Calif.) Municipal Water District.

Table 1 provides general service area information. The avoided-cost of water—the cost of the next-available water supply—varies greatly but is typical. In some areas, this is inexpensive. In areas in which it's difficult or expensive to obtain additional water, the avoided-water cost is higher.

Based on conservation analyses, the utilities are planning to invest significantly in 16–30 conservation measures, as summarized in Table 2, which also includes total conservation program budgets and expected program savings.


Table 1. General Service Area Information

Service Area Information	Palm Beach County	City of Santa Barbara	Marin Municipal Water District
Population	435,000	94,000	190,000
Water production, 2010	56 mgd	12 mgd	27.1 mgd
Water production without conservation, 2035	76 mgd	12.5 mgd	27.6 mgd
Avoided cost of water	\$700/mil gal	\$1,800/mil gal	\$5,000/mil gal
Source of avoided cost of water	Variable cost of water treatment	Imported state project water	Developing new imported supply

Table 2. Conservation Measures, Program Costs, and Savings

Programs	Palm Beach County	City of Santa Barbara	Marin Municipal Water District
Conservation measures	<ul style="list-style-type: none"> ■ Water pricing ■ New home ordinances ■ Efficiency awards ■ Water-loss reduction 	<ul style="list-style-type: none"> ■ Promote green buildings ■ Landscape irrigation upgrades incentive ■ High-efficiency fixtures 	<ul style="list-style-type: none"> ■ Water-loss reduction ■ Landscape programs
Budget	\$8.8 million (30-year net present value cost for 16 conservation measures)	\$3.1 million (30-year net present value cost for 17 conservation measures)	\$31 million (30-year net present value cost for 30 conservation measures)
Projected savings	10.2 mgd (about 13%) by 2035	1.3 mgd (about 10%) by 2030	4.6 mgd (about 16%) by 2035

of their conservation programs. New, innovative measures can be modeled using an end-use model. Savings resulting from adopted conservation programs have ranged from 10 percent to 16 percent over 20–25 years. Fiscal goals to maintain high-quality water service using the least-expensive supplies and per-capita targets are prompting some

agencies to increase conservation program spending. 

Authors' Note: Thanks to Tom Miller, Palm Beach County (Fla.) Water Utilities District; Alison Jordan, City of Santa Barbara, Calif.; and Dan Carney, Marin (Calif.) Municipal Water District, for their assistance with the case studies.

Certification Corner

Excerpted from the June 2010 issue of *Opflow*, published by AWWA. Reprinted by permission. For more information and references, visit www.awwa.org.

WATER

- Which of the following is the type of valve used in maintaining prime to a pump?
 - Foot
 - Suction
 - Vacuum header
 - Butterfly
- What type of ductile-iron pipe joint is used primarily for river crossings and underwater intakes, and occasionally in rough terrain?
 - Restrained
 - Mechanical
 - Flanged
 - Ball-and-socket
- The capability of a water or chemical solution to resist a change in pH is called
 - chlorine demand.
 - buffering capacity.
 - Langelier Saturation Index.
 - Zeta potential.

WASTEWATER

- The material that sloughs off a trickling filter from the buildup of organisms is called
 - scum.
 - nonvolatile organics.
 - sludge.
 - humus.
- The effluent from which of the following processes is called mixed liquor?
 - Secondary clarification
 - Primary clarification
 - Sludge drying bed or pond
 - Activated sludge
- What is the ideal level of solids in a jar test sample collected from an aeration tank if it is allowed to settle for 30 min?
 - $\frac{1}{4}$ of the jar depth.
 - $\frac{1}{3}$ of the jar depth.
 - $\frac{2}{3}$ of the jar depth.
 - $\frac{1}{2}$ of the jar depth.

ANSWERS: Water: 1. a, 2. d, 3. b Wastewater: 1. d, 2. d, 3. d

Training Calendar

ONE-DAY WORKSHOPS:

- December 4—Falls City
- December 5—Nebraska City
- December 6—Lincoln

CONFERENCES:

- November 8-9—Nebraska Section AWWA Annual Fall Conference, Younes Conference Center, Kearney
- Visit awwaneb.org/training for further details on training opportunities, resources, and funding assistance.



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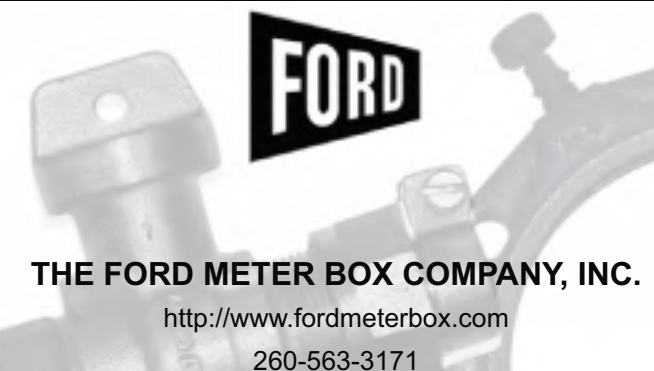
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