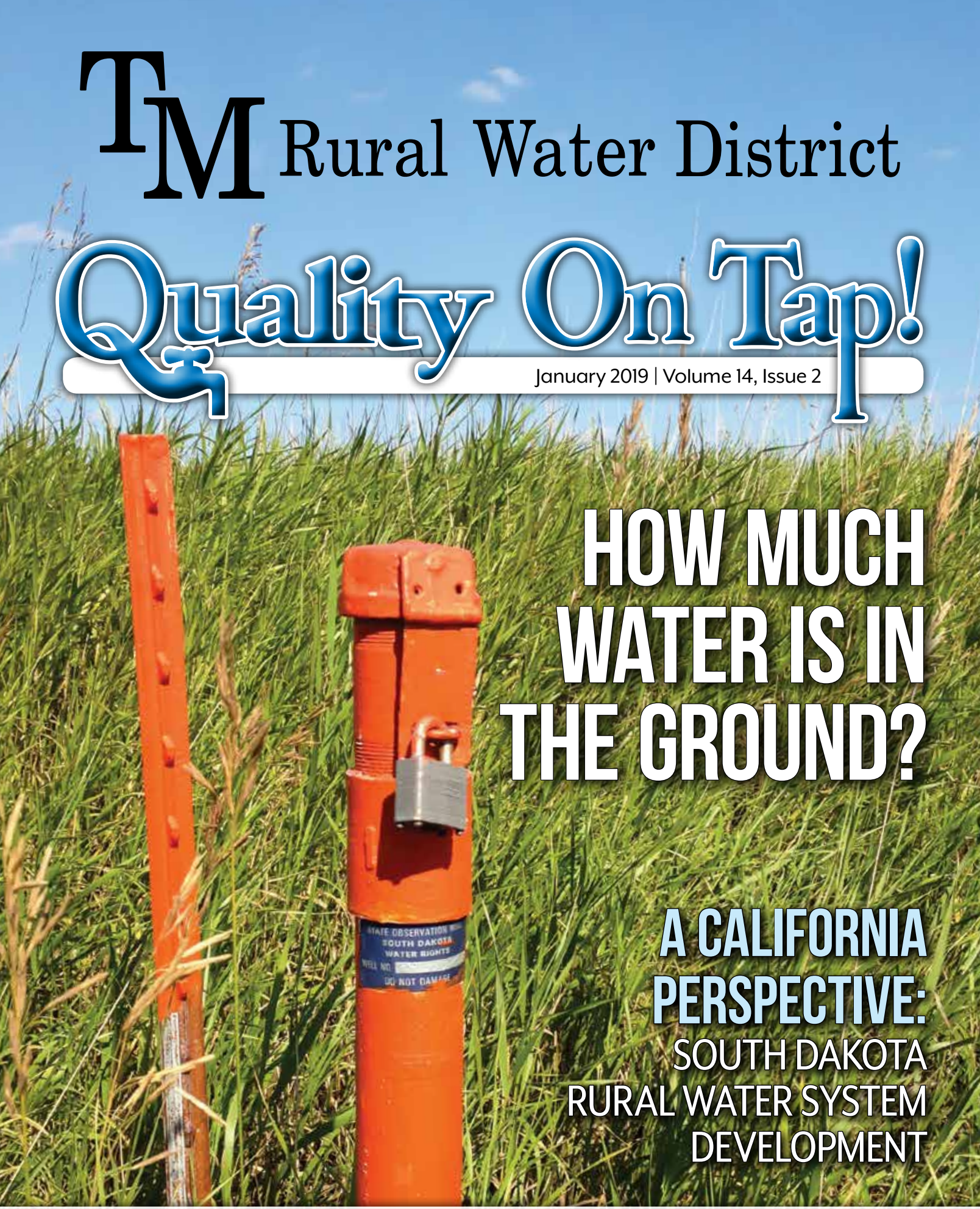
TM Rural Water District

Quality On Tap!

January 2019 | Volume 14, Issue 2



HOW MUCH WATER IS IN THE GROUND?

A CALIFORNIA PERSPECTIVE: SOUTH DAKOTA RURAL WATER SYSTEM DEVELOPMENT

FROM THE MANAGER

Jay Jorgensen
Jay.Jorgensen@tmruralwater.com

As 2018 comes to an end, we all look back at an exceedingly wet year that proved to be a challenge for our local farmers. Starting planting late and harvest running into November and December made for a stressful year for many of our users. Even with the wet summer, TM pumped an average of 1.9 million gallons per day to all user classes in 2018.

TM Operators kept busy this year adding new users to the system and completing regular system maintenance like fixing leaks and installing meter pits at existing water users residences as part of the District's plan to eventually switch all users over to meter pits.

During regular maintenance on one of TM's high production wells this year, camera inspection of the casing identified a baseball size hole in the well casing about 150' below the surface. Options were limited, and the TM Board decided to move forward with a replacement well on the same site. The new 375' deep well has been drilled and tested and will be put into service early next spring as the TM was unable to complete construction before freeze-up at the end of 2018. The old well was capable of pumping 600 gallons per minute, and the new well will be able to pump as much as 1,000 gallons per minute if needed.

Another big project that TM contractors continue to work on includes the relocation seven miles of water lines along US Hwy 18 in Turner County due to a road widening project being completed by the State. Most of the project is completed, but due to the exceedingly wet summer, a small amount of work remains to be done. A big thanks to all of the landowners in the area that were willing to work with the District to get a majority of this project relocated in the private right of way.

TM also started work on getting supplemental water to the Swan Lake area located between Viborg and Hurley. This area on the north side of the lake has seen enough development to justify additional water in this area.

...continued on page 3

TM RURAL WATER DISTRICT'S MISSION

TM Rural Water District's goal is to improve the quality of life in the rural and small community areas of our state. The District is committed to providing the highest quality drinking water possible at the lowest reasonable cost consistent with good business practices. As a water user district, the only other product that we have is the service we provide the users. The District goal is that the service is offered with the highest standards.

TM Rural Water District
Quality On Tap!

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OFFICE HOURS

8:00am - Noon & 12:30pm - 4:30 pm
Monday - Thursday
Office is Closed
Friday-Sunday and Holidays

TM Rural Water District Quality On Tap! is published quarterly by TM Rural Water District, PO Box 445, Parker, SD 57053 for its water users

Manager: continued from page 2

TM operators are getting very close to finishing up work on the system-wide deployment of Automatic Meter Reading (AMR) devices on all water user meters and have less than 50 AMRs left to install. Upon installation, at each site, the user will no longer need self-bill, as TM will be able to remotely read the meter and send out a monthly bill. Along with the AMR deployment, TM is offering ACH auto bill pay program that allows users that sign up for the program to automatically debit their checking account each month in order to simplify the billing process.

TM's website is up and operational and can be located by typing www.tmruralwater.com into your internet browser. On this site, you will be able to access forms and documents relating to the District, and you also have the option to pay your water bill online utilizing a debit/credit card or an e-check.

Repairing leaks is a big part of the maintenance that TM performs each year, and we rely on our users to call in if they see a potential leak. Please do not hesitate to call if you suspect a leak, and the sooner, the better, fixing leaks early reduces expenses to the system which benefits all users in the District. If in doubt, call us out.

Merry Christmas and Happy New Year from all of us, here at TM Rural Water District and may God Bless you and your families in the New Year.

And once again, thank you for choosing TM Rural Water District for your source of clean, reliable drinking water.

TM Rural Water District CALENDAR

The TM Rural Water District office will be closed on the following dates:

Christmas
December 24-25, 2018

New Years Day
January 1, 2019

If you have an emergency, please call the office at 605-297-3334.

TM TRIVIA

In this edition of Quality on Tap, be the first person to call Tanya with correct answers to the following questions below at 605-297-3334 to receive $10 off of your next water bill. A second place drawing for $10 off your next water bill will also be taken from those people who call in after the initial winner, so don't give up.

With this time of the year having so many holidays back to back I thought I would challenge you to try and figure out some of the less popular holidays celebrated during the year. A computer or smart phone may be needed to answer some of these wacky holidays. Good Luck!

HOLIDAYS TRIVIA

1. What day in January is the official "Ditch your New Year's Resolution Day"? Yeah, that new elliptical in the basement got old quick.
2. During the winter time we all can get a little grouchy, so what day in February do we celebrate, "Do a Grouch a Favor Day"? So do yourself a favor if for no one else.
3. Have you ever wanted to make up your own holiday? Well on this day in March you can, "Make Up Your Own Holiday Day". Good to know there is one day of the year we can put our name on.
4. "Eight Track Tape Day" is on this day in April. If you don't know what an eight track tape is ask your mom and dad, they're probably my age in the living room watching the Hallmark Channel.
5. "Lost Sock Memorial Day" in memory of all the socks lost to the Gremlins living under the dryer over our lifetime is on this day in May. An actual study in England states that an average of 84 million socks go missing each month in the UK.
6. "Middle Child's Day" on this day in August celebrates the children that always got the least amount of attention growing up. You know, what's his name.

TM Rural Water District employs six full-time employees from three different communities in the areas that we serve. Whenever possible we attempt to buy our supplies and consumables locally and prefer to hire local contractors when the need arises. We are thankful to have the ability to serve the communities and rural areas in which we live and hope that our service will continue to be a benefit to everyone in our District.

SEPTIC TANK MAINTENANCE

Did You Know?

Did you know that as a homeowner, you are responsible for maintaining your septic system? Did you know that maintaining your septic system protects your investment in your home? Did you know that you should periodically inspect your system and pump out your septic tank?

If properly designed, constructed, and maintained, your septic system can provide long-term, effective treatment of household wastewater. If your septic system isn't maintained, you might need to replace it, costing you thousands of dollars. A malfunctioning system can contaminate groundwater that might be a source of drinking water. And if you sell your home, your septic system must be in good working order.

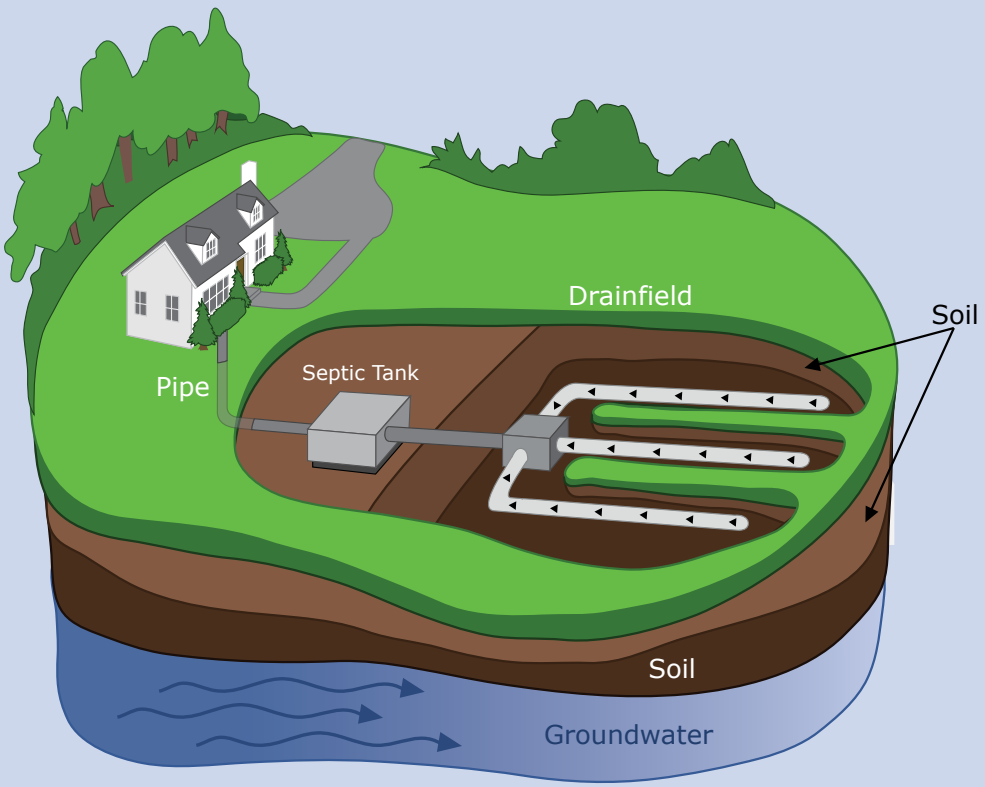
A typical septic system has four main components: a pipe from the home, a septic tank, a drainfield, and the soil. Microbes in the soil digest or remove most contaminants from wastewater before it eventually reaches groundwater.

The septic tank is a buried, watertight container typically made of concrete, fiberglass, or polyethylene. It holds the wastewater long enough to allow solids to settle out (forming sludge) and oil and grease to float to the surface (as scum). It also allows partial decomposition of the solid materials. Compartments and a T-shaped outlet in the septic tank prevent the sludge and scum from leaving the tank and traveling into the drainfield area.

Screens are also recommended to keep solids from entering the drainfield. The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. Microorganisms in the soil provide final treatment by removing harmful bacteria, viruses, and nutrients.

Steps to Protecting Your Septic System

- Regularly inspect your system and pump as necessary.
- Use water efficiently.
- Don't dispose of household hazardous wastes in sinks or toilets.
- Care for your drainfield. Avoid driving or parking vehicles on your drainfield. Plant only grass over and near your drainfield to avoid damage from roots.



LOWERING THE DEMAND

Lower the demand on a septic system by reducing the amount of water that the system is subject to. Approach this problem by attacking it from two angles: outdoor & indoor water.

OUTDOOR WATER

Homeowners should direct rain water from roof gutters and outflow from the sump pump away from the septic tank and drainfield, and landscape the area around the septic tank and drainfield to direct surface water away from them. Also, the tile drainage system around the foundation of the house should not empty into the sewer pipe leading to the septic system.

IN THE HOME

- Use low-flow faucets, water-saving showerheads and toilets that use little water.
- Reduce shower times and use appropriate-sized wash loads.
- Repair leaky faucets and toilets.
- Don't let the water run while shaving, washing hands, brushing teeth or washing dishes.
- Wash clothes twice a week rather than once to help avoid overloading the drainfield.
- Reduce the amount of water needed to flush old-style toilets by adding a jug (1- or 1 1/2-quart plastic milk container) to the toilet tank. Make sure the jug does not interfere with the flushing mechanism.

A CALIFORNIA PERSPECTIVE:
SOUTH DAKOTA RURAL WATER SYSTEM DEVELOPMENT

by Andy Christensen,
former Manager of the Clark Rural Water System

South Dakota rural water systems have a lot bo be proud of in all of their accomplishments. These systems, members of the South Dakota Association of Rural Water Systems, virtually blanket the entire state.. Our family owns farmland in Beadle County served by the Mid-Dakota Rural Water System providing an assured high-quality domestic drinking water. I can remember as a farm kid growing up in the 1950's of having to carry water in a pail from a windmill for drinking, washing and bathing purposes. So glad those days are gone and that the Mid-Dakota RWS now serves us.

My background in South Dakota water started as the Domestic Water Coordinator for the WEB Pipeline Corporation helping to organize six steering committees that morphed into the large system it is today. From 1982 to 1989, I served as the Manager for the Clark Rural Water System in a seemingly unending succession of construction projects. Today, Clark has more than doubled its size and population served under subsequent Managers each contributing to Clark's success. After living in California, I appreciate more how SD rural water employees rise to the occasion in building these systems and providing high-quality service.

I am the manager for the Woodbridge Irrigation District that provides a much different service to 13,000 acres (40,000-acre area) and bulk service to the Cities of Lodi and Stockton totaling 400,000 people. The District's Mokelumne River water supply comes from snowmelt water originating in the Sierra Mountains 100 miles to the east. The water is diverted by a new dam, 414 cubic feet/ second (cfs) diversion and fish screen structure and 100-mile system of pipelines and canals providing irrigation water to farmers but bulk untreated drinking water to our customers including Lodi and Stockton's water treatment plants.

California has been plagued with droughts, fires, and floods, but the biggest disaster has been the excessive regulation, taxation, and fees charged by the State Government in Sacramento (referred to as regulatory droughts). Since our legislature meets year around, the number of regulations and fees on water, licenses, and permits has seemingly unending new regulations and intrusive control of water districts (mostly deleterious) adding to cost of water services. California depends on both surface water and groundwater which is in a state of overdraft. California droughts are caused by lack of rainfall also by almost no new construction of new reservoirs to serve a population that has doubled to 40 million people in the last 30 years. California plans to help meet its future water demands with mandatory conservation, reduction, and rationing.

South Dakota, not California, is ahead of the curve in meeting the water needs of its cities and rural population without unnecessary, burdensome regulation. I am happy the "can do" spirit is alive and well in South Dakota ensuring that every South Dakota citizen has reliable and safe drinking water brought to them by South Dakota's numerous rural water systems. South Dakota is a leader in developing its groundwater and surface water resources for domestic use. California can learn a lot from the successes of South Dakota Rural Water Systems.

BACKGROUND ON DRINKING WATER STANDARDS IN THE SAFE DRINKING WATER ACT

SUMMARY OF SDWA RELATED TO CONTAMINANTS:

■ **Congress enacted the Safe Drinking Water Act (SDWA) in 1974 and amended and reauthorized it in 1986 and 1996.**

- *Main federal law that ensures the quality of Americans' drinking water*
- *Authorizes EPA to set national standards for drinking water to protect against health effects from exposure to naturally-occurring and man-made contaminants*

■ **Drinking water standards only apply to public water systems (not individual private wells).**

■ **EPA works with states, localities, and water suppliers who carry out these standards.**

DRINKING WATER STANDARDS APPLY TO PUBLIC WATER SYSTEMS:

■ **Public water systems are those having at least 15 service connections or serve at least 25 people for at least 60 days a year.**

■ **Over 150,000 public water systems across the U.S. serve more than 300 million people.**

■ **Approximately 646 public water systems exist in South Dakota.**

THREE TYPES OF PUBLIC WATER SYSTEMS:

■ **Community Water Systems (CWSs)**

- *Provide water to the same population year-round (for example: homes, apartment buildings)*
- *Approximately 52,000 systems serving the majority of the U.S. population*
- *There are 463 Community Water Systems in South Dakota*

■ **Non-Transient Non-Community Water Systems (NTNCWSs)**

- *Provide water to same people at least six months a year, but not all year (for example: schools, factories, churches, office buildings that have their own water system)*
- *Approximately 85,000 systems nationwide, 20 in South Dakota*

■ **Transient Non-Community Water System (TNCWS)**

- Provide water where people do not remain for long periods of time (for example: gas stations, campgrounds)
- *Approximately 18,000 systems nationwide, 163 in South Dakota*

Drinking water standards may apply differently based on type and size of public water systems.

WHAT ARE DRINKING WATER STANDARDS?

Drinking water standards are regulations that EPA sets to control the level of contaminants in the nation's drinking water. The regulations also require water monitoring schedules and methods to measure contaminants in water.

THE STANDARDS ARE PART OF SDWA'S "MULTIPLE BARRIER" APPROACH TO DRINKING WATER PROTECTION, WHICH INCLUDES:

- Assessing and protecting drinking water sources
- Protecting wells and collection systems
- Making sure water is treated by qualified operators
- Ensuring the integrity of distribution systems (for example, minimizing leaks, maintaining adequate water pressure)
- Making information available to the public on the quality of their drinking water

THERE ARE TWO CATEGORIES OF DRINKING WATER STANDARDS:

■ **National primary drinking water regulations (NPDWR or primary standard):**

- Legally-enforceable standards that apply to public water systems
- Protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in water from public water systems
- Take the form of maximum contaminant level or treatment technique rules

■ **National secondary drinking water regulations (NSDWR or secondary standard):**

- Non-enforceable guidelines for contaminants that may cause:
- cosmetic effects (such as skin or tooth discoloration)
- aesthetic effects (such as taste, odor, or color) in drinking water

The EPA recommends secondary standards to water systems but does not require systems to comply (except for the public notice required for exceedance of the fluoride secondary standard). However, states may choose to adopt them as enforceable standards.

SDWA PROCESSES INVOLVING DRINKING WATER CONTAMINANTS:

Contaminant Candidate List (CCL) – Requires EPA to develop a list of unregulated contaminants that are known or may occur in drinking water. This list is published every five years

Regulatory Determination for CCL – Requires EPA to decide whether to regulate at least five CCL contaminants with a drinking water standard every five years Specifies three criteria (adverse health effects, occurrence in public water systems, meaningful opportunity for health risk reduction)

Unregulated Contaminant Monitoring – Requires EPA to establish criteria for a program to monitor at least 30 unregulated contaminants every five years

Regulation Development – If EPA decides to regulate a contaminant via the regulatory determination process, the Agency has 24 months from the time of the determination to propose a regulation and 18 months from the proposal to finalize the regulation. The SDWA requires evaluatation of a number of factors in the standard setting process.

Six Year Review – The EPA is required to review each standard every six years and, if appropriate, revise the standard. Any revision must maintain or improve public health protection. If a regulation is revised, EPA goes through the standard setting process again and evaluates a number of factors.

National Contaminant Occurrence Database (NCOD) – Requires the EPA to assemble and maintain a national drinking water contaminant occurrence database using information for both regulated and unregulated contaminants in public water systems.

HOW DOES EPA DECIDE WHICH CONTAMINANTS TO REGULATE?

The EPA has drinking water regulations for more than 90 contaminants. The Safe Drinking Water Act (SDWA) includes a process that EPA must follow to identify and list unregulated contaminants. This process may lead to development of a national primary drinking water regulation (NPDWR) in the future.

The EPA must periodically publish this list of contaminants (called the Contaminant Candidate List or CCL) and decide whether to regulate at least five or more contaminants on the list (called regulatory determination). A regulatory determination is a formal decision on whether EPA should initiate a rulemaking process to develop an NPDWR for a specific contaminant.

The EPA also uses the CCL to prioritize research and data collection efforts to help the Agency determine whether it should regulate a specific contaminant.

Information in this arcticle provided by the EPA. For more information, please visit www.epa.gov/dwstandardsregulations/background-drinking-water-standards-safe-drinking-water-act-sdwa

HOW MUCH WATER IS IN THE GROUND?

South Dakota's lakes, rivers and streams are the most visible examples of our important water resources. Promotional efforts at the state and local level often like to focus on people enjoying recreational activities at a lake, boating and fishing along the Missouri river, or the scenic beauty of water falls, be they on the Big Sioux River or Spearfish Creek. However, the day-to-day water needs of most South Dakotans are met with water drawn from below the land surface. These under ground sources, called aquifers, provide needed water to public water supplies and private homes, ranches and farms all across the state.

Given the importance of these resources, keeping track of the amount of water in these aquifers is of critical importance. While it is easy enough to look at a river, lake or reservoir and tell whether it is full or empty, ground water by its very nature is hidden from view. The first indication that such a buried resource is in trouble might be when the well goes dry, at which point alternatives are going to be limited.

To keep track of South Dakota's under ground water resources, the Water Rights Program within the South Dakota Department of Environment and Natural Resources (SD DENR) maintains a network of roughly 1,600 observation wells across the state. They are divided among 105 different individual aquifers, or sub-units of larger systems, like the Big Sioux aquifer. Water level measurements are collected by Water Rights staff on a regular basis, with 12,000-15,000 manual water level readings gathered per year. However, in certain situations, more detailed information is needed, and about 40 wells are equipped with continuous recorders to collect more frequent measurements.

The network was established in 1957 under the direction of the Water Resources Commission. The first wells were drilled under contract with Grimshaw Drilling (James and Lewis Hutmacher were the drillers based in Oacoma and Sioux Falls). However, the oldest observation wells in the current network were constructed in 1953 by US Bureau of Reclamation and added to the observation well network in 1970's. Not surprisingly, a majority of the observation wells (936 wells) were added between 1976-1981, following a period of severe drought. In many instances, wells installed by other state entities, like the South Dakota Geological Survey, are incorporated into the network. Otherwise, private well drillers are hired to install new, or replace old, wells in the network.

The well network is used for a variety of purposes. First and foremost, it helps determine whether or not there is water available for additional users. South Dakota water law grants seniority to the first/oldest users of a particular water resource ('first in time/first in right'). Subsequent (junior) potential users have access only so long as their withdrawals do not adversely impact more senior users. The well network helps the Water Rights Program determine if there is water available for 'new' users.

State law also prohibits, in most cases, the mining of ground

water. This means that water cannot be withdrawn from an aquifer at a rate greater than it is recharged. The well network helps in determining how a given aquifer responds to existing pumping, and whether there is available water for other users.

In addition to help determine general water availability, the network is also used to:

- resolve well interference complaints or concerns;
- monitor long-term water level trends;
- determine the configuration of the potentiometric surface (water table) for the aquifer, and in turn determine overall flow directions;
- differentiate management units within larger aquifers; and
- provide input and calibration for models of ground water flow.

Is there a Water Rights network well near you? Information on the location of network wells can be found on the SD DENR website at: http://apps.sd.gov/nr69obswell/default.aspx. The link takes you to an interactive map, and you can zoom in on any part of the state to find the location of wells in your area of interest. Clicking on a particular well site will bring up information on the well location, elevation, depth and the aquifer being monitored. You can also pull up a detail drillers log, and a plot of water levels over the period of record.

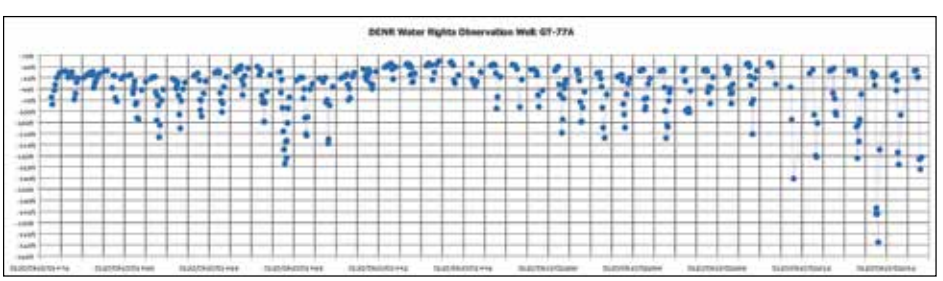
Two examples of the water level plots are shown. MA-57H is a well in the shallow Sioux Falls management unit of the Big Sioux aquifer shallow. Water levels in this well have been fairly stable over the life of the well, ranging from between seven and 15 feet below the casing top. Contrast that with the variability shown in well GT-77A. Located in the Prairie Coteau aquifer about 20 miles north of Watertown, water levels here rise and fall sharply in response to irrigation needs. Fortunately, once the pumps are turned off, water levels rise back up to 'normal' pretty quickly.

Water Rights well trivia:

Deepest well (JA-96A) - 2,239 feet total depth (TD) finished in the Dakota aquifer in northeastern Jackson County.

Shallowest well (FR-98A) - 12 feet total depth (TD) in alluvium along the Cheyenne River in northeastern Fall River County.

Greatest depth to water (LA-96B) - 900 feet below casing top in a Madison aquifer well near Spearfish in Lawrence County. By contrast, the pressure in a capped flowing well (ED-85B) in the Inyan Kara aquifer near lake Richmond in Edmunds County suggests that the water level would rise to 300 feet above the land surface.



WEST RIVER/LYMAN-JONES RWS

The concept of a rural community water system began as far back as the 1950s. A volunteer group was formed to take on the project, but the group had a difficult time obtaining funding. These dedicated people used their own money and resources to create an interest in their areas.

In the 1970s a project was being proposed by a group called Energy Transportation System, Inc. or the ETSI pipeline project. This was a pipeline project proposed to deliver large volumes of water through a huge pipe from the Missouri River to the coal fields of Wyoming. The purpose was to pulverize the coal, mix it with water, and send this slurry through a pipe to the power plants in the south and into the Gulf. The coal would then be dried and burned in the power plants.

The people of Lyman and Jones Counties decided to pledge their support along with the West River Water Development District; because they had been assured that if this project became a reality they would be able to draw water from this large pipeline for rural and municipal use. In time, this project was rejected and was unable to proceed. Shortly thereafter, the West River Water Development District decided to join in with Lyman and Jones Counties and work together in promoting a water project that would serve both areas.

Work began immediately signing members up and lobbying for seed money through the South Dakota Department of Water and Natural Resources so preliminary engineering and lobbying efforts could begin.

In August of 1986, a Senate sub-committee field hearing was held in Kadoka. About 450 people filled the auditorium, and it was at this meeting that three members of the Oglala Sioux Tribe addressed the meeting and indicated that they were interested in joining the project, which would eventually be called the Mni Wiconi Water Supply project, and included construction of the West River/Lyman-Jones Rural Water Systems.

A great deal of time and effort was put in by all entities involved in the process. Much of western South Dakota has been connected to rural water through the Mni Wiconi Project, which was authorized by President Ronald Reagan in October 1988.

Lyman-Jones and West River continued to work together and eventually limited each of their organizations to 5 directors. The first membership meeting was held in January 1991. In May 1994, the West River and the Lyman-Jones water systems merged into one system and was named West River/Lyman-Jones Rural Water Systems.

The Mni Wiconi systems are still in the process of completing construction. West River/Lyman-Jones Rural Water is approximately 95% complete to date.

WRLJ Headquarters in Murdo, SD

Construction of Vivian water tower

Director Joe Hieb, center, testifies on behalf of the project during the Senate field hearing in Kadoka in August 1986

WRLJ First Service - H&K Ranch

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Dean Nelson, Murdo
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Eddie Dartt, O & M - Philip
John Kramer, O & M - Philip
Nick Konst, O & M - Philip

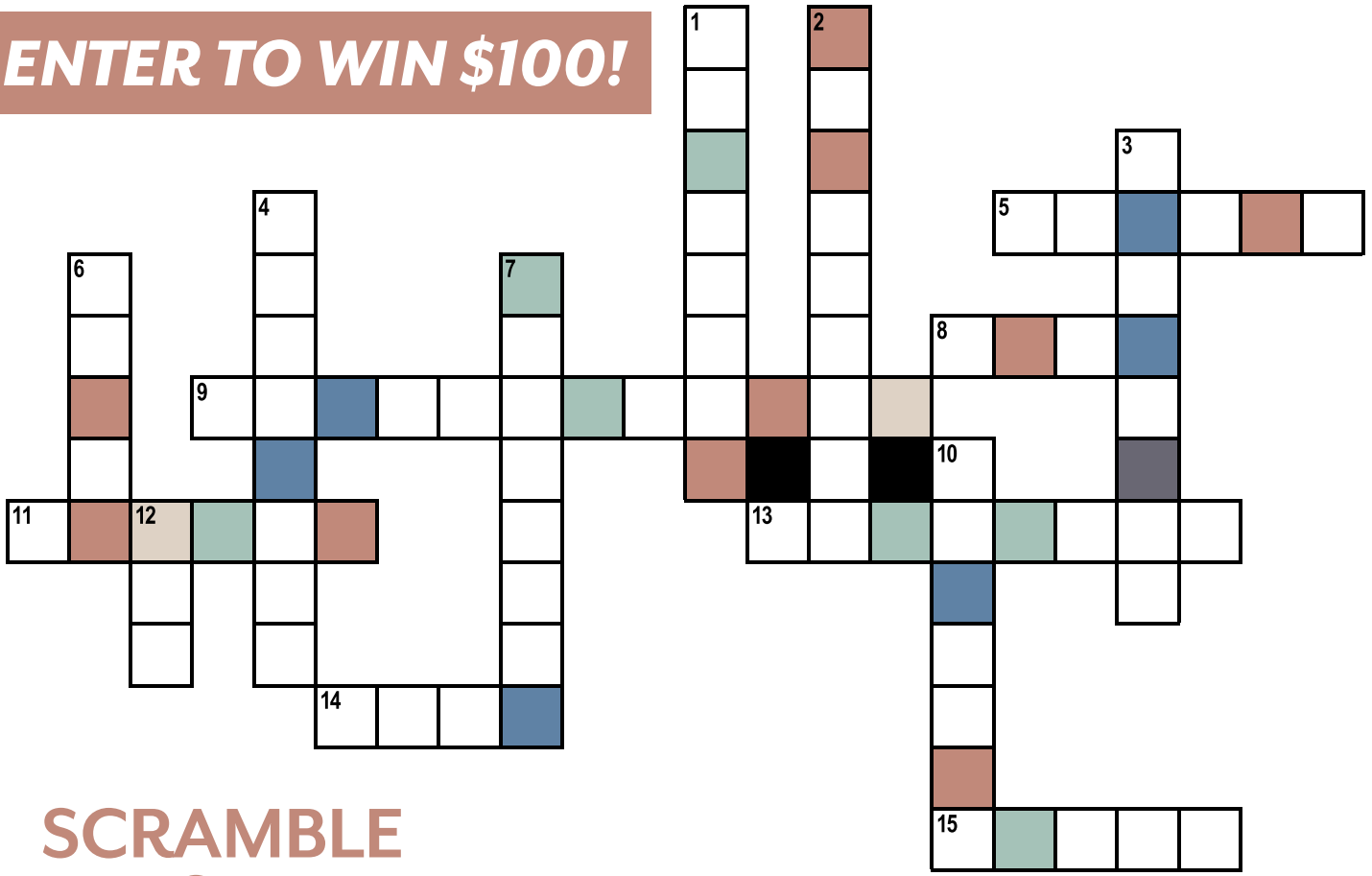
STATISTICS:

Hookups: 3,315
Miles of Pipeline: 3,450
Water Source: Missouri River via Mni Wiconi Water Treatment Plant, three West River/Lyman-Jones wells
Counties Served: Haakon, Jones, Lyman, Mellette, Stanley, and portions of Jackson and Pennington
Towns Served Individual: Draper, Reliance, Interior, Quinn, Vivian, Belvidere
Towns Served Bulk: Philip, Murdo, White River, Presho, Kennebec, Wall, Midland, Kadoka, Fort Pierre

RURAL WATER CROSSWORD & WORD SCRAMBLE CONTEST

WINTER WEATHER

ENTER TO WIN $100!



SCRAMBLE ANSWER

DOWN

1. White storm
2. Freezing factor
3. Accumulation of snowfall over time
4. Light, brief shower of snow
6. Another word for arctic
7. Blizzard hazard
10. Frozen stalactite
12. Frozen, slippery condition

ACROSS

5. Bright halo caused by ice crystals
8. Frozen flakes
9. Precipitation that becomes ice upon impact (2 words)
11. Bone chilling
13. Transparent driving hazard (2 words)
14. Strong wind
15. Raining ice pellets

RULES: Use the colored squares in the puzzle to solve the word scramble above. Call your Rural Water System (See page 2 for contact information) or **enter online at www.sdarws.com/crossword.html** with the correct phrase by January 8th, 2019 to be entered into the $100 drawing.

Only one entry allowed per address/household. You must be a member of a participating rural water system to be eligible for the prize. Your information will only be used to notify the winner, and will not be shared or sold.

Congratulations to Diane Byer who had the correct phrase of "Water, use it wisely" for October 2018.

RURAL WATER
ACROSS SOUTH DAKOTA

MID-DAKOTA RURAL WATER SYSTEM CONSTRUCTION

Mid-Dakota has several construction projects underway. At the current time, construction is being completed to add a new large customer, Ringneck Energy's ethanol plant, near Onida, SD. The plant will produce 80 million gallons of ethanol per year as well as about 240,000 tons of the byproduct of dry distiller's grain. Ringneck Energy will be Mid-Dakota's second largest customer and bringing the water to Ringneck has been a major undertaking. Nitteberg Construction Company (Nitteberg) was awarded Schedule 1 of Contract 2018-1 and Engineering Fluids Inc. (EFI) out of Centralia, Illinois was awarded Schedule 2.

Nitteberg started off with tapping Mid-Dakota's existing 15" water line and crossing Hwy. 83. This project also consists of burying approximately 5,300 feet of 10" PVC pipe and 1,900 feet of 8" PVC pipe with a railroad crossing just before entering Ringneck Energy property. The railroad crossing casing is 140 feet long to carry the 8" PVC pipe into Ringneck Energy property to attach to the master meter vault which is designed to deliver up to 675 gallons per minute (gpm) of water to the plant. EFI has delivered the master meter vault and Nitteberg is installing it.

EFI has also started the planned upgrades at our Onida Booster station; upgrades at this station include switching out two 150-horse pumps to 200-horse pumps and adding a third 200 -horse pump to the station. This also includes switching the VFD's to accommodate the larger pumps. Our electric provider has to upsize the power transformers to furnish electricity for the larger pumps. EFI will also be installing a HVAC system to help cool this station with all the motor heat it will be generating. Total package of both schedules when complete will cost $1.2 million.

Other projects that are at the beginning stages, is working with Ree Heights to upgrade their water delivery system and the Mainline Extension project. After lengthy discussions with town representatives all parties decided that the best course of action for Ree Heights was to replace the town's aging water distribution system and when complete to hand the water system over to Mid-Dakota to operate and maintain. Ree Heights received a loan from the Drinking Water State Revolving Fund for $430,000 that is 100% principle forgiven. Total cost of project is $509,000 so Mid-Dakota will pay for the amount over Ree Heights' loan ($79,000). This project is just getting started, Ree Heights with the help of Mid-Dakota held a sign-up meeting September 25, 2018 and signed up 76 water users. Bartlett & West Engineers will take this information and design the best route to serve all signups and hope to bid this project in the spring 2019 to be installed over the summer.

The Mainline Extension will include a new 1.5-million-gallon water storage tank next to the one west of Highmore(Twin Towers) along Hwy 14 and 20 miles of parallel 24" PVC mainline pipeline. Estimated cost of the Mainline Extension is $18 million. Bartlett & West has been gathering information to find best placement for parallel pipe, they have identified three separate sections to parallel and help Mid-Dakota out the most in areas of low pressure during peak flows. Mid-Dakota staff has been identifying landowners and working on getting landowners to sign an additional 40-foot easement to run beside existing 60-foot easement to have enough room to work to install new parallel pipeline. During the first part of October, Bartlett & West had a crew on site to fly a drone to survey the route and collect data needed to design project layout. If all goes well on easement gathering and gathering of information by the drone, this project could be designed this winter to be bid in January or February 2019 to start construction spring 2019 to be completed fall 2020. Mid-Dakota also has been in the habit of also installing close to 100 new services each year.

PROTECTING WATER QUALITY WITH BIOREACTORS

John McMaine, Ph.D., Assistant Professor & South Dakota State University Extension Water Management Engineer

Nitrogen is one of the building blocks of life, but too much nitrogen can lead to unwanted consequences for drinking water and aquatic ecosystems. For example, babies and toddlers that consume water with a high nitrate level are at risk for methemoglobinemia, more commonly known as blue baby syndrome. High nitrate decreases the ability of blood to carry oxygen which can be fatal to infants. Blue baby syndrome has resulted in a national drinking water standard, that nitrate concentrations must be lower than 10 parts per million. For reference, 10 parts per million is approximately equivalent to 10 drops in a 1,000 gallon tank. Nitrate (or any excess nutrients) are also a concern for water ecosystems. Excess nutrients can cause algae to bloom, or grow at a high rate. Besides being a nuisance for swimming, boating, and other recreation, algae blooms can also impact aquatic ecosystems. As the algae grows and dies, it uses oxygen out of the water until there is not enough dissolved oxygen for fish to survive. One of the more famous hypoxic zones, or water bodies with very little dissolved oxygen, is in the Gulf of Mexico near the coast of Louisiana and Texas. In 2017, the Gulf of Mexico hypoxic zone measured over 8,700 square miles (about 380 million acres or the size of New Jersey). Groups across the Mississippi River basin are working together to develop and implement practices and technology to reduce the size of the hypoxic zone through reducing nutrient losses from the Mississippi River basin.

Bioreactors are underground trenches on the edge of farm fields, filled with wood chips (or some other carbon source), that use bacteria to remove nitrate from subsurface drainage (tile) water by converting it into nitrogen gas.

So what can we do?

We do have tools in our toolbox to limit the loss of nitrogen and other nutrients into streams, rivers, and lakes including in-field best management practices such as soil testing, precision application of fertilizer, cover crops, and edge-of-field practices such as bioreactors, saturated buffers, drainage water recycling, and constructed wetlands. Bioreactors are an edge-of-field practice that has gained in popularity throughout Midwestern states over the last decade. Bioreactors are underground trenches on the edge of farm fields, filled with wood chips (or some other carbon source), that use bacteria to remove nitrate from subsurface drainage (tile) water by converting it into nitrogen gas. Some advantages of bioreactors are that they do not take much (if any) land out of production, they can be retrofitted into existing drainage systems, and they require little maintenance (changing levels in control structures a few times each year). Research has shown that bioreactors can reduce nitrate levels by 30% to 70%.

How do bioreactors work?

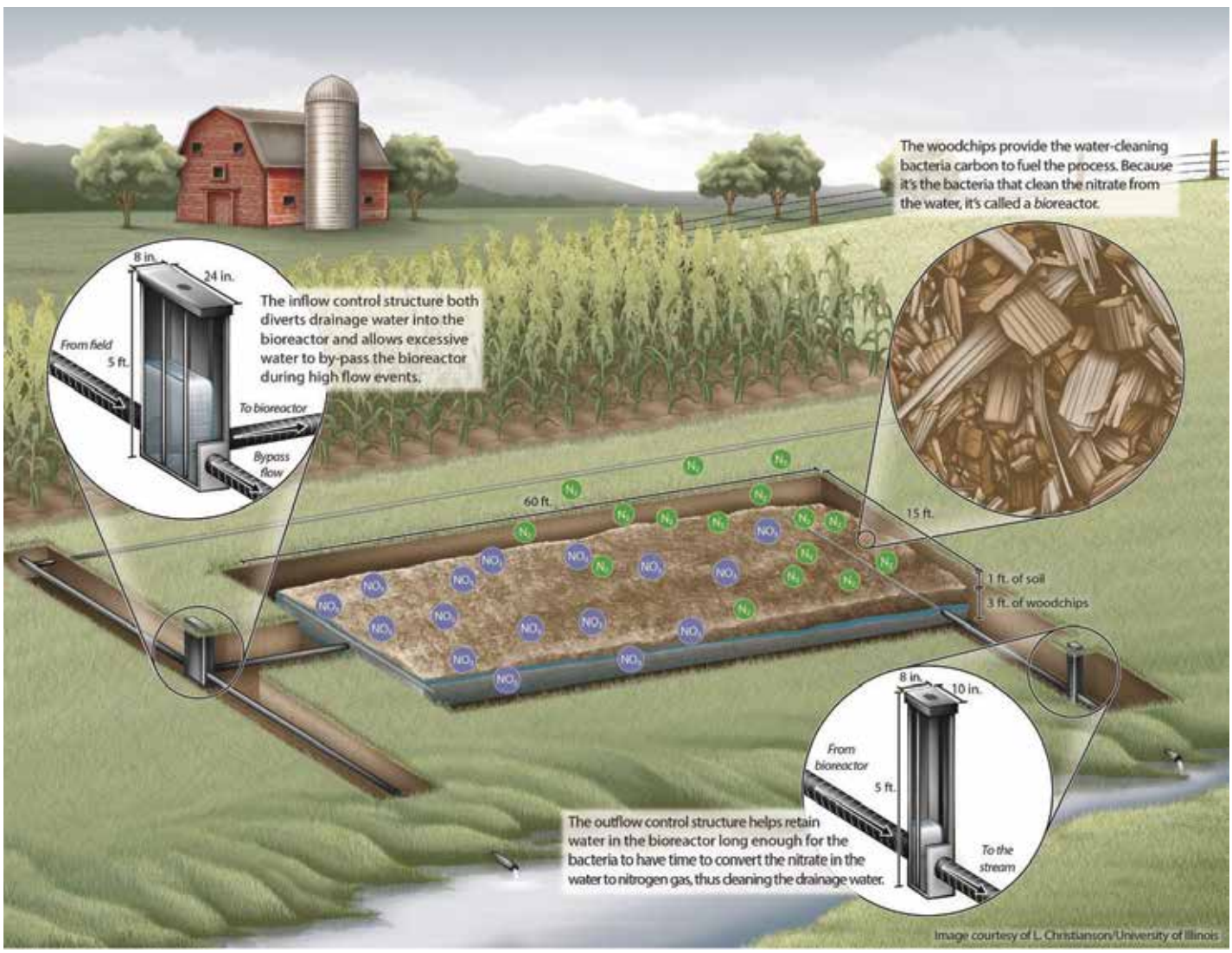
Nitrate can be converted to harmless nitrogen gas through a process called denitrification. In conditions where there is a carbon source (typically woodchips in bioreactors) and no oxygen, bacteria can transform the nitrate compounds into harmless nitrogen gas. Water levels are set at the inlet and outlet of a bioreactor to maintain saturated conditions which turn anaerobic (no oxygen present). Eventually the bacteria use up all the carbon present in the woodchips and the woodchips must be replaced. Some studies in Iowa have indicated that the woodchips in bioreactors need to be replaced after about 15 years.

Bioreactor dug, lined, and ready to be filled with woodchips. Image by Chris Hay.

Are there any bioreactors in South Dakota?

South Dakota State University has installed and monitored four bioreactors in eastern South Dakota with the first being installed in July, 2012. These bioreactors have been monitored for nitrate reduction and results show load reductions ranged from 12% to 40%. The Baltic bioreactor cost approximately $8,800 (with almost $4,000 from woodchips) and treated 40 acres. The Montrose bioreactor cost $10,400 (with $4,500 from woodchips) and treated 35 acres. The bioreactors are designed to have a hydraulic retention time (time it takes water to move from the inlet to the outlet) of 4-8 hours.

Bioreactor filled with woodchips, geotextile is being laid on top and topsoil is being backfilled onto geotextile. Image by Chris Hay.



Bioreactor conceptual drawing. Diagram courtesy of Matt Helmers and Laura Christianson, Iowa State University and University of Illinois Urbana Champagne. Illustration by John Peterson.

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WATER MATTERS

Nitrates in Well Water (Part 3)

Nitrate is a common contaminant found in many wells in South Dakota. Too much nitrate in drinking water can cause serious health problems for young infants. This is the last of a series of reports on nitrates in well water, intended to provide a basic explanation of nitrate in wells and gives steps that you as a well owner can take to protect your family and visitors from illness.

HOW IS NITRATE GETTING INTO MY WATER SUPPLY?

Nitrate contamination can enter your water supply several ways. One possibility is through physical or structural problems with the well itself. Ideally, the well is fully sealed off from any surface contamination, and the annular space (any open space in the drilled hole not filled with pipe) is fully sealed as well. If this is not the case, then surface contaminants have a pathway to enter your water supply.

Nitrate can also find its way into shallow aquifers by water moving through the soil. Nitrates are highly water soluble, that is, they dissolve readily in water. If there is residual nitrate in the soil, perhaps from fertilizer that was applied but not fully taken up by plants, water moving through the soil can pick up the contaminant and carry it down to the aquifer. Many of the shallow aquifers in eastern South Dakota have elevated nitrate concentrations, especially at or near the water table.

WHAT CAN I DO IF I SUSPECT A PROBLEM?

If you have concerns, it's a good idea to have your well inspected by a licensed well contractor if the well is old, or you do not know if it is structurally sound. Repairing the well or constructing a new, deeper well often results in a significant reduction in the nitrate level. To find licensed well drillers in your area, look in the Yellow Pages under "Well Drilling and Service."

Another good idea is to identify and remove sources of contamination near the well. Fertilizers, animal wastes, chemical storage areas, and septic systems should be located and managed so that they do not contaminate the well. If a source is too close to the well and cannot be moved, then you may need to consider having the well permanently sealed and replaced by a licensed well contractor.

WHAT ABOUT A WATER TREATMENT UNIT?

Home water treatment units are not recommended for treating high nitrate water which will be given to infants. There is no foolproof way of knowing when the treatment system may fail, and methemoglobinemia (blue baby syndrome) has been known to occur after just one day of exposure to high nitrate water.

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