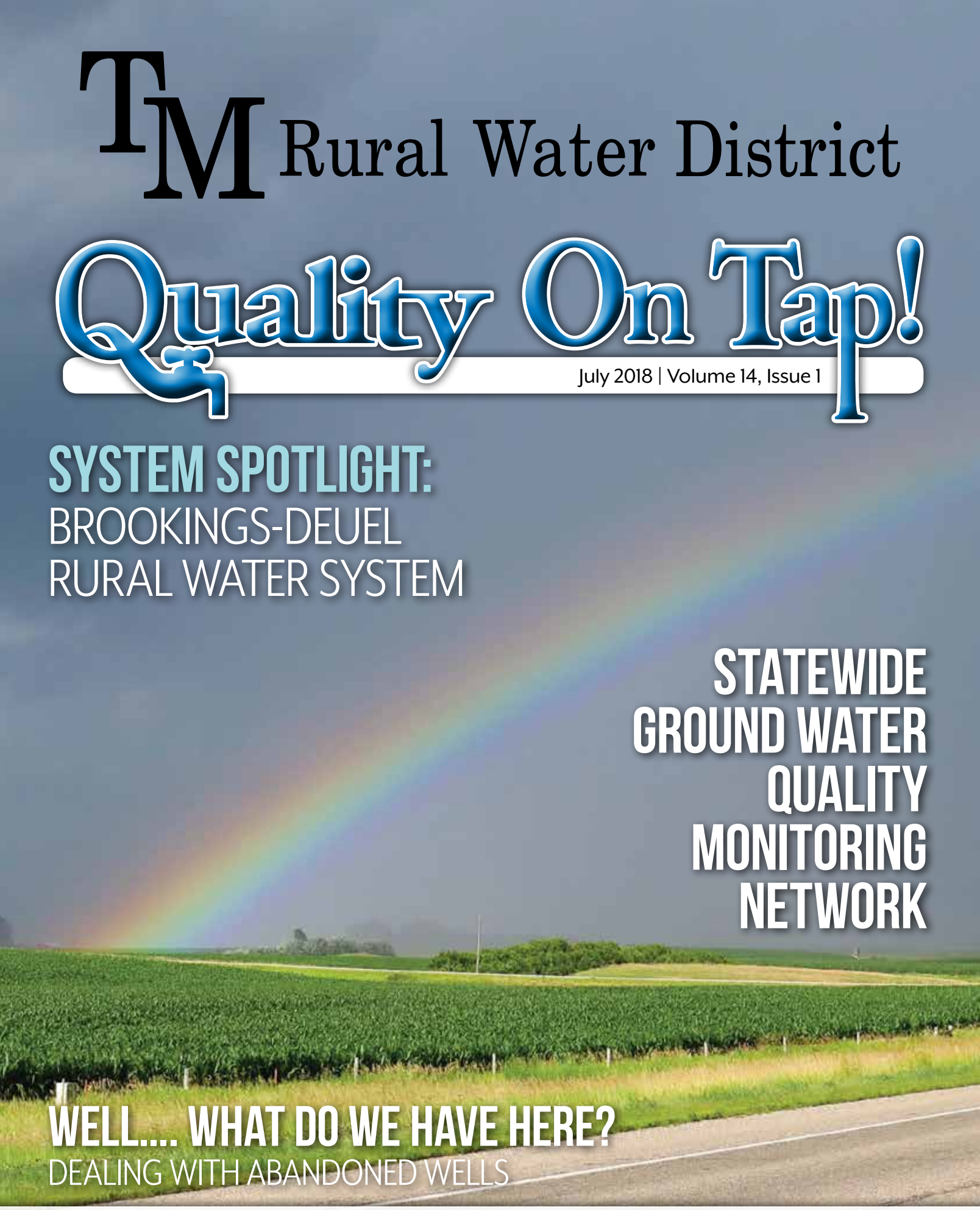
TM Rural Water District

Quality On Tap!

July 2018 | Volume 14, Issue 1

SYSTEM SPOTLIGHT:
BROOKINGS-DEUEL RURAL WATER SYSTEM

STATEWIDE GROUND WATER QUALITY MONITORING NETWORK



WELL.... WHAT DO WE HAVE HERE?
DEALING WITH ABANDONED WELLS

FROM THE MANAGER

Jay Jorgensen
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The planting season started off a little cold and wet. I hope that by the time you receive this edition of Quality on Tap that everyone was able to get their crop in successfully. TM operators have already installed several new users this spring, and new applications continue to come in.

TM is also coming to the end of its system-wide Automatic Meter Reading project with only a few users left to install. Upon completion, TM will be able to remotely read all meters in the District and send out monthly bills, which for most have a due date of the 20th of each month. Along with completion of the AMR project, TM would like to remind everyone that we continue to offer an ACH auto bill pay program that allows users that sign up for the program to automatically debit their checking account each month to simplify the billing process.

Another big project that started last fall includes relocating water lines along US Hwy 18 in Turner County due to a road widening project being completed by the State. Contractors made good headway last fall and were able to relocate most of the main water lines. This spring, contractors will be tying in the new water lines and services to the existing mainlines to allow for the abandonment of old lines that were in the way of the road widening project.

In this issue of Quality on Tap, we have an interesting article on Abandoned Wells some of which may be on your property. The July issue also contains TM's yearly Consumer Confidence Report regarding water quality and testing that goes on throughout the year to verify that your water meets the high standards required by the SD DENR and EPA. Please take the time to look through the information that we have compiled for you in this year's CCR.

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.

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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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

DENR RECOGNIZES TM RURAL WATER FOR DRINKING WATER COMPLIANCE

The South Dakota Department of Environment and Natural Resources (DENR) has announced that TM Rural Water District public water system and the system's operations specialists have been awarded a Secretary's Award for Drinking Water Excellence.

"Safe drinking water delivered to our homes for the price of your water bill is truly a modern day miracle," said DENR Secretary Steve Pirner. "DENR thanks the best drinking water systems and operation specialists in South Dakota with these awards and urges you to thank them too. The TM Rural Water District has successfully met all of the requirements of the Safe Drinking Water Act for 16 consecutive years."

The system's operations specialists are David Viet, Wade Kunkel, Gregory Simmermon, and Jason Krumbach.

To qualify for the Secretary's Award for Drinking Water Excellence, public water systems and their system operations specialists had to meet all of the following requirements for ten consecutive years or more:

- compliance monitoring and reporting
- drinking water standards, and
- certification requirements.

THANK YOU TOM KRAMER FOR YOUR MANY YEARS OF DEDICATED SERVICE TO TM RURAL WATER DISTRICT

This year Tom Kramer, a member of the original TM Rural Water District Board of Directors, for the first time in 36 years made the decision not to run for re-election on the Board. Tom played and integral part in creating TM Rural Water District and helped in molding it into the viable resource it is today for those living in the area that we serve. Tom served as President on the TM Board from 2005 thru 2018 and as a Director on the South Dakota Association of Rural Water Systems from 2007 thru 2015.

In January of 2018 Tom received the Spirit of Rural Water Award at the Annual Conference of Rural Water Systems in Pierre. This award is presented to an individual, business or group that goes above and beyond for a rural water system or rural water cause. South Dakota Rural Water recognizes exceptional rural water advocates that stand out from the pack because of their commitment to rural water issues and/or their passion for the job.

All of us here at TM wish to say thanks for your service and please know that your knowledge, insight and sense of humor will be missed at our monthly Board meetings. We wish you all the best Tom and don't forget to stop in for some dessert every now and then!

Tom Kramer holding a SDARWS award for 35 years of service to Rural Water in the State of South Dakota.

Tom circa 1983

Tom always willing to lend a hand!

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.

How about some South Dakota Trivia for some 4th of July fun? South Dakota has some interesting town names, can you figure out which town I am talking about with the clue given? Good Luck!

South Dakota Trivia

1. A Democrat bug has another name which is the name of this town.
2. A brilliant red color.
3. A person in charge of a grain mill.
4. Eddie's soft-hearted brother-in-law in the movie "Christmas Vacation."
5. Located just south of the Northern Isles.
6. A structure made of two by fours and plaster.
7. (Extra Credit) The activity or sport of moving rapidly through and area, typically in an urban environment, negotiating obstacles by running, jumping and climbing. (Not the exact name of the town but close enough.)

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.

OUT AND ABOUT

JULY

JUNE 30 - JULY 1 – THE GREAT OUTDOOR FESTIVAL, PIERRE
As a host city for the Bassmaster Elite Series, Pierre will also host a free festival in conjunction with the weigh-ins at Steamboat Park. The Great Outdoors Festival will be held 11 a.m.-5 p.m. on Saturday, June 30, and Sunday, July 1, in Steamboat Park. Activities will include kayaking, paddleboard contests, backyard bass, fly tying, touch tanks, inflatables, Wii ski and aquarium. There will be delicious food from local restaurants, a beverage tent and local entertainment. Fun for all ages! http://business.pierre.org/events/details/the-great-outdoor-festival-24713

JULY 1-3 – 1880 TRAIN WILD WEST SHOOTOUT, KEYSTONE
Experience an old west shootout aboard the 1880 Train this summer. Dates are June 21 and 28, July 1, 2, 3, 5, 12, 19 and 26, and August 16 (3:45 p.m. departure). The shootout begins at the Hill City Station where a few of the bad guys board the train and hide their treasure. The train is stopped by cowboys and "held up" halfway between Keystone and Hill City. It's a good thing the sheriff is in town! To experience the shootout, you must ride the 6:45 p.m. Hill City to Keystone departure. www.1880train.com/old-west-shootout.html. Admission fees.

1-3 – BADLANDS ASTRONOMY FESTIVAL
The festival brings together space science professionals, amateur astronomers, educators and visitors for a three-day celebration. Attendees will enjoy spectacular dark night skies at public star parties. During the day, a variety of family-friendly events will provide opportunities to learn about the night sky, the sun and space exploration. Special guest speakers, stargazing activities, solar observing opportunities, and more will take place at the Visitor Center and Cedar Pass Amphitheater. Festival is free, but park admission fees are required. https://www.nps.gov/badl/planyourvisit/night-sky-program.htm

19-22 – DANISH DAYS, VIBORG
Danish Days in Viborg has a long and rich history dating back to Viborg's earliest days. Originally celebrated on June 5th to coincide with Denmark's independence day, the celebration has been moved to the third weekend in July. Although the dates have changed, the spirit has remained the same. We still host many of the same events that our founding fathers did such as a parade, community worship service, ball tournaments, dances, and ethnic food. We invite you to come be a "Dane for a Day!" www.viborgsd.org

20-21 – RAVINE LAKE SUMMER FESTIVAL, HURON
Join us in Huron, on the beautiful shores of Ravine Lake, on Friday, July 20 (4-9 p.m.), and Saturday, July 21 (9 a.m.-5 p.m.) for two days of fun for the whole family. The fifth annual Ravine Lake Summer Festival will feature a great variety of arts and craft vendors, food vendors and activities. www.ravinelakesummerfestival.com

AUGUST

4-5 – RIVERSIDE PARK DAYS, FLANDREAU
Riverside Park Days is an annual, two-day festival held on the banks of the Big Sioux River. During Park Days, the city park is filled with craft and food vendors, hours of musical entertainment, children's activities and various adult activities including a softball tournament and bean bag tournament. The festival celebrates all there is to love about a small town in the summertime and we hope you'll join us! Hours: Sat – 10-5, Sun, 11-3. Team of Angels does begin breakfast at 7:00am Sunday in conjunction with a church service.

18-19 – 30TH ANNUAL ROSHOLT THRESHING BEE
The Rosholt Area Threshermen's Association was founded in 1988. Since then, men and women from the tri-state area have gotten together every summer to bring yesterday's memories to the present. Each annual Threshing Bee is full of old fashioned fun for the whole family. Events include threshing demonstrations, a parade, a car show, a horse show, a craft show, kids activities, music and food. The schedule runs 10 a.m.-4 p.m. on Saturday and 9 a.m.-5 p.m. on Sunday. The 30th year features Ford. $7 entry donation for the weekend, children 12 and under are free. www.rosholtthreshingbee.com.

23-26 – HUGH GLASS RENDEZVOUS, LEMMON
The 4th Annual Hugh Glass Rendezvous celebrates the history of frontiersman and fur trader Hugh Glass, who is known far and wide for surviving a grizzly attack at the forks of the Grand River in 1823. Step back in history nearly two centuries and walk upon the site where history was made, where the man became a legend on the banks of the Grand River and Shadehill Reservoir, at Hugh Glass Park. Events include the Rendezvous, a Plein Air Paintout, guided hikes, vendors of period goods and more. Free will donation. www.hughglassrendezvous.com

23-26 – PRAIRIE VILLAGE ANNUAL STEAM THRESHING JAMBOREE, MADISON
The 56th Annual Prairie Village Steam Threshing Jamboree is four days of fun. The 2018 event will feature the Minneapolis Moline National Show. Additional activities include steam and horse threshing, parades, machinery demonstrations, flea market vendors, tractor pulls, musical entertainment, and train and carousel rides. There is a dinner train Friday evening. $10 for adults ($12 on Saturday), $2 for children (ages 6-12) and free for ages 5 and under. A four-day pass is $30. www.prairievillage.org/jamboree

25-26 – FALL RIVER HOT AIR BALLOON FESTIVAL, HOT SPRINGS
Join us in Hot Springs in the southern Black Hills for two days of hot air balloon fun. Balloon launches are scheduled for both days about 6:15 a.m. from the Hot Springs Municipal Airport. On Saturday, August 25, there will be static displays and glider rides at the airport, a Night Glow at the Southern Hills Golf Course, and an Art Walk & Chalk in downtown Hot Springs. Refreshments will be available. Events are dependent on weather. Free Admission. www.hotsprings-sd.com/events/frhab

If you would like your event featured in the October 2018 issue of Quality on Tap!, please email your event description to: info@sdarws.com. October's issue will cover events taking place October - December 2018. Event listings are subject to approval by the QOT Editorial Board.

WHAT IS SOIL HEALTH
AND WHY SHOULD YOU CARE?

Soil health is "the capacity of a soil to function" (Doran and Parkin 1993). How well is your soil functioning to infiltrate water and cycle nutrients to water and feed growing plants?

Soil is a living factory of macroscopic and microscopic workers who need food to eat and places to live to do their work. There are more individual organisms in a teaspoon of soil than there are people on earth; thus, the soil is controlled by these organisms.

Tillage, fertilizer, livestock, pesticides, and other management tools can be used to improve soil health, or they can significantly damage soil health if not applied correctly.

Managing for soil health (improved soil function) is mostly a matter of maintaining suitable habitat for the myriad of creatures that comprise the soil food web.

Managing for soil health can be accomplished by disturbing the soil as little as possible, growing as many different species of plants as practical, keeping living plants in the soil as often as possible, and keeping the soil covered all the time.

MANAGE MORE BY DISTURBING SOIL LESS

Tilling the soil is the equivalent of an earthquake, hurricane, tornado, and forest fire occurring simultaneously to the world of soil organisms. Simply stated, tillage is bad for the soil.

Physical soil disturbance, such as tillage with a plow, disk, or chisel plow, that results in bare or compacted soil is destructive and disruptive to soil microbes and creates a hostile, instead of hospitable, place for them to live and work.

MANAGING FOR SOIL HEALTH MUST BEGIN BY CHANGING THE WAY YOU THINK ABOUT SOIL

The soil may also be disturbed chemically or biologically through the misuse of inputs, such as fertilizers and pesticides. This disrupts the symbiotic relationship between fungi, microorganisms and crop roots.

By reducing nutrient inputs, we can take advantage of the nutrient cycles in the soil to supply crop nutrients and allow plants to make essential associations with soil organisms.

DIVERSITY WITH CROP DIVERSITY

Sugars made by plants are released from their roots into the soil and traded to soil microbes for nutrients to support plant growth. The key to improving soil health is assuring that the food and energy chains and webs includes as many different plants or animals as practical.

Biodiversity will ultimately be the key to success of any agricultural system. Lack of biodiversity severely limits the potential of any cropping system and disease and pest problems are increased.

A diverse and fully functioning soil food web provides for nutrient, energy, and water cycling that allows a soil to express its full potential.

GROW LIVING ROOTS THROUGHOUT THE YEAR

There are many sources of food in the soil that feed the soil food web, but there is no better food than the sugar exuded by living roots.

Soil organisms feed on sugar from living plant roots first. Next, they feed on dead plant roots, followed by above-ground crop residues, such as straw, chaff, husks, stalks, flowers, and leaves. Lastly, they feed on the humic organic matter in the soil.

Healthy soil is dependent upon how well the soil food web is fed. Providing plenty of easily accessible food to soil microbes helps them cycle nutrients that plants need to grow.

KEEP THE SOIL COVERED AS MUCH AS POSSIBLE

Soil should always be covered by growing plants and/or their residues, and soil should rarely be visible from above. This is true regardless of land use (cropland, hayland, pasture, or range). Soil cover protects soil aggregates from 'taking a beating' from the force of falling raindrops. Even a healthy soil with water-stable aggregates (held together by biological glues) that can withstand wetting by the rain may not be able to withstand a 'pounding' from raindrops.

A mulch of crop residues on the soil surface suppresses weeds early in the growing season giving the intended crop an advantage. They also keep the soil cool and moist which provides favorable habitat for many organisms that begin residue decomposition by shredding residues into smaller pieces.

SOIL HEALTH FOR YOUR FARM, RANCH... FOR YOU!

Soil health is improved by disturbing the soil less, growing the greatest diversity of crops (in rotation and as diverse mixtures of cover crops), maintaining living roots in the soil as much as possible (with crops and cover crops), and keeping the soil covered with residue at all times. Drills, planters, seed, fertilizer, pesticides, livestock, fences, water, farm implements, etc. are all tools that can be used to manage the soil habitat for the benefit of living members of the soil food web.

Many soils have a water infiltration problem that causes a water runoff problem. If soil health is improved, the structure of the soil results in greater water infiltration, less runoff, less or no erosion, and reduced incidence of flooding and sedimentation.

Content provided by the South Dakota Natural Resources Conservaton Service (NRCS). For more information on soil health, visit www.nrcs.usda.gov/wps/portal/nrcs/main/sd/soils/health/

Well... WHAT DO WE HAVE HERE?

Abandoned wells exist throughout South Dakota and tap into every principle aquifer in the state. These are the same aquifers that we rely on today for much of the drinking water used in South Dakota. While the actual number of abandoned wells is not known, it is possible to make some reasonable estimates of the number of abandoned wells. In 1910, South Dakota had approximately 78,000 farms which reached a maximum of 84,300 farms in 1932. Since that time, farm numbers have declined steadily to about 31,700 today. Therefore, South Dakota has lost approximately 52,600 farms that likely had at least one well which may now be abandoned.

Aside from the reduction in the number of farmsteads, other factors have also contributed to the creation of abandoned wells. Rural electrification provided power to farmsteads that may have allowed access and pumping from more reliable, but deeper, aquifers. Similarly, regional rural water systems provided access to consistent and reliable water supplies, replacing, or at least supplanting on-site farm wells. Abandoned wells are not only a problem on farmsteads. Municipalities have also hooked up to rural water systems or constructed replacement wells and may not have appropriately plugged their old wells, which gradually fall into disrepair. Surprisingly, there remain a large number of private wells in many communities, even when there is a municipal water source.

Many people have good intentions to maintain an old well as a backup or standby well, but frequently these wells are sparingly if ever, used, and ultimately fall into disrepair. Many are forgotten over time. When this occurs, the old well becomes both a potential pollution source to everyone using the aquifer and as well as a possible physical safety liability to the property owner. Whoever owns the property on which the abandoned well is located is deemed to be the well owner, even if nobody knew of its existence.

LOCATING ABANDONED WELLS

Abandoned wells may be located anywhere, but there are some obvious indicators if you look carefully. On abandoned farmsteads, the presence of former wells may be marked by relic windmills or hand pumps, or a simple pipe sticking out of the ground. Wells were often drilled near outbuildings/barns, as hauling water to the livestock was more work than hauling water to the house. Large diameter, or bored, wells may have collapsed slowly over time, leaving a circular depression, with or without some other evidence of a well. Similar evidence would apply to locating old wells on existing farmsteads now served by alternate sources.

In many parts of South Dakota, early residents tapped into flowing artesian aquifers, which provided water without the need to pump it out of the ground. However, the quality of this water was not always the best, and as higher quality sources became available, many of these wells were also abandoned. Over time, the corrosive nature of this water can eat away at the well materials, degrading if not completely destroying the original structure. Old flowing well sites are often marked by low depressions supporting aquatic vegetation, such as cattails, in areas that are otherwise dry. If remnants of the original wells remain, water may be seen spraying into the air.

SAFETY HAZARDS

Many abandoned wells are not marked or covered. In some instances, the well casing, or a pit in which the well is located, is large enough for a person or animal to fall into and become seriously injured or killed. While the existence of such a threat to physical safety might be known by property owners familiar with the lay of the land, visiting friends and family may not know places to avoid. Fortunately, these types of accidents are entirely preventable with proper plugging of the well.

PROPERTY OWNER RESPONSIBILITIES

The owner of a property on which an abandoned well is located is deemed to be the owner of the abandoned well. Consequently, the owner is also responsible for plugging the abandoned well, or wells, as required by South Dakota Codified Law (SDCL) 46-6-18 and 46-6-27. There are many reasons for the owner to properly plug an abandoned well, aside from the legal requirement to complete the plugging. These wells also pose environmental and safety hazards resulting in potential legal liabilities. A list of abandoned well hazards is as follows:

- Contamination of aquifers by allowing surface runoff carrying pollutants to enter the ground water;
- Cross-contamination of aquifers by the well passing through more than one aquifer;
- Reducing artesian head pressure which may affect other wells in the same aquifer;
- Safety hazards to people and animals.

The plugging of an abandoned well needs to meet requirements outlined in the South Dakota Well Construction Standards, which can be found in the Administrative Rules of South Dakota Sections 74:02:04:67 and 74:02:04:69. These rules specify how to plug a well depending on the type of well construction, the kind of aquifer or aquifers which the well penetrates, and the materials to be used to plug the well. Even though the owner of an abandoned well may plug the well, we strongly suggest that a South Dakota licensed well driller perform the work. In some instances, complications may arise that benefit from a little practical experience. If a well is not plugged correctly, safety and ground water contamination threats may remain, and it is much more difficult and expensive to correct the improper plugging of an abandoned well.

If you have questions or need more information, please contact the Water Rights Program at 605-773-3352. Information is also available online at: denr.sd.gov/des/wr/abandonedwell.aspx.

Acknowledgment: Most of this abandoned well information consists of excerpts from a publication (FS 891 - October 1993) entitled, "Plugging Abandoned Water Wells" prepared in cooperation with the South Dakota State University Cooperative Extension Service, East Dakota Water Development District, and the Water Rights Program of the Department of Environment and Natural Resources.

Statewide Ground Water Quality **MONITORING NETWORK**

Many public water supplies, along with thousands of private individuals, across South Dakota, draw water from wells in shallow aquifers. In most instances, there is little more than a few feet of soil separating these aquifers from the land surface. Whenever it rains, or winter snows melt, water enters and recharges these aquifers. Unfortunately, this same process can carry pollutants into the ground water, which may require treatment before distribution and use for human consumption. Public water suppliers regularly monitor the condition of the water they provide, but their focus is just on their own particular source.

But what about the rest of the shallow aquifers? To gain a better understanding of the ambient water quality in shallow aquifers, the Geological Survey Program within the South Dakota Department of Environment and Natural Resources established what is known as the Statewide Ground Water Quality Monitoring Network (Network). The Network currently consists of a total of 144 observation wells spread across 79 locations monitoring conditions in 25 separate aquifers. The statewide ground water quality monitoring effort is an endeavor to monitor sensitive aquifers in South Dakota for non-point sources of contamination and long-term trends in water quality.

Attached is a map of South Dakota on which the locations of the monitored aquifers are plotted. Note that, due to limited information in many areas, the aquifer boundaries shown on this map are very approximate and should only be used for purposes other than general discussion.

The Network was designed to examine nonpoint-source pollution and ambient ground water quality. The goal of the statewide ground water quality monitoring effort is to maintain and modify as necessary ground water quality monitoring activities that regularly and systematically assess the present water quality, impact of agricultural chemicals on ground water, and long-term trends in water quality in sensitive aquifers.

The aquifers being monitored cover much of South Dakota and are among the most likely to be impacted by human activities because of their near-surface occurrence combined with overlying land use. Emphasis is placed on monitoring for health-related aspects of water quality and monitoring for non-point sources of ground water contamination. Over the years, analytes have included pesticides, pesticide transformation products, nitrate plus nitrite as nitrogen, common inorganic constituents, volatile organic compounds, radionuclides, cyanide, and trace metals.

METHODS

Monitoring sites are located away from known point sources of pollution, such as animal feeding areas, septic tanks, and underground storage tanks. Whenever possible, monitoring sites were placed in portions of aquifers that were thick enough to allow for installation of two wells whose screened intervals do not overlap vertically. Prior water quality investigations Geological Survey Program had indicated that water quality varied vertically within shallow aquifers.

Each well in the Network has a dedicated submersible pump used for development and sampling of the well. During a sampling event, water within a monitoring well is evacuated through the pumping system. During the evacuation of wells completed in sediments that are of moderate to high hydraulic

conductivity, temperature, pH, and electrical conductivity are measured until they have stabilized. Wells are considered to have stabilized after three consecutive readings taken 5 minutes apart indicate constant temperature, pH, and electrical conductivity. After stabilization and a minimum of 3 well volumes of water have been evacuated, a sample is collected.

All wells in the statewide ground water quality monitoring network are currently subject to sampling once every other year. An attempt is made to sample each well as close to the same time each year as possible. Samples collected on a biannual basis are analyzed for pesticides and common inorganic parameters. Trace metals, radionuclides, and cyanide analyses are currently performed once every five years. Volatile organic compounds are also analyzed once every five years but in only about 25 percent of the wells in an aquifer.

RESULTS

It would be hard to summarize all of the data collected over several decades from over a hundred wells in an exhaustive monograph, let alone in a short, two-page article. Interested readers can track down specifics about a particular aquifer or well at the contacts listed below. However, a few highlights can be discussed.

METALS

Water samples are tested for a variety of metallic elements, although very few were found present over established limits, or maximum contaminant level (MCL). Selenium exceeded the MCL (50 micrograms per liter) just five (5) times, all in the Cow Creek Aquifer in southern Potter County. Elevated lead (>MCL) was detected in two separate samples from the Big Sioux Aquifer. Elevated arsenic was found in a range of aquifers across the eastern part of the state, exceeding the MCL in 46 of 410 samples tested. None of these detections have been associated with a specific human health problem.

NITRATES

Elevated nitrate concentrations are a common occurrence in shallow aquifers in South Dakota. Of the twenty (20) east river aquifers in the Network, all but five (5) had at least one sample that exceeded the MCL (10 milligrams per liter). In many instances, levels were detected well more than the MCL, although most of these samples were collected from the shallow/water table well at paired sites. In many cases, rising overall trends in nitrate concentrations have been detected in the Network.

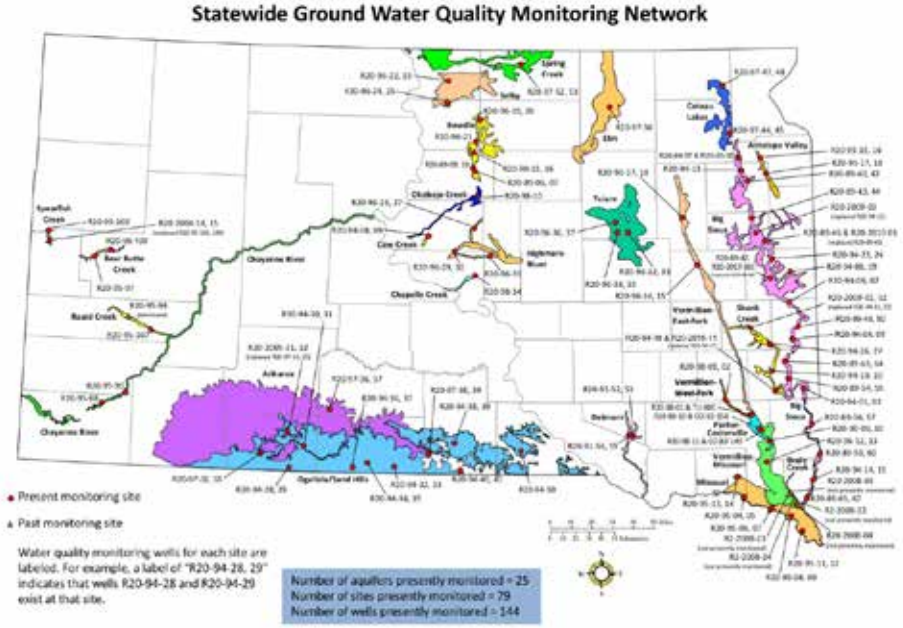
PESTICIDES

Samples have been analyzed for a wide range of pesticides, and while there are occasional detections, most are below the MCL. Atrazine and degradation product desethyl atrazine have been most frequently detected, occurring in about five percent (5%) of analyses. In most instances, detections have been reasonably transient. Re-sampling a site with a discovery most often results in a non-detect.

TO LEARN MORE:

The Geological Survey Program maintains a web page dedicated to the Network, which contains maps of the aquifers and well locations, and contact information for the lead investigator. www.sdgs.usd.edu/currentprojects/sgwqmn.aspx

Aquifers and Monitoring Sites in the Statewide Ground Water Quality Monitoring Network



BROOKINGS-DEUEL RURAL WATER SYSTEM

"Rural water is the greatest thing to come along since the rural electric and telephone." That's what one original customer of the Brookings-Deuel Rural Water System said after being hooked up to rural water in the early 1970s.

The need for a better water supply was first discussed around kitchen tables of local farmers – people working together to solve a common problem: a lack of quality water in area wells. Many wells were very high in iron (causing rust stains in laundry and sinks), manganese (causing dark stains), and nitrates from fertilizers and septic systems. It was very common on farms and in towns for people to have a cistern and pay to have water hauled in to fill them.

Brookings-Deuel started as a steering committee in 1972. In 1973, DeWild Grant Reckert and Associates (DGR) was hired as Brookings-Deuel's engineering firm, and the company still serves the system today. Brookings-Deuel RWS was incorporated in 1974, and a 16 member board was created. Today the system has a seven-member board. The original system was built in two phases – Phase I was the south end of the system, constructed in 1976, and Phase II was the north end of the system, constructed in 1977. 1978 marked the first year of full production.

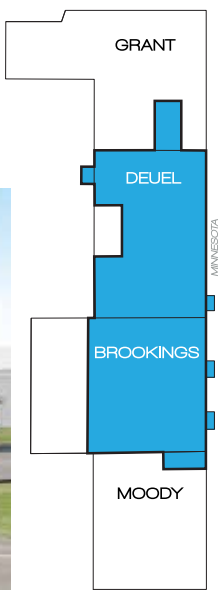
The original system consisted of about 1,000 hook-ups and 800 miles of pipeline. There was 150,000 gallons of storage. Over the years, system growth has been steady. The system now serves 2,600 customers, maintains 1,500 miles of pipeline and has 2.7 million gallons of water storage in tanks and towers throughout the system. All 13 towns located within the system's borders are now hooked up to Brookings-Deuel. Water systems were installed in Goodwin, Altamont and Labolt as part of Phase II construction, and the rest of the towns have hooked on one at a time, with Astoria being the last town to hook up in 2006. Livestock demand has always been an important part of the system. Rural water has allowed many livestock operations to grow with the access to more volume. Besides normal livestock usage, Brookings-Deuel RWS also serves eight commercial dairies and two colonies that have turkey and swine operations. With the exception of normal ongoing expansion, there were larger user expansion projects in 1982, 1984, 1992 and 2006.

Brookings-Deuel RWS has two well fields. One is the Clear Lake plant north of Clear Lake, and the other is the Joint Wellfield north of Bruce. Generally, the Clear Lake plant serves the north half of the system and the Joint Wellfield serves the south half

BROOKINGS-DEUEL RURAL WATER SYSTEM

of the system. Both plants have pressure filters for removal of iron and manganese. The Clear Lake plant's maximum capacity is 1.6 million gallons per day (MGD) and the Joint Wellfield's capacity is 3.8MGD. The Joint Wellfield is unique in the fact that Brookings-Deuel RWS owns it jointly with Kingbrook RWS. Both systems were being constructed around the same time and the partnership has been in place since day one. The Joint Wellfield is a separate entity and has its own board of directors consisting of three directors from each system. Brookings-Deuel administers the day-to-day operations at the Joint Wellfield.

BD RURAL WATER SYSTEM



DIRECTORS:

Doug Feten, Chairman

Clark Rogness, Vice Chairman

Scott Brandenburger, Secretary

Harold Haber, Treasurer

Gary Johnson, SA Director

STAFF:

Gene Wilts, Manager

Lenny Faehnrich, Operator II

Jesse Christianson, Operator II

Joshua Rogness, Operator II

Lyle Skorseth, Operator II

STATISTICS:

Hookups: 2,550

Miles of Pipeline: 1,500

Water Source: Wells

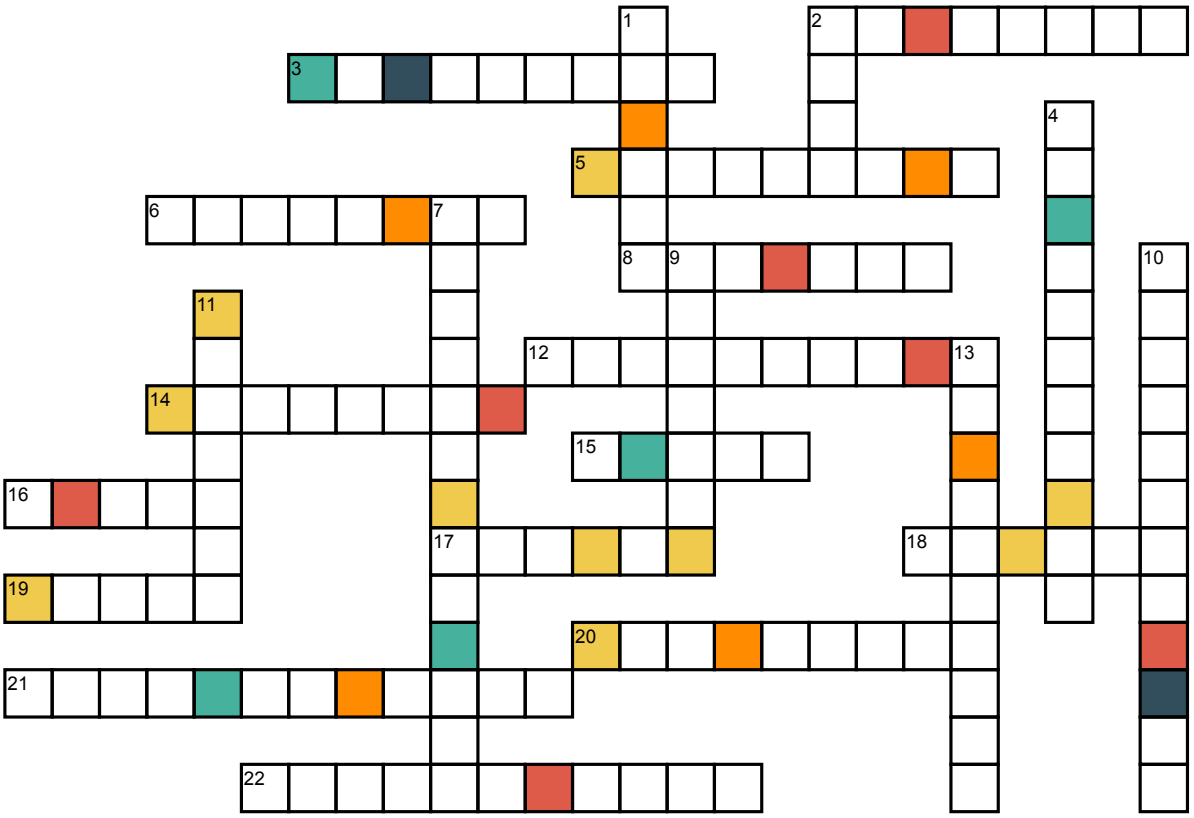
Counties Served: Brookings, Deuel, and portions of Grant, Moody, and Lincoln (MN)

Towns Served Individual: Revillo, Brandt, Astoria, Toronto, LaBolt, Bruce, Goodwin, Altamont, Bushnell

Towns Served Bulk: White, Elkton, Gary, Clear Lake

RURAL WATER CROSSWORD & WORD SCRAMBLE CONTEST

Earth's Fresh Water



WORD BANK

- ☐ brackish
- ☐ condensation
- ☐ confluence
- ☐ divide
- ☐ estuary
- ☐ evaporation
- ☐ floods
- ☐ ground water
- ☐ hydrologic
- ☐ limnology
- ☐ marshes
- ☐ mouth
- ☐ permeability
- ☐ ponds
- ☐ porosity
- ☐ reservoir
- ☐ rivers
- ☐ streams
- ☐ sublimate
- ☐ swamp
- ☐ well
- ☐ wetlands
- ☐ transpiration

ACROSS

2. Lands that are wet for significant periods of time
3. A storage location for water such as an ocean, glacier, pond
5. The study of bodies of fresh water and the organisms that live there
6. Amount of space between grains
8. Where the stream meets the ocean or lake
12. The cycle of water movement around Earth's surface
14. Water that has more salt than fresh water but less than sea water
15. A wetland with lush trees and vines found in a low-laying area beside slow-moving rivers
16. Point at which a stream comes into a large body of water
17. The largest types of streams
18. Usually occurs when precipitation falls more quickly than water can be absorbed into the ground or carried away by rivers or streams
19. Small bodies of fresh water that usually have no outlet
20. Solid changing directly into gas
21. Ability of water to flow through the pores
22. The largest reservoir of liquid fresh water on Earth

DOWN

1. A topographically high area that separates different water basins
2. Created by digging or drilling to reach groundwater
4. Change from a liquid to a gas
7. Process in which plants release large amounts of water into the air.
9. Bodies of water that have a current and are in constant motion
10. Change from a gas into a liquid
11. Shallow wetlands around lakes, streams, or the ocean where grasses and reeds are common
13. Where two streams come together

SCRAMBLE ANSWER

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 July 13th, 2018 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 Neal McIntyre who had the correct phrase of "ONLY FOOLS RUSH IN" for April 2018.

TM Rural Water District
Annual Water Quality Report
January 1, 2017 - December 31, 2017

Water Quality
Last year, the TM Rural Water District monitored your drinking water for possible contaminants. This brochure is a snapshot of the quality of the water that we provided last year. Included are details about where your water comes from, what it contains, and how it compares to Environmental Protection Agency (EPA) and state standards. We are committed to providing you with information because informed customers are our best allies.

TM Rural Water District is committed to providing our customers with safe reliable drinking water.

Water Source
We serve more than 1,485 rural residences and provide wholesale water to the communities of Canistota, Hurley, Marion and Viborg in addition to supplying treated water to an ethanol plant located NW of Marion, SD an average of 1,990,000 gallons of water per day. Our water is groundwater that we produce from local wells.

TM currently has two different sources of ground water that we treat and distribute to our customers.

The Dolton Aquifer, named after and located in the area of Dolton, South Dakota. It is the original aquifer that supplied the source of water for TM and provides a portion of the water used by our customers today.

The Upper Vermillion Missouri Aquifer otherwise known as the Basal Aquifer is the other source of ground water currently utilized by the District and is the larger of the two aquifers. The UVM Aquifer in some places is actually below the Dolton Aquifer.

Finished water is finally blended with a small amount of finished water supplied by BY Water User District and Lewis & Clark Regional Water System.

The state has performed an assessment of our source water and they have determined that the relative susceptibility rating for the TM Rural Water District public water supply system is low.

For more information about your water and information on opportunities to participate in public meetings, call the TM Office at 605-297-3334.

Additional Information
The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

Water Treatment
The water treatment plant located just to the east of Dolton, South Dakota is where TM brings in the raw water from the Dolton and UVM aquifers.

The water treatment plant utilizes conventional lime softening treatment where raw water is mixed with a lime slurry which then reacts with the calcium and manganese in the water. The calcium, manganese and other solids bond to the lime and settle to the bottom leaving only clarified water that continues onto the next stage of the treatment process.

Carbon Dioxide is then added to the water to further soften the water before it is sent to the filtration process which filters the water through 18 inches of anthracite coal and 12 inches of fine sand where any remaining suspended matter is removed from the water.

Chlorine is then added to the water at the rate of approximately 3.5 parts per million. Chlorine is added in order to kill any bacteria that the water may come in contact with during its travel through the distribution system. The water then flows to the underground storage units under our plant where the chlorine is thoroughly mixed before being sent out into the distribution system.

Water Distribution
The TM water distribution system is comprised of eight high service pumps, three booster stations, four water towers, and approximately 900 miles of water lines. Water is distributed to customers in six different serving areas in the District. Service areas are created when water is pumped or gravity fed from one service area to another and are typically categorized as having different hydraulic gradients associated with them.

Additional Information from the EPA
In order to ensure that tap water is safe

to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline 800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants can be obtained by calling the Environment Protection Agency's Safe Drinking Water Hotline at 800-426-4791.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The TM Rural Water District public water supply system is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

Detected Contaminants

The tables shown on page 15 list all the drinking water contaminants that we detected during the 2017 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 – December 31, 2017. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Definition of Terms

These definitions are provided in order for you to better understand the results of the testing shown below.

Questions?

TM Rural Water District firmly believes that it is important that our users read and fully understand this yearly report. We would encourage anyone that has any questions or concerns to contact the TM Rural Water District Office during normal business hours at 605-297-3334.

Definition of Terms

These definitions are provided in order for you to better understand the results of the testing shown on page 15.

Parts per million (ppm) or Milligrams per liter (mg/l) – one part per million corresponds to one minute in two years or a single penny in $10,000.

Parts per billion (ppb) or Micrograms per liter (ug/l) – one part per billion corresponds to one minute in 2,000 years, or a single penny in $10,000,000.

Picocuries per liter (pCi/l) – a measure of radioactivity.

Action Level (AL) – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Maximum Contaminant Level (MCL) – The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology. MCL's are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one in a million chance of having the described health effect.

Maximum Contaminant Level Goal (MCLG) – The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

Treatment Technique (TT) – A required process intended to reduce the level of a contaminant in drinking water. For turbidity, 95% of samples must be less than 0.3 NTU.

Nephelometric Turbidity Unit (NTU) – is the cloudiness or haziness of a fluid caused by individual particles (suspended solids) that are generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality.

Summary of 2017 Detected Contaminants in TM's Water

Antimony – occurs as a result of discharge from petroleum refineries; fire retardants; ceramics; electronics; and solder. The levels detected are well below those allowed by the EPA.

Arsenic – occurs as the result of natural deposits or from runoff from orchards. The levels detected in 2017 are well below those allowed by the EPA.

Barium – occurs as a result of erosion of natural deposits. The levels detected in 2017 are well below those allowed by the EPA.

Chromium – occurs as a result of erosion of natural deposits. The levels detected in 2017 are well below those allowed by the EPA.

Fluoride – is added to our water to promote healthy teeth. The optimum Fluoride level in water is 1.2 ppm.

Selenium – a naturally occurring substance found in the soil and rocks of this region. The levels detected in 2017 are well below those allowed by the EPA.

Nitrite (as Nitrogen) – can come from runoff from fertilizer use; leaching from septic tanks or erosion of natural deposits. Levels detected in 2017 are well below those allowed by the EPA.

Lead and Copper – Levels are normally a function of home plumbing fixtures. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels in your home may be higher than at other homes throughout the system as a result of the materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may want to have your water tested. Additional information is available from the Safe Drinking Water Hotline (1-800-426-4791)

2017 Table of Detected Contaminants For TM Rural Water District (EPA ID 0999)

Substance	90% Level	Test Sites > Action Level	Date Tested	Highest Level Allowed (AL)	Ideal Goal	Units	Major Source of Contaminant
Copper	0.1	0	09/15/16	AL=1.3	0	ppm	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives.
Lead	1	0	09/14/16	AL=15	0	ppb	Corrosion of household plumbing systems; erosion of natural deposits.

Substance	Highest Level Detected	Range	Date Tested	Highest Level Allowed (MCL)	Ideal Goal (MCLG)	Units	Major Source of Contaminant
Arsenic	2		08/04/14	10	0	ppb	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes.
Barium	0.015		08/04/14	2	2	ppm	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.
Chromium	1.1		08/04/14	100	100	ppb	Discharge from steel and pulp mills; erosion of natural deposits.
Fluoride	0.54	0.48 - 0.54	10/10/17	4	4	ppm	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.
Haloacetic Acids (RAA)	18.6		08/28/17	60	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.
Selenium	1.6		08/04/14	50	50	ppb	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines.
Total trihalomethanes (RAA)	31.3		08/28/17	80	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.

2017 Table of Detected Contaminants For Lewis & Clark Regional Water System (EPA ID 2288)

Substance	90% Level	Test Sites > Action Level	Date Tested	Highest Level Allowed (AL)	Ideal Goal	Units	Major Source of Contaminant
Copper	0.0	0	09/25/17	AL=1.3	0	ppm	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives.
Lead	1	0	09/25/17	AL=15	0	ppb	Corrosion of household plumbing systems; erosion of natural deposits.

Substance	Highest Level Detected	Range	Date Tested	Highest Level Allowed (MCL)	Ideal Goal (MCLG)	Units	Major Source of Contaminant
Fluoride *	0.76	0.59 - 0.76	03/07/17	4	4	ppm	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.
Haloacetic Acids (RAA)	15.1		08/23/17	60	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.
Nitrate (as Nitrogen) *	0.7		10/03/17	10	10	ppm	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits.
Total trihalomethanes (RAA)	32.5		08/23/17	80	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.

2017 Table of Detected Contaminants For B-Y Water District (EPA ID 0865)

Substance	90% Level	Test Sites > Action Level	Date Tested	Highest Level Allowed (AL)	Ideal Goal	Units	Major Source of Contaminant
Copper	0.0	0	07/07/15	AL=1.3	0	ppm	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives.
Lead	0	0	07/06/15	AL=15	0	ppb	Corrosion of household plumbing systems; erosion of natural deposits.

Substance	Highest Level Detected	Range	Date Tested	Highest Level Allowed (MCL)	Ideal Goal (MCLG)	Units	Major Source of Contaminant
Antimony *	0.3		05/13/13	6	6	ppb	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.
Arsenic *	3		05/13/13	10	0	ppb	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes.
Barium *	0.014		05/13/13	2	2	ppm	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.
Chromium *	1.7		05/13/13	100	100	ppb	Discharge from steel and pulp mills; erosion of natural deposits.
Fluoride *	0.84	0.41 - 0.84	12/11/17	4	4	ppm	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.
Haloacetic Acids (RAA)	11.3		09/11/17	60	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.
Haloacetic Acids (RAA) *	20.30		12/05/17	60	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.
Selenium *	1.9		05/13/13	50	50	ppb	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines.
Total trihalomethanes (RAA)	36.7		09/11/17	80	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.
Total trihalomethanes (RAA) *	34.33		12/05/17	80	0	ppb	By-product of drinking water chlorination. Results are reported as a running annual average of test results.

Please direct questions regarding this information to Mr. Jay Jorgensen with the TM Rural Water District public water system at 605-297-3334.

TM Rural Water District
Box 445
Parker, SD 57053

www.tmruralwater.com
605-297-3334

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WATER MATTERS

Nitrates in Well Water (part 1)

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 article is the first of a series of reports on nitrates in well water, intended to provide a basic explanation of nitrate in wells and give steps that well owners can take to protect your family and visitors from illness.

WHAT IS NITRATE?

Nitrate (NO_3) is a naturally occurring chemical made of nitrogen and oxygen. Nitrate is found in air, soil, water, and plants. Much of the nitrate in our environment comes from decomposition of plants and animal wastes. People also add nitrate to the environment in the form of fertilizers.

HOW DOES NITRATE GET INTO WELL WATER?

Natural levels of nitrate in South Dakota ground water are usually quite low (less than 1 milligram per liter [mg/L] of nitrate-nitrogen). However, where sources of nitrate such as fertilizers, animal wastes, or human sewage are concentrated near the ground surface, nitrate may seep down and contaminate the ground water. Nitrate is highly soluble (it dissolves readily in water), so it tends to move with water flowing through the ground.

Wells most vulnerable to nitrate contamination include wells in shallow aquifers, dug wells with a casing which is not watertight, and wells with damaged, leaking casing or fittings. Presence of nitrate contamination of a well is often regarded as the first sign of deteriorating ground water quality.

HOW MUCH NITRATE IS TOO MUCH?

The federal drinking water standard for nitrate is 10 mg/L of nitrate-nitrogen, which provides newborns with reasonable protection against blue baby syndrome. This level is mandatory for all public water systems and strongly recommended for private wells.

HOW DO I KNOW IF MY WELL WATER HAS NITRATE?

Nitrate is tasteless, odorless, and colorless. To find out if there is nitrate in your water, have it tested by a qualified laboratory. Sampling material can be obtained from the South Dakota Department of Health at the following website: https://doh.sd.gov/lab/environmental/privatew.aspx

HOW OFTEN SHOULD I HAVE MY WELL TESTED FOR NITRATE?

If you have a non-public water supply, it's a good idea to have a routine nitrate test every two or three years, more frequently if nitrate has been detected in the previous sampling. State regulations require well drillers or owners to have a water sample tested for nitrate (and other things) when they construct a new well. After that, owners of private wells must arrange for their own water testing. You should also have your water tested for nitrate if you are a woman planning on becoming pregnant or if infants will be using the water.

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