

# Insight

Nemaha Natural Resources District

## New Directors Bring Fresh Perspective



New Board Members (left to right): Todd Boellstorff, Patty Coates, Kraig Coonce, Tim Schaardt

The Nemaha Natural Resources District's (NNRD) board is a diverse group, having different backgrounds and interests. The complementary strengths and broad perspectives of our board members enhances their decision making process when it comes to protecting our natural resources.

Over the past year the NNRD has had four directors resign their positions. Although change can be difficult, it does help to make us stronger, more resilient, and keeps us able to adapt. The NNRD would like to thank the former directors for their years of service and also welcome our four newest directors to the board!

Todd Boellstorff (Douglas): Todd joined the board of directors in July of 2023. Todd is a farmer, raising both row crops and cattle. He additionally manages his own online parts business. He looks

forward to expanding his knowledge about the NRD and working with others to achieve a common goal.

Tim Schaardt (Steinauer): Tim joined the board of directors in September of 2023. Tim farms with his family in Johnson and Pawnee Counties. He is active in his community, having served in leadership positions and on other community boards. He looks forward to being part of the decision making process to improve the district in the future.

Kraig Coonce (Rulo): Kraig joined the board of directors in February of 2024. Kraig is a lifelong Rulo native. He serves as the Rulo fire chief and cemetery president. He is interested in learning what goes on at the NRD and assisting with various things.

Patty Coates (Nebraska City): Patty joined the board of directors in February of 2024. Patty is active in her community serving on the Keep Nebraska City Beautiful and Friends of Riverview Nature Park boards. She enjoys the Nemaha NRD recreation areas and is interested in learning more about what the NRD does.

The Nemaha NRD Board of Directors has 21 members. Ten equally populated sub-districts are represented by two members each, with one additional member elected from at-large. Board members serve four year terms, with elections every other year. The vacated positions our new board members filled will all expire at the end of 2024, so don't be surprised to see them on your ballot this November.



## Why We Sample Water? Two Words: Liquid Wisdom...

When people hear about the Nemaha NRD they most often associate it with recreation areas, if they have heard of it at all. From a public relations standpoint this is both good and bad. No negative news is a good thing. But when you work for the taxpayer, it is good for them to have an idea of the value added services being provided by their funding. The Nemaha NRD does so much behind the scene work to ensure that Nebraska's water resources are protected and that its lawful duties are carried out. Here is a quick overview of how the NNRD is keeping an eye on your water resources:



### Static Water Level Measurements

Groundwater measurements are taken to show fluctuations in water levels over time. These measurements also help to ensure withdrawals do not exceed recharge rates resulting in depletion of the aquifer.

Each spring and fall NNRD staff take static water level measurements on a series of 115 wells. These wells are strategically placed throughout the district and have been in the monitoring network for many years, providing historical information on the aquifer's characteristics.

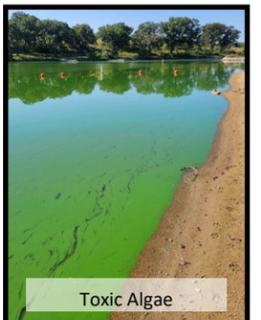
34 monitoring wells are in place throughout the district. These wells collect hourly static groundwater level measurements. Hourly measurements provide more of a real-time look at groundwater fluctuations from pumping and recharge.

### Basin Rotation

Nebraska has nearly 18,000 miles of continually flowing streams and rivers and more than 134,000 acres of lakes and reservoirs. The Basin Rotation Network was developed by NDEE to assess Nebraska's waterbodies to make sure they are safe for recreation and support aquatic life and industrial or agricultural uses. If a waterbody is not meeting the parameters for its intended use, it is listed as impaired. The most common impairment for streams in the state is E.Coli. Atrazine (herbicide) is the second most common impairment. NNRD staff participate in monitoring efforts that are done on a six year rotation in the 13 major river basins of the state. The NNRD completed monitoring in 2021 and will complete monitoring again in 2027.

### Beach Monitoring

Each week from May through September the NNRD collects water samples from Iron Horse Trail Lake, Kirkman's Cove, Wirth Brothers, and Duck Creek's beaches to test for toxic algae and E. Coli. Samples are collected on Monday and results are posted on NDEE's website by that Friday. Toxic algae and E. Coli can both have adverse health impacts to humans and animals in high enough quantities.



Toxic Algae

To trigger a toxic algae health alert only 8 parts per billion toxins need to be present in the water. That is the equivalent of 8 drops in 500 barrels of water! Make sure to keep your eye on the conditions if you or your pet are going to get in the water. If it looks like someone threw green paint into the water, please stay out!

### Lake Sampling



You may not be aware that NNRD recreation area lakes serve a dual purpose. These structures provide recreation opportunities for the public and serve as flood control structures for the watersheds they are situated in. Recreation structures can have additional features located above them in the watershed to reduce the volume of sediment entering the lake. Nebraska Department of Environment and Energy (NDEE) has developed a set of samples and measurements that are taken monthly from May through September to track trends and measure the health of a lake. The NNRD collects samples that provide NDEE information on :

- Water Clarity
- Eutrophication/Elevated Nutrients
- Pollutants in the Water Body

Lakes sampled by NNRD staff include Kirkman's Cove, Iron Horse Trail Lake, Duck Creek, Burchard Lake, and a road structure lake near Lorton.

### Domestic Well Water Testing

Did you know it is recommended that private, domestic water wells be tested annually? Any landowner with a domestic drinking water well in the NNRD may call and request a free water test per year. This test screens water for nitrates and bacteria, which both can have adverse effects on health. Tests are sent to an outside laboratory for analysis. Owners may request additional water quality tests for a fee.



### Irrigation Sampling

Irrigation water samples are collected throughout the growing season. Irrigation wells serve as a more accurate indicator of water quality because of the volume of water they pump. Water samples are tested for nitrates. Test results play a crucial role in the NNRD's ongoing efforts to monitor groundwater quality across the district. Results also pinpoint regions that have elevated nitrate concentrations exceeding the EPA's safe drinking water threshold of 10 parts per million (equivalent to 1 drop of water per gallon).

## Irrigation Efficiency Grant Funding Awarded For Pilot Area

The Nebraska Environmental Trust awarded the Nemaha NRD with \$18,900 in grant funding to go toward a special project designed to reduce the amount of water being applied by center pivots in a pilot study area between Tecumseh and Syracuse. This project is a cooperative effort between the Nemaha NRD and Otoe County Rural Water District #3 servicing Johnson, Otoe, and Cass Counties.



The project will provide cost-share to agricultural producers within the study area to voluntarily upgrade irrigation nozzles on existing center pivots to a low pressure, high efficiency system, including flow meter. The goal of the project is to reduce groundwa-

ter use during peak irrigation season leading to the long-term sustainability of the aquifer for all beneficial water uses and continued economic development.

Upgraded irrigation nozzles and reduced operating pressures will increase irrigation efficiency by:

- Reducing drift and evaporation as water leaves the pivot by increasing droplet diameter
- Increasing the uniformity of water distribution in a field, resulting in less ponding/runoff

Irrigated producers that would like to know if they are in the study area and/or wish to be contacted when more information is available should email [arippe@nemahanrd.org](mailto:arippe@nemahanrd.org) or call 402-335-3325.

# 2023 Nemaha Natural Resources District Water Report

## Groundwater Levels

A local network of 115 wells (irrigation, livestock, domestic, and public water supply) located throughout the District were measured in the spring and fall of 2023. 76 of the 115 wells measured were used to create a lifetime average, minus a 10-year average groundwater level change. The District lifetime average change was a decrease of 0.12 feet (this is for all well types). Lifetime average water levels for irrigation wells were down 0.42 feet, domestic wells were down 0.03 feet .

## Well Abandonment

A total of 25 abandoned wells were decommissioned in the past fiscal year. \$11,040.70 toward cost share was paid out for this program.

## Nitrate Testing

188 well samples were collected and tested for nitrate concentration. The district average nitrate concentration was 5.3 parts per million (ppm) with a median concentration of 3.0 ppm.

65 of the wells sampled were domestic. The average nitrate concentration of domestic wells was 6.9 ppm and the median was 6.0 ppm. Irrigation wells sampled averaged a nitrate concentration of 4.7 ppm.

34 of the wells sampled were from within the District's Phase II Groundwater Quality Management Area. The average nitrate concentration was 7.5 ppm, with a median concentration of 7.7 ppm.

## Chemigation

In 2023 the District received 341 permit applications and inspected 149 systems for safety equipment and compliance with chemigation regulations. Out of the 341 applications received, 317 were renewals; 21 were new; and 3 were emergency.

For the coming year, Chemigation zones will go away and the District will move to a three year rotational inspection process. If your injection site has not been inspected in the past two years, you will need an inspection in 2024. All new chemigation injection sites will be inspected in 2024.

As a reminder, applicator certification is required prior to chemigating. Training sessions are held through the state every year and available online year-round. Contact the NNRD or visit [www.deq.state.ne.us](http://www.deq.state.ne.us) and click on the Licenses and Certification drop box located on the top right center of the page and then click Chemigation for a current list of training dates, locations, and materials. On this webpage, applicators can also find their certification number and expiration year.



## Permitted Wells

The Nemaha NRD permitted 33 high capacity (over 50 gallons per minute) wells in calendar year 2023.

## Plans for FY24

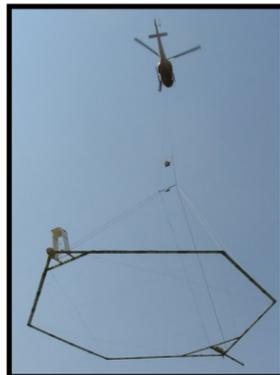
Technological advances are helping the Nemaha NRD to do more with the staff and budget we have. In the Fiscal Year 2024 budget which spans from July 1, 2023 to June 30, 2024, six new telemetry units and four replacement transducers were purchased to aid in monitoring groundwater levels across the District.



Telemetry allows water resources staff at the Nemaha NRD to view groundwater level logs remotely. A transducer is used to measure the depth of groundwater using a pressure sensor. When the transducer is placed in the water column of the monitoring well, it is calibrated to a known depth. Any fluctuation in pressure from the original calibrated depth's pressure results in a change in static water level. More pressure indicates a higher water level, and less pressure indicates lower water level.

## AEM Update

If you have been following along, the Nemaha NRD was awarded a grant through Department of Natural Resources' Water Sustainability Fund back in 2022. This grant provided funding to collect Airborne Electromagnetic (AEM) hydro-geologic logs for the last remaining priority areas in the District. Data collection efforts took place in the summer of 2023 using a helicopter and suspended measuring tool. Since then Aqua-Geo Frameworks has been working to compile all historical and new AEM data from the District into one final report. This final report is slated to be available on March 11, 2024.



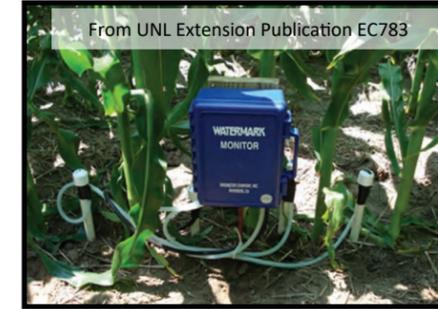
**SAVE THE DATE!**  
**WATERSHED**  
*of Wonders*  
**JUNE 18, 2024**  
**YOUTH AGES 10-12**

# Water Programs Cost Share Opportunities



## Well Abandonment

Cost share is available for a licensed well contractor to close hand-dug or drilled abandoned wells to prevent contaminants from entering groundwater.



## Soil Moisture/ET Gauges

Producers can install soil moisture probes and evapotranspiration sensors to help make irrigation decisions on their farm.



## Flow Meters

All new or replacement high capacity wells are required to have a flowmeter. Up to \$750 is available toward the purchase of a qualifying meter.



[www.nemahanrd.org/programs](http://www.nemahanrd.org/programs)

## How Does an Irrigation Well Get Approved?

The NNRD utilizes a scoring system to determine if wells pumping over 50 gallons per minute will qualify for Board approval. The District has pre-determined minimums based on the geologic location of the desired well within the district. Factors that go into the scoring criteria include spacing between other registered wells and test-hole geology down to bedrock.

When a test hole is drilled, the well driller or geologist will catalog the materials extracted at specific depths to create a cross section of the geology for that area (see photo to right). For an aquifer to supply the necessary water to irrigate, geologists look for a thick aquifer profile made of coarse materials, like gravel, that allow water to move through quickly.

For more information on the NNRD's high capacity well scoring system please visit [www.nemahanrd.org/programs/water](http://www.nemahanrd.org/programs/water).



## Department of Natural Resources Corner: Surface Water Irrigation



People who use Nebraska's surface water resources are required in most instances to obtain a surface water right/ permit from the Nebraska Department of Natural Resources (NDNR). The permit(s)/water right (s) are approved for a specific location, amount of water and purpose. Surface water rights are administered by NDNR, and are NOT recorded with the deed when land is bought, sold, or transferred. Many permits/rights were originally granted to previous landowners maybe one, two or sometimes three generations back. Permits/rights do not transfer with land titles. Often subsequent generations of owners are not familiar or aware of the surface water permit/right for their land. This can be especially true if the land is now irrigated using a groundwater well. While not always the case, it is not uncommon to find landowners with surface water permits/rights who have no idea that a permit/right exists for their land.

State statutes require all landowners to file a written notice with NDNR of any changes in ownership, and/or address for surface water rights and registered groundwater wells. The forms required to update this information are available on NDNR's web site. Surface water appropriation information can be checked by visiting [www.dnr.nebraska.gov](http://www.dnr.nebraska.gov) and navigating to: Services, Surface Water, then Permit Information. Forms for both surface water rights and well registrations are also available from NDNR upon request by calling 402-471-2363

NDNR would like all parties involved with land ownership, whether it be owners, buyers or sellers to be aware of the procedures necessary to be in compliance with Nebraska's surface water laws and groundwater well registration laws. If you have questions concerning groundwater well registrations, water permits/rights, changes in required ownership information or questions about Nebraska's water laws, please contact the Nebraska Department of Natural Resources at 402-471-2363.

## What is Chemigation?

Chemigation is the practice of applying agricultural chemicals, like fertilizer or pesticide, through an irrigation system. The chemicals are injected to irrigation water and then distributed to crops through the irrigation system (typically a center pivot).

There are a number of reasons why a producer would choose to apply nutrients and/or pesticides through an irrigation system rather than traditional methods like a sprayer. USDA stresses that when applying chemical or fertilizer, producers;

1. Choose the right source to match the needs of growing crops and soil conditions.
2. Apply using the right rates based on expected yields, crop needs, pest pressures, etc.
3. Choose the right timing to apply based on crop needs, label recommendations, etc.
4. Apply in the right locations to reduce the risk of loss from your target area.

Having the flexibility to spoon feed a growing crop what it needs through the pivot can really pay off in terms of profit. The practice does come with some risks in our corner of the state where we have a higher annual precipitation and irrigation is often more of an insurance than a necessity. Rains can impact the ability or desire of a producer to turn a pivot on to apply nutrients or chemicals.

As a reminder, anyone wishing to chemigate is required by law to be certified. The pesticide applicator license does not cover chemigation. Additionally, each injection site must be permitted with the Nemaha NRD. Trainings are offered each year in person, or online. Visit [cropwatch.unl.edu](http://cropwatch.unl.edu) or [www.nemahanrd.org](http://www.nemahanrd.org) for more information on the training.

If you are interested in learning more about nutrient budgeting or management, please call your local USDA service center's Natural Resource Conservation Service (NRCS) office.

## Why Read My Flowmeter?



One of the requirements of drilling a new irrigation well (or any well that pumps over 50 gallons/minute) within the Nemaha NRD is that you must have a flowmeter. If you haven't heard of a flowmeter before, it is a tool that measures the rate at which water is being pumped and the cumulative volume of water that has been pumped.

Each fall, after crops come out, the Nemaha NRD collects volume readings from flowmeters across the district. This data is used to calculate annual irrigation water use. The district average groundwater used to irrigate crops in 2023 was 3.89 inches per acre (mean was 3.68 inches per acre) on 24,401 acres. This value fluctuates year to year based primarily on the weather conditions in the district. Other factors include irrigation type, crop type, and producer management style.

Producers are strongly encouraged to read their flowmeters to monitor flow rates throughout the growing season and keep track of how much water is being applied to growing crops per irrigation event. Reading your flowmeter can also help to indicate pump or irrigation system problems. If the system isn't operating at its designed flow rate it may be an indication of underperforming components that could lead to inadequate irrigation.

To determine how much irrigation water was applied:

1. Find the difference between the ending flowmeter reading and the beginning flowmeter reading.
2. Convert that number (if necessary) to acre-inches.
3. Divide the acre-inches applied by the number of irrigated acres under your pivot.

For more information on irrigation water management or irrigation scheduling call your local USDA service center's Natural Resources Conservation Service office.

### What Can Over-Irrigation Cost?

The biggest benefit of having a flowmeter is that it can save you money! The following are ways that applying too much water can impact profits:

1. **Nutrient Leaching:** Nitrogen, Sulfur, and Boron are the three common leachable nutrients applied to crop fields. Too much water can push those nutrients down into the soil profile beyond the reach of crop roots. Nutrients can eventually make their way down and into groundwater.
2. **Disease and Pest Issues:** Disease pressure increases as the perfect moisture environment is created. For example, this past crop year White Mold emerged in our area, especially in irrigated bean fields.
3. **Potential Soil Erosion:** Too much water can cause valuable topsoil to erode from farm fields. This decreases the overall productivity of a farm and can also lead to water quality degradation from increased sediment loads.
4. **Operating Costs/Unnecessary Wear and Tear:** It costs money to irrigate! Energy, equipment, machinery, and your time are all costs associated with irrigating crops.

## 2024 Park Permits for Sale!

As a reminder, you must have a valid annual park permit on your vehicle to enter Iron Horse Trail Lake, Kirkman's Cove Recreation Area, Wirth Brothers Recreation Area, Duck Creek Recreation Area, and Prairie Owl Recreation Area. 2024 Park Permits are available by going online, stopping in the office, or at the park entry.

If you are ordering your permit online, be sure to watch for two of the "Captcha"/I am not a robot boxes. The first one is on the bottom of the first page. The second one is on the top left of the next page. The second one is not as obvious as the first.

Not sure if you want a permit? Try the parks for free the weekend of May 18-19, 2024!

### WATER SCIENCE



A person's body is 66% water



A corn plant is 80% water



H<sub>2</sub>O

Only substance found naturally as

liquid, solid, and gas



Author: Crystal A. Powers | Reviewers: Katie Pekarek, Gary Stone | Sources:

*Insight is a publication of the Nemaha NRD. Requests to be placed upon the Insight mailing list and/or comments regarding information in this publication should be directed to Ashley Rippe at 62161 Hwy 136 Tecumseh, NE 68450 or at [arippe@nemahanrd.org](mailto:arippe@nemahanrd.org). For more information on the Nemaha Natural Resources District please visit our website [www.nemahanrd.org](http://www.nemahanrd.org)*



**Nemaha NRD**  
62161 Hwy 136  
Tecumseh, NE 68450



### Upcoming Events

- April 11: Nemaha NRD Board of Directors Meeting
- May 9: Nemaha NRD Board of Directors Meeting
- May 18-19: Nemaha NRD Free Park Permit Weekend
- May 27: Memorial Day, Nemaha NRD Office Closed
- June 13: Nemaha NRD Board of Directors Meeting
- June 18: Watershed of Wonders Day Camp (WoW)
- June 19: Juneteenth, Nemaha NRD Office Closed