

PHASE II & III NEWSLETTER



Management Changes Triggered by Water Quality Changes in Zone 4

On September 21, 2023, the Upper Big Blue Board of Directors voted to move Zone 4 to a Phase II Management Area, beginning January 2024. This was based on the monitoring well sample results for the summer of 2023, which showed a median nitrate level of 7.1 ppm for the zone. The following townships will now be subject to Phase II requirements:

- York County: Seward (12N-01W), Thayer (12N-02W).
- Polk County: Map North Canada (14N and 15N-1W), Map North Osceola (15N-2W), Map South Osceola (14N-2W), Map South Canada (13N-1W), Map East Stromsburg (13N-2W).

All operators of land within a Phase II Management Area are subject to the following requirements:

- Nitrogen Certification Training once every 4 years
- Irrigation scheduling equipment is required in at least one field in a Phase II area
- Soil samples are required in years when corn or sorghum will be grown following a non-legume crop and/or when livestock, municipal or industrial waste has been applied within the last 12 months
- University of Nebraska Recommended Nitrogen Fertilizer Application Rate
- An annual report is required for all dryland and irrigated fields by April 1

To see all the requirements for Phase I, II and III see pages 10-11. ♦♦♦

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Allocation and Pooling Potential

Due to the drought conditions in the Upper Big Blue Natural Resources District area through much of 2022 and 2023, district staff have received many questions about allocation rules for groundwater users. While no allocation rules are currently in effect in the Upper Big Blue NRD, staff wants to ensure that if such rules are implemented, district groundwater users understand how the district would administer an allocation.

The district is well prepared in case of a groundwater shortage. Groundwater allocation rules and regulations were set by the Board of Directors in 1978 and have been updated several times in the past 45 years. Action by the Board of Directors of the NRD is the only way to modify these rules.

Allocation is defined as the apportioning of groundwater. The district has allocation rules for agricultural and municipal and other groundwater users. Allocation Pools will allow producers flexibility to use allocation water over multiple fields based on well, owner-operators, or pooling applications.

Pooling is a process that combines irrigated acres (multiple parcels of land), so that landowners and operators can average water withdrawal over the combined acres. In an allocation event, pooling can help farmers optimize allocated groundwater for each parcel of land within a pool. Pooling has been used internally to calculate average water use throughout the district since annual water reporting was started in 2007. Average water use for a pool is calculated

by dividing total water use (for parcels within a pool) by total number of acres within a pool. This formula determines inches applied per acre. The average water use in the Upper Big Blue NRD for the 2022 growing season was 7.53". District rules allow for three types of Pools:

- Owner-Operator Pool: Same owner and same operator for a group of tracts (parcels). These pools are identified using the owner and operator's unique ID numbers. Example 1547-22547
- Well Pool: Parcel is irrigated by multiple wells. One or more of these wells irrigate more than one parcel with different operator/ownership. These pools are identified using the smallest State Well ID number. Example 145796
- Pooling Application: Until an allocation is in place, pooling applications are not necessary. A pooling application allows the owners and operators to pool parcels together based on an approved application form signed by all parties and the NRD board of directors.

More information about our allocation rules, as well as videos on allocation rules and pooling scenarios is available on our website, www.upperbigblue.org/allocation. If you have any questions, please contact the NRD water department at 402-362-6601 or email wateruser@upperbigblue.org. ♦♦♦



Groundwater Quality Sampling Schedule

The Upper Big Blue NRD is divided into 12 groundwater quality Management Zones. The median nitrate value for that zone determines the phase of management and therefore, rules and regulations.

Taking a step back, the median nitrate value for a zone is the product of water samples collected from a specific network of wells. These wells are selected based on construction and geology. A well that provides accurate results is screened in one portion of the

aquifer only and does not have multiple screens. The screen also does not transect geological confining units such as clay layers, which could mix shallow and deep water.

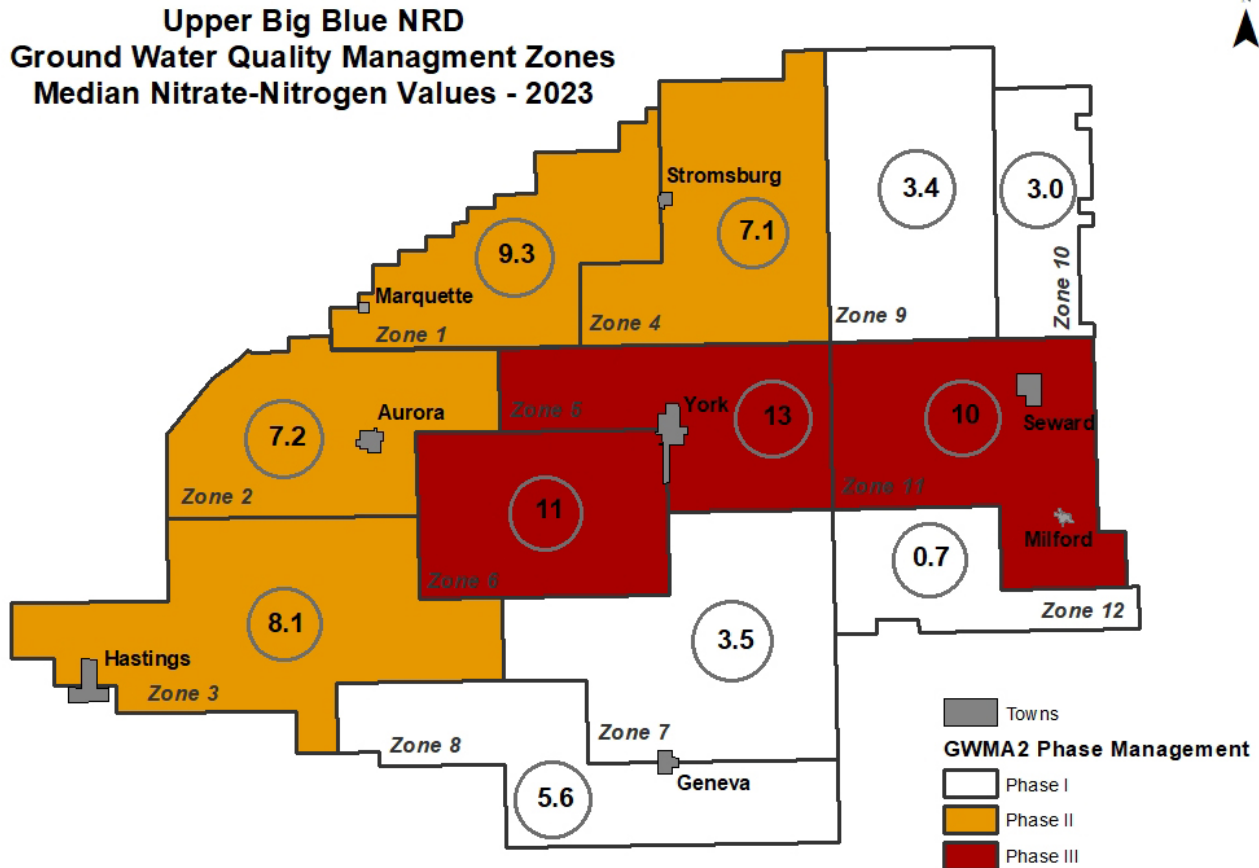
Currently, there are 305 wells in the water quality network. Most of the wells are irrigation, with some monitoring, domestic and public wells. To annually collect a water sample at each of these wells would be incredibly difficult given the sheer size of the District - over 1.2 million irrigated acres! Therefore, a rotation of zones below the Phase II trigger of 7.0 ppm was created. This means that if the median nitrate value of a Zone is below 7.0 ppm, it will be sampled once every

three years. If the median nitrate value is above 7.0 ppm, that Zone will be sampled annually.

In 2023, District staff sampled wells in Zones 1, 2, 3, 4, 5, 6, and 11.

In 2024, District staff will sample wells in Zones 1, 2, 3, 4, 5, 6, 7, 8, and 11.

Thank you to all irrigation, domestic, and monitoring well owners for your continued cooperation. Protecting groundwater quality is an important task and your support is valuable. ♦♦♦



Vadose Zone Study Update

district. To see the zone you are in, please refer to the map below. After that, look at the map on page three to see what the median nitrate-nitrogen

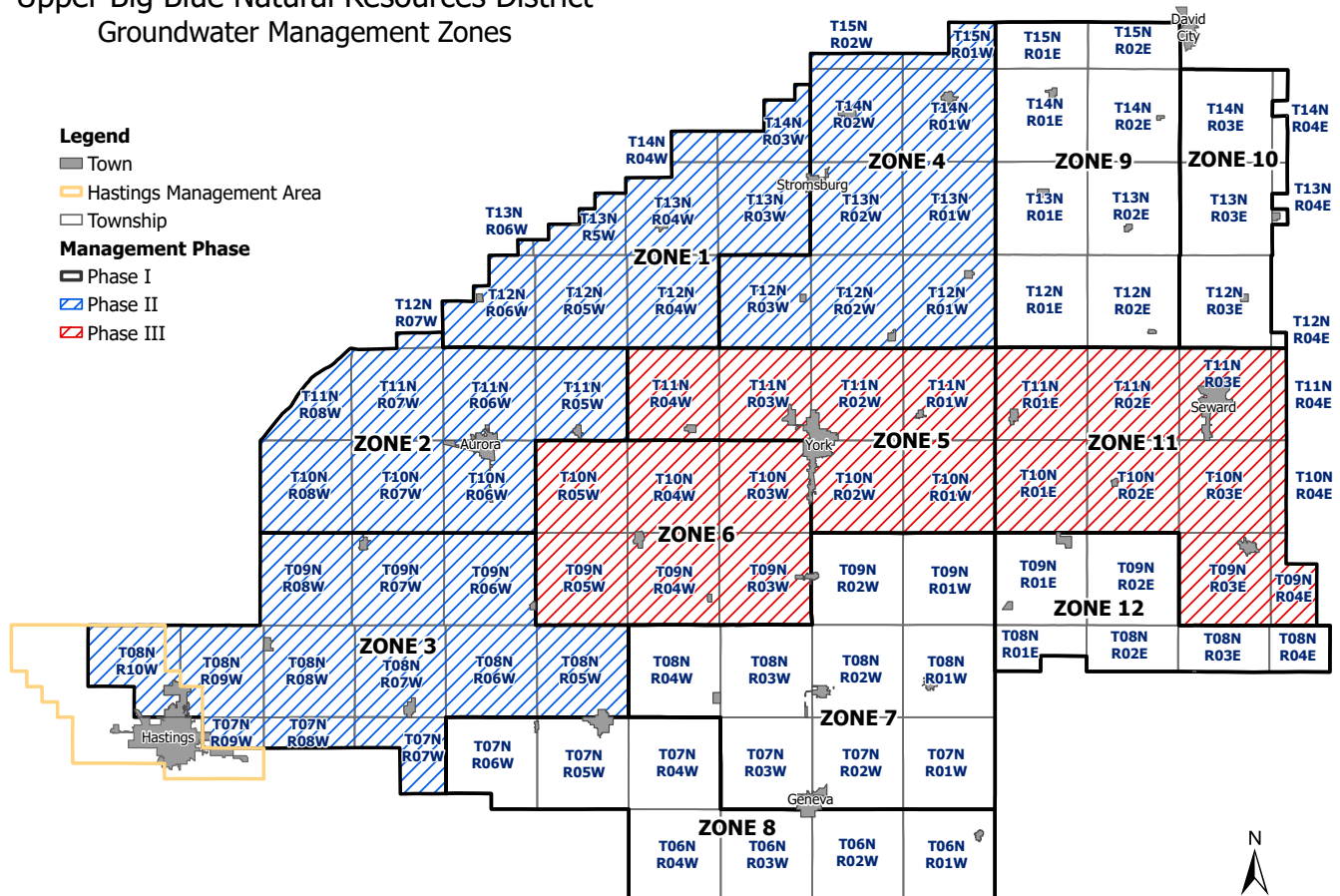
The Upper Big Blue NRD has partnered with the University of Nebraska-Lincoln to take part in a research study focusing on investigating the vadose zone. The vadose zone is the area beneath the root zone and above the groundwater table. It is also referred to as the unsaturated zone. The focus of the study will be to look at groundwater nitrate and agricultural contaminant occurrence in the vadose zone. To do this, we will be looking at both historic and spatial changes in groundwater nitrate throughout the district and in the 12 water quality management zones to compare the changes in nitrate levels. Nitrate levels will be determined by drilling test holes for chemical analysis, along with characterizing the soil type and physical characteristics.

levels are for your area. While we have seen decreases in some areas of the district, we have had an overall increase of 54 percent.

We will be continuing in the fall of 2023, and we are looking for volunteers who will be willing to take part in the study. Volunteers, if selected, will be asked to fill out a survey to look at current and historical management practices on the fields to be used in the study. For the fall of 2023, we will be sampling in zones 6, 7, and 8. In the spring of 2024, we will be sampling in zones 1, 2, and 3. Finally, in the fall of 2024 we will finish up in zone 9, 10, 11, and 12. If you have any questions, or are interested in participating in the study, feel free to contact Dawson Tietmeyer at dtietmeyer@upperbigblue.org. ♦♦♦

For the past few decades, we have seen a steady increase in nitrogen concentration in some parts of the

Upper Big Blue Natural Resources District
Groundwater Management Zones



Irrigation Water Nitrate Analysis – Zones 6 & 11

Operators within a management zone that has been designated a Phase III Management Zone must have their irrigation water tested for nitrates at least once every three years. Zones 6 and 11 moved to a Phase III Management Area January 2022, and operators within these zones are now required to submit water samples. Zones 6 and 11 include the following townships:

Zone 6

York County: Hays (09N-03W), Henderson (09N-04W), Baker (10N-03W), Brown (10N-04W)

Hamilton County: Farmers Valley (09N-05W), Beaver (10N-05W)

Zone 11

Seward County: Map E (11N-01E), Map F (11N-02E),

Map G (11N-03E), Map H (11N-04E), Map L (10N-01E), Map K (10N-02E), Map J (10N-03E), Map I (10N-04E), Map O (09N-03E), Map P (09N-04E)

Irrigation wells in Zones 6 and 11 must be sampled by April 1, 2025.

Important things to remember:

- All active irrigation wells in Zones 6 and 11 must be sampled.
- Comingled wells need to be sampled individually.
- Follow sampling instructions, especially the timeframe for delivery.
- If there are multiple wells per quarter, be specific when labeling – sub-quarter or physical location description is helpful to assign results and therefore, comply with rules and regulations.

The Upper Big Blue NRD is now utilizing a new database software that will allow staff to better track reporting information, such as, phase reports, sensor reports, and water samples. Wells that have not been sampled by April 1, 2025, will be found in violation of District rules and regulations. ♦♦♦

Coming Soon: Nitrogen Use Efficiency Reports

Keep an eye on your mailbox for something new from the NRD. This winter with your annual Phase II/ III and Hastings Management Area Reports you will receive a Nitrogen Use Summary Report based on the information you report annually. The district is now able to provide detailed reports to every producer in the district that will illustrate nitrogen use efficiency on a field-by-field basis.

Aggregating data from across the district will allow producers to benchmark NUE with other reporting producers in the district. All information will be kept confidential. No producer will be able to see information specific to another's field, however, they will be able to see anonymized and aggregated information about NUE.

These new nitrogen use reports are meant as an educational tool and a companion to the water use summaries sent to producers earlier this year. The NRD staff is hopeful that this information will equip district producers to make data driven decisions about their nitrogen and water management practices. ♦♦♦





NRD Welcomes New Water Conservationist

Kaleb Fritz has joined the staff of the Upper Big Blue Natural Resources District as a water conservationist. In this role, he will be responsible for groundwater management area educational programming, presenting district information on water use efficiency topics to various audiences, and working one-on-one with producers to protect groundwater quality and quantity.

Fritz has a bachelor's degree in agribusiness and business management from Chadron State University. Prior to working at the NRD, he owned a fencing business for a time before moving into roles in the ethanol industry. Most recently, he worked in quality assurance for Green Plains in Central City.

In addition to his day job, Fritz raises cattle and

grows corn. Fritz has two young daughters and lives in Stromsburg.

Fritz is excited for the work he'll be doing at the NRD, as he is passionate about serving as part of a team and working directly with producers to help them achieve their goals.

The former rodeo athlete says that working as the NRD's water conservationist is a great fit for his enthusiasm for agriculture education. "I think this will be a dynamic setting with limitless potential for growth," he said. ♦♦♦



*Kaleb Fritz
Water Conservationist
kfritz@upperbigblue.org*

Water Use Summary Reports

For 2023, the district mailed out water use summary reports to water users – presenting them with a visual of how much water they've used over the past several years (2013-2022), in hopes that our users can be more water conscious for the future. The report displays the usage in acre inches (calculated based on flowmeter beginning and ending readings) and inches per acre (acre inches ÷ total number of certified acres). Although our board has not issued any allocation restrictions for 2024, this report provides a basis should such an event occur.

Reminder, water use reports are due December 1.

Visit <https://www.upperbigblue.org/reporting> to access the reporting portal. There you will also find answers to frequently asked questions as well as video tutorials. If you have any questions, please contact wateruse@upperbigblue.org or call (402) 362-6601. ♦♦♦

Producer Survey

Operators of wells within our Groundwater Monitoring Well Network should have received a land practice survey along with their nitrate results this year. The purpose of this survey is to help us understand what is going on at the land surface as it directly relates to the quality of the groundwater. The survey focuses on nitrogen application, as well as irrigation usage. Operators should expect to receive this survey annually for the next few years. This survey will not be used to single anyone out over their land practices. Paper copies of the survey can be sent back to our office, or they can be filled out online at [upperbigblue.org/gwma-2-producer-survey](https://www.upperbigblue.org/gwma-2-producer-survey). To unlock the survey, you will need to know your well registration number (found on your results letter). ♦♦♦



Advancements in Irrigation

By Kaleb Fritz

As Nebraska grapples with the challenges of erratic weather patterns and loss of soil and water resources, producers and conservationists alike stand at the forefront of addressing these issues. One of the critical factors in achieving sustainable and efficient agriculture is the advancement of crop irrigation techniques. In recent years, remarkable innovations have emerged that not only enhance crop yields but also contribute to significant water and energy saving.

- **Smart Irrigation Technologies:** Real-time Monitoring

Advancements in sensor technology and data analytics have given rise to smart irrigation systems. These systems collect data on soil moisture, weather conditions, and crop needs in real-time. Farmers can then adjust irrigation schedules and quantities based on this information, optimizing water use and minimizing waste.

The district sells irrigation scheduling tools at a 50 percent discount to irrigators in the district. The equipment is also for sale to others at regular prices.

- **Precision Agriculture:** Tailored Irrigation

Precision agriculture integrates technology, data, and automation to customize irrigation based on specific crop needs and soil conditions. GPS-guided equipment and variable rate irrigation enable farmers to apply water precisely where it is

needed, reducing waste and optimizing yields.

- **Conservation of Natural Resources:** Soil Health and Erosion Prevention

Another critical benefit of modern irrigation techniques is the conservation of natural resources, particularly soil health and erosion prevention. By delivering water directly to the root zone we can maintain optimal soil moisture levels, reduce erosion, and prevent nutrient leaching. Healthy soil leads to increased crop productivity and reduces environmental impact.

- **Water Savings:** Healthy soils retain moisture more efficiently, reducing the need for excessive irrigation.
- **Energy Savings:** Less water pumping and reduced soil erosion lead to energy savings in the long run.

The advancements in crop irrigation techniques represent a significant leap forward in sustainable agriculture. By reducing water wastage and optimizing energy use, these innovations not only improve the economic viability of farming but also address the pressing global challenges of water scarcity.

Farmers worldwide are adopting these techniques to maximize their crop yields while minimizing their environmental footprint. As technology continues to evolve, we can expect even more sophisticated solutions that enhance water and energy savings in agriculture, making our food production systems more resilient and sustainable for the future. The conservation of soil health and prevention of erosion are crucial aspects of this sustainable agricultural revolution, ensuring that our precious resources are used wisely for generations to come. ♦♦♦

SCAL Advisory Board Seeks New Members

The South Central Ag Lab, SCAL, is seeking producers interested in holding a seat on the SCAL Advisory Committee. Participants help guide and promote the work conducted by the University of Nebraska Lincoln at SCAL

(<https://scal.unl.edu/>).



If you are interested in this opportunity, contact Dr. Joe Luck, Professor, Biological Systems Engineering, University of Nebraska-Lincoln
Phone: 402-472-1488
Email: jluck2@unl.edu. ♦♦♦





Soil Health Field Day Yields New Insights for Area Farmers

When input costs went through the roof in 2021 and 2022, Fillmore County farmer Jordan Uldrich decided that he needed a better strategy for fertilizer and weed management—one that wasn't going to break the bank, but that would still be effective. The following winter, "I got my PhD on YouTube," he joked. He watched hundreds of videos on soil health and decided to give cover crops a try on some of his acres to reduce the need for inputs in the 2023 growing season.

Uldrich was one of the speakers at a recent farmer-led soil health field day held in McCool Junction. The event drew a crowd of about 50 and was hosted by America's Conservation Ag Movement, Trust in Food, and the Farm Journal.

Uldrich spoke to the gathered farmers about lessons he's learned in year one of implementing cover crops. He won't know until harvest time if the investment will pay off. However, if there is little yield drag from the new management practices, he predicts that the changes he's implemented will save him \$25 per acre.

"It doesn't have to cost us a bunch of money to try something new," he told his fellow farmers. "What I did only cost me my time, ingenuity, and some elbow grease."

Everyone has a few acres they could use to experiment with new practices that won't cause financial ruin if it doesn't work out, he suggested. "It would be foolish

to not stand on our forefathers' shoulders, to move forward as the next generation of stewards of the land. There is no reason we can't help each other find a way to make the puzzle pieces of sustainability and profitability fit together for our future."

Building on Uldrich's message, Jenny Rees, Nebraska Extension educator, presented on a two-year study using perennial cover crops. While the study is still in progress, Rees shared information about what they have learned so far about the practice and how it might be incorporated on row crop acres in this area. She reminded producers in the room that they should take a broad view of the economic benefits of different management practices. The one-year snapshot of profit and loss might make it look as if practices like cover crops are too costly; however, if you zoom out to the two-to-five-year picture the practices may pay off over time.

Rees's presentation included success stories as well as failures so that when other farmers get started with these practices, they can avoid making the same mistakes as those in the study. Rees works with the On-Farm Research program in this part of the state and invites farmers to participate to find out answers to their agronomic questions.

Some of the most interesting material from the field day took place outside. The weather was ideal for a soil demonstration from USDA NRCS State Soil Health Specialist Aaron Hird.

Hird showed soil samples from a conventionally farmed field and a no-till field to show the differences in soil structure and function. He also demonstrated a variety of indicators of soil health that were observable without special equipment or a laboratory, such as its aggregate stability and infiltration rate. Hird suggested



that farmers who are curious about their soil health should reach out to their local NRCS office and schedule a visit with a soil specialist who could assess basic soil health indicators, collect soil for sampling, and provide recommendations. There is funding available through NRCS, local NRDs, and several other sources for practices that can improve the soil's function.

Jimmy Emmons, a Leopold Conservation Award winner, third generation Oklahoma farmer, and vice president of No-Till on the Plains, took the field day attendees to a nearby soybean field to show the benefits of leaving cover crop residue on the soil as 'armor' against compaction from livestock grazing or farm vehicles. Livestock integration was a main theme of the field day, as there were several speakers that touted the soil health and financial benefits of adding livestock to row crop operations.

Emmons suggested that thanks to climate smart initiatives, there has never been a better time to get started with conservation agriculture practices. There is money available from public and private sources to reduce the burden of cost for producers who are making management changes for soil health.

Representatives from Ducks Unlimited and The Nature Conservancy also spoke at the event to let producers know about programs and funding available for conservation practices, such as the Nebraska Soil Carbon Project. This program, which is available to farmers in the Central Platte and Upper Big Blue NRDs, provides funding and technical assistance to farmers who add cover crops, diverse rotations, and no-till practices to their acres.

York County producer Hank McGowan was one of the featured farmers for the event. McGowan talked about cover crops as a buffer against extreme weather variability (in recent years he has experienced hail, drought, and tornadoes) and how cover crops have improved his soil's infiltration rate, reduced erosion, suppressed weeds, and increased his overall profitability.

Cover crops improve soil organic matter much faster than no-till practices alone, said McGowan, so they are a great solution if you're trying to restore function

to degraded soil. McGowan has been adding new management practices and transforming his acres a bit at a time for the past few years. His goal is to move the needle even further to reduce synthetic nitrogen application in the future.

McGowan admitted that drilling in a cover crop in the fall does make harvest time more of a hassle, but it is manageable. The extra work in the fall leads to a simpler spring planting season, with less inputs needed.

While weed suppression wasn't his primary goal in planting cover crops, McGowan says he was surprised to see how effective the practice has been at combating marehail and waterhemp.

Adding rye to lock up residual nitrogen in the soil while also feeding his cattle has also been a benefit. McGowan says he is glad to be doing his part to address the nitrate problem in the drinking water supply in McCool Junction where he lives and farms, as the community recently had to drill a new well because the level of nitrate had gotten too high in the municipal water supply.

"These things will test your faith," said McGowan of cover crops and no-till practices, especially when your fields don't look as 'clean' as your neighbors'. However, his faith in conservation practices has paid off and he is seeing the dividends on his acres. "It's been working better than I expected it to. I was told it would take five years before I saw improvement, but it's not true. I saw some benefits immediately." ♦♦♦♦

Producers interested in improving their soil can learn more about funding from the Upper Big Blue NRD for soil health practices through the Water Quality Management Plan Incentive Program and Nebraska Soil Carbon Program.



Management Area Rules and Regulations

Phase I Requirements –

All operators within the district are subject to the requirements of Phase I.

- 1. *Fall Applied Anhydrous Ammonia***
Application of fall anhydrous ammonia before November 1 is prohibited.
- 2. *Pre-Plant Liquid or Dry Nitrogen Formulations***
Pre-plant nitrogen applications in liquid or dry forms are prohibited before March 1.
- 3. *Exemptions to Items 1 & 2***
The application of nitrogen fertilizer for any purpose other than fertilizing spring planted crops.
 - The application of nitrogen fertilizer for spring planted small grains such as barley, oats and rye.
 - The application of fertilizer that is not considered a “nitrogen fertilizer” as defined in Rule 5 of the District Ground Water Management Rules and Regulations.
 - The spreading of manure, sewage and other by-products conducted in compliance with state laws and regulations.

Phase II Requirements –

All operators of land within district Management Zones 1, 2, 3, 4, 5, 6, and 11 are subject to the requirements of Phase II. Refer to the map on page 3 for Phase II areas. Phase II operators are required to follow all Phase I requirements in addition to the following:

- 1. *Nitrogen Certification Training***
Farm operators must attend a nitrogen certification training once every 4 years.

- 2. *Irrigation Scheduling***

Irrigation scheduling equipment is required in at least one field in a Phase II area. The equipment should be installed in the largest field you operate. Examples of irrigation scheduling equipment are:

- Capacitance Probes
- Resistance Blocks
- Other methods approved by the District

- 3. *Soil Sampling Requirements***

Soil samples are required in years when corn or sorghum will be grown following a non-legume crop and/or when livestock, municipal or industrial waste has been applied within the last 12 months.

A minimum of:

- 1 composite 0-8” sample per field analyzed for organic matter and residual nitrogen, and
- 1 composite 8-24” sample per field analyzed for residual nitrogen are required.

For soil sampling purposes, a field is defined as one where the crop and irrigation practices are the same.

- 4. *University of Nebraska Recommended Nitrogen Fertilizer Application Rate***

Prior to applying nitrogen fertilizers, the operator must calculate the recommended application rate based on the University of Nebraska’s nitrogen fertilizer recommendation equation. The UNL nitrogen recommendation equation takes into account the residual soil nitrogen from your soil analysis and other nitrogen credits.

- 5. *Reporting Requirement***

An annual report is required for all dryland and irrigated fields by April 1. The report steps you through the University’s Nitrogen Recommendation Equation. A copy of your soil analysis must accompany the report.



Phase III Requirements –

All operators of land within district Management Zone 5, 6, and 11 are subject to the requirements of Phase III. Phase III operators are required to follow all Phase I and II requirements in addition to the following.

1. Soil Sampling Requirements

Soil samples are required in years when corn or sorghum will be grown following a non-legume crop and/or when livestock, municipal or industrial waste have been applied within the last 12 months. A minimum of:

- 1 composite 0-8” sample per 40 acres or any portion thereof, analyzed for organic matter and residual nitrogen

- 1 composite 8-24” sample per 40 acres or any portion thereof, analyzed for residual nitrogen are required.

2. Irrigation Water Sampling

All irrigation wells must be sampled and tested for nitrate once every 3 years. You are free to use any lab you wish, but the NRD offers nitrate testing free of charge.

3. Fall and Winter Application of Anhydrous Ammonia

All anhydrous ammonia applied between the dates of November 1 and February 29 must be applied with a district approved nitrification inhibitor. Active ingredients include: Nitropyrin, Pronitridine, and Dicyandiamide. A receipt as proof of purchase must accompany your annual report. ♦♦♦

Thinking about adding conservation practices to your farm?

The Nebraska Soil Carbon Project might be for you!

Funding is available for adding acres of no-till, diverse crop rotation, & cover crops.

Financial & technical assistance provided.

Enroll by November 17 for immediate funding consideration.

Visit upperbigblue.org/soilcarbonproject to get started!



Nitrogen Management Certification Training

- Dec. 19 | Cornerstone Ag & Event Center | York | 9:30 a.m. to noon | *Featuring Dr. Andy Little, UNL*
- Jan. 8 | Community Center | Sutton | 9:30 a.m. to noon | *Special Focus: Cover Crops*
- Feb. 13 | Polk County Fairgrounds | Osceola | 9:30 a.m. to noon |
- Feb. 28 | Regenerative Agriculture Conference | Cattle Conference Room | Janzow Campus Center at Concordia University | 9 a.m. to 2 p.m. | *Recertifications Only*

Visit upperbigblue.org/events for full details and to RSVP

Reverse Osmosis Funding Available

The Upper Big Blue NRD has a new program to address drinking water quality concerns in the district. The program will provide up to \$500 per home for a point-of-use reverse osmosis (RO) system on properties where the drinking water well exceeds 10 PPM of nitrate. Private well users in Nebraska are responsible for maintaining the integrity of their own water supply and should have it tested annually for contaminants—a process that residents of the NRD can do for free.

For full details on the NRD's Point of Use Reverse Osmosis Water Filtration System Pilot Program as well as application materials, visit www.upperbigblue.org/RO. ♦♦♦



Save the Date!

REGENERATIVE AG CONFERENCE

- February 28, 2024
- Concordia University Campus (Seward)
- Keynote: Mitchell Hora, Farmer & CEO of Continuum Ag
- Event for producers and crop consultants to learn about regenerative ag practices & available funding



Register now at www.upperbigblue.org/regenerative-ag

