



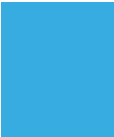
Annual Report

2020-21

Upper Big Blue

NATURAL RESOURCES DISTRICT





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The Upper Big Blue Natural Resources District provides a vital service in Adams, Butler, Clay, Fillmore, Hamilton, Polk, Saline, Seward, and York Counties, serving more than 56,000 people.

THE DISTRICT



- *More than 56,000 citizens rely on the Upper Big Blue Natural Resources District (NRD) to provide direction and assistance in the wise use, conservation and development of our soil, water and related natural resources.*

The NRD is dedicated to the conservation and careful development of natural resources to serve everyone’s needs. The NRD system was created in 1972, following Nebraska legislation which consolidated 154 statewide special-purpose districts into 24 NRDs (later further consolidated into 23 NRDs). The NRDs correspond to major river basins in Nebraska. NRDs carry the names of these rivers, hence the Upper Big Blue NRD is named after the uppermost portion of the Big Blue River.

NRDs are organized as governmental sub-divisions of the state. Local control is provided by a board of directors. At the Upper Big Blue NRD, a 17 member board of directors establishes policy. These directors are placed in office through the general election process and represent the community’s interests in conservation.

Across the state, NRDs offer a major source of assistance to landowners in conservation and natural resources management. Not only do the board members make decisions about conservation programs at the district level, they also bring a wealth of local judgment and experience when adapting state and national programs to local situations.

The NRD staff at York and the field clerks at the Natural Resources Conservation Service (NRCS) offices in each county are responsible for implementing NRD policy and regulations.

A major source of funding for projects, programs, and administration comes from a levy on taxable property within the district. Other sources include federal and state funding, as well as program fees. Certain projects may also be funded with a portion of other local, state, private and/or federal revenues. The NRD is empowered to coordinate land and water management programs with local, state and federal conservation organizations and other governmental units.

Mission Statement

The Upper Big Blue Natural Resources District shall be a leader in conserving, protecting, developing, and managing the natural resources of the district for the health and welfare of the people of the district.

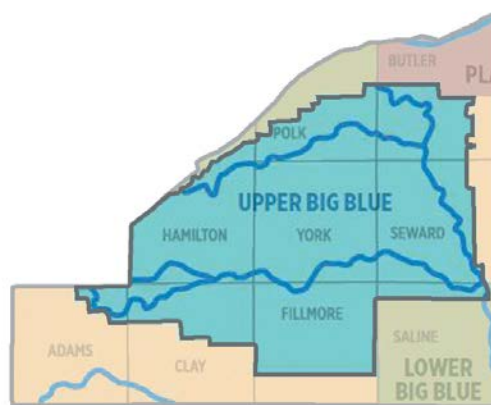
THE DISTRICT



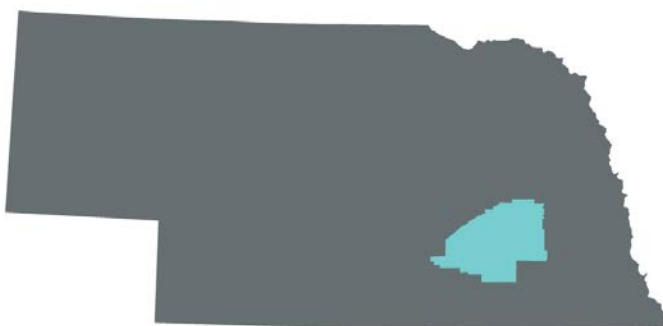
12 District Responsibilities

■ The Upper Big Blue Natural Resources District is a sub-division of local county government charged with the management, development, and protection of soil and water resources within district boundaries. District responsibilities are authorized by state statutes and are listed below but are **not** ranked in order of priority.

- Development, management, use and conservation of groundwater and surface water
- Soil conservation
- Erosion prevention and control
- Flood prevention and control
- Pollution control
- Water supply for any beneficial uses
- Prevention of damages from flood water and sediment
- Development and management of recreational and park facilities
- Forestry and range management
- Development and management of fish and wildlife habitat
- Drainage improvement
- Solid waste disposal






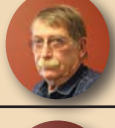

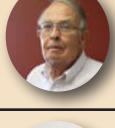
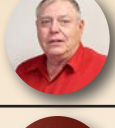

Within this general framework, the Upper Big Blue NRD carries out a variety of projects and programs in forestry, groundwater management, land treatment, flood control, water storage, and information and education. ■














Board of Directors

■ The Upper Big Blue Natural Resources District is governed by a 17 member Board of Directors. Two directors are elected from each of the eight sub-districts, plus one at-large member from any sub-district. The board sets policy for the district and works closely with the staff through a committee system to carry out the district's goals. Board meetings are conducted on the third Thursday of each month at the district office. Committees meet throughout the month. Special meetings are called as needed to consider important concerns and issues. The district board of directors sets the direction, policies and budget for the natural resources district. ■

Roger Houdersheldt Shelby Sub-district 1	
Larry Moore Ulysses Sub-district 1	
Jeff Bohaty Seward Sub-district 2	
Douglas Dickinson Seward Sub-district 2	
Richard Bohaty Seward Sub-district 3	
Bill Stahly Milford Sub-district 3	
Paul Weiss McCool Jct. Sub-district 4	
Lynn Yates Geneva Sub-district 4	

Micheal Nuss Sutton Sub-district 5	
Kendall Siebert Henderson Sub-district 5	
Bill Kuehner, Jr. Aurora Sub-district 6	
John Miller Aurora Sub-district 6	
Rodney Grotz York Sub-district 7	
Ronda Rich York Sub-district 7	
Paul Bethune York Sub-district 8	
David Robotham York Sub-district 8	
Linda Luebbe Beaver Crossing At-Large	

THE DISTRICT



Board of Directors News

- Three longtime members of the Upper Big Blue Natural Resources District were celebrated in December 2020 for their collective 83 years of service to the people of the district. Douglas Bruns, Gary Eberle, and Merlin Volkmer concluded their service after decades of board membership.

“We appreciate the leadership these men have provided through their involvement in the board all these years,” said David Eigenberg, general manager. “We want to thank them publicly for their dedication to our mission to protect lives, protect property, and protect the future of our district. The level of institutional knowledge and experience they possess will not be easy to replace on our board.”

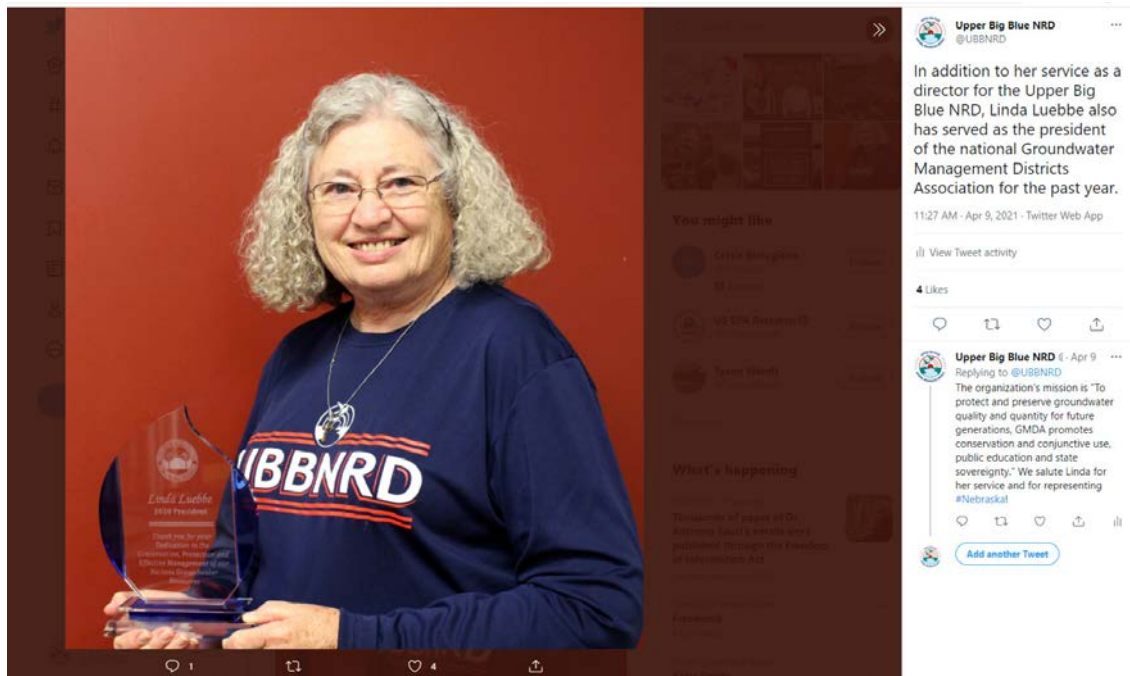
Douglas Bruns of Waco is a lifelong Nebraskan. He is retired after a career in farming and working for Pioneer, and now has an interest in raising cattle. He has served on the board of directors of the NRD since 1999 as a way of giving back to the community. “I felt keeping our water quality high is important,” he said. Bruns wishes that more people understood that the NRD is “working for the people to keep quality and quantity of water for future generations.”

Gary Eberle of Bradshaw has lived in Nebraska for 70 years. Now retired, his career years were spent raising corn, soybeans, milo, and seed wheat. He also raised swine seedstock with

a veterinarian monitored herd for 30 years. His interests include wood working, toy restoration, and travel. He has served on the board of the NRD since 1997. He says he believes in the work of the NRD board because it offers local control of natural resources.

Merlin Volkmer of Shickley has lived in Nebraska for more than 80 years. He is now retired, but he farmed for more than 40 years. He also worked in well drilling, irrigation, and manufacturing. His interests include ice fishing, collecting toy tractors, and travel. He has served on the board of the Upper Big Blue NRD since 1981. His initial interest in serving on the board of the NRD was due to a lack of representation for his area and his desire to make sure that the natural resource needs experienced in his sub-district were addressed. ■





THE DISTRICT



Upper Big Blue NRD Staff

■ The district currently has 29 employee positions: 27 full-time and two occasional workers. Full-time and part-time employees are permanent employees with paid benefits. Full-time employees work 40-hour work weeks all year, whereas part-time employees work a regular schedule of at least 20 hours per week. Occasional workers are temporary employees who do not earn benefits. Their hours vary depending on available work.

- David Eigenberg, General Manager
- Rodney Verhoeff, Assistant General Manager
- Jack Wergin, Projects Department Manager
- Marie Krausnick, Water Department Manager
- Nancy Brisk, Office Manager
- Chrystal Houston, Public Relations Manager
- Jeffrey Ball, Lead Engineering Technician
- John Bush, Water Resources Technician
- Drew ten Bensel, Water Resources Technician
- Dawson Tietmeyer, Water Resources Technician
- Jacob Maslonka, Water Resources Technician
- Erinn Wilkins, Water Resources Technician
- Miranda Coffey, Water Data Specialist
- Dan Leininger, Water Conservationist
- Sylvia Jividen, Geneva Field Office Clerk
- Tamra Jones, Osceola Field Office Clerk
- Janet Yates, Seward Field Office Clerk
- April English, York Field Office Clerk
- Rita Hoblyn, Projects Department Secretary
- Carleen Light, Water Department Secretary
- DeeDee Novotny, Water Department Secretary
- Patty Connors, Secretary
- Angie Johnson, Secretary
- Kyle Yrkoski, District Forester
- Mick Northrop, Lead Maintenance Worker
- Jay Geiger, Maintenance Worker
- Andy Larkin, Maintenance Worker
- Tom Johnson, Maintenance Worker
- Mark Olsen, Maintenance Worker



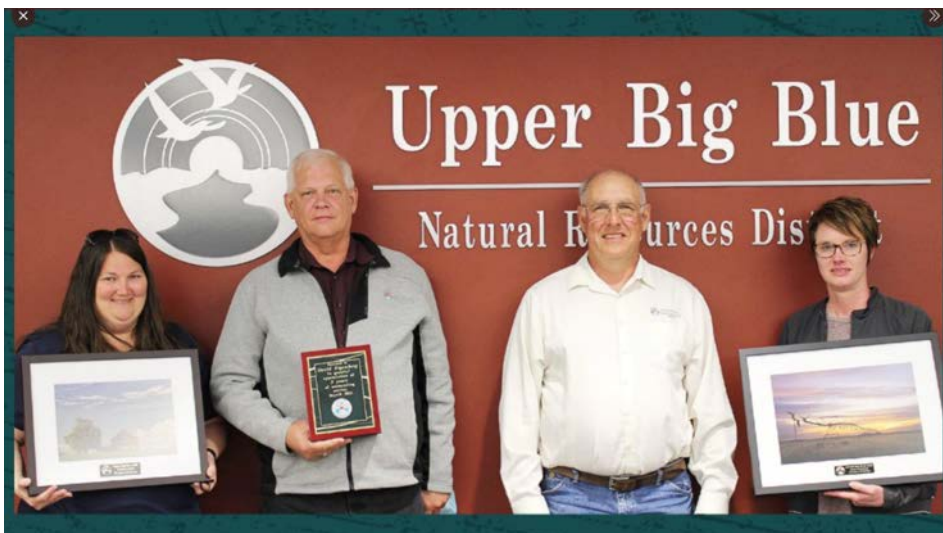
November 2020

NRD Employee Recognition

Jack Wergin (5 years)
Projects Department
Manager

John Bush (10 years)
Water Resources
Technician

Kyle Yrkoski (5 years)
District Forester



April 2021

Carleen Light (15 years)
Water Department
Secretary

David Eigenberg (5 years)
General Manager

**Pictured: Lynn Yates,
Chairperson
Board of Trustees*

Marie Krausnick (20 years)
Water Department
Manager

WATER



Water Levels Rise

Groundwater Level Increases 0.35 Feet on Average

- During March and April 2021, NRD staff measured roughly 500 observation wells throughout the district. The goal of these well measurements is to determine an average water level change for the district, based on a weighted change from each well.

For spring 2021 water level measurements, the NRD has determined that the average groundwater level change shows an increase of 0.35 feet from last spring. The findings show that the spring 2021 average groundwater level is 9.13 feet above the “Allocation Trigger.” Thus, there will be no allocation restrictions for the 2022 irrigation season.

Observation wells are measured in the spring of each year, allowing the water table to rebound from the previous irrigation season. The wells that are measured are uniformly distributed throughout the district to provide an accurate profile of the average groundwater level change. Each well measured is assigned an area of the district based on distances from other wells. This method gives the average groundwater level change a weighted average.

Last year’s spring 2020 level showed an increase of 3.67 feet and spring 2019 showed an increase of 1.22 feet. Fluctuations from year to year are common throughout the district. The Upper Big Blue NRD sits above the High Plains Aquifer, which stretches from South Dakota to Texas. This portion of the aquifer is dynamic and different factors like rainfall and pumping affect how the aquifer reacts.

In recent years, producers have done an exceptional job of managing use of this water resource.

Along with NRD staff measuring observation wells, all groundwater users are required to annually report their water use. This is how the NRD maintains records on historic groundwater usage. Groundwater use records are very important to the district for making informed management decisions. The 2020 district average groundwater usage was 5.7 inches. Since 2007, the overall district average groundwater usage is 5.8 inches/year.

The district’s goal is to hold the average groundwater level at or above the 1978 level. In 2005, the district average groundwater level reached the “Reporting Trigger” initiating groundwater users to report annual groundwater use to the district and to certify their irrigated acres. If the district average water level falls below the 1978 level (“Allocation Trigger”), groundwater allocation will begin. ■

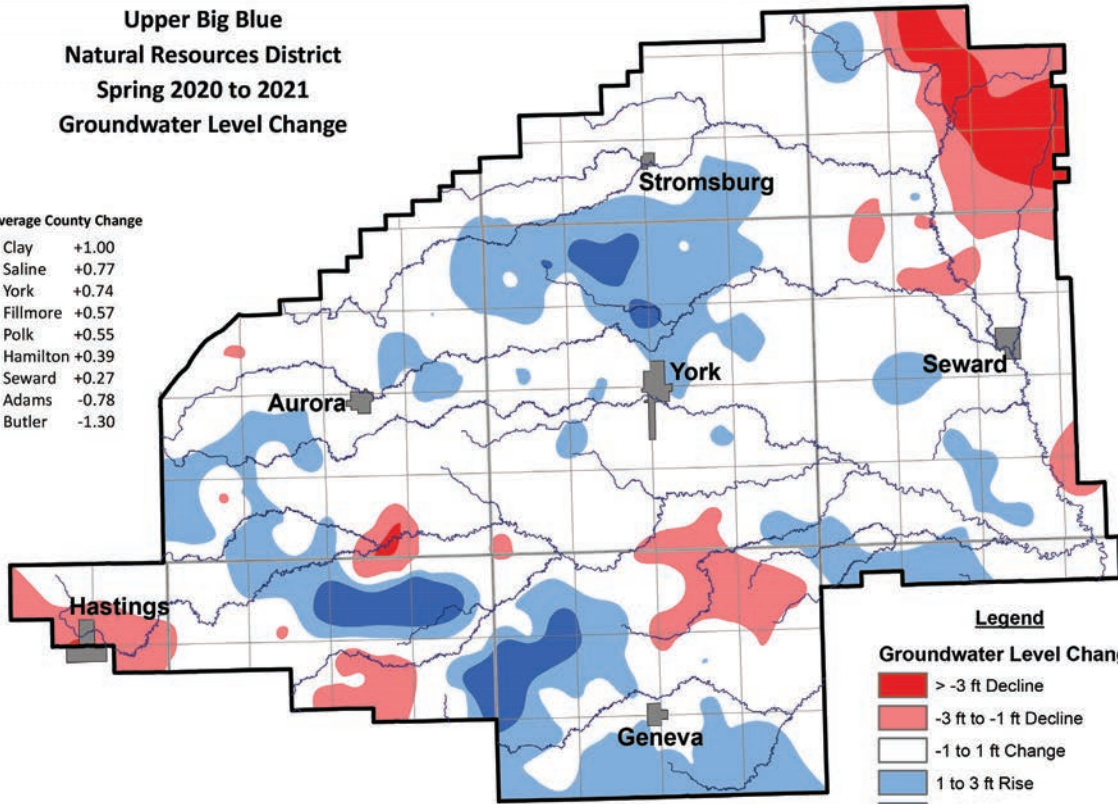


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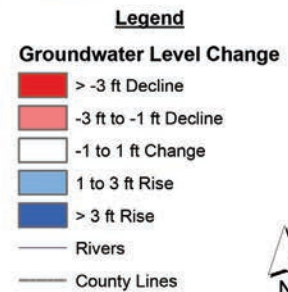
**Upper Big Blue
Natural Resources District
Spring 2020 to 2021
Groundwater Level Change**

Average County Change

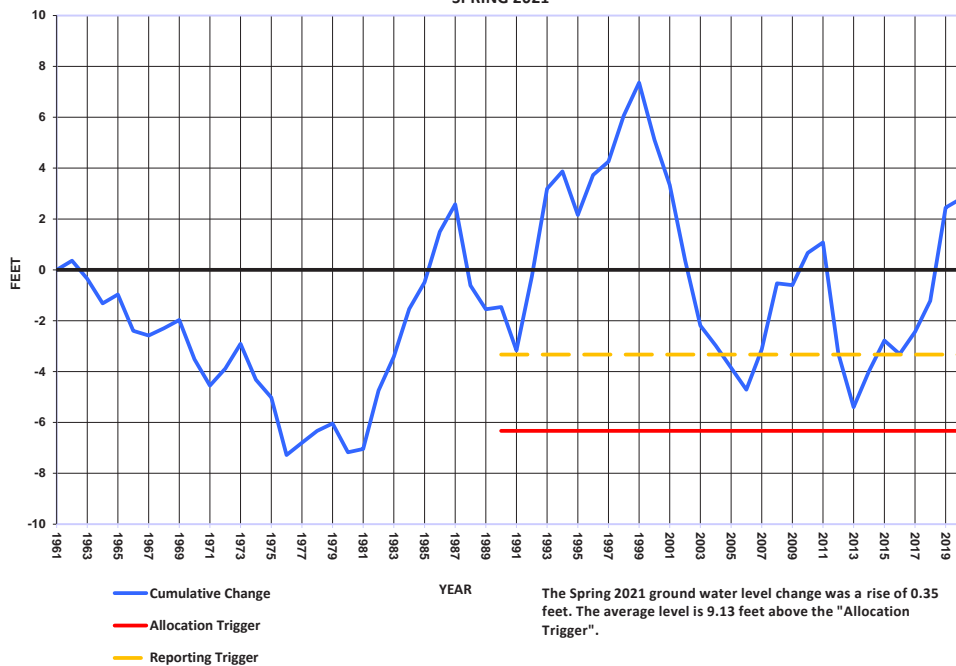
Clay	+1.00
Saline	+0.77
York	+0.74
Fillmore	+0.57
Polk	+0.55
Hamilton	+0.39
Seward	+0.27
Adams	-0.78
Butler	-1.30



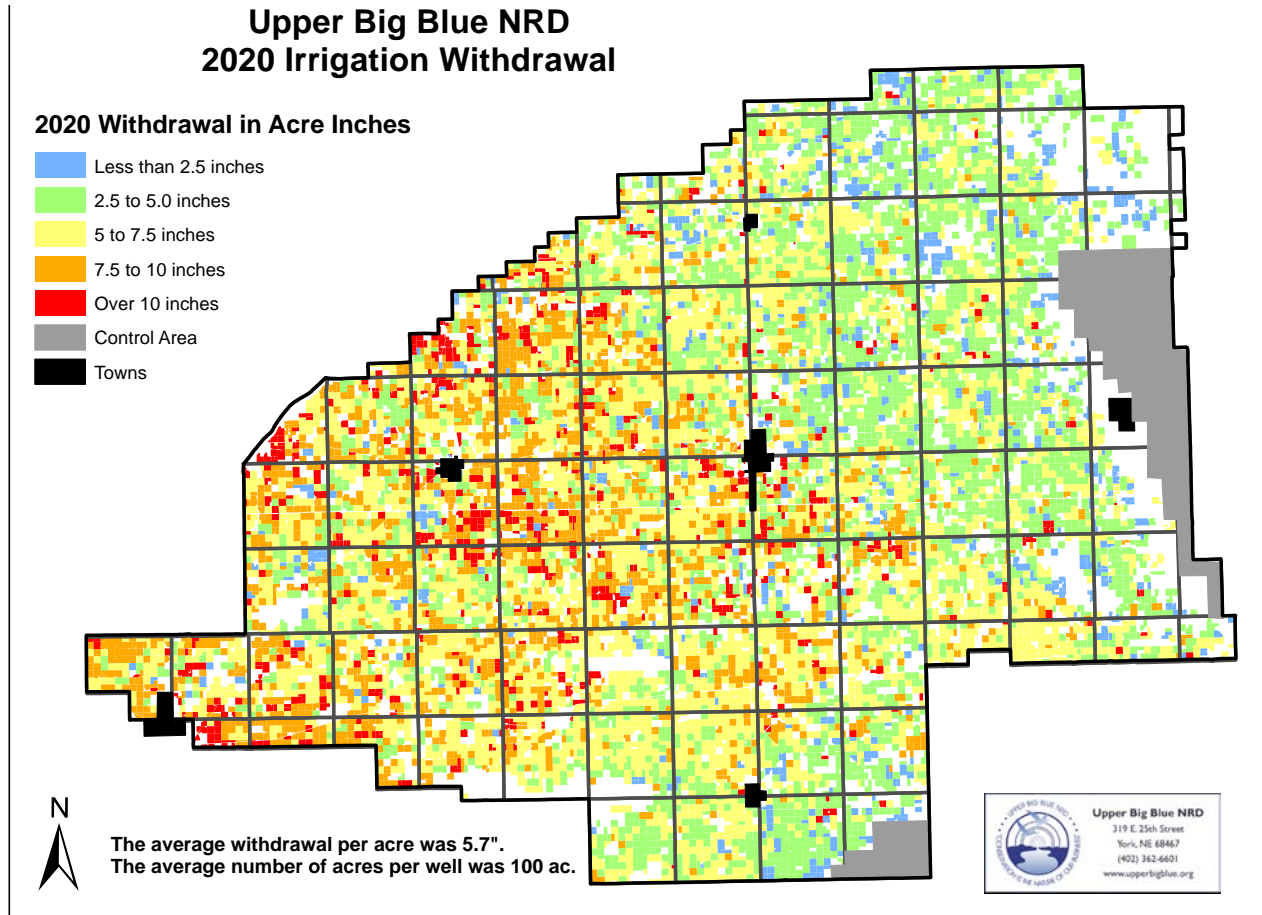
The average groundwater level change was + 0.35 Feet



UPPER BIG BLUE NRD - AVERAGE GROUND WATER LEVELS
TRIGGERS COMPARED TO HISTORIC LEVELS
SPRING 2021



WATER

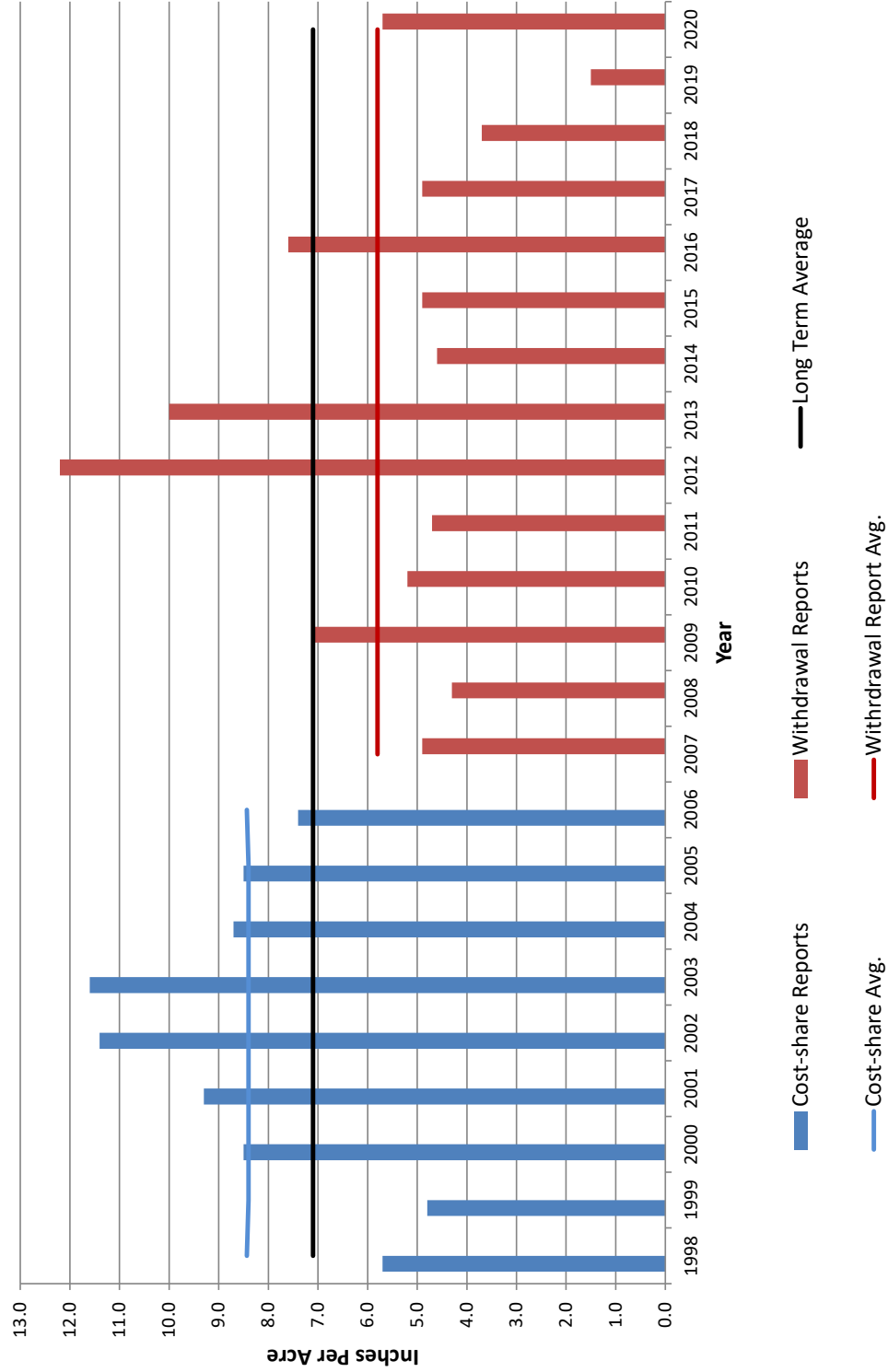


Average Irrigation Use Decreased in 2020

Irrigation water use was down in the 2020 growing season in the district, according to Marie Krausnick, NRD water department manager. Despite some parts of the district experiencing lower than average in-season rainfall, the average irrigation use was 5.7” per acre. Based on historic water use data, the average water use is closer to 6.6” per acre in the district.

“Advancements in irrigation technology and soil moisture monitoring have led to increases in irrigation efficiency,” said Krausnick. “Those efficiencies are important safeguards to the district’s water supply. Our producers are to be commended on their commitment to conserve our water resources.”

Upper Big Blue NRD
Historic Groundwater Withdrawal for Irrigation



WATER



What's Water Worth?

- (May 2021) In an era of extreme weather, growers across the globe are more focused than ever on adequate irrigation to sustain crops through periods of drought. Severe drought can threaten a farmer's livelihood, as it leads to crop damage and reduced yield.

While everyone recognizes that water is valuable, it is challenging to come up with a standard value for irrigation water because it is not equally available, or necessary, at all times and all locations across a region. This variability also makes it difficult to understand the economic impact of efforts to conserve water, as the cost and return on investment of irrigation is constantly fluctuating, even in a single location.

Nebraska has an abundant supply of groundwater stored in the High Plains Aquifer, but it is not a limitless quantity. What are the financial considerations of policies to ensure that there is sufficient water for all for decades to come? Is there a greater economic argument to be made for why conservation efforts, including cover crops and irrigation management, are so important? A recent study from researchers at the Daugherty Water for Food Global Institute at the University of Nebraska Lincoln sheds light on the conversation by

examining the dollar value of irrigation water. The study indicates that the average value of irrigation water is highest in rainfed production areas where irrigation is used only supplementally. Researchers suggest that drought mitigation planning as well as implementing water management and allocation in locations where crop production is under rainfed conditions is of the utmost importance—especially where water sustainability has not traditionally been prioritized.

Researchers arrived at their conclusions by studying rainfed and irrigated acres in Colorado, Nebraska, and Kansas from 2010-2017. Notably, this period contains the severe drought year of 2012. They created a value equation that multiplied the yield differential (irrigated versus dryland fields) by the crop price, then divided by the irrigation requirement.



Their formula did not include irrigation specific costs such as water pumping, as the fuel and equipment needs for irrigation systems vary greatly.

Using this formula, the value of irrigation water for this time period and region was between \$10 and \$87 per acre-inch. For the exceptionally dry 2012 growing season, researchers found that supplemental irrigation had a direct impact of \$600 to \$1,250/acre.

Why should the impact be greater in rainfed fields than those more traditionally irrigated? The research suggests that water is particularly valuable in terms of the additional crop production during drought conditions, but that where irrigation requirements are already high, the average physical benefit of irrigation decreases; although irrigation makes a large difference to yields in irrigated fields, a more than the corresponding amount of irrigation is needed to provide this benefit. Thus, where irrigation is seldom used, it makes the greatest economic impact.

Why does this finding matter? Most previous research to determine the value of water in agriculture has focused on regions where irrigation is essential for crop growth, rather than rainfed

agriculture where irrigation is supplemental. For this study, average gross water values were highest not at points in time and space where the water supply was scarcest in absolute terms, but where irrigation could make the largest improvement in average crop productivity. This is significant, as researchers suggest these findings are useful when anticipating where new disputes over water use in agriculture may arise. As climate change continues to impact agriculture through more extreme weather patterns, areas where rainfed agriculture is the norm and water management infrastructure is minimal are ripe for future dispute. Projections using these metrics can help determine where water policy should be prioritized to prevent disputes. Researchers suggest that increased management ahead of potential shortages would be less costly than doing it while simultaneously managing a drought crisis that pits agricultural, residential, and commercial water needs against one another. ■

For more information, see “Informing drought mitigation policy by estimating the value of water for crop production” by Rimsaite, Gibson, and Brozovic.



WATER



Pediatric Cancer Study Looks for Possible Link to Common Water Contaminants

■ Why is the rate of cancer in children so high in Nebraska?

The Upper Big Blue NRD is partnering with the University of Nebraska Medical Center (UNMC) to conduct a groundwater quality study on domestic wells to see if elevated levels of common agricultural contaminants may be linked to pediatric cancer.

Nebraska is in the top seven states for rates of pediatric cancer in the US and is ranked first for incidence of certain malignant pediatric brain tumors. Researchers believe that the cause of pediatric cancers is likely to be a combination of genetic and environmental factors.

The Nebraska Cancer Registry has shown that between 1987 and 2016, 37 cases of pediatric cancer have been diagnosed within the Upper Big Blue NRD area. Could there be a link between these cases and water quality, the new study asks? Upper Big Blue NRD staff will collect samples from domestic wells in the district located close to where cases of pediatric cancer have been documented. The samples will be analyzed for nitrates, arsenic, atrazine, uranium, and uranium decay products. Due to season variability, samples will be collected in intervals over a two-year period. Samples will be collected in April/May (pre irrigation), June/July (during irrigation), and October/November (after irrigation). The goal is to sample 50 wells across the district that are located near known cases of pediatric cancer. Water quality information will be sent to the homeowner responsible for the well with an explanation of their results. If elevated levels of contaminants are detected, the

participants will be provided with information about technologies for removing these compounds from drinking water.

At the conclusion of the study, location-based result maps will be generated to show where areas with high pediatric cancer incidence intersect with areas that have elevated agrochemical concentrations in drinking water. All data reported to the public will be aggregated, so that individual results cannot be tracked to a specific home, well, or family.

The findings from this research will allow for development of a comprehensive monitoring program for environmental contaminants in areas where elevated incidence rates for pediatric cancer have been documented. UNMC anticipates development of techniques that will enable them to draw preliminary conclusions about water quality and pediatric cancer. NRD staff will collaborate with UNMC researchers on the release of this information when the study is complete. ■



By Erinn Wilkins, Water Resources Technician



Project GROW Report

Soil Health Still GROWing in Demonstration Fields

- (May 2021) Now in its fourth year, the Project GROW (Growing Rotational crops on Wellfield) demonstration fields on the City of York wellfield are trying something new: alfalfa and sorghum.

The five-year collaboration between the city and the NRD involves farming 120 acres using soil health practices including diverse crop rotations, cover crops, livestock grazing, and reduced tillage. Soil health practices are shown to reduce the leaching of nitrogen and other agrochemicals into the groundwater supply. The goal of this project is to improve the soils above the wellfield (where water for residents of the City of York is drawn) and thus protect water quality.

This growing season, alfalfa will be planted on the south field and sorghum on the north. This is the first time either of these crops have been cultivated at the NRD site. Introducing new crops into the rotation provides natural pest and weed control, which means less inputs of pesticide and herbicide are needed, said Dan Leininger, NRD water conservationist. Additionally, alfalfa roots can reach lengths of 20 feet. These elaborate root

structures break up compaction in the soil and increase aeration and water holding capacity. When these roots decompose over time, they release nutrients throughout the soil profile that feed the diverse microbiome required for a healthy soil system. “With these kinds of crop practices, you have more natural mineralization, so that over time you don’t need as much commercial fertilizer,” added Leininger.

Currently, the north field has a cover crop mix of rye and hairy vetch growing on it. In the next few weeks, the sorghum will be planted “green” using a drill--seeds will be deposited into a narrow furrow of soil cut into the cover crops. The rye and hairy vetch will then be terminated, but will continue to provide soil protection and feed the microbiome as they decompose. Sorghum, also known as milo, is a popular ingredient for cattle and bird feed. Leininger says there is increasing

WATER



demand for this crop, which requires less water to grow than corn and is ideal for dryland acres.

Each year, the soil at Project GROW is tested in two ways. A conventional soil test is conducted that measures the amount of nutrients in the soil. These measures provide a guide for how much fertilizer will be necessary for a particular crop and yield goal. Leininger says this year, cooperating farmer Scott Gonnerman will add 80 lbs of phosphorus per acre to the alfalfa, but likely no other inputs. A Haney Test will also be run on soil samples from the GROW fields, which will indicate the amount of nutrients available to microbes, as a proxy for soil health. After three years of soil health practices implemented on this ground, Leininger expects the Haney Test to show significant improvement in soil microbial activity.

There are some soil health improvements that require no testing to document. In previous years, a section of the north field had gullies developing where heavy rains would wash out the soil. Erosion like this can be a major problem in Nebraska. The solution is cover crops, explains Leininger. Keeping the soil covered year-round strengthens the soil structure and protects the topsoil from washing away in a heavy rain. “You can really see how we are healing this land,” said Leininger proudly.

Last fall, cattle were used to graze the rye cover crop, providing a secondary income stream for the property, as well as an additional opportunity for improvement to the soil. Incorporating livestock grazing with cover crops can be exceptionally beneficial to the soil system, says Leininger, as livestock fertilize the soil naturally. ■



Leininger gives a lesson to students from Concordia University on Project GROW soil health practices





Water Quality Impairments Lead to Changes

- (March 2021) When it comes to water quality, the facts are clear and the water is murky: Beaver Creek and Recharge Lake (York) have chemical loads above the standard set by the state of Nebraska for optimum health.

The quantity of atrazine, nitrogen, and phosphorus contaminating these waterbodies is causing problems for aquatic life. The evidence is easy to see with the naked eye—water that is cloudy with suspended sediments that won't settle, no matter how long you wait. These sediments are the carriers of the chemicals, which have reduced the populations of many species in the creek and lake.

No one is disputing the fact that these waterbodies are compromised and that the problem needs to be addressed at the source by keeping soils and agrochemicals on the fields and out of the water.

How to accomplish that while keeping producers profitable is another matter.

An EPA-approved Water Quality Management Plan that targets these impaired waterbodies is already in place; however, the NRD has asked those that live and farm in the watershed for direction on next steps for implementation.

The landowners, operators, agribusiness owners, and livestock producers involved in a recent stakeholder process came to this discussion with a variety of knowledge and experience. Some are

already doing a lot to reduce erosion and runoff on their farms. Others said that there are significant barriers to adoption of practices that would improve water quality.

Jess Spotanski was one of the farmers involved in the discussion. His family has been farming in York County since the 1980s. In the 15 years since he took over the operation, he has tried a number of practices to reduce erosion. "I think that there are so many options and solutions to the problems that it's mind boggling. Even though [this watershed] is such a small area...it encompasses so many growers and landowners. I think the task of finding solutions that work for everyone is daunting for sure." Spotanski and other producers say they are ready to tackle that challenge.



WATER



The NRD is ready to partner with them to do it.

A group of 14 stakeholders from across the watershed (including Hamilton, York, and Seward Counties) recently met to discuss best agricultural land management practices for improving water quality. A few practices rose to the top as those that stakeholders believe more producers would utilize if the NRD and other agencies could increase cost-share and provide additional technical resources.

The group discussions culminated in a public open house in March. The purpose of the event was to provide information about water quality issues and proposed solutions, and to gather feedback from the public. This feedback will guide additional federal grant proposals, said Marie Krausnick, Upper Big Blue NRD water department manager. Ideally, the NRD will receive federal funds that will combine with local and state funds to provide greater cost-share dollars to help producers implement best management practices. The stakeholders group identified four key practices they would like to see implemented more widely in the Beaver Creek and Recharge Lake watershed area: cover crops, buffer strips, no-till, and irrigation water management. There are a variety of reasons these practices are not already widespread, from cost to culture to the

status quo, explains York grower Tony Kreifels.

“There are different kinds of producers out there. Some are willing to change and try new things and some just want to do what their dad or their grandpa did without even thinking maybe there is a better way,” said Kreifels.

Spotanski says he doesn’t believe producers are doing anything intentionally harmful, but sometimes doing the same thing that’s been done for years isn’t the best thing to keep doing. “We all like short-term results, but these practices are all for the long-term...You can see the dollars going into implementing these things, and the headaches they’re going to cause...but to get to the profitability, that’s the hardest part to explain or understand.”

Spotanski says when it comes to convincing producers to change their practices, profitability is key. If producers believe there’s a chance that they will lose money on a practice, they aren’t going to try it, no matter how much others tout its environmental impact. “Some of these practices aren’t necessarily going to increase your profitability in the short-term. How do you convince somebody to change their practices, when it’s going to affect their bottom line?” he said.

Other stakeholders also suggested a barrier to adoption of these practices was communication: farmers are more interested in hearing from other farmers about what works, not from the NRD or other agencies. “One of the things that came up in the stakeholder meetings repeatedly...is the importance of crop consultants, farm managers, people at the cooperatives, the vendors, the people involved with the fertilizer industry. They have a continuing interaction with farm operators and the farming community...That is a very good avenue





for promotion of things like cover crops and filter strips,” suggested Doyle Onnen, a farm manager with Farmer’s National.

Onnen and Spotanski both spoke about the dangers of short-term thinking when it comes to farming. All farm practices need to be oriented toward greater stewardship, they said.

“Going forward, I have this hope and I know there are a lot of other people too, that we do sustain and actually improve our production practices and improve our farms,” said Onnen, who has more than 30 years’ experience in agriculture. “We really are in the job of preservation. We are trying to preserve our environment for future generations, for the farmers that are going to come.” Onnen sees the future of agriculture as inextricably linked to soil health. “Maintaining our soil and sustaining it and having that productivity for future generations...it’s encouraging that we’re seeing more of that.”

Spotanski agrees. A farmer’s ultimate goal shouldn’t only be about profit or yield, he says. “It should be about stewardship of the land. It’s a finite resource. Everyone probably feels like they’re doing some kind of stewardship, but what’s the next level of stewardship that you can do? My advice is to try something. Start small. Learn from it. If you get some positive results, maybe expand on it. Maybe start with some of the worst-case-scenario fields that need more attention. Grow from there.” ■



Water quality concerns: Recharge Lake in York, where the fishery has been harmed by nutrients. (page 20 top)

Outstanding in his field: Jess Spotanski stands amid rows of cover crops. (page 20 lower)

Eyes on the future: Anthony Kreifels’ children Rachel and Jackson represent the fifth generation of the family’s farming operation in York County. (above)

WQMP Stakeholder Gayle Marsh talks to a producer at the open house event in March. (pg 21) Jenny Rees, Nebraska Extension Educator, talks to an NRD board member at the open house (left).

For an enhanced article, video interviews, and additional resources on this topic, visit www.upperbigblue.org/wqmp.



WATER



Expansive Basin Modeling Project Nears Completion

- (June 2021) Imagine this: a severe drought hits Nebraska, causing rivers and streams to slow to a trickle. Lakes are so low that fish are flopping in the mud. Groundwater levels dip as well as the aquifer continues to be depleted, with little precipitation to refill it.

There's one question on everyone's mind as the drought drags on--will there be enough water to meet the needs of domestic users, irrigators, and industry if everyone continues to use water at the same level as before?

While this worst-case scenario sounds like an exercise in pessimism, it is a very real problem faced in the western United States. Given the right circumstances, could it happen here? To safeguard the water supply for all users and prevent against future shortages, the Upper Big Blue Natural Resources District has partnered with the State of Nebraska and three other NRDs in the Blue River Basin in an ambitious project. Since 2017, the group has been working with an engineering firm to conduct a comprehensive survey of the Blue River and surrounding area to examine areas of hydrologic connection—places in the basin where the groundwater and surface water interact. The balance between surface water and groundwater is a vital data point to understanding the water system in the district.

By collecting information about stream flow, groundwater recharge, land use in the basin, drought patterns, and average rainfall and water use, engineers have created a computer program that allows users to run scenarios that test different variables. For example, what would the impact to groundwater recharge be if land use changed

from irrigated farmland to dryland or livestock production? What would the impact be on stream flow if a new industry entered the district and increased demand on water? How long would surface water and groundwater supplies last at typical levels of use if the rainfall decreased by 75 percent in a given period? These variables can be run through the model to determine likely outcomes for geographic and time-based scenarios.

The monitoring and data collection part of the project was completed in 2020. Now the model is being refined and calibrated to produce the most accurate results and is expected to start providing useful data in early 2022. Once completed the model will provide a sophisticated tool for forecasting future possibilities that can assist boards of directors at the Upper Big Blue, Tri-Basin, Lower Blue, and Little Big Blue NRDs as they set policy to ensure abundant water use for all.

“Keeping the agricultural economy of the Blue River Basin strong requires the best science to inform policy for water use,” said Marie Krausnick, NRD water department manager.

Modeling in the Upper Big Blue Natural Resources District started in 2005 with an effort to produce a similar tool for the Platte River. At that time, the state of Nebraska was looking for data about when a water system (surface and ground water) was



fully appropriated (meaning water use is maxed out and no additional acres of irrigation or industrial development can be supported by current water levels) or over appropriated. Part of the district between Bradshaw and York was deemed fully appropriated at that time based on the results of the modeling project.

“At that point, the district saw the value in groundwater modeling,” said Krausnick. When that study was complete, the focus shifted from the Platte River hydrologic interconnection to the Blue River. The current model being created uses a different methodology that provides greater accuracy to the model.

Once threats to the water supply have been identified, the information will become part of the district’s Integrated Management Plan, which means additional resources would be targeted to those areas of greatest concern. Having this plan in place would allow the NRD to apply for additional federal grant monies through the Water Sustainability Fund to make improvements in the district to reduce the threat to the water supply.

“Our goal is to keep groundwater levels stable,” said Krausnick. “The modeling project is an important tool to help us do that.” ■



*Marie Krausnick
Manager, NRD
Water Department*



Big Blue River
Near Milford, NE

WATER



Vadose Zone Study Examines What Lies Beneath the Soil

- The soil under your feet can tell you a lot about the quality of the water hundreds of feet below. A new research collaboration between the Upper Big Blue NRD and the University of Nebraska-Lincoln will focus on measuring indicators in the vadose zone across the district.

The vadose zone is the area beneath the plant 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 other agrochemical contaminant occurrence in the vadose zone. To do this, researchers will examine both historic and spatial changes in groundwater nitrate throughout the district's 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.

For the past few decades, NRD staff have documented a steady increase in nitrogen concentration in some parts of the district. While some areas of the district have seen decreases in nitrate levels, the district overall has had an increase of 54 percent.

This research will begin in the fall of 2021. The NRD is recruiting volunteers to take part in the study who have agricultural land. Selected study participants will be asked to fill out a survey to document current and historical management practices on the fields used in the study. Research will begin sampling in Zones 4 and 5 in fall 2021. It will proceed throughout the district until 2024, including two to three zones each year.

2019 Hastings Vadose Zone Study Complete

Nitrate concentrations in the Hastings, Nebraska public supply wells have been increasing over the past 20 years, forcing the city to implement a costly treatment system to comply with safe drinking water regulations. Two studies conducted by the University of Nebraska over the past 10 years have looked at nitrate storage and movement in the soils around the city's wells to help understand how changing land use can also reduce contaminant loading to these wells. This soil, called the vadose zone, or area between the land surface and the groundwater table, serves as a dynamic reservoir for water, nitrogen and other chemicals seeping past the root zone.

The most recent study compared five-year changes between 2011 and 2016 in stored nitrate under the same fields sampled during the first study and estimated the differences under specific land uses. Some cropland sites showed increases in vadose nitrate while others showed a reduction, though overall the average amount of vadose zone nitrate beneath irrigated cropland increased by about 30 percent in the top 60 feet of the profile. This means nitrogen fertilizer continues to be lost below the root zone despite changing managing practices. The largest amount of nitrate was measured beneath furrow irrigated cropland. Nitrate beneath fields that changed from furrow to water-conserving sprinkler irrigation tend to have lower vadose zone nitrate and supports the idea that reducing



agricultural water use also reduces nitrate leaching.

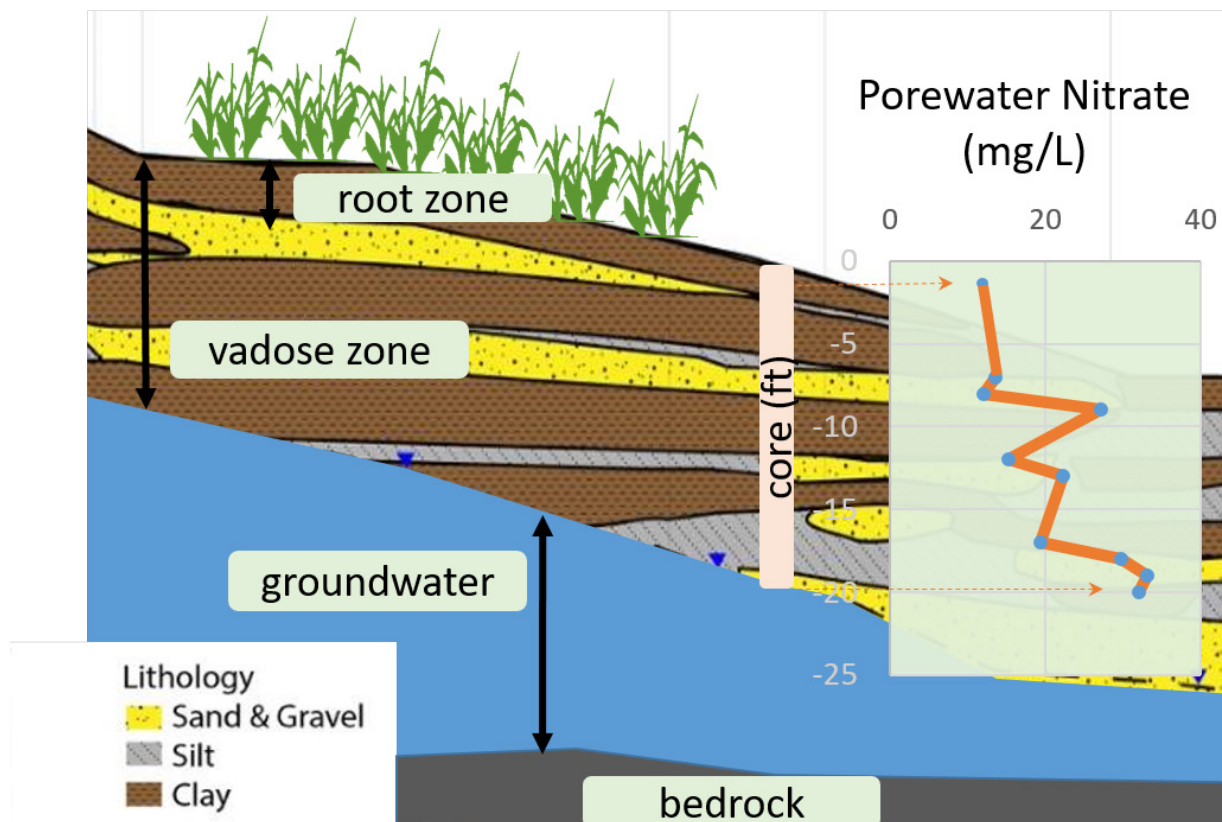
The study found significant differences between ammonia and uranium concentrations by irrigation method, and that almost two-thirds of vadose zone inorganic nitrogen was in the form of ammonia. Ammonia may be leached directly from the surface or derived from leached nitrate. Nitrate isotope testing in the vadose zone and groundwater suggest that livestock manure may contribute to nitrate loading under some areas, though the major source is commercial fertilizer nitrogen. Groundwater age-dating, and simulation of nitrification and recharge, suggests that water and nitrate production and movement through the vadose zone in the Hastings area occurs in less than 20 to 30 years.

Slowing the buildup of nitrate in the vadose zone and in Hasting groundwater will require long term cooperative efforts between producers and natural resources districts to reduce water and nitrogen losses from fertilized crops.

Cooperation is even more critical now as other drinking water contaminants such as uranium found in the Hastings area groundwater may also be linked to irrigation water and fertilizer use. ■



Jacob Maslonka, NRD Water Technician, is using this vadose zone study as a thesis project for his master's program at the University of Nebraska Lincoln. He is working toward an MS in Natural Resources with an emphasis in hydrologic sciences.



WATER



Seeds of Change

- (June 2020) On a hot, dry, and extremely windy day in early June 2020, Neal Hentzen surveys the dryland field on the edge of Seward where his corn is ankle high. The leaves on the plants whip in the wind like green streamers running in long, straight rows from the road to a faraway fence post.

Hentzen is semi-retired, but he still farms this field and one other, 160 acres in all. In the distance, a tractor slowly rolls down the rows pulling a blue piece of equipment. The device is gently breaking the soil between the rows of corn and depositing a multi-variety cover crop mixture.

“I’ve been farming around here for 50 years,” Hentzen says. “When I heard about this research project with cover crops, I thought, why not give it a try?”

Hentzen is one of 11 area producers participating in an on-farm research study that looks at the many effects of interseeding cover crops into standing corn at an early stage of development. The study is a collaboration between the Upper Big Blue Natural Resources District, Nebraska Extension, and The Nature Conservancy.

Hentzen has used cover crops for many years in his seed corn, planting once the male rows were destroyed. He experimented with using different planting methods and seed varieties to find the best outcomes for winter grazing cattle and reducing soil compaction in his fields. This year he is growing commercial corn and is eager to see how interseeding the cover crops (a method he has not used before) will

change the operation. “It will be an experiment. Since they were providing the equipment and were going to plant it for me, I thought I would see if it would work. If it does, I will probably do it again,” he said.

Cover cropping has numerous benefits, from preserving soil moisture and decreasing flooding, to adding carbon and other nutrients to the soil ecosystem, to preventing nitrogen leaching to the groundwater supply. Many previous studies have established the value of cover crops. This new study will look specifically at timing. How does

planting the cover crop into an immature growing crop, as opposed to a newly harvested field, impact the system?

It’s an important question, as farmers who are interested in introducing cover cropping may struggle to do so in the fall. There is a small window of time between harvest and when the soil is too cold for plants to get established.

Interseeding the cover crop in late spring or early summer extends the window of opportunity.

Even in spring, the timing is tricky. Plant the cover crop too early and it will crowd out the cash crop. Too late and it will not have sufficient time to get





*Bruce Hudson,
cooperating grower near
Bradshaw*

established before the canopy of the corn leaves block out the sunlight. The best time to do it is between corn growth stages V4 and V6, when the plant is about four inches high, the study organizers predict.

NRD Water Conservationist Dan Leininger is behind the wheel of the tractor in Hentzen's field. A farmer himself, Leininger is at home in the cab as he slowly steers the machine between the rows of green, planting the cover crop in eight row strips. Leininger is the resident cover crop evangelist at the NRD; for the past four years he has maintained the Project GROW demonstration fields in York, where cover crops are an essential component of restoring soil health.

"What I wish more farmers understood about cover crops is that they're not going to rob your cash crop of water and nutrients. The cover crops lock up leftover nitrogen [during its fall and spring growth] in the above ground biomass, which is going to be available for next year's crop," Leininger explains over the rumble of the tractor's engine. "This system keeps any residual nitrogen from leaching into the underground aquifer,"—an important consideration, as many rural Nebraskans are exposed to the health risks associated with increased nitrate in their drinking water as a result

of incomplete plant uptake of nitrogen fertilizer.

The cover crops Leininger is planting today will emerge in the next two weeks then will lie dormant for a time when the canopy of the corn closes over them. When the corn reaches senescence in the fall and the leaves dry out, the cover crop will spring back to life and continue to grow, protecting the soil when the cash crop has been harvested.

For this research project, cooperating producers were given the choice between two cover crop mixes: a legume mix to add nitrogen to the soil and a diversity mix better for grazing, increasing biodiversity, and building organic matter and activity.

Hentzen's is the second field Leininger has planted so far for the research project. "That field we planted near Beaver Crossing yesterday had had some cover crops on it over the winter, so that planting was really different. The ground was a lot softer," he says, noting how the roots of the cover crops keep the soil loose and porous. At the end of the row, Leininger swings wide, skipping eight rows before starting down another stretch of the field. This is intentional, as the alternating sections of cover crops provide a control group in the experiment, giving side-by-side verification of the practice's effectiveness. The process will be repeated in this field for the next three years.

According to Steve Melvin, UNL extension educator based in Hamilton and Merrick Counties, the three-year period will even out weather variations from one growing season to the next and will provide more reliable data than a one-year snapshot approach. Data on soil health and yield will be analyzed and reported annually through UNL's

WATER



On-Farm Research Network publications and events as well as through the NRD, but the overall effectiveness of the project won't be known until after harvest in 2022. In future years of the project, they may expand to interseed cover crops into soybeans as well.

Nelson Winkel, soil health specialist with The Nature Conservancy, describes how the project came to be. "When we start a new project, we're always looking for ways to amplify the good work of others already underway. When we learned from the Upper Big Blue NRD and UNL that farmers in the area were starting to experiment with interseeding, we knew there was a great project waiting to be funded." In collaboration with Kellogg Company and a pending grant from The Nebraska Environmental Trust, The Nature Conservancy purchased the project's interseeder drill and will cover the costs of soil and plant tissue analysis.

"We are a science-based organization, and to make the science do its best work we put farmers at the center of our projects. When a farmer tells us that they're experimenting with soil health, we ask them 'what are you doing, what's working, how can we get you the information you need to further assess

the practice?'" Winkel adds. "Working with the NRD and UNL to deliver that science to farmers has been a great experience so far."

Melvin is also pleased with the research collaboration between the three agencies. "I've heard from a lot of farmers in the last few years that they are interested in trying cover crops but find it difficult to get them planted in a timely manner in the fall after harvest. This project is a good coming together of these three different groups, working together to test this idea," he said. More than yield data or soil health breakdowns, Melvin says the first year of this project is about one question: will this work in Nebraska?

"There are a lot of questions about the practicality of interseeding and a lot of things we will measure, but we are looking at the big picture, a systems approach. How can we make cover crops work in the Nebraska corn/soybean cropping system? Is this the right time and method for cover crops?"

Time will tell. ■

Update: This project continued in 2021 with the same 11 cooperating farmers.



Interseeding cover crops in test rows under a cloudy sky

Project GROW Winter Workshop: Better Soil, Better Health—For Plants and People

- (December 2020) Soil health is in the hands of farmers. This was the key take away from the 2020 Project GROW Winter Workshop, hosted by the NRD on December 3, 2020. Most of the speakers were virtual, but the information on how to improve soil health and profitability were real and applicable for the nearly 100 people gathered in-person and online.

The keynote speaker was Dr. Jill Clapperton, international soil health expert. Due to pandemic travel challenges, Clapperton joined the Project GROW event from her farm in Washington. Clapperton is the principal scientist and owner of Rhizoterra Inc, a science-based organization dedicated to increasing soil health around the world through research and education. Clapperton explored a variety of topics pertaining to soil health and its links to human health during her sessions. (Recordings of Dr. Clapperton’s presentations, as well as the other Project GROW speakers’ sessions, are available on the NRD YouTube channel.)

Clapperton presented on the complex web of organisms at work in the soil, from mites to mycorrhizal fungi, and the predator-prey relationships that govern a healthy soil system. Clapperton advocates for practices including reduced tillage, reduced chemical inputs, diverse crop rotations, incorporating livestock grazing, and cover crops as ways to increase the biological activity in the soil. Improving the soil has many benefits, from increasing its water and nutrient holding capacity, to reducing erosion, to improving water quality. Clapperton made the case that producers can focus on soil health and be profitable—it doesn’t have to be an either/or scenario.

This message was echoed later in the day when Dan Leininger, a water conservationist with the NRD, and local producer Scott Gonnerman presented on the progress made at the Project GROW (Growing Rotational crops on Wellfield) demonstration fields in York. In the most recent growing season, the fields were profitable as Leininger and Gonnerman implemented soil health practices on the city’s wellfield, such as planting soybeans into a standing cover crop of rye on one of the fields. “I like planting green,” Gonnerman said, showing a photo of the minimal disturbance method he used when planting the soybeans. After emergence of the beans, he used a roller/crimper to flatten the rye. Gonnerman, who was named a master conservationist by the *Omaha World Herald* in 2018 for his farm practices, talked about how he



WATER



has increased the water infiltration rate of his own fields dramatically in the span of ten years through investments in soil health. In a recent test, his soil infiltrated two inches of water in less than two minutes. While the Project GROW demonstration fields are only in year three of a five-year project to restore the soil structure, Gonnerman and Leininger noted that the infiltration rate is increasing there as well, which means less erosion, flooding, and nutrient loss.

Tatiana Davila, a groundwater geologist with the Nebraska Department of Environment and Energy, spoke to event attendees on the topic of water quality in Nebraska. Davila manages the Wellhead Protection Program and Source Water Protection Program for the state, helping communities guard their groundwater against contamination by working collaboratively with stakeholders from the local, state, and federal levels.

“Everyone is a stakeholder when it comes to water,” she explained. Nebraska is a groundwater dependent state, both for drinking water and irrigation. “The majority of samples show that groundwater in Nebraska is of very high quality,” Davila noted. “However, the samples also show a number of contaminants continuously show up in certain areas of the state in high concentration,” such as nitrate-nitrogen, atrazine, and a variety of chemicals linked to agricultural production. Studies have linked these contaminants to a variety of health concerns, including pediatric cancers and birth defects. Nebraska has some of the highest rates of pediatric cancers in the U.S. explained Davila. Continuing to improve agricultural practices and remediate for legacy nutrients in the groundwater system is vital to the health and wellbeing of Nebraskans.

The final speaker of the day was state

climatologist Al Dutcher. Dutcher recapped the weather patterns in Nebraska in 2020 and predicted some possible weather outcomes to look for in 2021. He also looked at weather patterns that will affect other grain and soybean producing nations including Brazil, Australia, and South Africa to predict how global markets might respond to future events. The fall 2020 period in Nebraska has been warmer and dryer than normal and Dutcher predicts drought conditions will continue through the winter and possibly into the spring.

That forecast makes the Winter Workshop emphasis on soil health all the more important, says Leininger. “Good soil health is really a buffer against weather extremes,” he said. “We’re having more frequent big rain events and then long periods without much moisture. When the soil is healthy and has a good infiltration rate, it will lock in all the moisture from a heavy rain instead of having it run off. Having the soil covered means that it will hold onto moisture longer, even in times of drought.”

The Winter Workshop also included programming for area high school students, who met with Clapperton via Zoom. FFA and ag students from York, Milford, and McCool Junction learned about the elements of soil health and why it’s worth investing in it, as well as careers in soil science. ■

Videos of Project GROW speakers are on our YouTube channel.





New Incentive Program for District Producers

- The Nebraska Soil Carbon Project is a collaboration with the Natural Resources Conservation Service (NRCS), the Upper Big Blue and Central Platte NRDs, The Nature Conservancy, Ecosystem Services Market Consortium (ESMC), Cargill, Target, and McDonald's.

The goal is to team up with 100 producers to install 100,000 acres of new soil health practices on central Nebraska cropland over five years. In year one, the target acreage enrollment is 20,000 acres. Farmers who enroll will be compensated for adopting cover crops, no till, and/or diverse rotations.

This project will provide greater financial incentives to producers who utilize key conservation practices in central Nebraska. Farmers can adopt soil health practices--including cover crops, no-till, and diverse crop rotations--that store carbon in the soil. This stored carbon can be utilized by private companies to help reach their goals around sustainability. Depending on the practices implemented, producers will earn up to \$45 per acre each year.

The goal is to have ~100 producers install these soil health practices on 100,000 acres of farmland over the next five years. The expectation is to enroll 20,000 acres in the first year across the two NRDs, providing \$8 million to farmers.

Increasing cropland soil carbon has multiple benefits for the producer and the environment including more stable yields; improved nutrient availability and water holding capacity; and climate stabilization. Now is a great time to invest in soil health practices that increase soil carbon, as markets are emerging to link soil carbon buyers and suppliers. Private companies are looking for ways to decrease their carbon footprint and Nebraska's growers can provide these benefits by improving their farming operations as they implement soil health practices. It is a win-win situation, as this systems approach gives companies a way to meet part of their greenhouse gas reduction goals while supporting farmers who are implementing conservation practices.

The payments producers will receive are tied to the practices implemented on the acres, not the carbon outcomes, to reduce the amount of risk involved for producers. Colorado State University is providing scientific support through this project.

WATER



The project is estimated to store the equivalent of 150,000 metric tons of CO2 while enhancing Nebraska’s soil and linking producers to new carbon payment opportunities.

Beyond the financial incentives and soil health improvements, involved producers will have the opportunity to:

- Share conservation stories with a larger audience via field days, media spots, and short videos relating to the project.
- Attend training events with local and national leaders in soil health, agronomy, and related topics.
- Receive a report on the new practice’s soil carbon and water quality outcomes. Those that are interested in going deeper may also opt-in for a detailed report on the practice’s financial return on investment.

There will be year-round assistance from the NRDs, NRCS, and The Nature Conservancy staff, who will provide support for paperwork/application processes and soil health practice management.

There is no gross income or acre enrollment cap for NRCS payments, but producers are encouraged to enroll a reasonable number of acres given their operation size and soil health experience. More acres can be submitted for enrollment in subsequent years of the program. Payments are for new soil health acres only, however a measurable improvement of an existing practice could count (such as moving from strip till to no till) if it aligns with the NRCS’s standards. ■



TIMING

One new crop over **three years.**



DEFINITION

A new crop is defined as a **small grain or perennial crop**, e.g., wheat, sorghum, alfalfa.



PAYMENTS

All enrolled acres receive **payment** for all **three years.**



ALTERNATIVES

Three alternatives to implement this rotation.

Year One Results (enrollment period May 1 -June 15, 2021)

District	# of Producer Applicants
Upper Big Blue NRD	24
Central Platte NRD	19
TOTAL	43



The Nebraska Soil Carbon Project



#1: Increased cropland soil carbon has multiple on and off farm benefits.

- More stable yield
- Improved nutrient, soil, and water status
- Climate stabilization



#2: Soil health practices increase soil carbon.

- No till
- Cover crops
- Diverse rotations



#3: Markets are emerging to link soil carbon buyers and suppliers.

- Private companies (buyers) are looking for ways to offset their climate change footprint.
- Farmers (suppliers) can provide those climate benefits through soil health practices.



WATER



A New Twist on Nitrogen Management Training

- A suggestion from the public changed the content and format of the nitrogen management trainings offered by the NRD in the winter of 2020/2021. The new approach allowed for a diversity of information and formats to give producers more flexibility and options.

Each year the NRD offers several training dates in locations across the district to address issues related to nitrogen fertilizer use, including how nitrogen use impacts water quality in the district, mandatory reporting, and resources available. All district producers who are in a Phase II or III management area are required to attend one of these training sessions or to complete an agronomic centered take-home test every four years to maintain their nitrogen certification.

A member of the local ag community suggested at a board of directors meeting in the fall of 2020 that the NRD consider expanding the annual programming to include more content, as overuse of nitrogen fertilizer in the past has many concerned about water quality and the possibility of additional regulation across the state in the future. More education, they reasoned, could be part of the

solution to changing agricultural practices and stave off the need for enhancing rules around fertilizer use.

Dan Leininger, water conservationist for the NRD, is the chief organizer for the annual nitrogen management training sessions. Leininger saw this suggestion a way to give producers more learning opportunities by expanding training topics. Previously, the same content was delivered at each session, no matter where it was offered, so that attendees would hear a consistent message across the district. This year, some portions of the trainings offered are standard across all locations, while others are varied. Producers still need to attend only one training session, however, they have been encouraged to attend multiple training events or watch the recordings from each of the events to hear the expanded content.



The first session was held at the Leadership Center in Aurora. In addition to presentations from NRD employees, participants also heard from Dean Krull with Nebraska Agricultural Extension on interseeder cover crop trials and from Ron Jakubowski with Aurora Co-Op on nitrogen use efficiency.

A week later, the NRD offered its annual Project GROW Winter Workshop in York, which touched on some of the same concepts as the other nitrogen management trainings as well as broader topics about soil health. That event drew about 50 people in-person and the same amount online, as it was offered for the first time in this hybrid format.

In January, the training opportunity took place in Osceola at the Polk County Fairgrounds, where the 40+ producers heard from Tim Mundorf, a nutrient management lead at Central Valley Ag. Mundorf's informative program looked at how to analyze a soil test so that producers can make informed, data-led decisions about their nutrient needs for maximum profitability.

In February and March, additional training events were held at the Holthus Convention Center in York, including sessions from guest presenters as well



as NRD staff. Dr. Dan Snow, University of Nebraska research associate professor, presented on how nitrate-nitrogen moves through the soil profile in Nebraska. Paul Jasa, University of Nebraska Lincoln extension engineer, spoke about increasing nitrogen efficiency using cover crops and reduced tillage. Tim Mundorf and Mick Goedecken from Central Valley Ag returned to talk about soil tests and nitrogen efficiency.

“We hope that local growers will take advantage of these opportunities to learn,” said Leininger. “The NRD wants to partner with producers so that we can all work together to protect the natural resources of our district while improving nitrogen use efficiency.” ■

Videos from Project GROW Winter Workshop and Nitrogen Management Trainings are available on our YouTube Channel



PROJECTS



Emergency Plans Reviewed for Hastings Northwest Flood Control Structure

- HASTINGS, Neb. — Two years removed from Nebraska's devastating floods, Hastings leaders gather to look at the unique hazards in the community. If the water surges, Ron Pughes wants to be ready. The Adams County emergency management director said if a flood project northwest of the city failed it could be deadly.

"People don't realize it and get swept off their feet in 30 degree water is quite the event you have to overcome," he said.

While Nebraskans may picture devastation like the Spencer dam in 2019, the state has nearly 3,000 dams that it tracks, both big and small. Some of those are for irrigation or recreation and some are for power generation. The Hastings Northwest Flood Control Structure is near the airport and not far from homes and commercial development.

Jack Wergin of the Upper Big Blue NRD said, "Due to its location so close to town, it's considered a high hazard dam, high hazard has nothing to do with the condition of the dam, it has to do with the threat downstream of the dam."

Operated by the Upper Big Blue, Wergin said the dam is in good shape. Still he said it's important to run through disaster plans every five years to stay sharp.

Pughes said he took it serious as they called 911 and notified the state. "It creates a little spot in our brain, brings it back to us because we've actually done it," Pughes said.

Wergin, the projects manager for the NRD said the city likely would have had flood damage if not for the dam. "What the dam does is slow flood flows, so there's less flooding downstream."

In addition to this table top drill done every five years the state inspects the structure every year. ■



Buffer Strips: Good for Growers AND Their Land

■ (August 2020) -- The sun is high in the sky and the temperature is rising on a late summer day in York County. Despite the heat, semiretired farmer Ken Janzen looks perfectly comfortable as he stands on the gravel road next to one of his cornfields.

He’s seen plenty of scorching Nebraska weather in his lifetime of farming in this area. Rows of tall green stalks and golden tassels stretch to the horizon in all directions. Amidst the sea of corn, the only sounds are the loud whir of cicadas and the running water of a creek that cuts through Janzen’s property.

It’s the area around the creek that is of special interest today. Janzen points out the wide swath of native grasses that line the banks of the creek. “When we get big rains, the water gets pretty high through here,” he said. Tired of seeing his topsoil washed away down the creek while the banks

grew ever steeper with every major rain event, in 2000 Janzen worked with the Upper Big Blue Natural Resources District to take advantage of the Nebraska Buffer Strip Program. Through funds available through the NRD and other state and federal agencies, Janzen was able to receive cost-share funds for the installation of seven acres of native grasses in his fields adjacent to the creek. He also receives an annual payment for those acres to make up for the loss of income involved in taking them out of production.

Buffer strips are native grass or trees planted where runoff water leaves a field. These strips are cultivated along streams, lakes, ponds, or wetlands to protect surface water and reduce erosion. They have many benefits for the land as well as the landowner.

Janzen’s motivation for adding this conservation activity were highly practical. His main concern was his pivots. If he could keep the banks from washing out more and the creek from getting deeper, the pivots were less likely to get stuck when traveling over the creek. He first tried lining the problem areas with concrete, but it wasn’t a good long-term solution. The buffer strips have performed better. Now when there’s a heavy rain, the



PROJECTS



grasses are bent over flat for a few days when the water is high, but as soon as the water recedes, the grass bounces back up—and the soil is still where it is supposed to be, Janzen says. When it’s time to irrigate, the pivots are able to cross the small creek without difficulty.

An added benefit is that Janzen can more easily and safely get between the crop and the creek with farm machinery.

Today the water in the creek is low, no more than a slow trickle through the grass. It has been a few weeks since there was a good rain and a pivot is running in a nearby field. The mix of native grasses growing along the creek are waist high. In addition to keeping Janzen’s soil in place, this buffer strip also filters agrochemicals, preventing excess nitrogen from his field from entering the water supply. Janzen likes that he’s doing his part to keep the local waterways clean. According to the Nebraska Department of Agriculture, strips like the ones employed at Janzen’s farm can filter up to 60 percent of pesticides and can remove up to 75 percent of sediment from entering the creek.

“We know that vegetative filter strips and riparian forest buffer strips positively impact water quality by reducing the amount of sediment, pesticides, and nutrients that reach surface water,” said Craig Romary, environmental programs specialist with the Nebraska Department of Agriculture. “These practices are just a part of many other best management practices that are being implemented in an effort to keep sediment and other contaminants from leaving the farm.”

This kind of common-sense conservation is a no-brainer for Nebraska, says Romary. “Reducing nonpoint source pollution to our surface waters benefits all Nebraskans.”

Janzen is one of 428 producers in the state who are

part of the Nebraska Buffer Strip Program, which currently has 3,889 acres enrolled. The program began in 1999 and Janzen was an early adopter. Annually, the program pays out nearly \$600,000 to Nebraska landowners for their participating acres.

In the Upper Big Blue NRD, there are 23 contracts for about 170 acres of filter strips with an annual payout of more than \$30,000. These filter strips provide protection for approximately 21 miles of streambanks.

“Buffer strips were one of the priority practices identified by the Stakeholder Advisory Committee during the development of the district wide Water Quality Management Plan,” noted Jack Wergin, projects department manager at the Upper Big Blue NRD. Two segments of Beaver Creek were identified as priority waterbodies in this plan, which resulted in the entire Beaver Creek drainage area being named as a single target area.

“The Water Quality Management Plan serves as a roadmap to improve the water resources and water quality within the district. As we begin the implementation phase, we hope to see an increase in the number of buffer strips, especially in the targeted priority areas around Beaver Creek.”

Janzen encourages other producers to consider adding buffer strips to their operations, especially in low-lying areas that are prone to flooding. “It’s a good way to keep the soil in your field and control erosion--and you get paid pretty well for the acres,” he said. Without the strips, Janzen noted that he would be losing money and topsoil every year on the harder to farm stretch of land. The conservation practice has proven to be good for the environment and very good for his wallet over the past 20 years.

Contracts with producers in the program last five to ten years and payments vary from \$20 to \$250 per acre depending on soil type, whether the areas

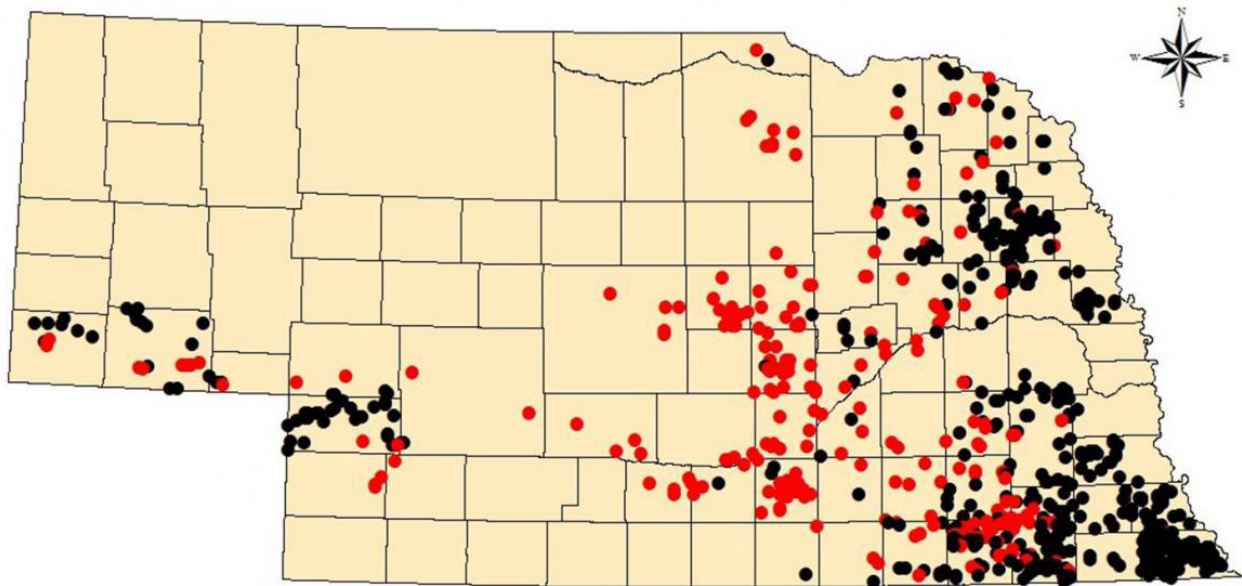


are irrigated or not, and whether payments are received from other programs. The program can be partnered with the USDA Conservation Reserve Program for additional incentives.

The 95-year-old house where Janzen grew up is nearby. Built by his grandparents, it's also where Janzen's mother grew up. Today, his son's family lives there and farms the land with him. His grandson, representing the fifth generation of Janzens on the property, drives a pedal tractor around the outbuildings as the farm dogs keep watch. Another section of buffer strip lines a small creek between the home place and the gravel road. While Janzen is looking forward to retiring fully someday, he's committed to leaving his son, grandson, and future generations of Janzens a farming operation that is in the best shape possible. ■



Nebraska Buffer Strip Program



Buffer Distribution

- Non-irrigated Buffers
- Irrigated Buffers



PROJECTS



"The Heart and Soul of Our Community"

NRD Funds Improve Park in Beaver Crossing

- (September 2020) -- When a massive tornado tore through Beaver Crossing on Mother's Day 2014, it destroyed or damaged virtually every home and business in the small community, ripped trees out by the roots, and left farm buildings lying in heaps of twisted metal. Power lines blocked the roads and center pivots with wheels in the air were scattered across fields.

Thankfully, no one in Beaver Crossing was hurt; neither was the community's spirit harmed.

Immediately, residents began the long, slow process of clearing away the wreckage and working together to build back stronger than before.

The city park, just a few blocks from downtown, became the unofficial dumping grounds during the clean-up phase. Debris littered what was once the main gathering place for the community. "We wondered if we would ever see green grass there again," said longtime resident Marsha Barth. "There were huge piles of trees and there was broken glass and nails everywhere."

It took more than a year to finish repairs to homes

and businesses before work on restoring the park could begin. Municipal funds were involved in the clean-up, but there wasn't money in the village's budget to rebuild the ballfields, grandstands, and other amenities. "It was a labor of love for the whole community," to bring the park back to life, explained Terry Barth, Marsha's husband and a lead volunteer on the park renovation. Even older folks who couldn't do much physical labor came out to help. "With their trembling hands, they would hold the bolts or pass the wrenches," recalled Terry.

It took years to raise the funds necessary and renovation happened in stages, a bit at a time. Thanks to contributions from citizens and businesses, hundreds of volunteer hours, and support from the Upper Big Blue Natural Resources



District, the park is once more a focal point for the village. The latest upgrade included improvements to the park's main building, which houses restrooms and the concession stand (the proceeds from which support youth sports). Through the Upper Big Blue NRD's Parks Program, the NRD's board of directors approved the village's request to provide 25 percent of the local cost-share up to \$10,000 toward the total \$80,000 needed for the renovation.

"We feel good about the work that Beaver Crossing has put in to their park as well as the whole town itself in rebuilding," said Roger Houdersheldt, chairman of the Upper Big Blue NRD board of directors. "The amount of labor and machinery that has been volunteered is remarkable and a testament to the town and surrounding area."

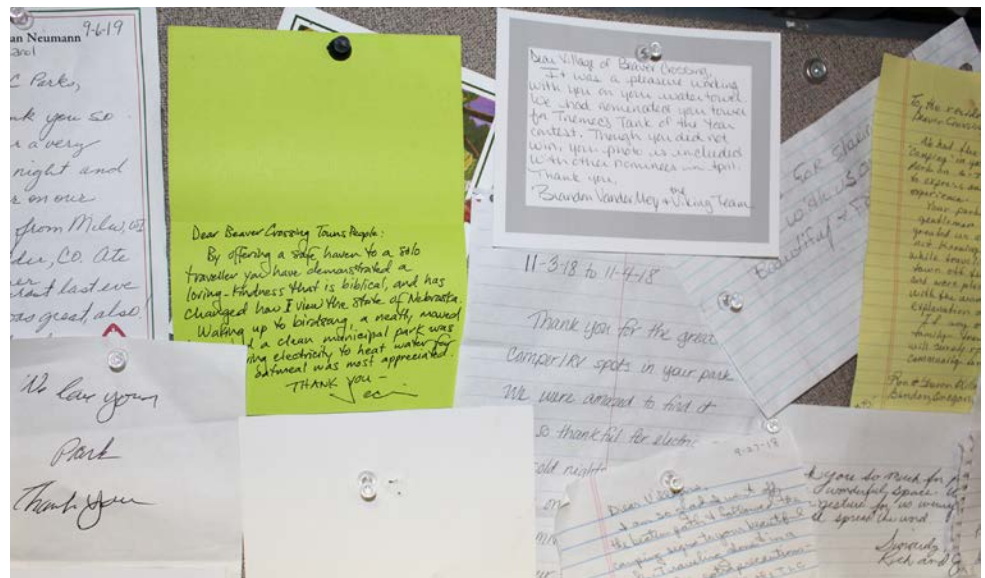
Summer 2020 was the perfect time for park improvements, as the pandemic meant the cancellation of regularly scheduled baseball and softball tournaments. The renovation was completed at the end of September, including upgrades to the bathrooms for ADA compliance. "We wanted to make sure the park was accessible for everyone," said Jere Leif, who has worked with Terry to coordinate funds and volunteers for the project.

"We couldn't have done all of this without the help of the NRD," explained Marsha. In addition to funds through the NRD's Park's Program, which supported the recent facility upgrades and the installation of a half-mile walking trail around the perimeter of the park, the NRD also supplied trees in the aftermath of the tornado. The NRD's Storm Damaged Tree Program provided 170 new trees for planting on public and private property throughout the village in 2014.

The NRD's Parks Program offers district cities and villages planning and financial assistance for the development or improvement of natural resources in nature areas, campgrounds, and park facilities that encourage tree planting, creation of wildlife habitat, and open spaces.

Now fully restored, the Beaver Crossing City Park is used by community members daily. Families enjoy the swimming pool, tennis and basketball courts, and playground equipment. Seniors exercise on the walking trail. High school teams compete at the ballfields. A ladies group meets for coffee most days at the picnic shelter. The annual Beaver Daze community festival is held there (though this, too, was cancelled in 2020), featuring live music, a rib cook-off, and other events.

The park is also frequented by visitors who make use of the six RV hookup spots available for a free-will donation. The park is close enough to I-80 to be convenient for cross-country travelers, yet far enough away from the traffic to be a peaceful place to stop. "We hear from campers all the time that they are amazed such a small town has such a great park," said Jere, noting that many travelers have



PROJECTS



also contributed funds to the community’s effort to rebuild.

“This park is the town’s heart. It is the heart and soul of our community,” said lifelong resident Johnny Davis. A retired farmer, Davis has volunteered his time, labor, and tractor for park improvement projects since the tornado.

The park has been here for more than a century said Davis, reminiscing about the spring-fed, gravel-bottomed swimming pool and the vintage grandstand that used to be on the property. Davis recalled with a smile the memory of practicing with the high school football team at the park many decades ago and getting tossed, pads and all, into the old pool as part of freshman initiation to the team. While the park looks a bit different today, it remains a place where good times are celebrated and memories are made, thanks to the efforts of Beaver Crossing’s citizens and the partnership with the Upper Big Blue NRD. ■



NRD trees planted in the Beaver Crossing park after the tornado (above). This cheeky fellow greets visitors to Beaver Crossing on their way into town (below).



Lifelong Beaver Crossing resident Johnny Davis has volunteered his time, labor and tractor for park improvement projects since the tornado.





Conservation and Recreation: Private Dams

■ (September 2020) -- The water in the pond on Dwaine Kubicek’s farmland in Milligan is low, having been drained recently for improvements to the dam structure. Still, it is the prettiest spot in the area on this warm day in early fall. Bullfrogs are hopping, crickets are singing, and a family of ducks is paddling across the pond toward the haven of a small island.

Trees hug the shoreline, providing cover for white tailed deer and mule deer. Kubicek has seen plenty of bobcats, rabbits, pheasants, quail, and numerous species of waterfowl at the communal watering hole. In the spring, dozens of endangered whooping cranes will pause their annual migration for a short stay on the property, filling up on last year’s corn in the neighboring fields and bedding down on the water at night.

This robust and diverse ecosystem is made possible by the dam on the north end of the pond. Originally installed by Kubicek’s father in 1964, the dam collects runoff from 1,600 surrounding acres and holds 78 acre-feet (25.4 million gallons) of water in the conservation pool. After 56 years of use, the dam was still functional but had begun to show its age. Parts of the tube were rusted through. Kubicek knew that water seeping through the pipe could wash out the soil underneath and lead to the dam’s eventual failure.

“I didn’t want to just break it open and not catch all that water,” said Kubicek. “I wanted to keep that conservation practice going.” Kubicek partnered with the Upper Big Blue Natural Resources District on the repairs, taking advantage of cost-share funds in the Private Dams Program. These funds provide landowners with an opportunity to correct or re-build privately owned dams. The NRD will contribute 75 percent of the project costs up to a



maximum cost-share of \$50,000. Eligible costs include construction and design services provided by a private engineering firm. The NRD works with the Natural Resources Conservation Service for the design and construction support services provided to this popular program.

The repairs to Kubicek’s dam, which included removing the old pipe and installing a new one, as well as a new riser and other reinforcements, cost about \$71,000, of which the NRD contributed \$50,000. “When my dad built it, it cost \$10,000. Now just to replace the tube is over \$70,000. But I guess that’s progress,” Kubicek jokes. “I was most appreciative that the Upper Big Blue decided to help me out on that because it would have been a much bigger decision for me otherwise.”

PROJECTS



Nebraskans have made a large investment in building dams across the state. There are over 2,900 dams on the Nebraska Dam Inventory; 57 percent of them are privately owned. Most of these dams are considered “small” (storage of 15-250 acre-feet). According to a report from 2018, 43 percent of Nebraska’s dams are more than 50 years old, and nearly 500 Nebraska dams are in poor condition, meaning they may fail under expected conditions. To rebuild these dams (at an average cost of \$60,000 each) the total investment would be \$122,820,000. Dams like Kubicek’s provide sediment and erosion control. They also control flooding and store water for future irrigation use. Water that would have been lost instead stays on Kubicek’s land and recharges the aquifer. Kubicek is considering the installation of a second dam on another part of his property for additional flood control.

After the flooding Nebraska saw in 2019, Kubicek isn’t the only one who recognizes the value of dam investments. Across the state, the flood control benefits of Nebraska’s dams provide an estimated benefit of over \$62 million per year.

The work on Kubicek’s dam was completed in August and with the rainy week at the beginning of September, the water level was on the way back up. One of the final components to the project was reseeding the area that had been damaged by work crews and heavy machinery with native grasses to prevent erosion and restore the wildlife habitat.

Kubicek stocks the pond annually and says the fishing and hunting at the dam site are both good. “There are six of us eating off of that area,” he says. And that, in addition to the many other benefits, is an investment worth protecting. ■





Boys Pond Upgrades

NRD Supports Improvements to Geneva Landmark

- (August 2020) -- Since the 1900s, residents of Geneva have been enjoying local flora and fauna at a little fishing spot simply dubbed the Boys Pond. Surrounded by benches and bisected by a walking bridge, the one-acre pond offers several places to quietly cast a line and enjoy the songs of the crickets, birds, and frogs. Sheltered picnic tables and barbecue grills make it a great place to gather and enjoy a meal.

A fountain keeps the water moving and regular stocking means there are plenty of fish for anglers to enjoy. A paved path invites visitors to walk the shaded circumference of the pond and enjoy the swaying foliage of the willow trees dancing over the surface of the water.

Big things are in the works for this picturesque community gem. A planned upgrade to the site would increase the footprint of the pond by about 25 percent, extending it to an adjacent property to the south. A playground and basketball court may also be added, as well as a dock with improved access. The project is a partnership between the City of Geneva and the Geneva Volunteer Fire and Rescue Department, whose members fundraise and manage upkeep and improvements at the park. The volunteers are seeking to raise about \$57,000 for the expansion of the pond.

At the August 2020 board meeting for the Upper Big Blue Natural Resources District, Jeff Wusk, an industrial technology teacher at Fillmore Central and volunteer firefighter in Geneva, requested support from the NRD for the pond expansion project. The NRD board voted to allocate \$10,000 in the next two years for the project. Additionally, Jack Wergin and Jeff Ball of the NRD Projects Department will provide technical assistance during the planning phase, along with input from the Nebraska Game and Parks Commission.

Through the NRD's Parks Program, district cities and villages have access to planning and financial assistance for the development or improvement of natural resources in nature areas, campgrounds, and park facilities that encourage tree planting, creation of wildlife habitat, and open spaces. ■

PROJECTS



Table LT-1: Land Treatment Projects per County 2020

County	NRD	NSWCP	Total	% of Total
Adams	2	0	2	5.41%
Butler	0	9	9	24.32%
Clay	0	1	1	2.70%
Fillmore	3	1	4	10.81%
Hamilton	2	0	2	5.41%
Polk	0	0	0	0%
Saline	1	0	1	2.70%
Seward	5	3	8	21.62%
*York	10	0	10	27.03%
TOTAL	23	14	37	100%

* Denotes that 100% of county land area is located within the Upper Big Blue NRD.



NRD staff repaired Dunker Dam near Ulysses in 2021 (left)

Oxbow Recreation Area, where invasive phragmites were removed using a drone sprayer (right)

|||||

Table LT-2: Expended Land Treatment Funds per County 2020

County	NRD	NSWCP	Total	% of Total
Adams	\$6,174.94	\$0	\$537.18	0.46%
Butler	\$2,218.62	\$52,219.84	\$37,736.08	30.58%
Clay	\$0	\$1,912.47	\$950.70	0.77%
Fillmore	\$3,639.35	\$12,116.35	\$22,241.95	18.03%
Hamilton	\$1,840.60	\$6,665.86	\$18,119.83	14.69%
Polk	\$0	\$0	\$0	0%
Saline	\$2,431.19	\$0	\$0	0%
Seward	\$9,843.29	\$24,706.55	\$30,233.52	24.5%
*York	\$2,1355.96	\$7,500.00	\$13,533.98	10.97%
TOTAL	\$47,503.95	\$71,667.20	\$123,389.24	100%

* Denotes that 100% of county land area is located within the Upper Big Blue NRD.



PROJECTS

Table LT-3: NUMBER of Practices By Type of Land Treatment 2020

Practice Type	NRD	NSWCP	Total #	% of Total
Basin --Sediment Control	0	8	8	21.62%
Brush Management	1	1	2	5.41%
Outlet	0	0	0	0%
Pasture Planting	0	0	0	0%
Planned Grazing	0	0	0	0%
Terrace System	0	3	3	8.11%
VRI (Variable Rate Irrigation)	1	0	2	2.70%
Waterway -- grassed	1	2	3	8.11%
Windbreak Planting	20	0	20	54.05%
Windbreak Renovation	0	0	2	0%
TOTAL	23	14	37	100%

Table LT-4: COST of Practices By Type of Land Treatment 2020

Practice Type	NRD	NSWCP	Total \$	% of Total
Basin --Sediment Control	0	\$49,645.64	\$49,645.64	40.13%
Brush Management	\$7,500	\$1,912.47	\$9,412.47	7.61%
Outlet	\$0	\$0	\$0	0%
Pasture Planting	\$0	\$0	\$0	0%
Planned Grazing	\$0	\$0	\$0	0%
Terrace System	\$2,218.62	\$14,726.38	\$16,945.00	13.70%
VRI (Variable Rate Irrigation)	\$1,520.00	\$0	\$1,520.00	1.23%
Waterway -- grassed	\$2,302.28	\$9,922.19	\$12,224.47	9.88%
Windbreak Planting	\$33,963.05	\$0	\$33,963.05	27.45%
Windbreak Renovation	\$0	\$0	\$0	0%
TOTAL	\$47,503.95	\$76,206.68	\$123,710.63	100%

PUBLIC RELATIONS



Media Reach

In the past year, the Upper Big Blue Natural Resources District had thousands of dollars worth of earned media with placements in district, regional, and national publications and channels, including:

TV and Radio

- News Channel Nebraska
- KOLN TV Lincoln
- KTMX/KAWL York Radio
- KRVN Rural Radio

Newspapers and Magazines

- Aurora News Register
- David City Banner Press
- Friend Sentinel
- Nebraska Signal
- Hastings Tribune
- Henderson Service Press
- Seward Independent
- Polk County News
- Clay County News
- York News-Times
- No-Till Farmer
- Trader's Dispatch
- Farm and Ranch Nebraska Edition
- Doniphan Herald
- Nebraska Farmer
- Columbus Telegram

Other

- National Association of Conservation Districts News Clips
- Nebraska Water Center Water Current
- Nebraska Farmer Update
- York County Development Corporation 17-County Podcast
- Aurora Chamber of Commerce Podcast



PUBLIC RELATIONS



Website Statistics, Top Pages Viewed and Duration

Analytics upperbigblue.org
All Web Site Data

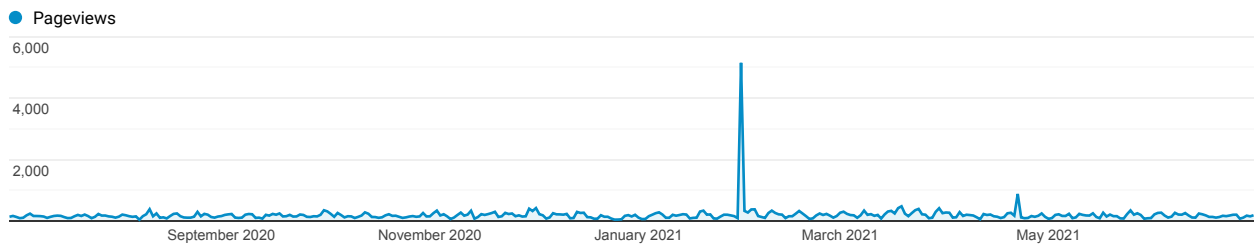
[Go to report](#)

Pages

All Users
100.00% Pageviews

Jul 1, 2020 - Jun 30, 2021

Explorer



Page	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit
	70,349 % of Total: 100.00% (70,349)	54,837 % of Total: 100.00% (54,837)	00:01:44 Avg for View: 00:01:44 (0.00%)	32,973 % of Total: 100.00% (32,973)	57.98% Avg for View: 57.98% (0.00%)	46.87% Avg for View: 46.87% (0.00%)
1. /	18,089 (25.71%)	13,362 (24.37%)	00:01:31	12,779 (38.76%)	41.88%	42.37%
2. /bot-traffic.icu	5,040 (7.16%)	5,022 (9.16%)	00:00:00	5,022 (15.23%)	99.64%	99.64%
3. /about/recreation-areas	4,423 (6.29%)	2,685 (4.90%)	00:00:41	1,311 (3.98%)	36.27%	23.49%
4. /trees	2,890 (4.11%)	1,937 (3.53%)	00:01:54	1,379 (4.18%)	49.18%	53.53%
5. /programs/online-reporting	2,005 (2.85%)	1,603 (2.92%)	00:05:18	900 (2.73%)	18.95%	66.98%
6. /staff	1,882 (2.68%)	1,563 (2.85%)	00:02:47	600 (1.82%)	63.18%	55.42%
7. /board	1,453 (2.07%)	1,056 (1.93%)	00:02:36	428 (1.30%)	33.72%	47.21%
8. /page/4ATnYel6w4NGW/	1,289 (1.83%)	614 (1.12%)	00:00:04	614 (1.86%)	56.68%	47.63%
9. /bruce-l-anderson-recharge-lake	1,261 (1.79%)	945 (1.72%)	00:02:01	213 (0.65%)	44.80%	38.22%
10. /general-information-history	1,222 (1.74%)	951 (1.73%)	00:00:55	89 (0.27%)	62.07%	20.87%

Rows 1 - 10 of 2515

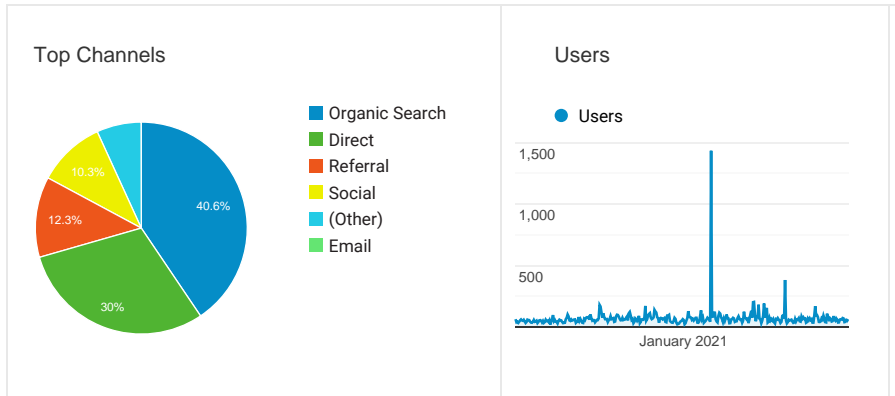
Website Statistics, Traffic Sources

Analytics upperbigblue.org
All Web Site Data

Acquisition Overview

All Users
100.00% Users

Primary Dimension: **Top Channels** Conversion: **All Goals** [Edit Channel Grouping](#)



	Acquisition			Behavior		
	Users ↓	New Users ↓	Sessions ↓	Bounce Rate ↓	Pages / Session ↓	Avg. Session Duration ↓
	18,879	18,685	33,120	57.98%	2.12	00:01:58
1 Organic Search	8,347			47.41%		
2 Direct	6,174			59.14%		
3 Referral	2,531			77.72%		
4 Social	2,126			66.41%		
5 (Other)	1,398			61.51%		
6 Email	7			66.67%		

To see all 6 Channels click [here](#).

PUBLIC RELATIONS



Educational Capital Projects Fund

- Each year the Board of Directors of the Upper Big Blue NRD approves up to \$10,000 for educational projects, from school greenhouses to gardens. In the past year, they have approved funding for these projects:



Centennial Public Schools in Utica received \$1,200 toward the purchase of a HACH spectrophotometer and other materials for the Citizen Scientist Pilot Program. These materials will be used to study groundwater quality and common contaminants in an earth science unit at the high school. Students will communicate results to the landowners whose wells are tested.



Osceola High School was provided \$1,000 for the purchase of a tiller and potting soil for their Blue Jackets, Green Thumbs program. These items will be used to expand the community garden plot on the school grounds.



Cross County Public Schools near Stromsburg was approved for \$1,900 for the development of a sensory garden. This project will be an opportunity for students to practice horticultural skills as well as experience the multisensory benefits of a specially designed garden space. ■



Burke Scholars

- In 2020, two students were chosen as Burke Scholars. These students received scholarships of \$2,000 each to pursue studies at a Nebraska college or university to study natural resources or a related field.

Kaitlyn Fehlhafer is the daughter of Steve and Kara Fehlhafer of Utica. She graduated from Centennial High School in spring 2020 and continued her education at UNL in the fall, where she is majoring in wildlife and fisheries management. Her goal is to work with farmers and others in Nebraska to raise awareness about the importance of wetlands. Eventually, she would like to have her own business as a land consultant, helping Nebraskans manage hunting grounds and wetlands. Kaitlyn has been involved in FFA and National Honor Society, as well as many other extracurricular activities.



Ben Janssen is the son of Steve and Donna Janssen of Marquette. A 2019 graduate of Nebraska Christian High School, Ben participated in many leadership and extracurricular activities, as well as maintained an excellent GPA. He has completed his sophomore year at UNL where he is currently pursuing a degree in horticulture with a specialty crop option. He is also interested in plant biology, ecology, and management. He is passionate about the conservation of Nebraska's native plants and natural landscapes. His career goals include working in plant science, prairie restoration, and natural resource management in Nebraska. ■



PUBLIC RELATIONS



Events: Land Judging Contest Held

- While most educational events were postponed in 2020 due to the pandemic, one activity that was permitted to continue was Land Judging Contests. Staff from the Upper Big Blue NRD assisted with the contest at the regional event in Clay County and hosted the state contest in McCool Junction.

Students and instructors from 32 Nebraska FFA chapters met to compete in the State Land Judging event on October 28. The NRD teamed up with the USDA Natural Resources Conservation Service (NRCS) to host the annual competition. Land Judging is a high school competition that challenges students to gain a better understanding of soil structure and land evaluation. Teams consist of four students from the same FFA chapter, and a few individuals who qualified separate from a team. Each participant learns how to recognize the physical features of the soil, determine land capability for crop production, and evaluate management practices needed for proper stewardship.

During the competition, students judge four soil



pits using an evaluation card to make assessments on: soil depth, surface texture, permeability, slope, thickness of surface and erosion. Each evaluation card is scored and added together to determine overall scores for individuals and the team. In order to compete in the state contest, teams advance from one of the seven regional competitions hosted across the state in October.

First and second place teams and individuals were both from the Upper Big Blue Natural Resources District, hailing from Heartland and Fillmore Central public schools.





NRD Displays Relocated

After 15 years of use and thousands of miles traveled, the NRD has retired two interactive learning exhibits, "Operation Conservation" and "Fantastic Fun River Run."

For many years these displays were featured at water festivals and other educational events across the state and region, impacting thousands of young people. These large-scale exhibits have found new homes where they will continue to be used to educate kids about Nebraska's natural resources. "Operation Conservation" is currently on display at the Edgerton Explorit Center in Aurora and "Fantastic Fun River Run" will be used by the Nebraska State Irrigation Association.



History Project

As the 50 year mark for Nebraska's Natural Resources Districts approaches, the Upper Big Blue NRD started capturing stories of long-serving board members and employees, as well as others involved with conservation work in the district. The short videos produced for this project can be viewed at www.upperbigblue.org/NRDhistory. ■



FORESTRY & PARKS



The NRD and Trees

The tree planting crew for the spring of 2021 consisted of Jay Geiger, Andy Larkin, and Kyle Yrkoski, district forester. The district purchased 19,225 trees/shrubs. The trees and shrubs purchased were used for farmstead windbreaks, habitat areas, and riparian plantings.

The trees were purchased from three nurseries, most of which came from our local Bessey Nursery in Halsey. It took six days to sort the 14,192 hand plant orders and two days to distribute them to the NRCS offices. The district planted a total of 5,033 trees for 20 cooperators, which took 10 days.

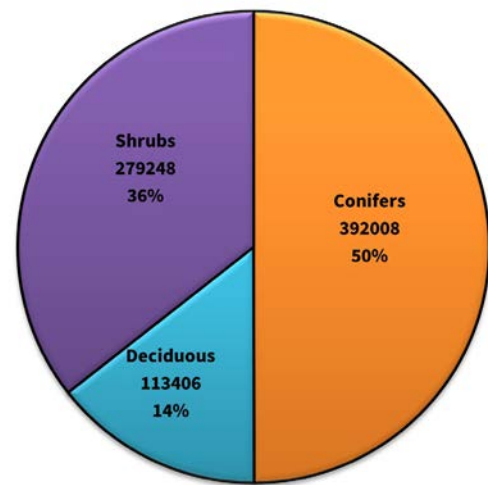
An total of 4,719 linear feet of fabric was laid to enhance the tree plantings by our private contractor.

The weather conditions during the weeks of April and May were mostly cool and wet. Soil moisture was adequate.

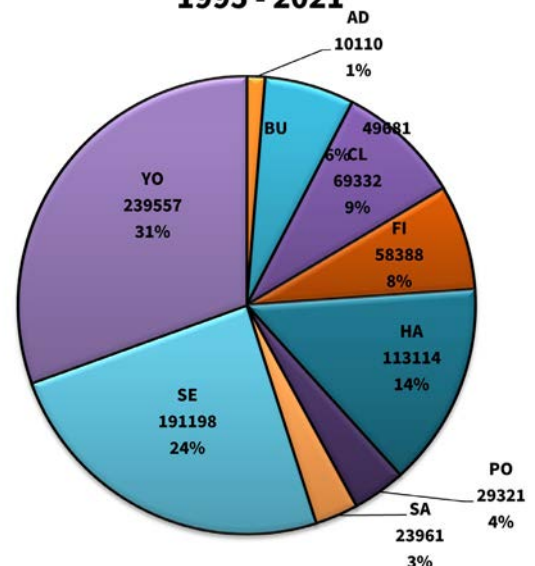
The scheduled plantings were completed on May 13, 2021.

The following is a synopsis of the expenditures and revenue for FY2021.

**TOTAL TREES SOLD BY SPECIES
1996 - 2021**



**TOTAL TREES DISTRIBUTED BY COUNTY
1995 - 2021**



Tree Planting Expenditures

Machine Planting Materials Purchased (includes shipping)

Lincoln-Oakes Nurseries	2,225 @ \$0.99	\$2,010
NARD (less 1% discount)	13,200 @ \$0.7995	\$10,553.79
NARD (Addendum/seedling)	13,200 @ \$0.03	\$396.00
Towner State	3,650 @ \$1.13	\$1,820.00
Schumacher's	150 @ \$1.15	\$172.50
TOTAL	5,005	\$3,759.05

Operating Costs

Packing Material for Handplants		\$156
Nursery Dealers License		\$85.07
TOTAL		\$241.07



Protect & Improve Your Land with Upper Big Blue NRD's Tree Program!

INSTALL, RESTORE OR EXTEND A WINDBREAK!

GET STARTED TODAY

Contact us for windbreak projects



Protect & Improve Your Land with Upper Big Blue NRD's Tree Program!

GET STARTED TODAY

Featuring our popular acreage package for

\$55 for 50 Trees Plus Many Others!

FORESTRY & PARKS



Tree Sales Report

Number of Trees Sold by County

	NRD Planted	Customer Planted
Adams	482	325
Butler	0	800
Clay	650	842
Fillmore	477	275
Hamilton	518	1,300
Polk	0	600
Saline	0	225
Seward	1,340	4,950
York	1,566	4,875
Total	5,033	14,192



Combined Total: 19,225 Trees

Special Projects

Entity	# of Trees	Cost	Total
Polk County Extension (Osceola)	75	\$0.80	\$60
TOTAL	75	\$0.80	\$60



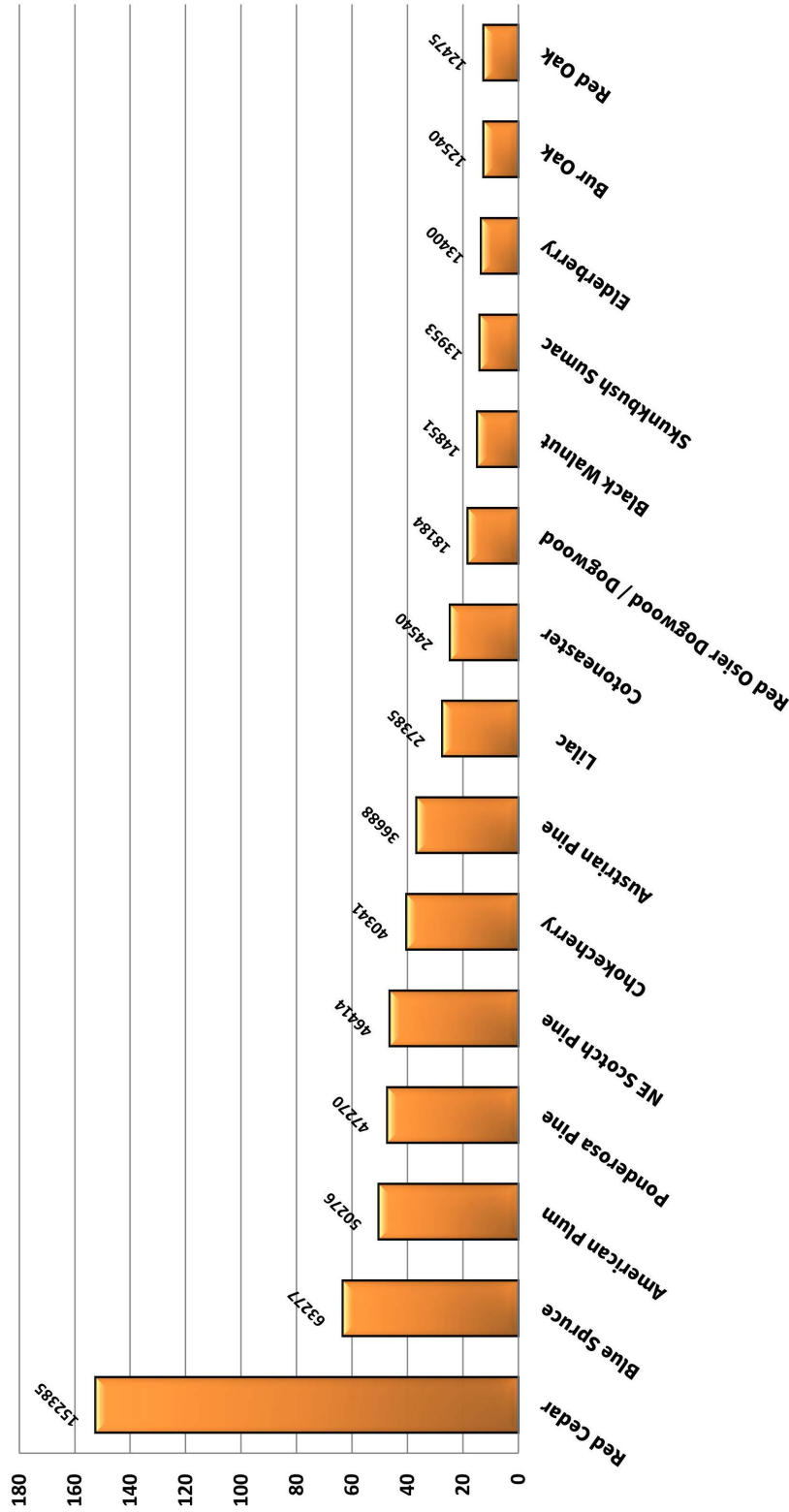
Tree Planting Revenue

Type	# of Trees	Cost	Total
NRD staff planted trees	4,719	\$1.18	\$5,568.42
Machine planting charge	4,719	\$1.16	\$5,568.42
		sub-total	\$11,136.84
Customer planted trees	12,534	\$1.18	\$14,790.12
Acre Packages	37	\$55	\$2,035
		total	\$16,825.12



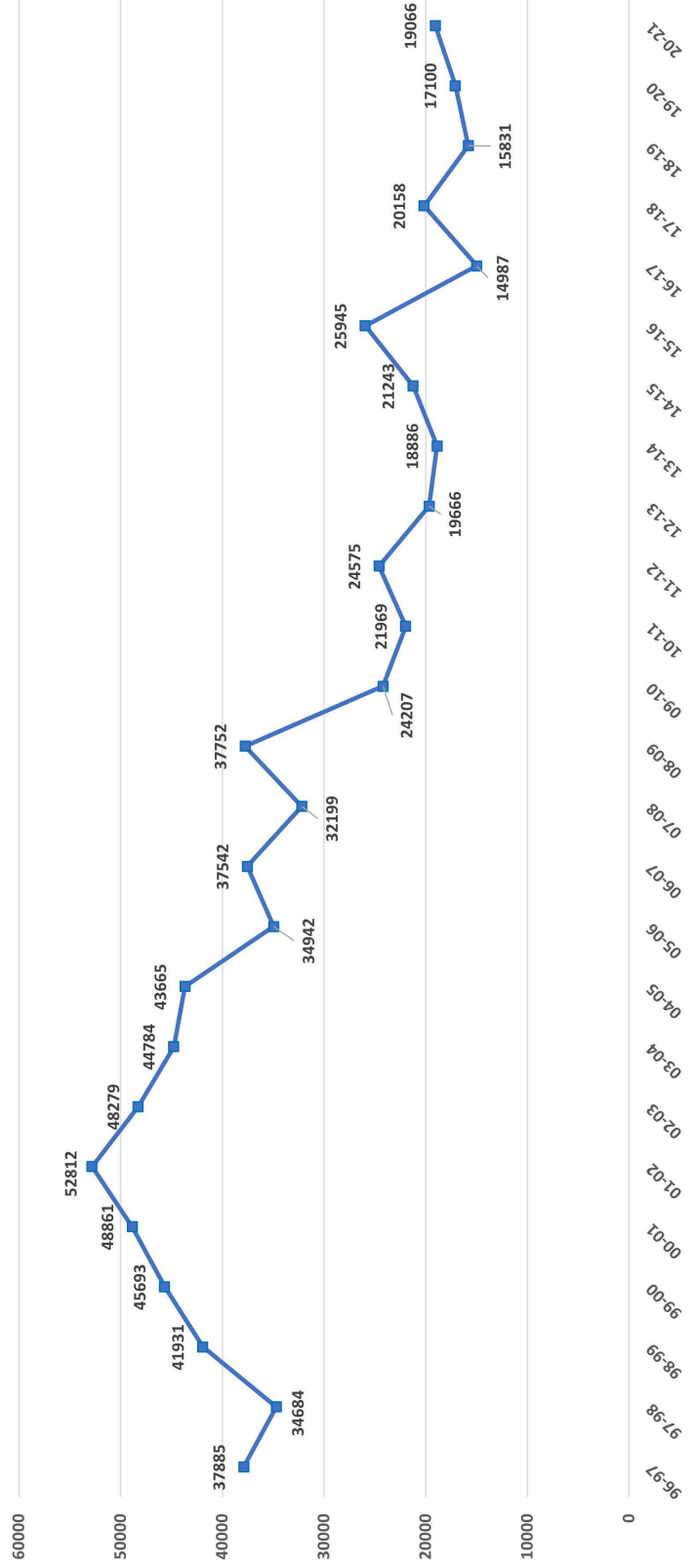
FORESTRY & PARKS

UPPER BIG BLUE NRD TOP 15 SELLING TREES 1996 - 2021

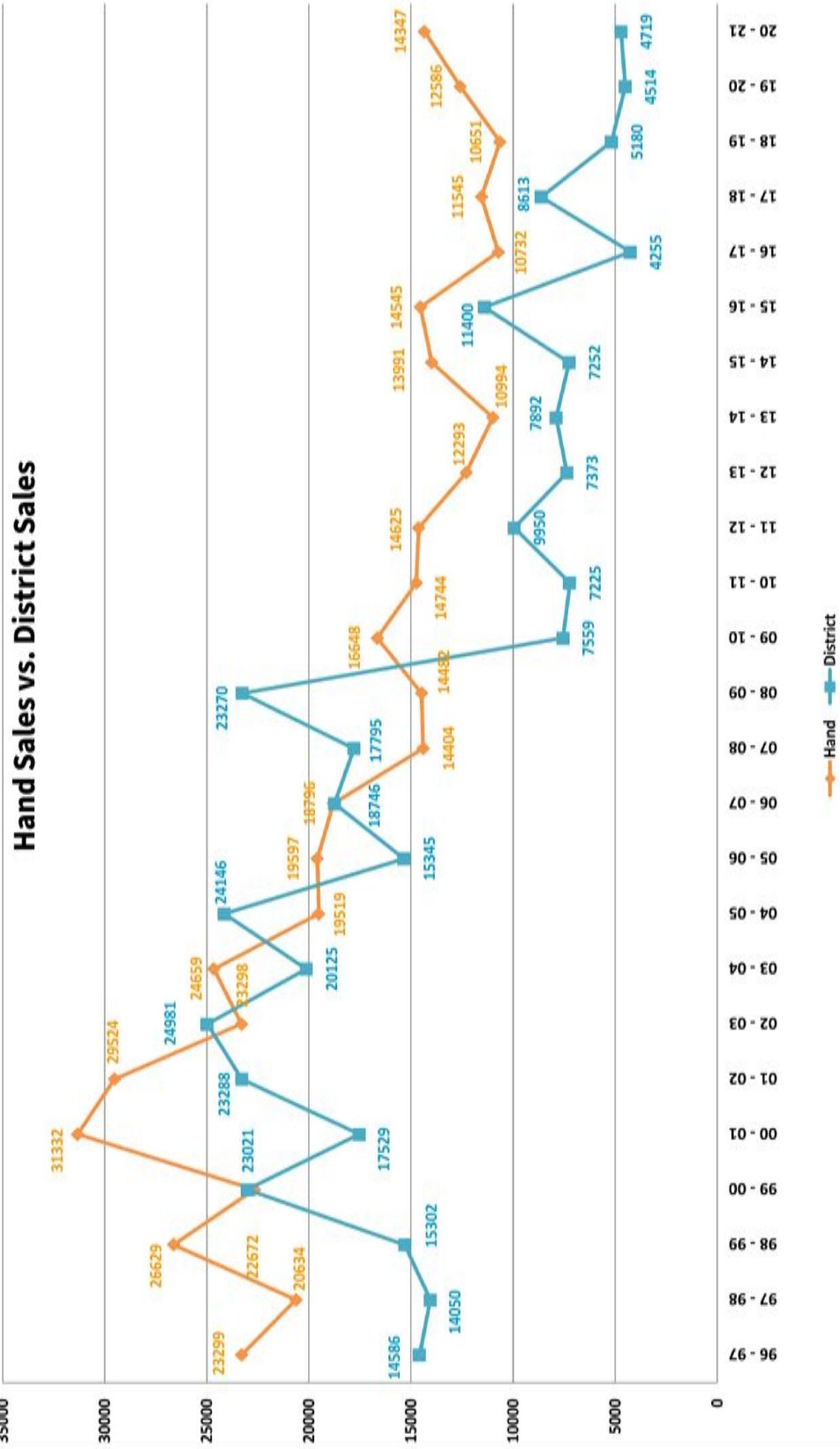




UPPER BIG BLUE NRD TREE SALES BY YEAR



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Nebraska Trees Suffer Due to Weather, Disease and Insects

- LINCOLN, Neb. (KOLN) -The state’s natural resources districts have an urgent message to Nebraskans as the state’s tree canopy number are declining due to extreme weather.

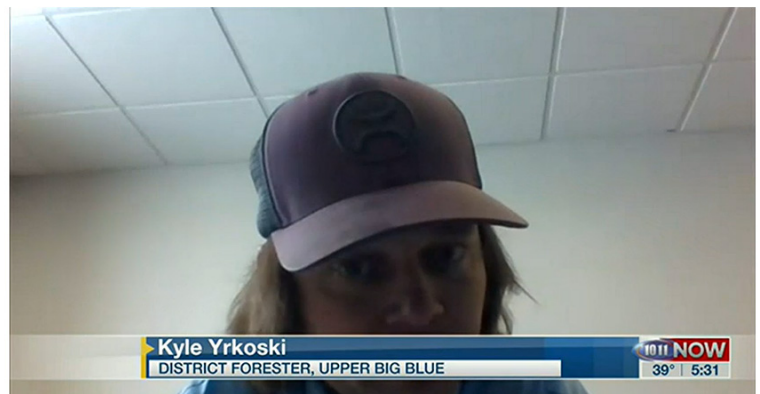
Over the last decade 18% of canopy trees in Nebraska have been taken out due to extreme weather, diseases and invasive insects according to the Nebraska Forest Service. They said the time to act is now to help restore the tree population.

There are 23 natural resources districts in the state. They said there are many benefits to trees, including how they help lower heating costs and wildlife use them for protection. Freezing cold temperatures are hard on trees, especially when they aren’t dormant yet. Impacts on the trees succumbing to diseases and insects, which is concerning to district foresters and they hope the public is concerned to.

“The whole state of Nebraska needs to be concerned about losing trees,” said Kyle Yrkoski, District Forester at Upper Big Blue. “Losing the

canopy, trees are vital to the great plains. Without trees we’d basically be back in the dust bowl days.” The livestock industry and agriculture industry can also suffer from a lack of trees according to the Natural Resources District. ■

(See video link on our website for this segment.)



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Teal View Wetland Education Area Under Development

(May 2021)--The sun is shining and frogs are chorusing their songs on a breezy day in May in a field in Hamilton County, about five miles north of Hampton, Nebraska. Spring rains have saturated a low area in what was previously a cornfield. Beetles creep through the lush vegetation, an early Monarch butterfly flits along, and the trills and chirps of dozens of killdeer and red-winged blackbirds fill the air with sound.

Long before this was a cornfield, it was a wetland, a vital area for water filtration, aquifer recharge, and wildlife habitat. The area is being restored to its original state through a partnership between Ducks Unlimited, Natural Resources Conservation Service, Nebraska Environmental Trust, Rainwater Basin Joint Venture, and the Upper Big Blue Natural Resources District. The 39-acre property called Teal View Wetland Education Area is still being developed. Soon it will fulfill the important functions of wetlands, as well as provide an area for nature enthusiasts and hunters.

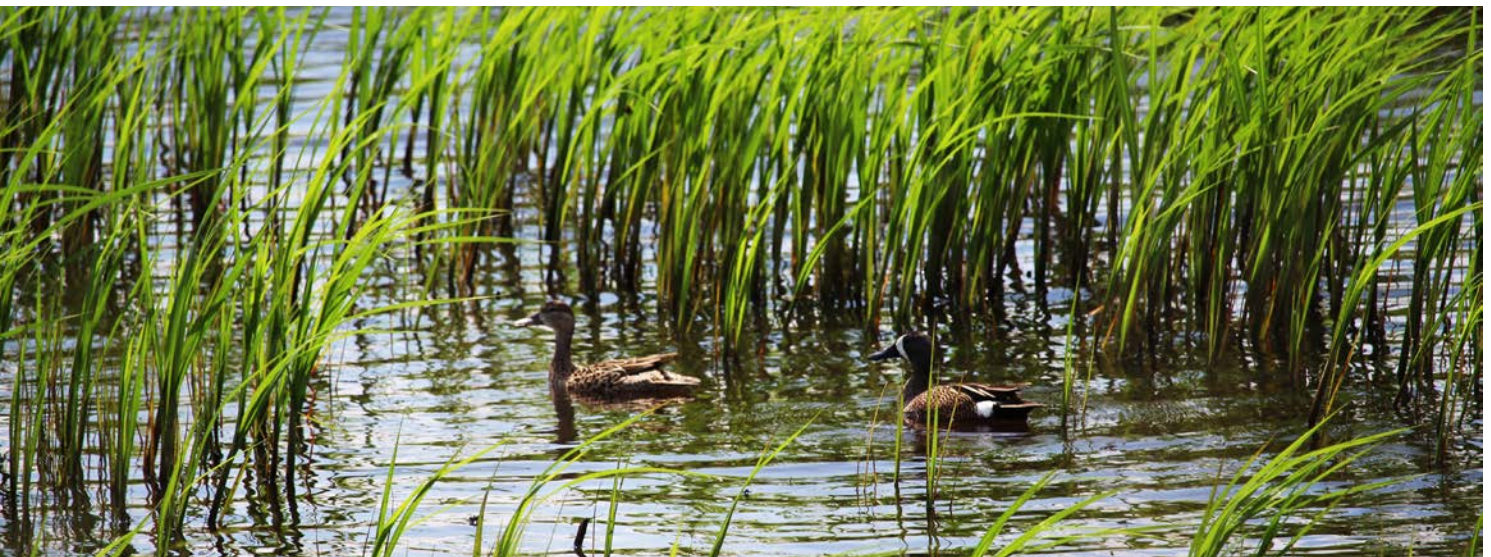
Earlier this spring hundreds of ducks waddled, foraged, and drowsed on the water here, enjoying a layover on their migration northward. Many species were spotted including American widgeons, green- and blue-winged teal, northern shovelers, gadwall, redheads, mallards, pintails, and ring-necked ducks. The flocks mingled in the safety of the shallows and took advantage of the rich food source available in this central flyway region of Nebraska, where millions of migratory birds annually travel.

Today, a single pair of blue-winged teal paddle peacefully, darting in and out of the tall stands of eastern gamagrass. Blue-winged teal are long distance migrants, among the last ducks to migrate northward in spring and one of the first to migrate southward in fall.

In the distance, a single great blue heron hunts frogs in the marshy habitat. The area is home to many mammals as well. A quick visual inspection of the soft mud reveals tracks of deer, coyote, and raccoons.

Nebraska was once dotted by a variety of wetlands, including marshes, lakes, river and stream backwaters, oxbows, wet meadows, fens, forested swamps, and seep areas.





Most of Nebraska’s network of wetlands has been destroyed or degraded in the last hundred years, as the land has been drained and converted to some of the most productive agricultural real estate in the world. What has been lost is harder to quantify than the number of acres. Wetlands improve water quality by filtering agrochemicals before they enter the groundwater supply. They provide habitat for thousands of species of plants, animals, and insects. They reduce the impacts of flooding and prevent soil erosion. A functioning system of wetlands is an essential part of the landscape for a healthy and productive place to call home, for humans and animals alike.

Many of Nebraska’s wetlands have been drained and filled to make way for row crops. Today the benefits of wetlands are being recognized more often as the frequency and intensity of storms increase. As a result, there is a greater need for the flood control and water filtration wetlands provide.

The Upper Big Blue NRD is partnering with other agencies to protect this spot and use it to educate the public on the importance of wetlands in Nebraska.

The Teal View property was purchased through the Ducks Unlimited revolving lands program, which takes ownership of properties temporarily while they are being restored, then gives them to entities like the Upper Big Blue NRD to manage for public benefit or sells them to private owners who will maintain them as wetlands. Ducks Unlimited, the Rainwater Basin Joint Venture, and the Natural Resources Conservation Service (NRCS-USDA) offer a variety of programs to help landowners restore and protect wetlands.

When it is more established, Teal View will be a good spot for hunting in fall and early winter. (To look up public access hunting locations, use this interactive tool provided by Nebraska Game and Parks. Teal View Wetland Education Area is currently listed as “Ducks Unlimited Revolving Property– Kohtz.”) Tim Horst, Ducks Unlimited land manager for Nebraska and Kansas, is eager to see the area maintained for conservation purposes. The property was of interest to Ducks Unlimited in large part because of its location. “This is an underserved area for public wetlands,” Horst said. “We wanted to make it available to the public for recreation.”

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Horst’s primary consideration is, of course, the birds. “We hope that the public is able to recreate, but we also hope that the habitat will be managed to its highest and best uses. Our objective in this area is migration habitat so that we can send healthy ducks north. This is the last stop-over before they get to the breeding grounds. The birds that reach the breeding grounds first and in the best condition are also most successful at completing the nest and rearing a brood.” In that way, the habitat availability in Nebraska is essential to maintaining a robust population of many species of waterfowl, like geese and ducks, as well as shorebirds and waterbirds including cranes, herons, and pelicans.

Most of the ducks that visit Teal View each spring will only be in Nebraska for an average of seven days before continuing their journey north. While short, it is a valuable time as the birds will put on an additional 10 – 15 percent of their body weight as lipid reserves that will be used to complete migration and initiate nesting.

“Without quality habitat in Nebraska, they won’t have as much reproductive success in breeding grounds to the north,” said Horst, including in the Dakotas, Montana, Alaska, and Canada, as well as the sand hills of Nebraska.

A challenge with wetlands is that they are not the zero maintenance landscapes one might imagine. Proper management is key, Horst explained. “If you’re not properly managing a wetland, cattails, bullrush, reed canary grass, trees, and

other perennial plants will take over.” Nebraska’s wetlands were once naturally managed by herds of bison, that would keep plant populations in check, deposit fertilizer, and turn the earth with their hooves. While these roving megafauna have largely disappeared from the landscape, their domesticated cousins, cattle, are abundant in Nebraska, outnumbering people four-to-one.



“One of the best wetland management tools we have is grazing,” said Horst. “Keeping the wetlands maintained often takes a more aggressive approach first, like disking or spraying, but once you’ve done that, cattle can keep you in that early successional state longer.” An early successional habitat is one that is dominated by grasses, flowering plants, and other food sources for wildlife. Without maintenance, these habitats will become forested and lose their value to migratory birds.

“There’s no finish line and no silver bullet when it comes to land treatment. There’s nothing you can do that will just ‘set it’ forever when it comes to wetlands.”

To restore Teal View, Ducks Unlimited removed sediment, filled a reuse pit that was draining the property, removed trees, and planted grasses. The Rainwater Basin Joint Venture will soon install fencing and a livestock well to maximize cattle grazing opportunities. Moving forward, the NRD and Rainwater Basin Joint Venture will work together to make sure the wetland is properly maintained and providing the best habitat for migratory birds. The



Upper Big Blue NRD also works with the Rainwater Joint Venture to provide equipment to district cattle producers to make wetlands more accessible for grazing.

“We are happy to partner with these other conservation-focused agencies to provide this new public access wetland,” said David Eigenberg, general manager of the Upper Big Blue NRD. “We hope this will be a great place for people to learn and enjoy nature, as well as a place for wildlife to thrive.” ■



The Rainwater Basin Joint Venture recently recognized the Upper Big Blue NRD with its 2021 Conservation Partner Stewardship Award for its dedication to wetland restoration over the last 10 years.

Andy Bishop, coordinator of the RWBJV, presented the award to the chairman of the board of directors Roger Houdersheldt at the January 2021 board meeting.

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Planning and Planting

- (December 2020) -- It's a brisk winter day in Nebraska. The sun is shining but the wind is sharp as Kyle Yrkoski stands on the edge of a cornfield with a landowner in Seward County, just south of I-80. The landowner, Mitch Springer, has a house nearby that is well protected by trees.

"In the summer, you can't even see the house from here," he says. He's looking to add the same screen of protection to the few acres of farmland adjacent to his homeplace, where a thick layer of corn stubble covers the rich, dark earth. Currently he rents the farmland out, but someday he may sell it for acreages. While he has no immediate plans to change ownership of the property, he is looking ahead and considering how he could improve the value of the land and enhance his investment.

Step one is simple: plant trees.

"Trees really open up the possibilities for your property," explained Yrkoski, district forester for the Upper Big Blue NRD. "Regardless of whether he sells the land for more housing development or continues to have it farmed and possibly add livestock grazing, the trees are going to add value and give him options." On this property, trees will provide protection from the elements and added privacy. "Adding trees is going to be something he's glad that he did in a few years," said Yrkoski.

There is a lack of certified arborists in Nebraska outside of the major metro areas. Yrkoski recently completed the statewide arborist certification training program. As one of the few certified arborists in this district, he is pleased to be bringing a high level of expertise to underserved rural areas. This certification benefits district residents as Yrkoski will be a local resource for all tree related concerns.



Tree plantings aren't a one-size-fits-all solution. That's why Yrkoski meets with district landowners who want to add trees to create a customized plan. He asks many questions as part of this process: What are you hoping to accomplish with trees? Are you looking for a windbreak to protect a house or crops? Do you want to improve wildlife habitat? Do you want a living privacy fence or an ornamental enhancement? How quickly do you need results?

The answers to these questions guide Yrkoski's recommendations for the project. The NRD also works with communities on urban planting needs, such as improvements to city parks. Last spring, the town of Stromsburg made use of these services when they worked with the NRD to add about 500 trees to expand the campgrounds area at Buckley Park. For large-scale plantings, Yrkoski typically visits



the property to look at geographic considerations including boundary lines, power lines, nearby roads and water ways, and trees that are already present to make sure that any additional trees planted will be well set up for growing success. Yrkoski then creates a proposal for the landowner that maps where trees could be installed, how many, and of which varieties. The plan includes a total cost for labor and trees as well as projected cost-share funds available. The Upper Big Blue, like other NRDs across the state, offers financial assistance to qualifying landowners for large-scale planting projects, such as windbreak installations, renovations, or extensions, and wildlife conservation plantings. Cost-share funds are also available for communities for improvements, including trees, in public nature areas.

Once a tree plan is complete, Yrkoski works with the landowner to fine tune the project and answer questions. Sometimes the landowner gets started with planting the following spring (NRD trees are planted each year from April to June) and other times they delay a year or two before enacting the plan. While pricing may vary slightly from one year to the next, a planting plan can easily be updated depending on when the trees will be installed.

Collaborating on a tree plan with the NRD does not obligate a landowner to implement the plan, and since there is no cost to the landowner to consult on these types of projects, there is no risk involved in getting started.

Yrkoski encourages landowners who are thinking about trees to reach out to the NRD. After all, trees are a long maturing investment. “There’s a

saying that the best time to plant a tree was ten years ago and the next best time is today,” said Yrkoski. “You may wish you had put in trees a long time ago, but it’s never too late to start. You’ll be glad you did in a year or two.”

Yrkoski joined the Upper Big Blue NRD in 2015 as a water technician and moved into the role of district forester in spring 2020. A lifelong Nebraskan with roots in agriculture, Yrkoski has a passion for conservation through tree planting. His family has raised cattle and farmed row crops in the Osceola area since the 1800s and has always been dedicated to planting trees and preserving wildlife areas. He also has forestry experience from his previous position with the Upper Loup NRD in Thedford, where he was responsible for designing windbreaks and installing more than 200,000 trees and shrubs.

For tree resources and programs offered through the NRD, online tree orders, or to contact Yrkoski, visit www.upperbigblue.org/trees or call 402-362-6601. ■

The NRD tree team planted 500+ trees at Stromsburg's Buckley Park in spring 2020



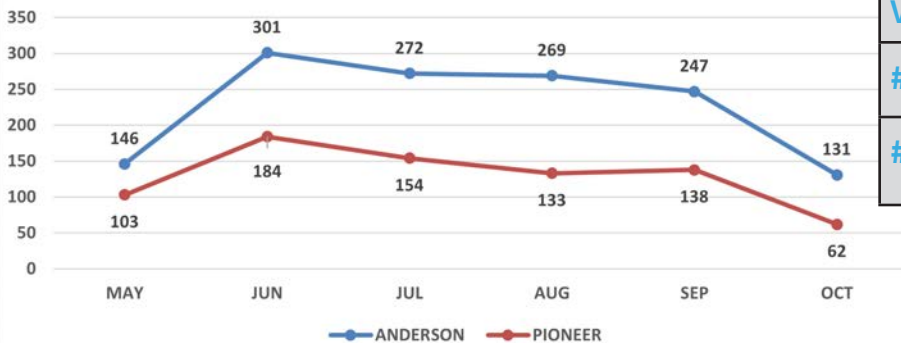
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Recreation Area Usage & Upgrades

- Camping at NRD recreation areas was impacted by the pandemic in 2020. The season was shortened and many events at the rec areas were canceled, but there was greater use during times when the parks were open for camping. In 2021, demand for camping spots across the state remains high. Smith Creek Recreation Area, which does not have camper pads/hookups, continues to see high usage from campers from across the state and nation, as it is listed online as one of the best free camping spots in Nebraska and is close to I-80.

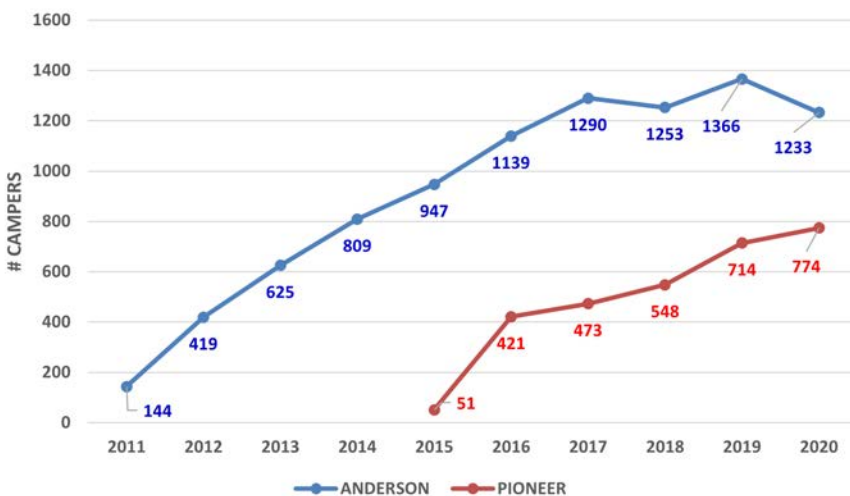
ANDERSON REC AREA VS. PIONEER TRAILS
NIGHTS SPENT BY MONTH
2020



2020 Visitor Geographic Representation

Visitors	Anderson	Pioneer
# of Counties	26	24
# of States	21	10

ANDERSON REC AREA VS. PIONEER TRAILS
NIGHTS SPENT BY YEAR



Opening day of camping for the 2020 season saw a long line of campers ready to pull into Bruce L. Anderson Recreation Area as the sun rose.



Recreation area facilities improvements are ongoing at Smith Creek Recreation Area and Oxbow Trail Recreation Area. New CXT Rocky Mountain Double Vault restrooms were installed at both sites. These restrooms are ADA accessible and future plans include ADA parking stalls and sidewalks. Other planned improvements include installation of a domestic well with a hydrant, security light, and outlets on the picnic shelters.



Oxbow Trails Recreation Area before upgrades



New restroom facilities installed at Smith Creek



Upgraded facilities at Oxbow Trails Recreation Area

ADMINISTRATIVE



Financial Highlights

This discussion and analysis of the financial performance of the Upper Big Blue NRD provides an overview of the district's financial activities for the year ended June 30, 2020.

The district's net position as of June 30, 2020, was \$9,561,108, of which \$4,216,814 is unrestricted and may be used to meet the district's ongoing obligations. The remaining \$5,344,294 is invested in capital assets, net of related debts.

The net position of the district increased by \$837,285 up from \$8,723,823 in the prior fiscal year. The governmental fund revenues were \$13,841 less than the prior year and expenses were \$17,380 more than the prior year.

Financial Analysis of the District as a Whole

Revenues for the district's activities were \$4,380,751, while expenses were \$4,328,742. The following pages summarize the district's changes in the net assets from revenues and expenses. The district is predominantly reliant on property taxes to support governmental activities. Factors such as property tax rates and valuation have a major impact on the district's revenues each year.

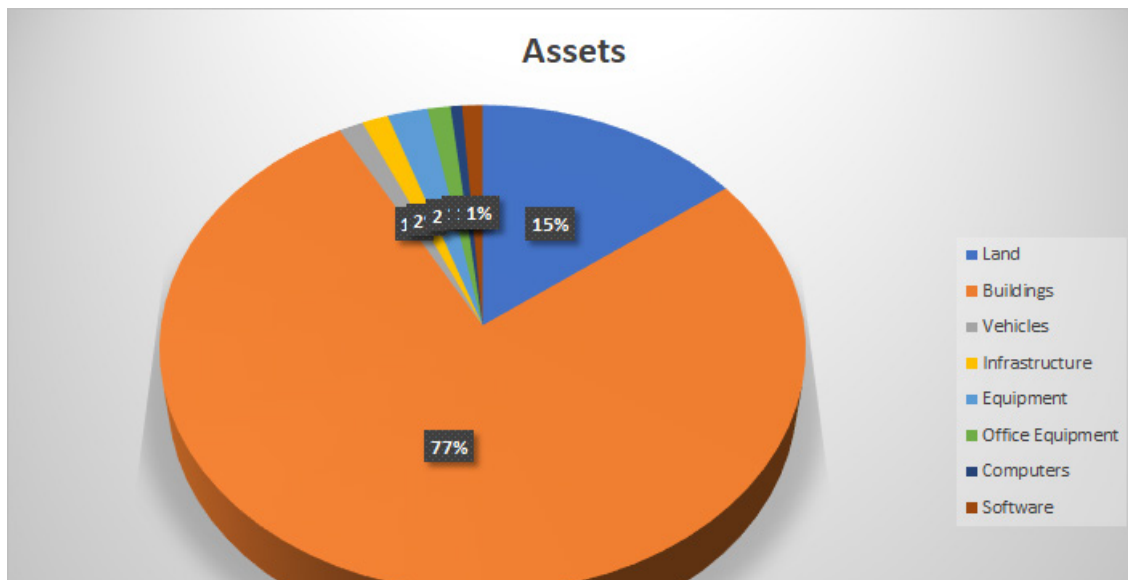


August 2020: Matt Lohr, United States Department of Agriculture's Natural Resources Conservation Service (NRCS) chief, spent time in Nebraska to learn more about conservation projects and partnerships in the state. His visit included sites in the Upper Big Blue and Lower Platte North Natural Resources Districts. Lohr visited locations where conservation activities from cover crops to wetland restoration have been implemented to get a better idea of the vital natural resources work happening in Nebraska.

Capital Assets

The district's investment in capital assets as of June 30, 2020, amounts to \$5,344,294 (net after depreciation). This investment in capital assets included land, buildings, equipment, and improvements. The summary of capital assets net of depreciation follows:

Asset	June 30, 2020	June 30, 2019
Land	\$788,574	\$788,574
Buildings	4,127,865	\$4,248,463
Vehicles	\$71,532	\$77,244
Infrastructure	\$77,233	\$94,052
Equipment	\$118,452	\$116,628
Office Equipment	\$67,171	\$87,195
Computers	\$33,746	\$28,602
Software	\$59,721	\$74,969
TOTAL ASSETS	\$5,344,294	\$5,515,727



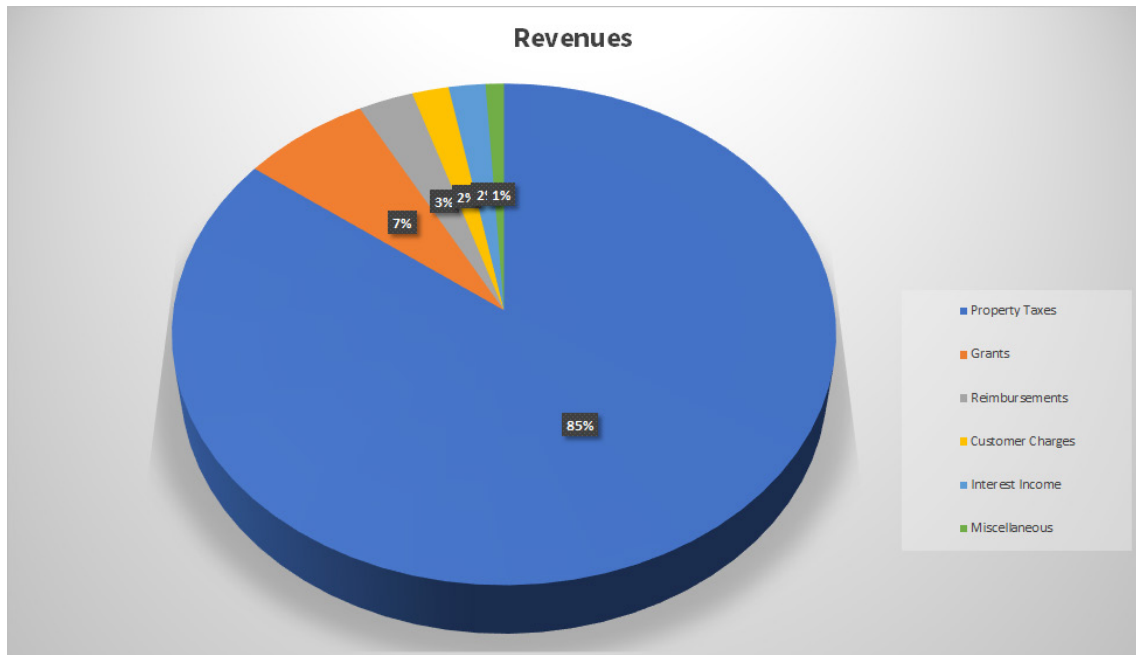
ADMINISTRATIVE



Revenues

General Funds Revenues for FY2020

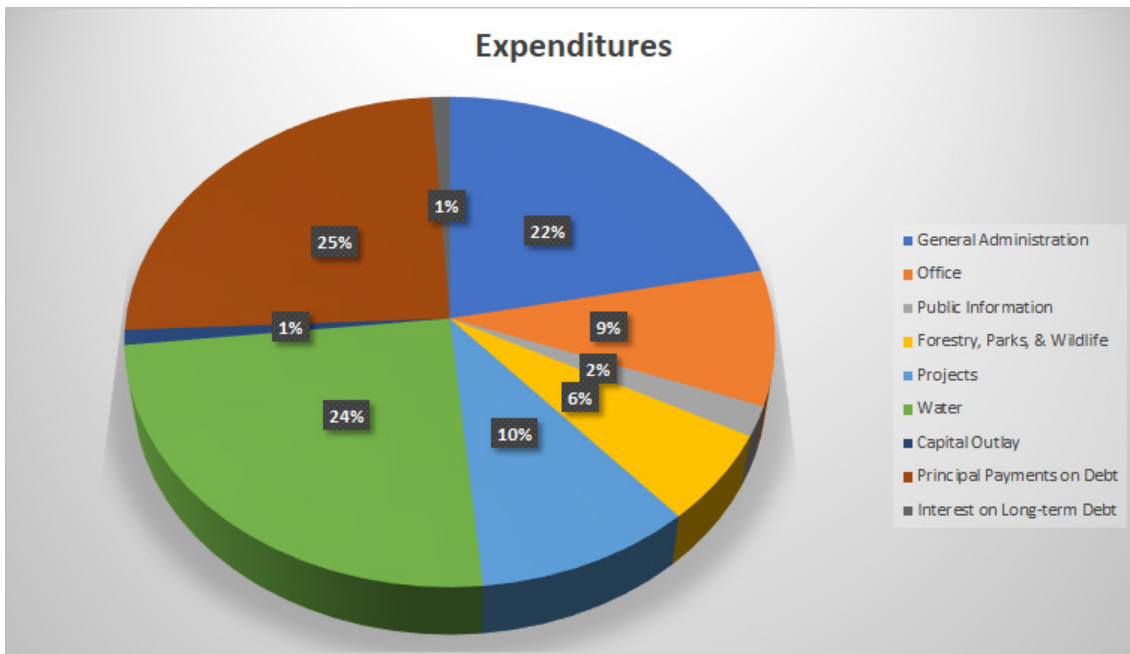
Revenue Source	General Fund	Sinking Fund	Total Funds	% of Revenue
Property Taxes	\$3,752,734	--	\$3,752,734	87
Grants	\$287,871	--	\$287,871	7
Reimbursements	\$112,103	--	\$112,103	3
Customer Charges	\$104,881	--	\$104,881	2
Interest Income	\$20,325	\$52,492	\$72,817	2
Miscellaneous	\$50,345	--	\$50,345	<1
TOTAL REVENUES	\$4,328,259	\$52,492	\$4,380,751	100%



Expenditures

General Funds Expenses for FY2020

Expenditure	General Fund	Sinking Fund	Total Funds	% of total
General Administration	\$1,007,268	--	\$1,007,268	22%
Office	\$370,529	--	\$370,529	9%
Public Information	\$79,113	--	\$79,113	2%
Forestry, Parks, & Wildlife	\$270,737	--	\$270,737	6%
Projects	\$452,329	--	\$452,329	10%
Water	\$1,134,693	--	\$1,134,693	25%
Capital Outlay	\$65,708	--	\$65,708	1%
Principal Payments on Debt	\$1,138,868	--	\$1,138,868	25%
Interest on Long-term Debt	\$19,507	--	\$19,507	<1%
Total Expenditures	\$4,538,752	--	\$4,538,752	100%
Excess of Revenues Over Expenditures	(\$210,493)	\$52,492	(\$158,001)	--



ADMINISTRATIVE



General Operating Expenses

- Payroll: Salaries/Benefits/Taxes (Admin./ Clerical)
- Directors' expense & per diem
- Dues & Memberships/Fees & Licenses
- Insurance
- Legal notices
- Office supplies/Postage
- Special projects and Professional services
- Project operations & maintenance/Auto & Truck
- Supplies & maintenance/Building maintenance
- Purchases for resale
- Rent/Telephone/Utilities

Projects, Engineering Design, Cost-Share

- Sediment control basins/Stream bank stabilization
- Dams
- Diversions/Grade stabilization structures
- Pasture planting/Planned grazing systems
- Pitless irrigation water reuse systems
- Windbreak planting & renovation
- Grassed waterways/Terraces
- Water impoundment dams
- Subsurface drip irrigation
- Mechanical outlets
- Buffer Strips

Water Quantity & Quality, Cost-Share

- Rules & Regulations enforcement
- Groundwater level measuring - Observation well monitoring
- Well Permitting/Registration

- Certification of irrigated acres
- Crop water use reporting
- Nitrate monitoring
- Domestic well testing
- Deep soil sampling
- Wellhead protection
- Irrigation well pump testing
- Chemigation safety inspections
- AQWACAP and Abandoned well verification
- CROP-TIP
- Flowmeter inspection
- Zones 5 & 6 Nitrate management training.

Public Education

- Quarterly newsletters
- Seminars
- Publications
- Speaking engagements
- Advertisements

Forestry, Parks, and Wildlife, Cost-Share

- Tree/shrub/Native grass planting programs
- Corners For Wildlife
- Wildlife habitat improvement
- WILD Nebraska
- Parks & Recreation management
- Parks Program
- Storm Damaged Trees Program

Balance Sheet--Governmental Funds 2020 with comparative figures for FY2019

ASSETS	June 30, 2020	June 30, 2019
Cash and Cash Equivalents	\$1,418,106	\$999,327
County treasurer cash	\$33,944	\$30,581
Investments	\$3,062,101	\$3,597,519
Accounts Receivable	\$60,468	\$76,659
Interest Receivable	\$1,837	\$8,856
Inventory	\$62,670	\$37,018
Prepaid Insurance	\$73,531	\$64,107
TOTAL ASSETS	\$4,712,657	\$4,814,067

LIABILITIES	June 30, 2020	June 30, 2019
Accounts Payable	\$229,346	\$193,803
Payroll Liabilities	\$17,197	\$14,955
Accrued Wages	\$137,173	\$118,429
Sales Tax Payable	\$199	\$137
TOTAL LIABILITIES	\$383,915	\$327,324

The information contained in this financial section are based upon the independent and unbiased audit performed by AMGL CPAs & Advisors of Grand Island, Nebraska. The audit was presented to the Upper Big Blue NRD Board of Directors on September 17, 2020.



Upper Big Blue NRD

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