



# Annual Report

2019



# Upper Big Blue

## NATURAL RESOURCES DISTRICT



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# 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. 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



## 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 in order of District priorities:

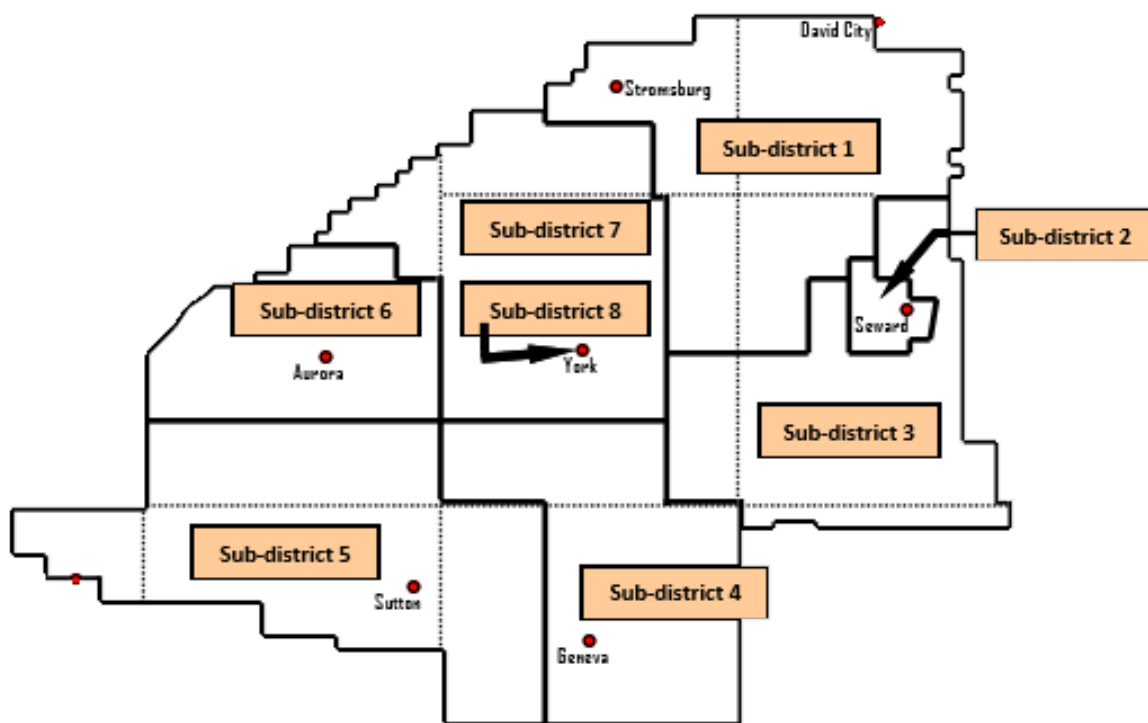
### The 12 Responsibilities of the Natural Resources Districts

1. Development, management, use and conservation of groundwater and surface water
2. Soil conservation
3. Erosion prevention and control
4. Flood prevention and control
5. Pollution control
6. Water supply for any beneficial uses
7. Prevention of damages from flood water and sediment
8. Development and management of recreational and park facilities
9. Forestry and range management
10. Development and management of fish and wildlife habitat
11. Drainage improvement
12. 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 subdistricts, plus one at-large member from any subdistrict. 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.



- Jeff Bohaty, Seward, NE Sub-district 2
- Douglas Bruns, Waco, Sub-district 3
- Paul Bethune, York, Sub-district 8
- Douglas L. Dickinson, Seward, Sub-district 2
- Gary E. Eberle, Bradshaw, Sub-district 7
- Roger W. Houdersheldt, Shelby, Sub-district 1
- Linda L. Luebbe, Beaver Crossing, At-Large Member
- John Miller, Aurora, Sub-district 6
- Larry K. Moore, Ulysses, Sub-district 1
- Micheal D. Nuss, Sutton, Sub-district 5
- Bill Kuehner, Jr., Aurora, Sub-district 6
- David Robotham, York, Sub-district 8
- Bill Stahly, Milford, Sub-district 3
- Ronda Rich, York, Sub-district 7
- Merlin M. Volkmer, Shickley, Sub-district 5
- Paul Weiss, McCool Junction, Sub-district 4
- Lynn Yates, Geneva, Sub-district 4

# The District



## Wells, Watersheds, and Shelterbelts *Directors tour NRD project sites in area communities*

From a proposed recreation area near Milligan to a dam renovation in Friend, nine members of the board of directors of the Upper Big Blue Natural Resources District toured the southeast portion of the district to explore NRD projects on Friday, September 6.

The day began by viewing a proposed dam site for future consideration in McCool Junction. The next stop was a demonstration of monitoring wells located at the former Fairmont Airfield. The facility in Fillmore County was constructed in 1942 as an Army training airfield. No longer in service as a military facility, the area is now privately farmed and rows of corn line the cracked runways. The monitoring wells at the location are tested regularly for nitrates. These wells are part of a network of 23 spread across 10 sites in the district which are routinely sampled to track water quality trends over time. The samples vary in depth, allowing for data collection from shallow, medium, and deep well sites to capture a more accurate picture of the health of the district's water. The Upper Big Blue NRD has been tracking this data consistently since 1997 to look at non-point source contamination in the groundwater supply.

The morning continued with a stop a mile northwest of Milligan at the property of Dwaine Kubicek. The Upper Big Blue NRD is exploring the possibility of purchasing some of Kubicek's land and improving it for use as a public recreation area. Called Cedar View, the recreation area would feature boating and fishing in the 25-acre pond as well as other amenities. The board of directors is still in the preliminary stages of evaluating the property.



The tour continued with a drained dam site near Friend. The Johnson Creek 46 dam was being repaired using Snap-Tite slip lining, a method that may be used at other NRD dam sites in the future.

*Board Member Merlin Volkmer and Office Manager Nancy Brisk examine a water testing tool at a monitoring well near Fairmont.*



The Snap-Tite repair process involves lining the existing corrugated metal pipes with a high-density polyethylene pipe and filling the space between the old and new pipes with grout for a water-tight, sturdily reinforced structure.

Dorchester was the next stop on the tour, including a watershed area with aging dams originally constructed by the federal government that are now the responsibility of the NRD. At a nearby location, directors viewed a mature shelterbelt planted by the NRD at a private residence more than 20 years ago. Tree plantings such as the one visited on the tour have many benefits for farmsteads, including increasing livestock survival, increasing crop production, and improving field moisture. The Dorchester site also featured a domestic well that is regularly sampled by NRD staff. It is one of a network of 250 domestic wells across the district that is sampled annually to track water quality.

The tour concluded with a stop at Smith Creek Recreation Area near Utica. Constructed in 1983, the Smith Creek dam and reservoir were designed to provide aquifer recharge, flood control, and recreational opportunities. The site features tent camping, fishing, boating, waterfowl hunting, and picnic tables, and is heavily used in the summer months.



*Projects Department Manager Jack Wergin discusses Slip-Tite lining at the Johnson 46 dam during the annual board tour.*

*Board and staff as well as members of the Kubicek family and others in front of the dam near Milligan.*



# The District



## Upper Big Blue NRD Staff

The district currently has 25 employee positions: 22 full time, one part-time and one occasional worker. 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. At the end of 2019, staff members included:

- David Eigenberg, General Manager
- Rod DeBuhr, Assistant General Manager
- Ken Feather, Forestry Department 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
- Kyle Yrkoski, Water Resources Technician
- Erinn Richert, Water Resources Technician
- Nancy Beach, Water Data Specialist
- Miranda Coffey, Water Data Assistant
- Dan Leininger, Water Conservationist
- Julie Dudley, Aurora Field Office Clerk
- 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 Dept. Secretary
- Carleen Light, Water Dept. Secretary
- DeeDee Novotny, Water Dept. Secretary
- Abigail Peterson, Secretary
- Patty Connors, Secretary
- Jay Geiger, Maintenance Worker
- Tom Johnson, Maintenance Worker
- Andy Larkin, Maintenance Worker





*Maintenance Worker Tom Johnson was recognized by the National Weather Service with a Thomas Jefferson Award for his years of volunteer weather reporting.*

*Patty Connors and Rita Hoblyn were recognized for 10 and 25 years of service (respectively) in fall 2019.*



*(left) Rod DeBuhr was honored for his 40 years of service to the Upper Big Blue NRD at a retirement reception in December. His last day with the NRD was in January 2020.*



# The District



## Upper Big Blue NRD Hosts Statewide Managers Retreat

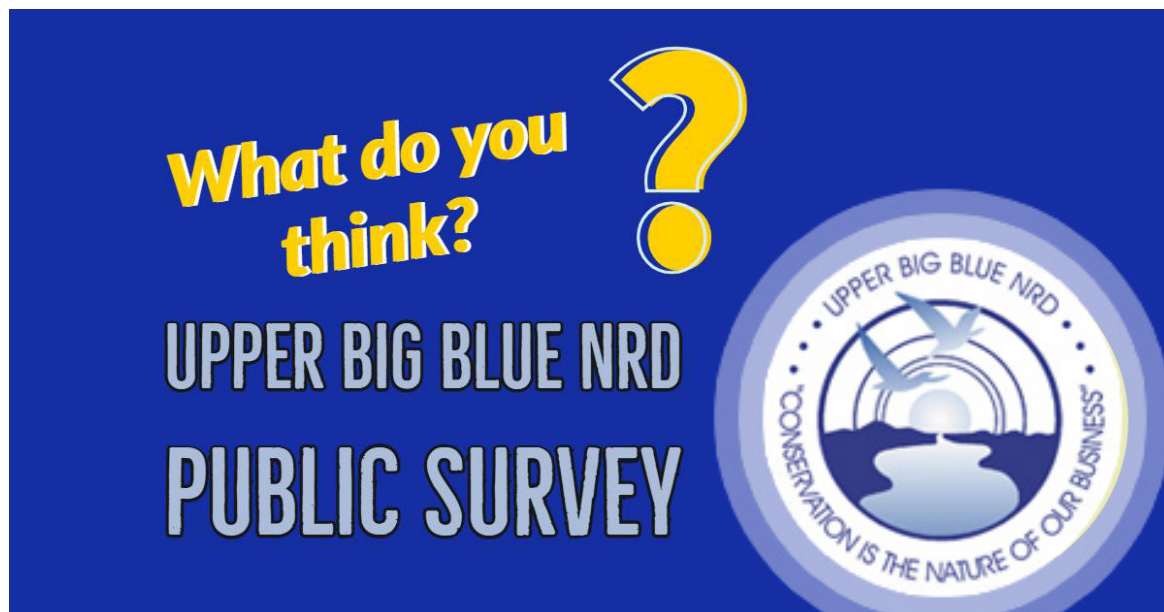


The Upper Big Blue NRD hosted the NRD managers retreat August 26-28. The event included tours to Hastings Utilities to learn more about preventing nitrates in drinking water and to Senator Curt Friesen's farm in Henderson to see his subsurface drip irrigation system.

*(Right) NRD Managers visit Hastings Utilities to learn about their unique process for treating the city's drinking water, which has high nitrate levels.*



*(Left) Subsurface drip irrigation demonstration at Curt Friesen's farm. This method of irrigation saves water by reducing evaporation, but it also poses unique challenges.*



The Upper Big Blue NRD asked for district residents to sound off on a number of general interest issues via a website survey in the fall of 2019. Forty-eight people responded by the end of the year (the survey remained open into 2020). Insights may be gleaned from these survey results that can inform communication strategies in the coming year.

#### Survey responses included...

- **Location:** Most respondents (79%) live in towns, not on acreages or farms; responses came from York, Polk, Fillmore, and Adams counties, with the majority of responses from York County.
- **Impressions:** Most respondents (91%) indicated that they had heard of the Upper Big Blue NRD before. When asked what they knew about the NRD, responses included protecting and testing ground water, flood control, regulations, recreational areas, and water and soil conservation.
- **Media:** Asked about how they have heard about NRD projects and programs in the past, most indicated that they had seen coverage in newspapers, newsletters, and via word of mouth. In the future, they would prefer to see news from the NRD primarily on social media and in newspapers. They are not interested in news from the NRD in podcasts or radio.
- **Concerns:** When asked to rank areas of concern for the environment, most reported high levels of concern for water quality, wildlife habitat, and soil and water conservation.
- **Priorities:** When asked to rank importance of the work the NRD undertakes, respondents ranked ground water quality and quantity at the top and recreation areas, education, and flood control structures at the bottom.
- **Program Knowledge:** When asked which NRD programs or projects they had heard of, the most well-known elements were the conservation tree program, Project GROW, and the recreation areas. Least well known included educational programs (ECAP and Burke Scholars) and the private dams program.



# Water Department



## Water Levels Are Up *Groundwater Level Rise 1.22 Feet on Average*

During April-May 2019, Upper Big Blue NRD staff measured 531 observation wells throughout the district to determine the district groundwater level change. Overall, the spring 2019 average measurement for the groundwater level change shows a rise of 1.22 feet from the previous spring. The findings reported in May show that the spring 2019 average groundwater level was 5.11 feet above the allocation trigger. As a result there were no allocation restrictions for the irrigation season.

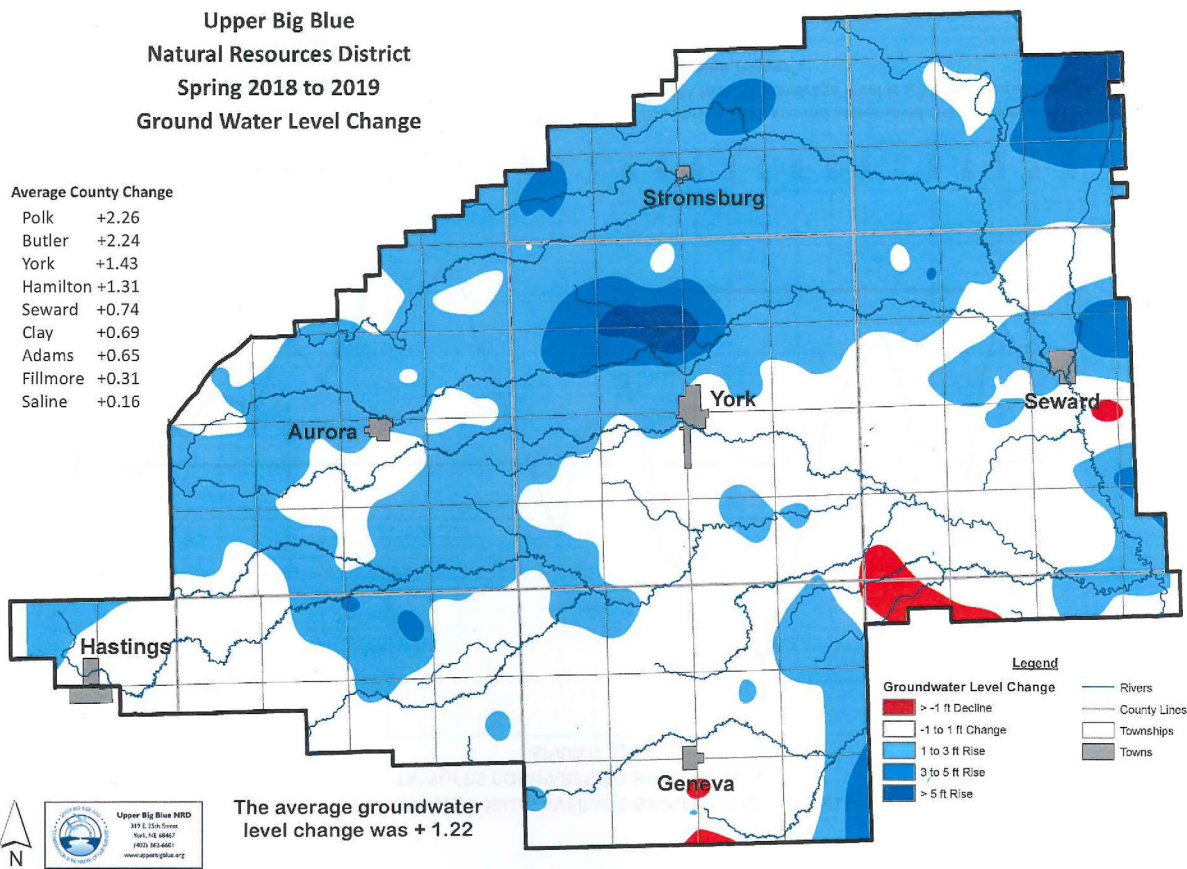
The district goal is to hold the average groundwater level at or above the 1978 level. In 2005, the district average groundwater level reached the reporting trigger level, initiating groundwater users to report annual groundwater use to the district and to certify their irrigated acres. If the district average falls below the 1978 level (allocation trigger) groundwater allocation will begin in the district.

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

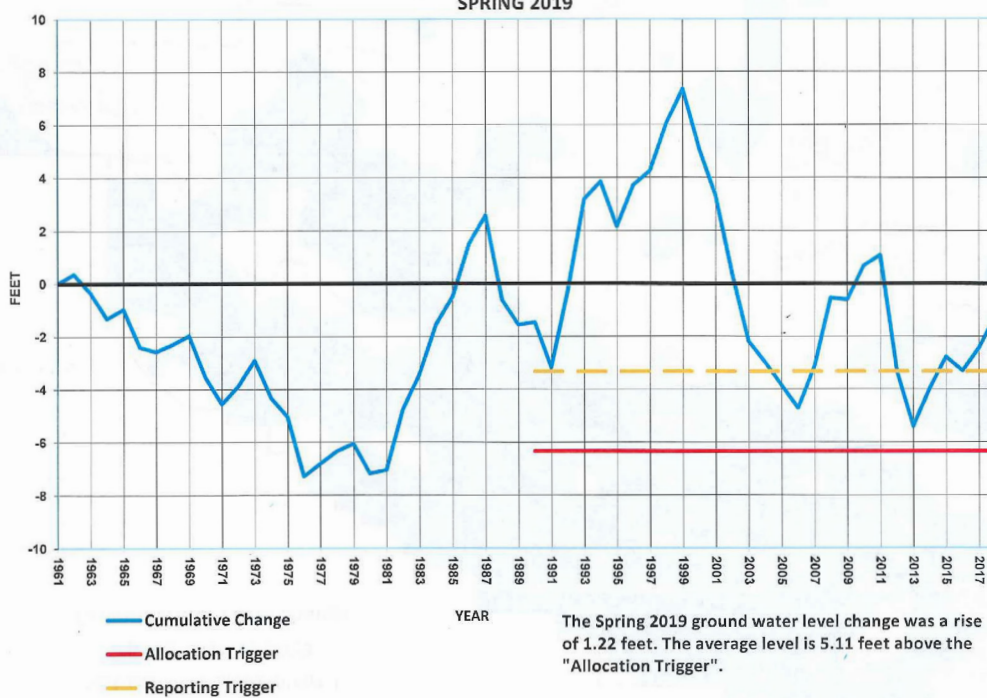
### **Online Reporting**

A major goal was accomplished in 2019 as online reporting for water use and for Phase II and III management area reports was introduced. While paper reporting is still allowed, many producers experimented with the online reporting and found it quick and easy. The new tool received praise from many producers and streamlined the data management for NRD staff as well. The portal can be accessed at [upperbigblue.org/reporting](http://upperbigblue.org/reporting).

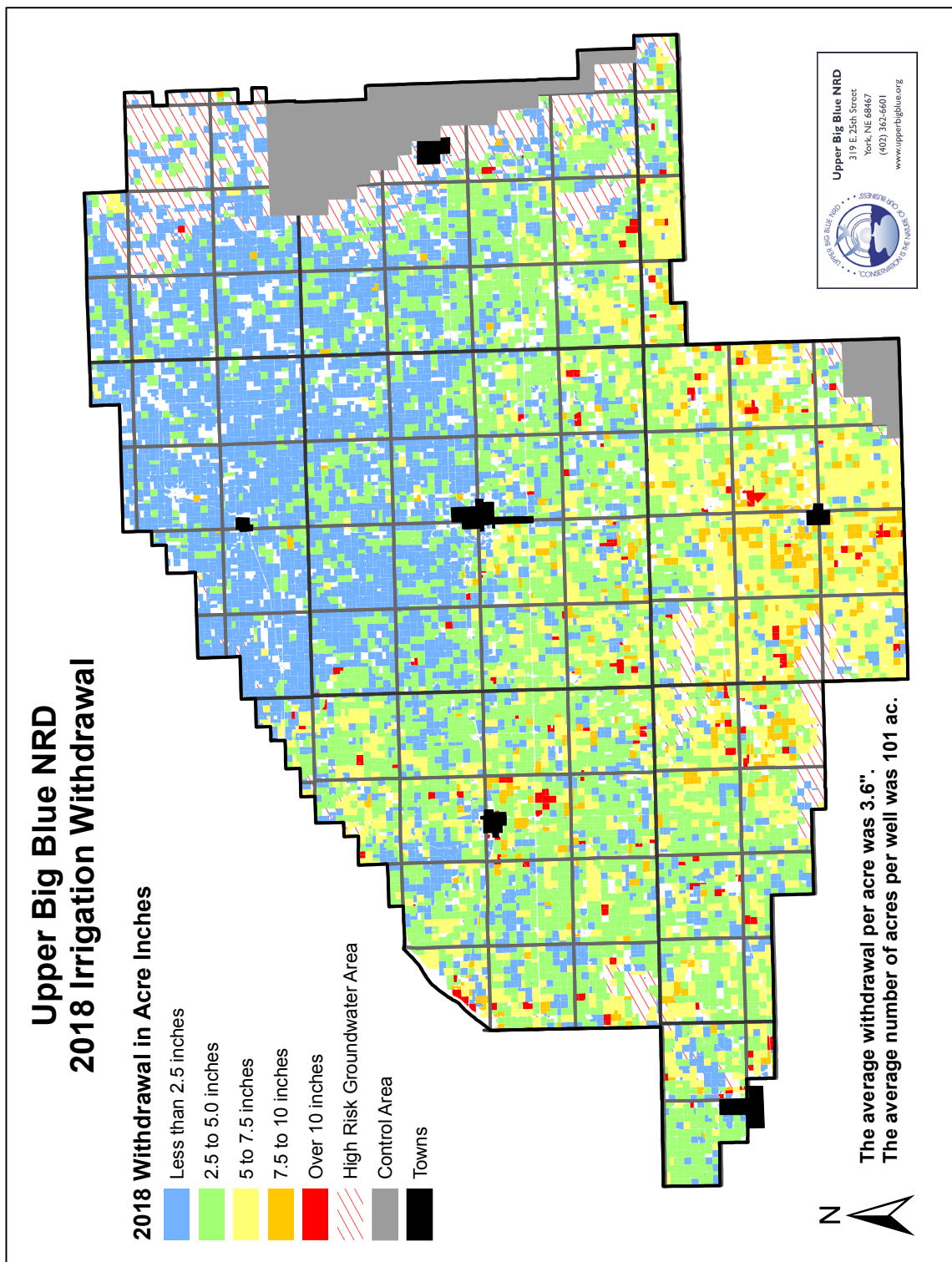




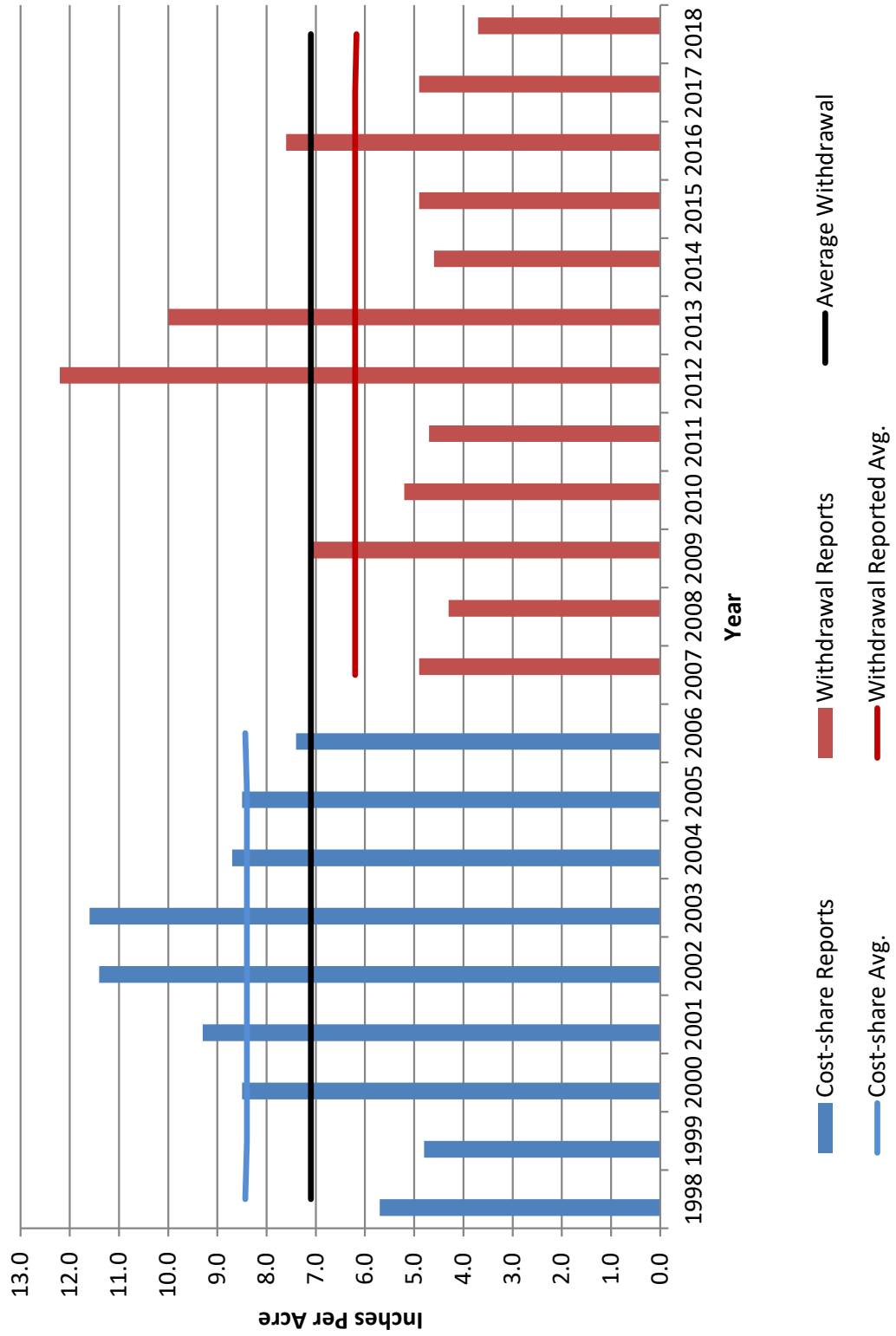
**UPPER BIG BLUE NRD - AVERAGE GROUND WATER LEVELS  
TRIGGERS COMPARED TO HISTORIC LEVELS  
SPRING 2019**



# Water Department



## Upper Big Blue NRD Historic Groundwater Withdrawal for Irrigation



# Water Department



## Update: One District, Two Plans, One Water

In 2018, the Upper Big Blue NRD joined the Nebraska Department of Environment and Energy to create a plan to address water quality concerns in the district. The district also entered into an agreement with the Nebraska Department of Natural Resources to prepare a Voluntary Integrated Management Plan. This planning effort looks at the relationship between groundwater and surface water uses in the district. The engineering firm JEO was contracted to help with this ambitious project. The conversations and work on this topic continued in 2019 and a public open house on the topic was held on April 2. Both planning efforts occurred concurrently utilizing stakeholders in an effort to promote efficiency and in recognition that solutions to these problems are often related.

The planning process began with building partnerships between agencies. Stakeholders explored the characteristics of the basin to identify water quality priority areas and management actions based on quality impairments. A planning document has been drafted and is currently under review by the EPA. The Nebraska Department of Natural Resources is drafting their portion of the Voluntary Implementation Plan for water quantity for surface and groundwater at this time. Future work will include

1. Designing an implementation program;
2. Developing an outreach strategy to educate and engage residents in protecting and conserving water resources;
3. Implementing the watershed plan; and
4. Measuring progress and make adjustments.

In this district, next steps will also include forming an advisory group of landowners in the watershed area above Recharge Lake in York with the goal of improving water quality in the lake. Grant funding through the Environmental Protection Agency will eventually be sought (Clean Water Act: Section 319 Grant Program).



## Update: Rule 5 Proposed Changes

In 2019, the board spent considerable time discussing the ongoing concern about nitrates in the drinking water supply of a majority of the population concentration areas of the district. They examined research on the topic and weighed several options for how to proceed with this challenging issue.

In July, the board proposed changes to Rule 5 nitrogen management practices. The proposed changes would have impacted fertilizer practices for agriculture producers across the district with the aim of reducing the amount of nitrates in the groundwater supply. The changes proposed involved the timing and amount of fertilizer application, the addition of a nitrification inhibitor when fertilizing in a certain window of time, and additional reporting on fertilizer use. Some changes would have impacted all producers, while others would have only affected those in areas with high median nitrate levels in the groundwater.

A public hearing was held on this issue on August 19 and a follow-up public meeting was held September 10. Testimony was collected from more than 40 individuals during this period of public comment. Many producers expressed concern at the added expense this regulation would burden them with. After reviewing the testimony, the board chose to send the proposal back to the committee level for further review as a consensus could not be reached about the changes needed. The conversation about regulation changes will continue in February 2020.



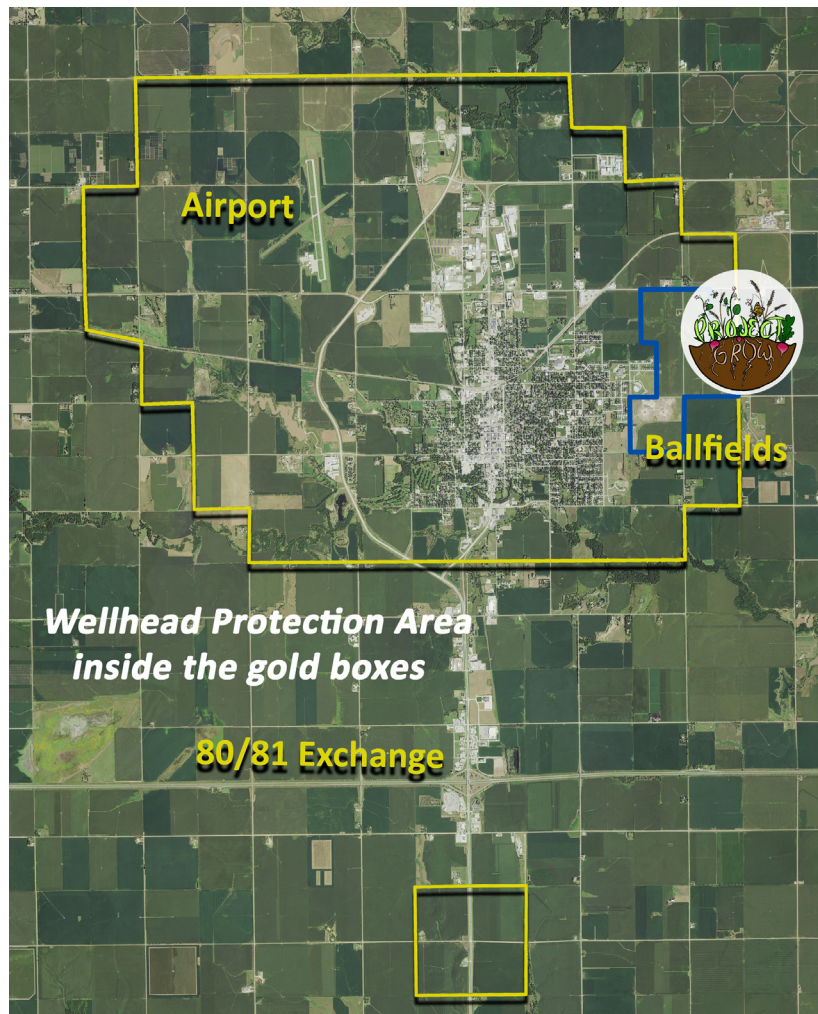
# Water Department



## Source Water Grant

In November 2019 the Upper Big Blue NRD launched the York Well Watch program in conjunction with the City of York. The program seeks to inventory all private wells in the Wellhead Protection Area—a region that extends from the ballfield complex on the east to beyond the airport on the west, and north to south encompassing the residential and business sector of York. The area also includes a section of land south of Interstate 80 on Highway 81. The NRD is collecting data about all domestic, livestock, and irrigation wells in this area, both active and abandoned wells, to create an accurate picture of the risks wells may pose to the water system.

Depending on their condition, wells can be a direct conduit for contaminants to enter the city's drinking water. Mapping well locations will help the city and NRD to better understand how many wells are still in use and if further action is needed to safeguard the water supply. If a number of inactive wells exist in the Wellhead Protection Area, the city may be eligible for additional grant funding that could provide tools like ground penetrating radar for research and services such as well decommissioning. Cooperation with municipalities on non point source contamination continues to be a priority.





## Project GROW: 2019 Report

*Practices prove sustainability, profitability*

*(\*\*This article appeared in the York News-Times in February 2020 and was picked up by Channel 8 News KLKN TV Lincoln)*

“It was kind of tough.” That simple understatement is how Scott Gonnerman described the 2019 growing season, a cycle impacted by heavy rain and lower than normal temperatures. “We didn’t have a lot of sun or a lot of heat, so it lowered our corn yield. It was not great conditions for high yield growing,” he added. Despite these challenging conditions, the fields Gonnerman farmed with the Upper Big Blue Natural Resources District in York were profitable. More importantly, thanks to the farm practices implemented, Gonnerman and the NRD are improving soil health in the 160 acres of the Project GROW demonstration fields.

Gonnerman, a fourth-generation Nebraska farmer, has been farming in York County since 1976 and has been working toward greater environmental sustainability through his farm practices since 2008. He and his wife, Barb, were recognized with a Master Conservationist distinction by The World-Herald in 2018—the same year he began collaborating with the Upper Big Blue Natural Resources District and the City of York on Project GROW.

The purpose of Project GROW (Growing Rotational crops on Wellfield) is to improve the drinking water supply for York residents

by improving soil health in the wellfield (near the ballfield complex on the northeast side of town). Underwritten by a Source Water Protection Grant from the Nebraska Department of Environment and Energy, Project GROW uses no-till, diverse cover crops, and proven crop rotations to improve soil health, decrease soil erosion, and improve water holding capacity—all while maintaining profitability. One of the main goals of the project is to maintain the quality of the



drinking water produced from the wellfield, as a healthy soil acts as a filtering system to the aquifer and decreases nitrogen leaching and contamination into the water supply.

Separate from the commercially farmed fields, the project also includes a berry orchard, a pollinator patch, and community garden plots.

At the conclusion of the second growing season at Project GROW, Gonnerman and the Upper Big Blue Natural Resources District

# Water Department



are reporting information about their 2019 methods and results to encourage other producers in the region to adopt the practices they have implemented.

## Project GROW: 2019 Methods and Results

Project GROW fields were planted with triticale (a wheat-like cover crop) and hairy vetch (a nitrogen-fixing legume) in the fall of 2018. The cover crops fed the soil as they grew through the winter and into the 2019 spring months, turning sunshine above ground into carbon below ground. The cover crops also tied up residual nitrate-nitrogen in the soil that would have otherwise had the potential to leach into the drinking water supply.

The triticale and vetch were terminated after conventional (non-GMO) corn was planted in one field and conventional soybeans in the other, but the cover crops didn't stop being useful when they stopped growing; instead they provided a weed barrier around the corn and beans and continued to feed the soil as they decomposed, making the residual nitrogen it had absorbed while growing available to the new year's crop. The barrier

over the soil also increased moisture retention for the soil and prevented erosion.

Soil tests conducted prior to planting in 2019 confirmed low levels of residual nitrogen from the previous growing season. How low? There was about one-third as much residual nitrogen in the soil at the Project GROW fields as there was in the average commercially farmed soils reported to the Upper Big Blue Natural Resources District in Phase II and III areas (where high levels of nitrate have been recorded in the drinking water). Some Phase III growers in the district reported residual nitrogen levels nearly ten times higher than the Project GROW fields in the same time period.

Parts of York County are in a Phase III management area as nitrate levels are above the safe drinking water standards set by the Environmental Protection Agency.

Residual nitrogen and leaching can be caused by over application of nitrogen fertilizer, as well as non-optimal timing of application, so Gonnerman was conscientious about the timing and quantity of fertilizer applied. No fertilizer was applied in the fall or pre-plant,



*Project GROW leadership: Water Department manager Marie Krausnick, cooperating farmer Scott Gonnerman, and Water Conservationist Dan Leininger.*

as those practices lead to greater nitrogen leaching risk to groundwater. Instead, Gonnerman applied 40 pounds of nitrogen to the corn at the time of planting and an additional 80 pounds at the time of tasseling (R-1), utilizing a y-drop system that placed the nitrogen directly at the base of the corn stalks.

As farmers well know, nitrogen fertilizer is expensive and managing this input is critical to profitability. Gonnerman has focused on lowering his nitrogen use efficiency ratio (a measure of yield divided by amount of fertilizer applied) through the years on his own property. His increased efficiency means that while the average amount for district growers has remained around 1.1 pounds of nitrogen per bushel for decades, Gonnerman has improved his operation to be successful at 0.65 by maintaining yields while using less nitrogen.

Gonnerman reported that the nitrogen efficiency at Project GROW in 2019 was 0.68 lbs of nitrogen per bushel.

The split application of fertilizer was significant in reducing the amount of residual nitrogen at Project GROW in 2019 as heavy rainfall during the growing season meant that some of the corn planted was flooded out. No additional nitrogen was applied to the areas where flooding occurred, which meant a direct cost savings as well as a reduction in the amount of nitrogen that would have leached into the water supply.

After harvest, both of the Project GROW fields were seeded with rye, in keeping with Gonnerman's growing philosophy: "Every time a combine leaves the field, a planting drill follows." Keeping something growing

in the soil is essential to maintaining soil health. In the north Project GROW field, the rye will be harvested as a cash crop in June or July. In the south field, soybeans will be sown into the rye and the rye will serve as a cover crop.

Despite the wet weather conditions that delayed planting and harvest, the Project GROW fields recorded a profit while using methods that improve soil health. Profits generated are returned to the City of York—providing a revenue stream as well as improved water quality for citizens.

Soil health can be measured in several ways. One test looks at the amount of microbial activity in the soil. Another common method examines the infiltration rate (how quickly water is absorbed by the soil). A healthy soil will have high levels of microbial activity and will more quickly absorb water. These tests were completed in 2018 to create a baseline reading for the Project GROW fields and will be repeated this spring to determine the level of improvement after two years of farming using no-till, cover cropping, rotational cropping, and minimal inputs.

The level of improvement to the water supply will take years to see, as nitrogen moves slowly through the soil. However, measuring the residual nitrogen in the soil each spring is a good indicator of the success of the Project GROW efforts. This number will also be reported after soil testing in the spring and is expected to be as low or lower than the previous year.



# Water Department



## Project GROW: Soil Health Workshop Held

More than 100 people attended the annual Project GROW Winter Workshop hosted by the Upper Big Blue Natural Resources District on December 3 at the Holthus Convention Center. Most of the attendees were farmers or others involved in the agriculture industry. Speakers were a diverse group of researchers and practitioners, presenting on subjects from increasing carbon in soil to more accurate irrigation and fertilization practices.

“We were very happy with the turn out and participation of our local ag community,” said Dan Leininger, water conservationist for the Upper Big Blue NRD and event organizer. “Opportunities for professional development are important and we are pleased to be able to provide that for our partners in agriculture.” Leininger was the first speaker of the day, presenting on the Project GROW demonstration fields in York. Leininger discussed the methods used in the fields in 2019, where 160 acres of corn and soybeans were grown with cooperating farmer Scott Gonnerman. To improve soil health, no-till practices were implemented and a mix of cover crops were planted in addition to the cash crops. Manure was also added to increase the microbiotic activity in the soil. These efforts led to a reduction in residual nitrogen.

Dr. Patricio Grassini, associate professor of agronomy at UNL,

and Fatima Amor-Tenorio, a post-doctoral student who works with Grassini, presented on their research on irrigation and nitrogen efficiency. They looked at data to benchmark water and fertilizer use across the state to determine where producers were losing money due to overuse of resources without yield increases. They concluded that in Nebraska there is much room for improvement in this area and that achieving high corn yields with relatively small amounts of residual nitrogen is a realistic goal, especially as corn in rotation with soybeans exhibited higher yields with lower nitrogen balance. They hope that their research tools and benchmarking framework will be of use to producers as well as NRDs and other government agencies involved in planning and resource allocation.

Crystal Powers, a research and communication extension specialist with





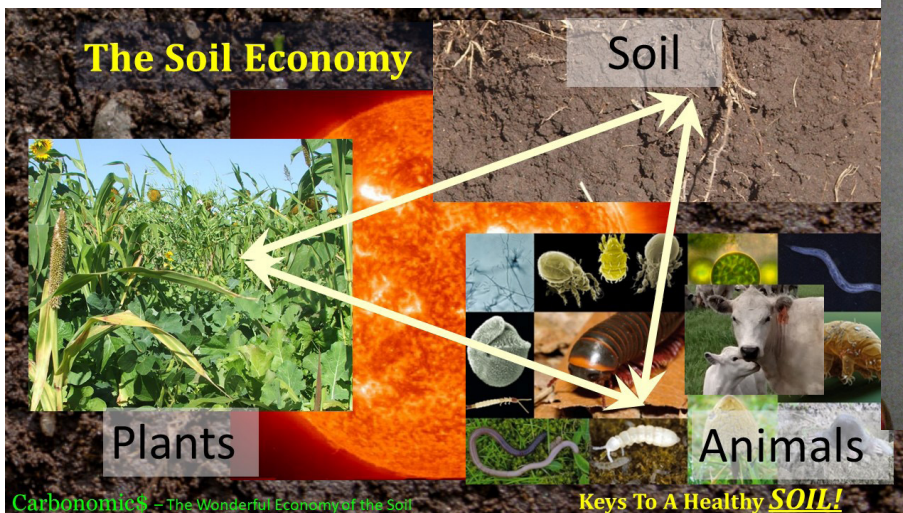
the Nebraska Water Center, followed with a presentation on the nitrogen contamination problem in Nebraska's groundwater supply. She acknowledged that it is a complicated problem tied into food supply, rural vitality, and health, and suggested Nebraskans need to take action to reduce further nitrate contamination in groundwater. More than a matter of human and environmental health, the excess nitrogen left in fields is a huge economic drain for producers. UNL estimates that 77 percent of fields in the Upper Big Blue NRD in 2018 had 20-40 pounds of excess nitrogen applied, costing individual producers thousands of dollars. She also presented data on the health risks and associated costs involved with nitrogen contamination, including cancers and negative birth outcomes. Some communities in Nebraska are implementing water treatment solutions to remove nitrogen (and associated uranium) at a cost of about \$60 per person in a large city up to \$650 per person in a smaller town.

The keynote speaker of the day was Keith Berns, no-till farmer and co-owner of Green Cover Seed of Bladen, Nebraska. Berns compared the activity in soil to the economy of a nation. Carbon, he explained, was the currency of this economy and all supply and demand, production and consumption, turned on this one simple

element. He also discussed the vital role that microbiota and fungi play in the healthy economy of the soil, as they are involved in plant defense, nutrition, and communication. Conventional tillage, Berns suggests, is highly damaging to the soil as it disrupts the infrastructure provided by these beneficial microorganisms. Berns recommended no-till and cover crop practices to improve the health of a producer's soil and thus increase yield while keeping inputs at a minimum.

The final speaker of the day was state climatologist Al Dutcher. Dutcher recapped the wild weather patterns in Nebraska in 2019 and predicted some possible weather outcomes to look for in 2020. He suggests that an elevated flood risk will continue through much of the Corn Belt through spring 2020 and that the degree of flood risk will hinge on precipitation, temperature, frost depth, and storm tracks through the winter months.

The 2020 Project GROW Winter Workshop will be held December 2 and will feature keynote speaker Dr. Jill Clapperton, principal scientist, founder and owner of Rhizoterra Inc.





# Water Department



## Healthy Soils, Healthy Harvest *Cover Crops Make all the Difference*

\*\*\* (Between October 23 and December 1, this article appeared in the following publications: *York News-Times*, *Nebraska Farmer*, *No-Till Farmer*, *Farm & Ranch* Nebraska Edition, KRVN and KRVN.com, and the National Association of Conservation Districts *Conservation Clips*. Additionally, Dan Leininger and Marie Krausnick appeared on two episodes of the Central Valley Ag podcast *Soil Talk*, presenting on this topic in October.)\*\*\*

On a windy autumn day, Dan Leininger, a water conservationist with the Upper Big Blue Natural Resources District, stands in a field of ripe soybeans on the northeast side of York. The crop at the Project GROW demonstration plot is thigh-high, the rows of fuzzy bean pods a muted golden brown. Leininger pulls a pod from a plant and pops it open to reveal three perfectly shaped milky white ovals. "These are ready to cut, ready to combine. They're dry enough," he says, rolling the beans around his palm speculatively. These tiny, egg-shaped legumes will soon be shipped around the nation and the world as food products, oil, or biodiesel. It's a field of possibilities, ready to harvest.

While the beans are impressive, Leininger gets down on one knee to show what he's most proud of. "See this?" he says, pointing to a smattering of small holes where something has burrowed into the soft, rich earth. He gathers a few clumps of what appears to be soil. "Do you know what this is?" he grins, holding them up.

"This is earthworm castings. In other words, earthworm poop!" The earthworms are both indicators and agents of a healthy soil system, he explains.

"These worms can burrow down to six feet and as they come back up, will ingest soil and dead plant matter. Their castings are very fertile." The worms offer a double benefit: in addition to enriching soil with



their natural fertilizer, their tunnels break up the soil, keeping it loose and aerated—the ideal growing conditions for crops. The tunnels make the soil more porous, like a sponge. That's never been more important in Nebraska than in 2019, when flooding has threatened the livelihood of many farmers. "If you have healthy soil, that's a huge buffer of protection against weather extremes, because your soil can take in more moisture

and it can hold that moisture longer for your crop....Healthy soil is really an advantage when it comes to variabilities in weather.”

The key to developing this healthy soil full of earthworms and other beneficial organisms is no-till farming practices and cover crops, says Leininger. A cover crop is a plant that is sown not to be harvested and sold, but to remain on the ground and benefit the soil in myriad ways. It may be planted immediately after a cash crop is harvested or sown between the rows of a cash crop while it's growing. The environmental nonprofit The Nature Conservancy recently gave the Upper Big Blue NRD a highboy interseeder, a piece of equipment specifically designed to plant cover crops in between rows of a standing crop. The interseeder will allow the NRD to continue to be leaders in conserving and protecting the natural resources of the district while demonstrating sustainable agricultural practices. It will be used on the 160 acres at Project GROW as well as demonstration farmland managed by the Nature Conservancy and farmers in the area.

The NRD will use the interseeder for research as well as demonstrations, testing what seed mixes work best in different growing conditions to see if interseeding is a viable option for district growers.

“These beans aren't RoundUp ready, they don't have any kind of treatment on them,” explains Leininger, noting that cover crops provide natural weed and insect control. “These are just regular soybeans, and we do get a premium for those. We can grow non-GMO beans because of the use of cover crops and crop rotation.” On the Project GROW demonstration fields, one is growing soybeans and the other is growing corn. Next year, rye will be planted as the cash crop on the current soybean field and soybeans will be planted on the current corn field. This multicrop rotation is essential to keeping the soil healthy, as well as for weed and pest suppression.

“Mother Nature loves diversity,” Leininger says. “It's healthier for the whole system. When you fight against nature by only growing one crop year after year, it's expensive. Your inputs will be higher every





# Water Department



year, because you'll be developing resistant weeds and insects and depleting the soil."

Leininger picks up a handful of dried biomass that lines the ground between rows of soybeans. It's triticale, a wheatlike plant, the cover crop planted last year after harvest. The triticale provided benefit to the soil while it was growing as it sequestered excess nitrogen in the soil to prevent it from leaching into the groundwater. A year later, it's still working, as now it protects the soil from erosion and provides nutrition and cover for earthworms and other microorganisms as it decomposes.

harvests sunlight—free energy—and through photosynthesis it makes plant sugars that get transported into the plant roots. When it's down in the roots, the roots will exude carbon into the soil, and carbon is the building block of all living material. So what the cover crops do is take advantage of the sunlight throughout the year to put carbon into the soil."

Project GROW (Growing Rotational crops on Wellfields) began in 2017 as an effort to improve the soil health on the York wellfield—the land that sits above the part of the aquifer that provides water for much of the community. Improving the soil will also improve the water quality

from this source. Using sustainable practices including no-till, diverse cover crops, and crop rotations, the Project GROW fields are demonstrating how ag producers can improve soil health, decrease soil erosion, and improve water holding capacity on their land, all while maintaining profitability.

There have been cover crops in use at the Project GROW fields since 2018. After

just one year, Leininger says there was a noticeable improvement in the soil. Both fields showed signs of increased biological activity and test samples from the cornfield



*Dan Leininger examines triticale cover crop*

"With cover crops you always have a living root in the soil," adds Leininger. "The plant

showed that there was very little residual nitrogen in the soil (only two parts per million), meaning that there was not a significant amount that could leach into the groundwater supply. Soil improvement at greater depths (like 20 feet) may take a number of years to be seen, says Leininger.

“One of the goals of Project GROW is to show how you can make a profit in farming using less inputs if your soil is healthy,” said Leininger, drawing a distinction between maximum yield and maximum profit. While you may have a greater yield using RoundUp ready seeds and spraying your fields for weeds and other pests, the expenses are also higher. It’s counterintuitive, but depending on the conditions, growing less (with fewer inputs) can deliver greater profit because it’s more

cost effective.

Cover cropping is a scalable practice, insists Leininger. It’s as good for a backyard garden as it is for a several thousand-acre farm. “It’s beneficial for any size of operation.” More than simply beneficial, it’s necessary. “Long term sustainability and profitability in agriculture depends on more diversification when it comes to what we plant,” he says. If we plant only one or two crops and use only commercial fertilizer, herbicides, and insecticides, we will create more resistant pests and weeds, which will in turn demand ever costlier inputs.

“It’s expensive to fight Mother Nature,” he says again, shaking his head.





# Projects Department



## Land Treatment Program

Land treatment is defined as the construction or installation of practices to prevent or reduce soil erosion, water contamination, and the overuse of both surface water and groundwater. Many land treatment practices result in an additional benefit — the creation of habitat for wildlife.

The purpose of the Land Treatment Program is to provide soil and water conservation incentives throughout the Upper Big Blue NRD. The District's technical guidelines and cost-share procedures generally coincide with USDA (United States Department of Agriculture) and Nebraska Department of Natural Resources (NDNR) programs. Cost-sharing rates are based on county average costs determined by the Farm Services Agency (FSA) county committee.

The Land Treatment Program receives funding for public disbursement from the NDNR. An ancillary program within the auspices of Land Treatment is the Buffer Strip Program which receives funding from the Nebraska Department of Agriculture. The District's board also budgets local tax dollars to fund the balance of the Land Treatment Program.

The following are the types of practices that comprise Land Treatment:

- Basin — sediment control
- Brush Management
- Dam — water impoundment
- Diversions
- Drip irrigation — subsurface
- Grade stabilization structures
- Mechanical outlets
- Pasture planting
- Planned grazing system
- Reuse pits — irrigation water collection for gravity systems
- Stream bank stabilization
- Terrace System
- Waterway — grassed
- Windbreak planting
- Windbreak renovation

Special programs administered by the NRD include:

1. Buffer Strip
2. Dry Hydrant
3. Conservation Reserve Enhancement Program

*The following pages contain tables summarizing Land Treatment Program cost-sharing practices by county, number of practices and cost of practices. Data has shown a high level of interest for installing land treatment practices throughout the district.*

## Land Treatment Fund Disbursement

There are two sources of cost-share assistance available to area landowners for installing conservation practices on their land. The Nebraska Soil and Water Conservation Program (NSWCP) and the Upper Big Blue NRD offer the incentives through the Land Treatment Program. The cost-share programs place primary importance on water conservation, water quality, and erosion control practices.

The Natural Resources Conservation Service (NRCS) is a vital federal agency partner of the Upper Big Blue NRD as both entities work together to facilitate various aspects of the district's Land Treatment Program. Local NRCS personnel provide technical assistance and other conservation services to farmers and landowners.

The following tables define the land treatment program by county and type of project, noting total numbers of projects as well as costs. A total of 31 practices were given cost-share assistance in fiscal year 2019, for a total cost of \$123,389.24. From this total, the Nebraska Soil and Water Conservation Program (NSWCP) state share was \$71,667.20 with the remainder (\$51,722.04) coming from the Upper Big Blue NRD.



*The Nebraska Buffer Strip Program provides cost-share funds for landowners to establish vegetative buffer strips along shorelines of wetlands, streams, and lakes. This is an easy way to keep waterways clean by slowing runoff, trapping sediment, and providing filtration of agrichemicals.*



*These pictures show the impact of a buffer strip near Ord after a rainstorm in August 2019. The photo above was taken during the heavy rainfall and the one on the right was shortly after. Storm waters were appropriately managed thanks to the buffer strip.*

# Projects Department



**Table LT-1: Land Treatment Projects per County 2019**

County	NRD	NSWCP	Total	% of Total
Adams	1	0	1	3.23
Butler	5	3	8	25.81
Clay	1	0	1	3.23
Fillmore	5	2	7	22.58
Hamilton	2	1	3	9.68
Polk	0	0	0	0
Saline	0	0	0	0
Seward	2	4	6	19.35
*York	4	1	5	16.13
<b>TOTAL</b>	<b>20</b>	<b>11</b>	<b>31</b>	<b>100%</b>

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



*Flood waters controlled by NRD structures in York in March (left) and in Aurora in May (right).*



**Table LT-2: Expended Land Treatment Funds per County 2019**

County	NRD	NSWCP	Total	% of Total
Adams	\$573.18	\$0	\$537.18	0.46
Butler	\$17,057.64	\$20,678.44	\$37,736.08	30.58
Clay	\$950.70	\$0	\$950.70	.77
Fillmore	\$10,125.60	\$12,116.35	\$22,241.95	18.03
Hamilton	\$11,453.97	\$6,665.86	\$18,119.83	14.69
Polk	\$0	\$0	\$0	0
Saline	\$0	\$0	\$0	0
Seward	\$5,526.97	\$24,706.55	\$30,233.52	24.5
*York	\$6,033.98	\$7,500.00	\$13,533.98	10.97
<b>TOTAL</b>	<b>\$51,722.04</b>	<b>\$71,667.20</b>	<b>\$123,389.24</b>	<b>100%</b>

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



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**Table LT-3: NUMBER of Practices By Type of Land Treatment 2019**

Practice Type	NRD	NSWCP	Total #	% of Total
Basin --Sediment Control	1	2	3	9.68
Mechanical Outlets	1	3	4	12.9
Pasture Planting	1	2	3	9.68
Planned Grazing System	0	1	1	3.23
Terrace System	1	2	3	9.68
Variable Rate Irrigation (VRI)	5	0	5	16.13
Waterway -- grassed	1	1	2	6.45
Windbreak Planting	8	0	8	25.81
Windbreak Renovation	2	0	2	6.45
<b>TOTAL</b>	<b>20</b>	<b>11</b>	<b>31</b>	<b>100%</b>

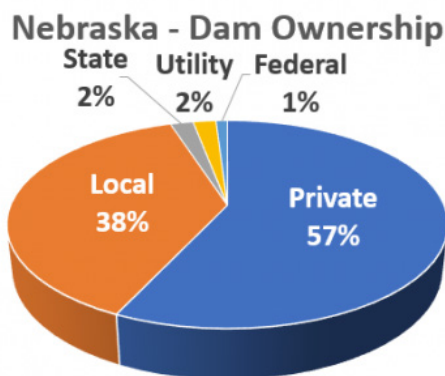
**Table LT-4: COST of Practices By Type of Land Treatment 2019**

Practice Type	NRD	NSWCP	Total #	% of Total
Basin --Sediment Control	\$3,687.62	\$14,968.16	\$18,655.78	15.12
Mechanical Outlets	\$1,789.72	\$17,737.08	\$19,526.80	15.83
Pasture Planting	\$883.45	\$11,282.21	\$12,165.66	9.86
Planned Grazing System	\$0	\$7,500.00	\$7,500.00	6.08
Terrace System	\$4,215.25	\$12,679.75	\$16,895.00	13.69
Variable Rate Irrigation (VRI)	\$15,814.32	\$0	\$15,814.32	12.82
Waterway -- grassed	\$4,714.80	\$7,500.00	\$12,214.80	9.9
Windbreak Planting	\$9,162.91	\$0	\$9,162.91	7.43
Windbreak Renovation	\$11,453.97	\$0	\$11,453.97	9.28
<b>TOTAL</b>	<b>\$51,722.04</b>	<b>\$71,667.20</b>	<b>\$123,389.24</b>	<b>100%</b>

## The Importance of Maintaining/Rebuilding Nebraska's Dam Infrastructure

By Jack Wergin, Projects Department Manager

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). Forty-three 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 are owned and operated by individuals, private and public organizations, and the government. The responsibility for maintaining a safe dam rests with the owner. Proper operation and maintenance of a dam is key to preventing a failure and limiting the liability of the owner. The Nebraska Department of Natural Resources inspects inventory size dams on a set schedule, ranging from annually for high hazard dams to once every five years for low hazard dams. Each dam is assigned a condition rating:

- Satisfactory--acceptable performance expected
- Fair--dam may fail under extreme conditions
- Poor--dam may fail under expected conditions
- Unsatisfactory--dam failure is likely
- Unable to Rate--not enough information to rate NRDs also inspect their dams on a regular schedule.

These dams provide benefits such as flood



*Johnson 46 structure renovated with Slip-Tite lining in summer 2019.*



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control, sediment and erosion control, water conservation, groundwater recharge, and fish and wildlife benefits. Flood control benefits alone provide an estimated annual benefit of over \$62 million per year.

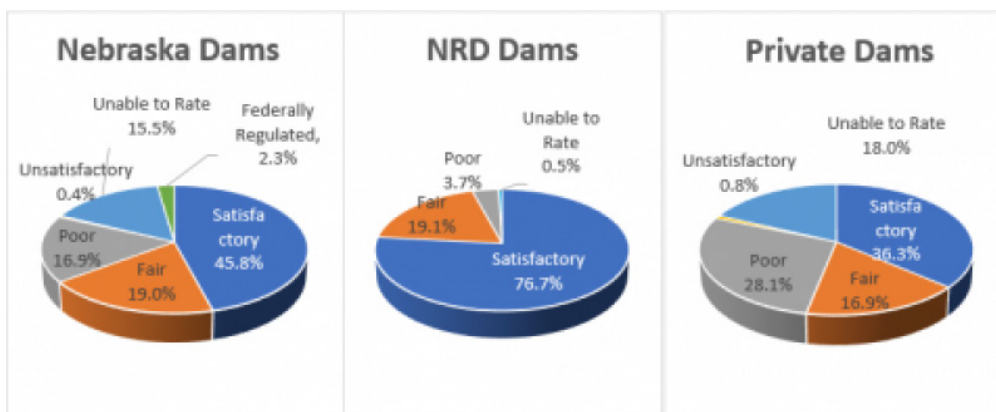
Many private dam owners face challenges when considering major maintenance activities of aging dams or decision to rebuild dams that have already failed. Landowners must weigh costs and benefits along with the liability of owning a dam. Programs such as the Upper Big Blue NRD's Private Dams Program provide technical assistance and financial incentives to landowners wishing to rebuild failed structures.

The Upper Big Blue NRD's Private Dams Program provides landowners with an opportunity to correct or re-build privately owned dams. The UBBNRD will provide 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 cost-share for design services will only be reimbursed if the dam is constructed.)

Four dams were completed during the first year of the program, seven during the second year, and two during the third year. The average construction costs for these thirteen dams was approximately \$24,000, with an average NRD cost share of \$18,000. The average drainage area of these completed dams is 182 acres. Storage capacity averages 5 acre-feet with an additional 15 acre-feet of flood storage.

Interest in the Private Dams Program continues in the program's fourth year as two larger dams are under construction and two other dams have been approved for cost share funds. A number of other dams are in the initial evaluation phase for inclusion in the program. The UBBNRD would like to recognize the staff of the Natural Resources Conservation Service for the design and construction support services provided to this popular program.

*\*\*Some information quoted in this article came from the Nebraska Department of Natural Resources Dam Safety Office.*





Flood control structure near Hastings in August 2019

### Nebraska's Dam Infrastructure: Estimated Annual Flood Control Benefits

	# of Dams	Controlled Drainage Area (mi <sup>2</sup> )	Annual Benefit (per mi <sup>2</sup> )#	Estimated Total Annual Benefit
All Dams * <sup>o</sup>	2,638	6,870	\$9,046	\$62,146,020
NRD Dams*	950	2,819	\$9,046	\$25,500,674
Private Dams* <sup>o</sup>	1,394	2,733	\$9,046	\$24,722,718

# Estimated Annual Flood Control Benefits from Natural Resources Conservation Service Study

\* Does not include dams with drainage are greater than 100 mi<sup>2</sup>

<sup>o</sup> Does not include livestock waste lagoons

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## A Mooooo-vable Feast

*New equipment encourages wetland restoration through cattle grazing*

\*\*\*(Between September 3 and November 1, this article appeared in the following publications: *York News-Times*, *Nebraska Farmer*, *Farm & Ranch* Nebraska Edition, and *Grand Island Independent*)\*\*\*

The sun is rising over a pasture just south of York on a late summer day. Prairie grasses sway in the breeze at the spot, called the Kirkpatrick Basin North. Black-Eyed Susans and Mexican Hats flash their bright yellows and reds to attract the buzzing pollinators. Water is pooled in the low-lying areas and meadowlarks fill the air with sound. Looking at this unassuming patch of prairie, you might not guess how important this idyllic landscape is—or how fragile.

Wetlands like this one provide essential water filtration and aquifer recharge. They are also habitat areas for hundreds of species, including some that are at risk, such as whooping cranes, peregrine falcons and bald eagles. Wetlands in Nebraska are a valuable natural resource that has been negatively impacted in the last 150 years through land development and cultivation. Restoring these areas is the goal of a new collaboration between the Rainwater Basin Joint Venture and the Upper Big Blue Natural Resources District.

Today at the Kirkpatrick Basin, the birds have competition in the noise-making department. On the edge of the pasture stands a herd of black angus cattle who have just been rounded up. Hemmed in by a shiny new portable corral, they bellow

their displeasure as they are led into a chute then up a ramp and onto an idling semi. This herd of 40 cow-calf pairs has spent the summer grazing the 355-acre wetland, which sits a mile from I-80 and is managed by Nebraska Game and Parks. Similar to the bison who once roamed freely across



this range, the cattle have mowed down many invasive species (such as reed canary grass and smooth brome), turned the earth and fertilized it, and spread seeds of native plants (including switchgrass and prairie clover). The paths they've created through the dense brush provide habitat for the local pheasant population and other wildlife. Their presence in this ecosystem is mutually beneficial: the calves have enjoyed an enriching and nutritious environment in which to grow.



The cattle are owned by Kim and Lindy Siebert, who are using the new Rawhide Portable Corral for the first time today. The corral is one of three purchased by the Rainwater Basin Joint Venture through a grant from the Nebraska Environmental Trust for the use of cattle producers in the Upper Big Blue and neighboring NRDs. The equipment makes it easier for producers to load cattle into and out of wetlands and is provided for free use through the NRDs as an incentive for grazing wetlands.

The Sieberts have raised cattle in York County for four decades. “Just before we got married in 1979, Kim bought his first cattle. So, we started our marriage \$100,000 in debt,” Lindy said with a laugh. It appears to be an investment that has paid dividends, as the couple has continued to farm and serve as leaders in the local cattlemen’s association. Their cow-calf operation typically has about 150 pairs each year, which they graze locally—often in wetland areas.

Why wetlands? “That’s the biggest pasture left in York County,” says Kim. “These are some of the only large blocks of grass still available. Yes, they come with rules and regulations that are not always convenient, but it is still the most economical way to

raise cattle in this area.”

Shielded by a broadbrimmed sun hat and tall rubber boots, Lindy works alongside Kim, their son and nephew. They ‘yip’ and ‘hep’ and ‘get-on!’ the animals, leading them gently with a long stick used to tap backs or hindquarters. The portable corral is modular, allowing for set up as one large pen or smaller sections. It also features a head gate to make treating individual animals for illness much simpler. This is important as grazing wetlands comes added risk of hoof rot and pink eye. The cattle look healthy today, notes Kim, who watches closely for signs of illness in his herds. “The wetter the year, the less problems we have, because the water is fresher. When the weather is dry and the water is stagnant, we seem to have more problems,” he said.

In fact, it’s been so wet lately that they used a kayak to round up some of the cattle in the wetland this year, Kim says with a chuckle.

The corral is set up with two holding pens, separated by gates that connect to the chute. When the animals are rounded up, it’s quick work to divide them into pens—cows on one side, calves on the other. The cows moo anxiously at the separation, but it is



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for the calves' safety, as the little ones are in danger of being unintentionally trampled by the cows during transport. It takes the Sieberts and their team less than an hour to move the herd from the portable corral onto the semi and a smaller trailer. Later in the day, they repeat the operation at the Kirkpatrick Basin South, where they have grazed 40 cow-calf pairs of red angus for the season. It takes half the time on their second go round.

After a summer of grazing the wetlands, these herds and several others are being moved to the Sieberts' property, where the calves will be weaned and fattened up. The cows will be moved to graze in another pasture. Rotational grazing protects the land from overuse and allows adequate recovery time for the wetlands. The cattle will return to the Kirkpatrick Basin areas next summer, as the Sieberts' herds have done annually for the past 20 years.

"Almost all my pastures are wetlands or river bottoms," says Kim, noting that it makes good financial sense to graze these areas that are not useful for growing row crops like corn and soybeans.

There was a bit of a learning curve with the new equipment, but Kim says it was worth the added effort. He plans to use the portable corral again in the future. "Without this corral, we have to manhandle a lot of panels [to round up and load the cattle] and there's nothing stationary except the truck. This

corral has a nice solid base in the middle to anchor it. That made a big difference. Everything worked a little bit better. The cows went in two at a time and not everything moved with them. Little things like that made the work a lot easier."

Comments like these are music to the ears of Andy Bishop, coordinator for the Rainwater Basin Joint Venture. The Rainwater Basin is a network of wetlands that stretches across much of Nebraska and includes all of the Upper Big Blue NRD managed area. The region provides one of the world's greatest waterfowl migration spectacles as tens of millions of waterfowl descend on the Rainwater Basin each spring, not as a destination, but as a way station between southern wintering retreats and northern nesting grounds. Bishop sees use of cattle grazing in the Rainwater Basin as a natural way to manage the ecosystem. "Heavy grazing at the right time means





more diverse plant communities in these wetlands," said Bishop. "By using grazing, we don't have to use chemical treatments and other mechanical methods to manage the area....We directly impact the population sustainability of millions of migratory waterfowl by maintaining these wetlands."

Access to the new portable corral is a potential cost savings for local cattle producers as well, notes Bishop. "Many of them have pasture in the Sandhills or the Flint Hills, so they are shipping the cattle for grazing. Having these wetlands to graze is great because it keeps animals closer to home...Having easier access to the wetlands with this equipment helps them diversify their operation without significant additional work." In addition to the portable corral, the Rainwater Basin Joint Venture also offers cost-share funds for perimeter

fence, livestock wells, and cross fence--the infrastructure to make grazing wetlands and associated grasslands effectively fit into a producers' operation without a lot of out-of-pocket expense.

"We are excited to partner with the Rainwater Basin Joint Venture and cattle producers in our district on this project," said David Eigenberg, general manager at the Upper Big Blue NRD. "We see this as being a win-win for the environment and the farmers we serve."

*Interested in using the new corral in a designated wetland area? Contact the Upper Big Blue NRD at 402-362-6601. For information about grazing infrastructure cost-share opportunities, contact the Rainwater Basin Joint Venture at 308-382-8112.*





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## Ready for Action *Hazard Mitigation Workshop Held*

As Nebraskans learned in the spring of 2019, you can't predict when disaster will strike—but you can be prepared. Funding for emergency preparation and other community enhancements was the main topic at a workshop presented at the Upper Big Blue Natural Resources District office August 7. The event was attended by 20 representatives from area municipalities and counties seeking grant funding.

Representatives from Marquette, Hampton, Gresham, Bradshaw, Waco, McCool Junction, Pleasant Dale, Beaver Crossing, York, Henderson, Seward, and Milford attended the event, as well as those from Hamilton, Seward, and York county offices.

Four organizations presented on a number of grant funding programs currently available. JEO Consulting Group out of Lincoln presented on Hazard Mitigation Grants through the Federal Emergency Management Agency (FEMA). This grant program offers participants a 75 percent cost-share for projects that are aimed at reducing the risk to life and property from hazards such as high winds and flooding. This funding was made available in the state of Nebraska in response to the historic storms and flooding experienced across much of the state in March 2019. FEMA grants could reduce the severity of the impact of future events in Nebraska, should they occur.

The workshop also covered community improvement grants and loans available through the Nebraska Community Development Block Grants program, including those for emergency preparation. These funds address the needs of low- and middle-income communities, with the aim of providing a stable platform for economic development.

Kirt Smith, the emergency management director for Hamilton County, was encouraged to hear that there were funds available through multiple sources for the villages he serves. "Each jurisdiction is looking at doing their own projects—storm water drainage, generators, safe rooms. Those type of things," he said. "The workshop gave us a look at a lot of avenues of funding. Some of them I hadn't heard of before... The recent flooding has really opened people's eyes in the villages to the need for better planning and drainage in some areas."

The staff of the Nebraska Environmental Trust also presented at the workshop on funding opportunities for Nebraska natural resource projects. Funded by revenues from the Nebraska Lottery, the organization funds projects in the areas of wildlife habitat, water quality and quantity, recycling and waste reduction, air quality, and soil health. The Nebraska Environmental Trust is working with four other NRDs in the northern part of the state on a groundwater

nitrate reduction project in the Bazile Groundwater Management Area. This is of interest, as reducing nitrates in groundwater in the district is one of the most pressing initiatives of the Upper Big Blue NRD.

Staff from the Rural Development program of the United States Department of Agriculture was also at the workshop to discuss emergency community water assistance grants. These funds can provide improvements to water systems in rural areas to ensure access to safe drinking water. They also fund other types of emergency preparedness initiatives, including a new ambulance and medical equipment in Webster County; a new fire station in Dakota County; and an ambulance

barn in Thayer County.

Jerry Zieg, mayor of Beaver Crossing, hopes USDA funds can have a similar impact on his community. Zieg has applied for a grant to expand the village's fire station. Emergency funding is always top of mind for Zieg since his community was the site of a powerful tornado in 2014. The event damaged virtually every structure in the small town and led to a months-long clean up and recovery process. "I would hope that such a thing never happens again, but if it does, we want to be a little bit more prepared. I'm confident there were things we could have done then that we didn't know to do. We don't want to make the same mistakes twice," he said.



*Flooding from  
Beaver Creek near  
Aurora in May 2019*



# Public Relations



## Events

Outreach efforts in 2019 included NRD representatives at the following events:

- Nebraska State Fair, August 28: Erosion Control Activity
- Seward County 4-H Family Nature Night, September 4: Erosion Control Activity
- Husker Harvest Days, September 9-10: Conservation Tree Program Promotion
- Nebraska Power Farming Show, December 11: Conservation Tree Program Promotion

## Platforms

In addition to the continuing communication stream through the tri-annual newsletter Blueprint and other print communication from the NRD, 2019 saw a new focus on digital communication including e-mails, social media, and video marketing. Thanks to increased targeting of media outlets, the brand message was carried throughout the district, region, and state by print and online publications (see pages 25 & 37 for examples). Upper Big Blue Natural Resources District messaging is now promoted across many platforms including:

- Print (Blueprint, informational booklets)
- Social media: Facebook, Twitter, LinkedIn, Instagram, YouTube
- Media Outlets: Radio, podcasts, print and digital news sources
- E-newsletters and e-blasts
- Direct mail

*In August Chrystal Houston stepped into the role of Public Relations Manager for the NRD. Scott Snell had served in the role for 15 years prior to this transition. Houston is pictured below, conducting a lesson on erosion control in Seward in September.*



*This couple at Husker Harvest Days were pleased to receive a free tree to plant as well as information on best planting practices for the state from Nebraska NRDs.*





## Programs

- **Burke Scholars Program**

For sophomore agribusiness majors Madi Baker and Caden Theis, college thus far has been fun and challenging. Both Baker, at Concordia University, and Theis, at Doane University, are being helped along in their studies by scholarships from the Upper Big Blue NRD. Baker and Theis are recipients of 2019 Raymond A. Burke scholarships, which support district residents pursuing two- or four-year degrees in a natural resources related field as a full time student at a Nebraska college or university.

Each Baker and Theis will receive a \$2,000 scholarship through the Burke fund. The family of Raymond A. Burke established this scholarship in his memory, as he was passionate about natural resources and education. Burke was a land improvement contractor and farmer and served for 40 years on the elected boards of the Polk County Soil and Water Conservation District and the Upper Big Blue Natural Resources District.



- **Educational Capital Projects Fund (ECAP)**

Training the next generation of environmental scientists is important work. That's why the Upper Big Blue Natural Resources District is partnering with area schools by providing grant funding through its Educational Capital Projects Fund. The grant funding will assist York High School in creating an outdoor classroom and Shelby-Rising City Schools in the construction of a greenhouse and environmental studies lab.

The total cost for the greenhouse at Shelby-Rising City is \$75,000, of which the Upper Big Blue NRD will provide \$4,750. Other funding will be provided by the school district building fund, the school's FFA chapter fund raisers, private donations, and additional grants. The facility will be located on school property and be used for precision agricultural and environmental science, biology, and general agricultural instruction for all grade levels.

The project at York High School will include transforming a small retention pond into a biology lab where students will study wildlife and collect water samples for analysis. NRD grant funds will be used to line the pond with rock, add a concrete pad and benches, and construct an all-abilities accessible path. York High School and the York Public Schools Foundation will provide the remainder of the funding to create the classroom, which is expected to cost \$1,500 and be completed by fall 2020.



# Forestry Department



## The NRD and Trees

The tree planting crew for the spring of 2019 consisted of Jay Geiger, Andy Larkin, and Ken Feather, Forestry and Parks department manager. The district purchased 15,650 trees/shrubs. The trees and shrubs purchased were used for farmstead windbreaks, habitat areas, and riparian plantings.

The trees purchased from Schumachers were delivered April 9; Towner Nursery and Musser Nursery trees were delivered April 10; Lincoln Oakes Nurseries were delivered April 11; and Bessey Nursery trees were delivered April 17. The district started planting on April 24. The district planted a total of 5,180 trees for 21 cooperators, an average of 246.7 trees per cooperator.

Of the trees sold in 2019, 33 percent were planted by the district and 67 percent went out as hand plants. A total of 8.1 miles of fabric was laid to enhance the tree planting.

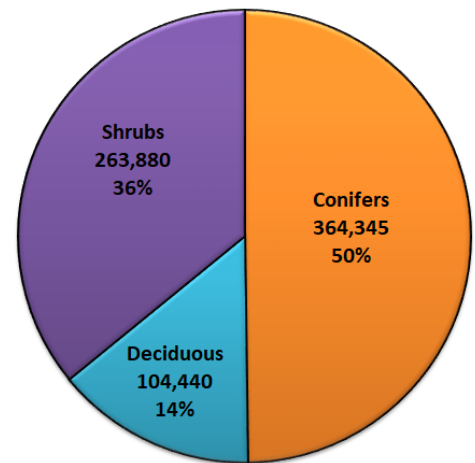
Weather conditions during the weeks of April and May were cool and dry to wet in certain areas of the district. The end of May brought rain that slowed the tree plantings. Ground conditions for the most part were hard and wet side. The last tree planting was completed July 1, when the weather turned quite warm.

The district spent 16 days in the field planting trees. The soil moisture was good and remained on the wet side for the entire planting season. The ground conditions were hard, which made the planting of trees more difficult. An average of 323.8 trees and shrubs were planted daily.

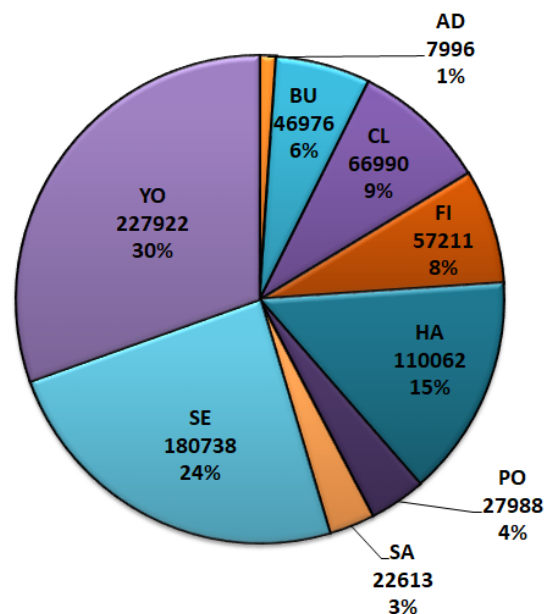
Due to wet weather, our tree planting days varied from 2.5 hours to 9.5 hours. We spent the majority of our days planting 5-6 hours, which made planting last longer than anticipated.

The scheduled plantings were completed on July 1. The district planted the 116 remaining trees and shrubs at NRD managed recreation areas.

**TOTAL TREES SOLD BY SPECIES  
1996 - 2019**



**TOTAL TREES DISTRIBUTED BY COUNTY  
1995 - 2019**



## 2019 Tree Planting Expenditures

### Machine Planting Materials Purchased (includes shipping)

Lincoln-Oakes Nurseries	110 @ \$1.09	\$119.90
NARD	3,905 @ \$0.73	\$2,850.65
Towner State	925 @ \$0.80	\$740.00
IA State Forest	15 @ \$0.65	\$9.75
LBNRD	25 @ \$1.15	\$28.75
Musser Forest	25 @ \$0.40	\$10.00
<b>TOTAL</b>	5,005	\$3,759.05

### Operating Costs

Fuel & Oil (Tractor)	39.58 gal	\$114.91
Packing Material for Handplants		\$145.50
Vehicle Mileage (14/mile)	1,416 miles	\$198.24
Vehicle Mileage (58/mile)	785 miles	\$455.30
Nursery Dealers License		\$115.00
Operating Cooler	4,000 kwh (.06/kwh)	\$240.00
<b>TOTAL</b>		\$1,268.95

*Bessey Nursery, September 2019*





# Forestry Department

## 2019 Tree Sales Report

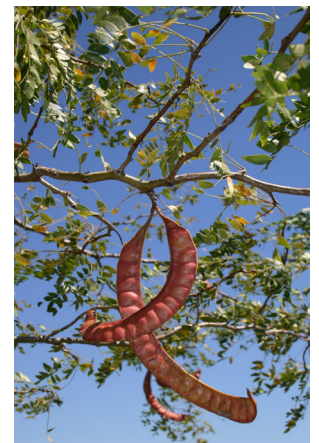
As part of the totals from the previous page, the NRD planted trees designated as "Special Projects." These include schools, government and NRD managed recreation areas. Below is a chart depicting such plantings. Also, on this page is a chart showing the "2019 Tree

Planting Revenue Less Expenses." During 2019, trees/shrubs cost \$1.10 per seedling. The planting charge of \$1.10 applied to the NRD staff planting trees as an additional cost in conjunction with the purchase price.

### Number of Trees Sold by County 2019

	NRD Planted	Customer Planted
Adams	225	225
Butler	950	2,819
Clay	1,394	2,733
Fillmore	300	325
Hamilton	950	980
Polk	0	350
Saline	0	75
Seward	0	1,975
York	3,155	5,746
Total	5,180	10,651

**Combined Total: 15,831 Trees**



### Special Projects 2019

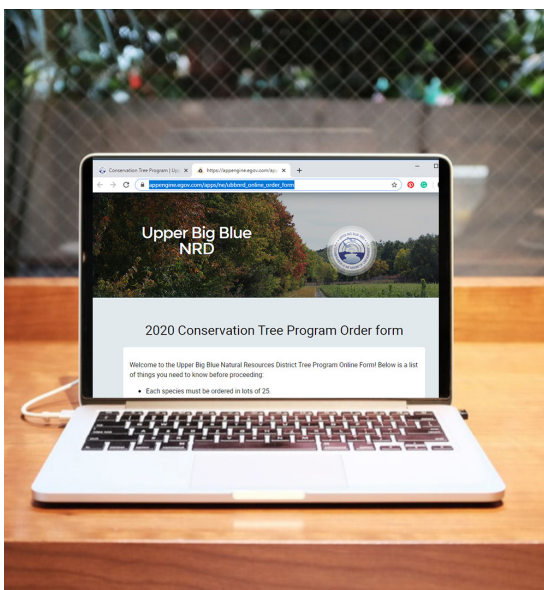
Entity	# of Trees	Cost	Total
York County Extension (for school children)	200	\$0.73	\$146.00
St. Paul's Lutheran School (Waco)	35	\$0.73	\$25.55
UBBNRD Recreation Areas (district-wide)	126	\$0.73	\$91.98
Polk County Extension (Osceola)	100	\$0.73	\$73.00
UBBNRD Project GROW (York)	25	\$0.73	\$18.25
<b>TOTAL</b>	<b>486</b>	<b>\$0.73</b>	<b>\$354.78</b>

### Tree Planting Revenue Less Expenses: 2019

	# of Trees	Cost	Total
NRD staff planted trees	5,180	\$1.15	\$5,957.00
Machine planting charge	5,180	\$1.15	\$5,957.00
		<b>sub-total</b>	\$11,914.00
Customer planted trees	10,651	\$1.15	\$12,248.65
		<b>total</b>	\$24,162.65
Less expenses (salaries/benefits of NRD staff, plus fuel/mileage/equipment maintenance costs)			\$24,302.69
Profit/Loss			-\$140.04

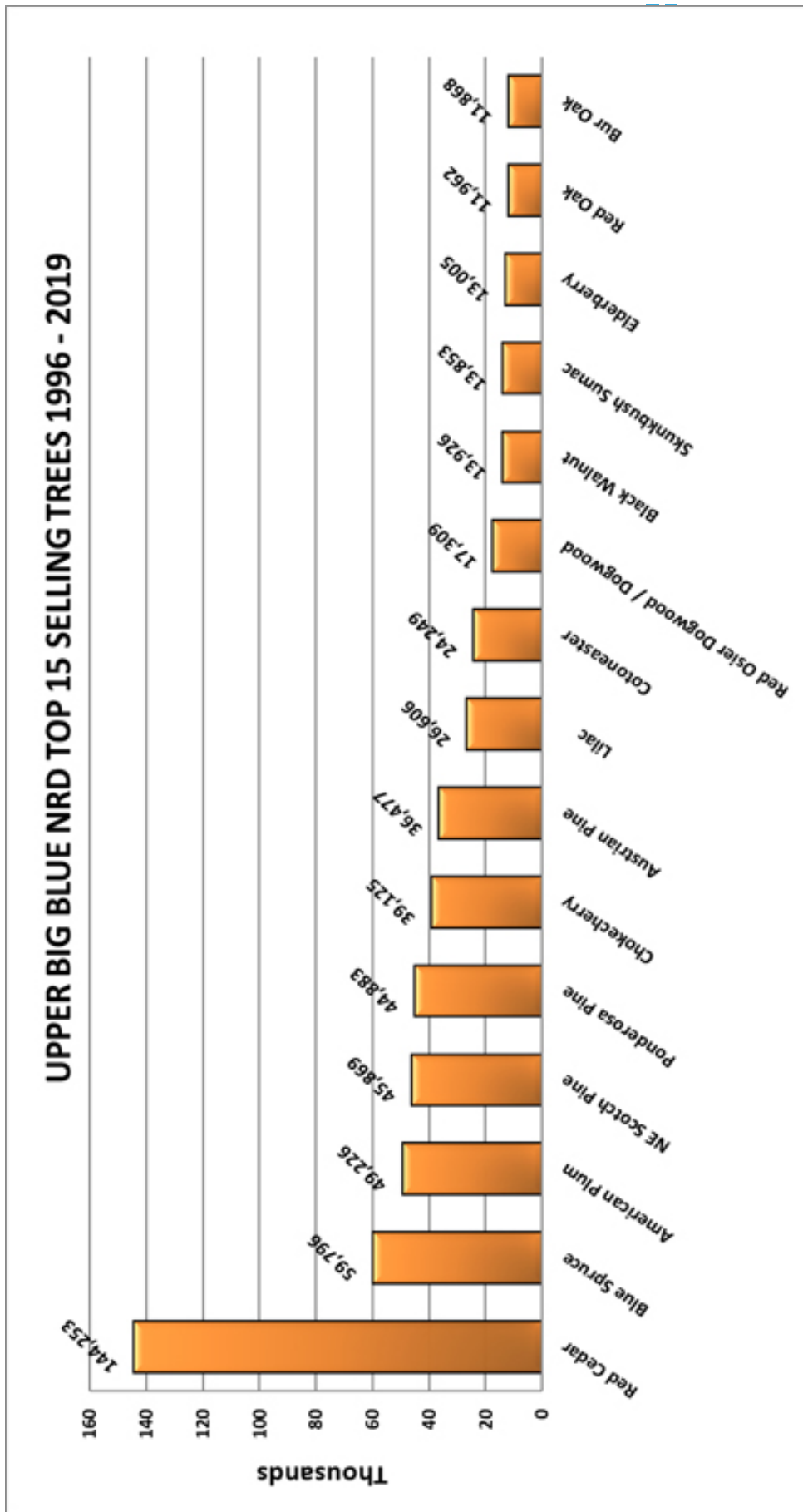
## WILD Nebraska Program

The Upper Big Blue NRD and the Nebraska Game and Parks Commission cooperate on the WILD Nebraska Program to develop, manage, and enhance wildlife habitat in response to declining wildlife populations. Participating landowners are offered financial assistance to establish new wildlife habitat areas and improve existing habitat locales. The program has been in effect since 1999. With the close of 2019, there were two contracts totaling 45.7 acres in the Upper Big Blue NRD that were designated as WILD Nebraska Program habitat.

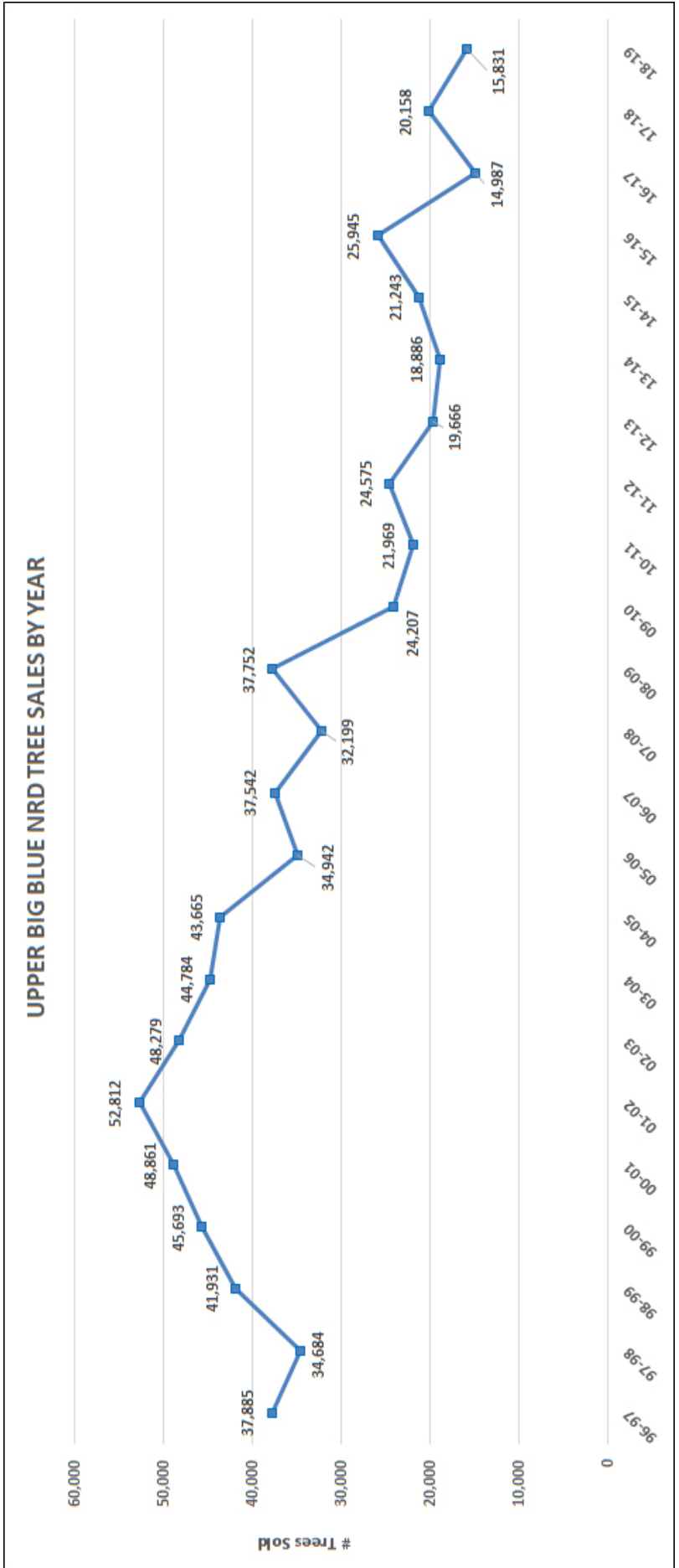


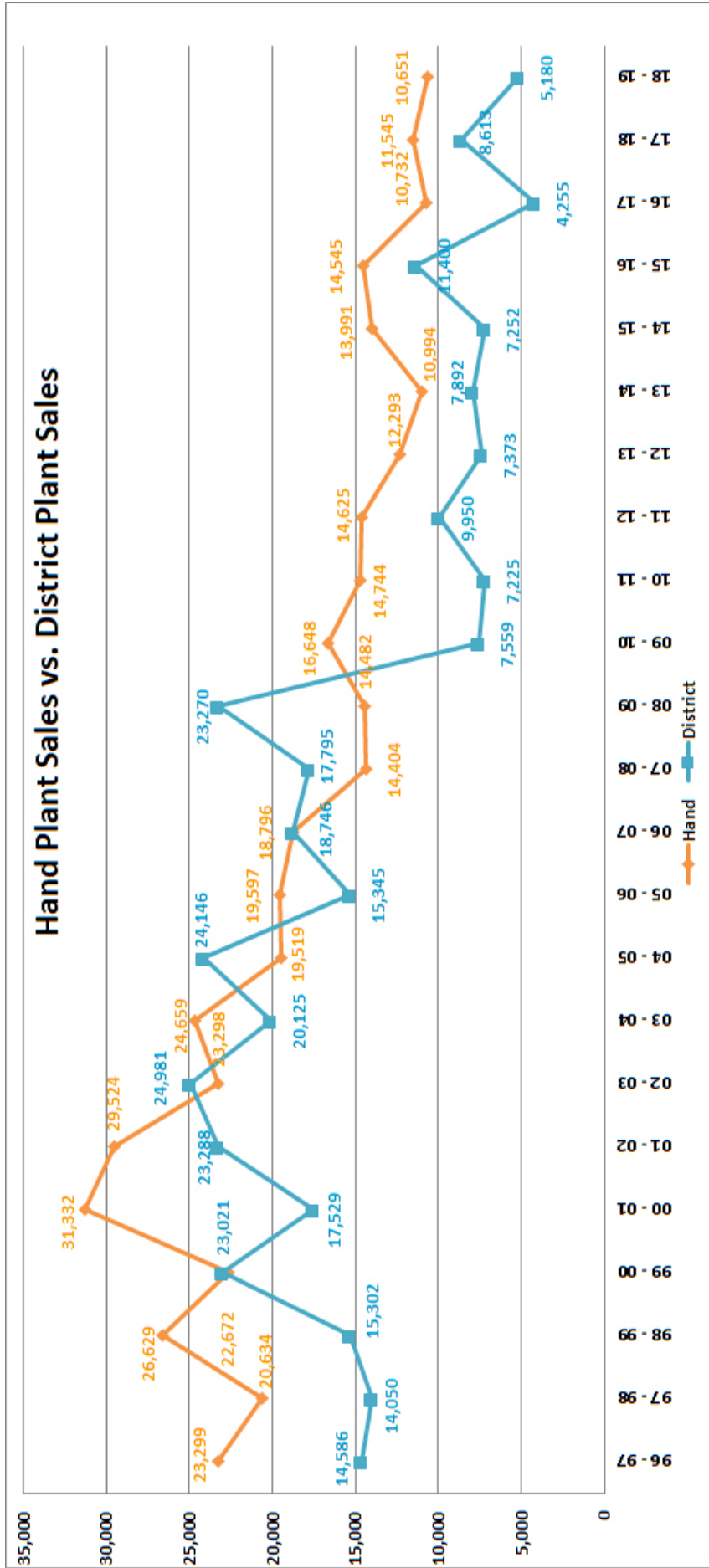
### Online Tree Sales

The NRD launched a tree sales website in November 2019 and began driving traffic through the web portal at [www.upperbigblue.org/trees](http://www.upperbigblue.org/trees). Another addition in fall 2019 was small acreage packages, which included 50 trees for \$55. Reporting on the success of these changes will occur in spring 2020.









# Forestry Department



## Corners for Wildlife Program

Corners For Wildlife gives landowners the option of enrolling in a conservation program to help establish wildlife habitat on center pivot corners not capable of sustaining high yields when planted to row crops. Pivot corners already containing native grasses and/or trees are not eligible for the program as the goal of the program is to create wildlife habitats where there are none.

Corners For Wildlife becomes a win/win situation in which landowners benefit by converting crop-less corners into a wildlife sanctuary and receive payment for doing so. At the same time, wildlife wins because a substantial habitat has been created.

Sponsoring organizations of Corners For Wildlife are Pheasants Forever, Nebraska

Game and Parks Commission, the Nebraska Environmental Trust, and the Upper Big Blue NRD.

During the fiscal year 2019, one new contract was accepted for nesting and brood-rearing habitat winter cover for a total of 13.0 acres currently enrolled in the district. In the Upper Big Blue NRD, there are a total of 48 Corners for Wildlife areas representing 226 acres.





# Forestry Department



## Recharge Revisited

### *Bathymetric Survey Conducted at Recreation Area in York*

*(This article appeared in the York-News Times on October 8, 2019)*

It's a warm fall day at Recharge Lake in York. High winds make the trees and tall grasses dance on the banks as the crickets and cicadas sing their last songs of the season. A young man in camo chest waders and a ball cap stands on the water's edge, a large remote control in his hands. His gaze is locked on a small yellow catamaran 30 feet away that skims the water's surface, buffeted by choppy waves. The craft is loaded with scientific equipment and the operator, Will Walker, is using caution so as not to swamp the craft in the gusty conditions.

Walker is a field engineer and part of a team from the Nebraska Natural Resources Conservation Service (NRCS) who are using the boat, a Seafloor HyDrone, to conduct a bathymetric survey of Recharge. The craft

uses GPS and echo-sounder technology to record the various depths of the lake. This process is useful in studying the habitat health of waterbodies.

"What do you think? Is it good enough back in there?" Walker asks his colleague, Nate Garrett, gesturing to an area close to the bank on the Northwest side of the tail end of the lake. Garrett consults the laptop showing real time data transmitted from the HyDrone. Based on the readings on the screen, Garrett determines another pass of the area is needed for accuracy and Walker turns the boat back in that direction. The high winds and waves are making it hard to steer the lightweight craft with precision. The slow process of measuring the depth of the entire 44 surface-acre lake would take two days, estimates Garrett. However, they measured the main part of the lake in 2016, and so will probably spend little time on that section for this survey.



Recharge Lake (so named because of its original function: aquifer recharge) is part of Bruce L. Anderson Recreation Area, which includes RV pads, shelter house, archery range, amphitheater and other amenities. The area is managed by the Upper Big Blue Natural Resources District. Jack Wergin, projects department manager with the NRD, requested the bathymetric survey, suggesting that it should be done every 10 years or so for proper lake maintenance.

Recharge Lake used to be one of the premier fishing spots in the region. Over the years, however, the lake has filled with additional sediment from Beaver Creek during heavy rainfalls, making it shallower and murkier—qualities that negatively impact the lake’s habitability for fish. Now, the lake is populated mostly with less desirable species, such as carp and catfish, when once it delighted anglers with its abundance of bass and crappie.

The HyDrone continues to glide silently along the surface of the water, back and forth from one bank to another. The \$30,000 craft is the only one of its kind in Nebraska and is frequently used by NRCS when evaluating dam improvement projects. The mapping software on the laptop expresses a colorful array of data, indicating where the lake is shallow, where its deeper, and where trees and other debris are submerged.

“The lake is very full,” notes Garrett, pointing to areas on the computer screen map that were dry land when they surveyed in 2016 that are now several feet underwater. “It’s been a crazy year for weather in Nebraska.” Garret points to a channel near the bank

where the water is six feet deep. “There are several spots like this where you should have some pretty good fishing,” he said.

Wergin and his staff will use the data collected to produce an updated topographic map and to estimate the amount of sediment that has accumulated since the last survey. The map showing lake depths will soon be available as a resource to anglers. The information gathered will help the NRD determine if work needs to be done to trap sediment where the water flows into the lake to prevent further build up.

“The Recharge Lake watershed has been designated as a target area in the NRD’s draft Water Quality Management Plan,” said Wergin. “The implementation of best management practices in this watershed will improve the water quality in Recharge Lake. Bathymetric surveys can be used to measure the success of these practices by tracking reservoir sedimentation rates over time.”



# Administrative Department



## 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, 2019.

The district’s net position as of June 30, 2019, was \$8,723,823, of which \$4,346,964 is unrestricted and may be used to meet the district’s ongoing obligations. The remaining \$4,376,859 is invested in capital assets, net of related debts.

The net position of the district increased by \$608,595 up from \$8,115,228 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 \$4,340,858, while expenses were \$3,732,263. 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.

## Capital Assets

The district’s investment in capital assets as of June 30, 2019, amounts to \$5,515,727 (net after depreciation). This investment in capital assets included land, buildings, equipment, and improvements. The summary of capital assets net of depreciation follows:

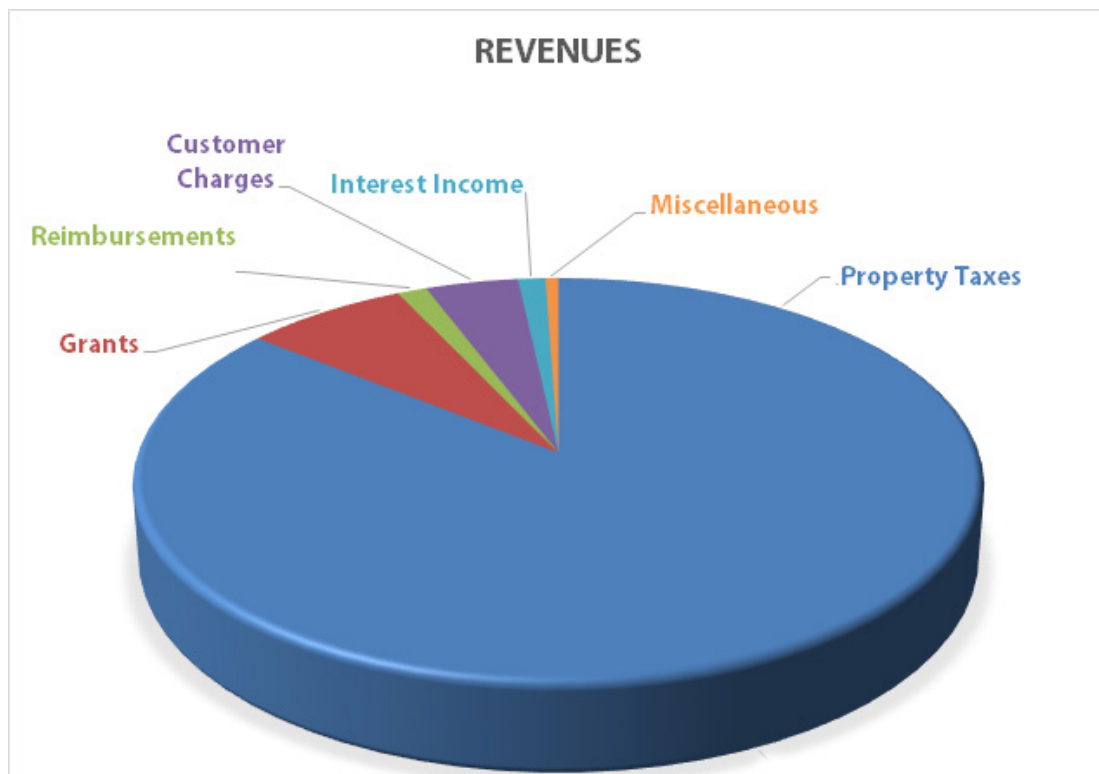
Asset	June 30, 2019	June 30, 2018
Land	\$788,574	\$788,574
Buildings	\$4,248,463	\$4,369,065
Vehicles	\$77,244	\$77,401
Infrastructure	\$94,052	\$114,579
Equipment	\$116,628	\$55,917
Office Equipment	\$87,195	\$101,617
Computers	\$28,602	\$40,711
Software	\$74,969	\$190
<b>TOTAL ASSETS</b>	<b>\$5,515,727</b>	<b>\$5,548,054</b>



## Revenues

**Table FYREV-19: General Funds Revenues for FY2019**

Revenue Source	General Fund	Sinking Fund	Total Funds	% of Revenue
Property Taxes	\$3,726,572	--	\$3,726,572	86
Grants	\$310,197	--	\$310,197	7
Reimbursements	\$55,806	--	\$55,806	1
Customer Charges	\$175,061	--	\$175,061	4
Interest Income	\$11,486	\$40,197	\$51,683	1
Miscellaneous	\$24,505	--	\$24,505	<1
<b>TOTAL REVENUES</b>	<b>\$4,303,627</b>	<b>\$40,197</b>	<b>\$4,343,824</b>	<b>100%</b>



*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 19, 2019.*



## 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

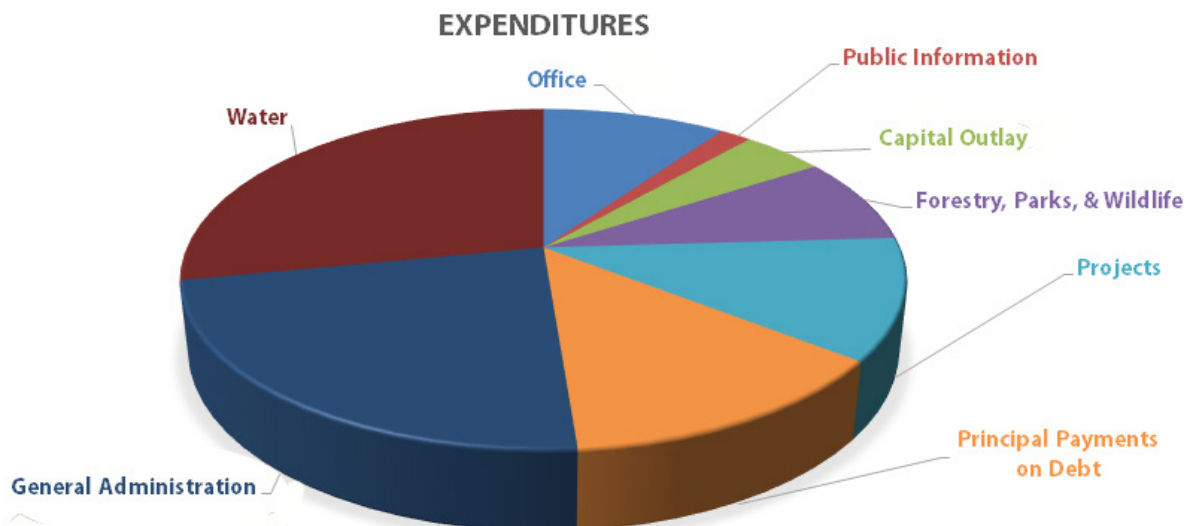
- Deep soil sampling
- Wellhead protection
- Irrigation well pump testing
- Chemigation safety inspections
- AQWACAP and Abandoned well verification
- CROP-TIP
- Flowmeter inspection
- Zones 5 & 6 Nitrate management training.

## Public Education

- Quarterly newsletters
- Seminars
- Publications
- Speaking engagements
- Exhibits

## Forestry, Parks, and Wildlife, Cost-Share

- Tree/shrub/Native grass planting programs
- Corners For Wildlife
- Wildlife habitat improvement
- WILD Nebraska
- Parks & Recreation management at five District owned sites





# Administrative Department

**Table FYBALS-19 Balance Sheet--Governmental Funds 2019  
with comparative figures for FY2018**

<b>ASSETS</b>	<b>General Fund</b>	<b>Sinking Fund</b>	<b>June 30, 2019</b>	<b>June 30, 2018</b>
Cash and Cash Equivalents	\$999,327	--	\$999,327	\$1,669,514
County treasurer cash	\$30,581	--	\$30,581	\$29,107
Investments	\$1,273,490	\$2,324,029	\$3,597,519	\$2,883,620
Accounts Receivable	\$76,659	--	\$76,659	\$37,451
Interest Receivable	\$917	\$7,939	\$8,856	
Inventory	\$37,018	--	\$37,018	\$59,082
Prepaid Insurance	\$64,107	--	\$64,107	N/A
<b>TOTAL ASSETS</b>	<b>\$2,482,099</b>	<b>\$2,331,968</b>	<b>\$4,814,067</b>	<b>\$4,678,777</b>

<b>LIABILITIES</b>	<b>General Fund</b>	<b>Sinking Fund</b>	<b>June 30, 2019</b>	<b>June 30, 2018</b>
Accounts Payable	\$193,803	--	\$193,803	\$250,533
Payroll Liabilities	\$14,955	--	\$14,955	N/A
Accrued Wages	\$118,429	--	\$118,429	\$82,231
Sales Tax Payable	\$137	--	\$137	\$694
<b>TOTAL LIABILITIES</b>	<b>\$327,324</b>	<b>--</b>	<b>\$327,324</b>	<b>\$406,663</b>

<b>FUND BALANCE</b>	<b>General Fund</b>	<b>Sinking Fund</b>	<b>June 30, 2019</b>	<b>June 30, 2018</b>
Non-Spendable	\$101,125		\$101,125	N/A
Assigned		\$2,331,968	\$2,331,968	\$2,216,771
Unassigned	\$2,053,650	--	\$2,053,650	\$2,055,342
<b>TOTAL FUND BALANCE</b>	<b>\$2,154,775</b>	<b>\$2,331,968</b>	<b>\$4,486,743</b>	<b>\$4,272,113</b>

<b>Total Liabilities &amp; Fund Balances</b>	<b>\$2,482,099</b>	<b>\$2,331,968</b>	<b>\$4,814,067</b>	<b>\$4,678,777</b>
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## Upper Big Blue NRD

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