
Upper Big Blue
Natural
Resources District
WATER
DEPARTMENT

WATER

The Upper Big Blue NRD Water Department:
Water Conservation Programs and Assistance...

History of Groundwater Level Monitoring in the Upper Big Blue NRD:

In the spring of 1962, the U.S. Geological Survey, UNL Conservation & Survey Division, and other cooperating organizations recorded the groundwater level in part of the Big Blue River basin, which is now part of the Upper Big Blue NRD. The springtime recording reflected the level for the 1961 irrigation year. This groundwater level was officially marked by the District as a reference point to determine the rise and fall of the water table. Therefore, the spring 1962 point of reference is marked at "zero" feet so that subsequent years of recording can be marked as a rising or falling deviation from that point or base level. Each spring, the Upper Big Blue NRD measures over 500 observation wells to determine the average groundwater level across the District.

Goal *The long-term goal of the NRD is to hold the District groundwater level above the 1978 groundwater level.*

Objective *Encourage, promote, and regulate the efficient management and conservation of groundwater and maintain an adequate groundwater supply for the foreseeable future.*

The Upper Big Blue NRD Water Department is one of five departments at the NRD. The Water Department staff consists of the Department Manager, Resources Technicians, Conservationists, and Data Specialists.

The Water Department is responsible for implementing and managing water conservation programs aimed at protecting both the quantity and the quality of Nebraska's groundwater. The following pages describe the many programs that the Upper Big Blue NRD Water Department administers pertaining to both groundwater quantity and quality.

Groundwater Management Area for Quantity

Flowmeter Maintenance and Repair

Flowmeter Maintenance

To keep flowmeters working properly and get that best water withdrawal data possible, the District provides free flowmeter maintenance for most flowmeters used in the District. A private service provider performs a maintenance inspection on mechanical flowmeters approximately every five years. The inspection includes inspections of the working parts and lubrication of bearings. The cost of inspection is paid by the District. If a flowmeter requires repair, the service provider will offer the meter owner repair services at the owner's cost. The owner is not required to use this service provider; however, broken flowmeters must be repaired.

Electronic flowmeters require periodic battery replacement. District staff will replace batteries every four years. The flowmeter owner is required to pay for the batteries. The District can purchase batteries in bulk at a reduced cost and does not charge a service fee. These savings are passed on to the flowmeter owner. As with the mechanical flowmeters, some battery powered flowmeters will need repair or replacement. The repair service is the flowmeter owner's responsibility.

Flowmeter Repair Cost-Share

When a flowmeter needs repair, the District offers cost-share assistance for 50% of the cost of repairs up to $150. District staff must be notified before work is completed.

The Upper Big Blue NRD's Groundwater Management Area for Quantity (GWMA#1) was established in December of 1977, in response to concerns regarding declining groundwater levels. As a result, groundwater regulations were first adopted in 1979.

The Groundwater Management Area for quantity makes provisions for water metering, allocation, and other controls if the District's average groundwater level falls below the "allocation trigger," which is defined as the 1978 groundwater level. In 1978, the level was at 6.33 feet below the base level. The District continues to look for ways to encourage water users to adopt voluntary conservation efforts to hold the groundwater level above that historic 1978 level.

The following requirements are included in the District groundwater quantity regulations to monitor groundwater development and evaluate their impact on the water supply.

Well Construction Permits

All wells with a capacity of more than 50 gallons per minute must be permitted by the District prior to construction. A well designed and constructed to pump less than 50 gallons per minute is exempt from permitting in groundwater control and management areas unless it is clustered or joined with another well or wells and that the combined capacity of the wells is 50 or more gallons per minute.

Certification of Irrigated Acres

Over 1.2 million irrigated acres have been certified by the District Board of Directors. All owners of irrigated lands are required to report their acres and irrigation wells to the NRD. This land is being irrigated by some 12,000 active irrigation wells.

Other types of groundwater users are also required to report. This reporting includes over 150 municipal and other public water supply wells and more than 140 industrial wells.

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Groundwater Management Area for Quality

Joint Water Planning Efforts

Water Quality Management Planning (WQMP)

The District has entered into an agreement with the Nebraska Department of Environmental Quality (NDEQ) to prepare a Water Quality Management Plan for the Upper Big Blue River Basin. The planning effort will involve public stakeholders to identify surface water and groundwater quality issues and how to solve them. The plan will be completed by September of 2019.

Voluntary Integrated Management Planning (V-IMP)

The District has also entered into an agreement with the Nebraska Department of Water Resources to prepare a Voluntary Integrated Management Plan. This planning effort will look at the relationship between groundwater and surface water use in the District. The same stakeholder group from the WQMP will be tasked with making recommendations on the efforts needed for the V-IMP.

Both planning efforts will occur concurrently in an effort to promote efficiency, and in recognition that solutions to these problems are often related.

Federal and Nebraska regulations state that nitrate-nitrogen concentrations in drinking water greater than 10 parts per million (ppm) are potentially hazardous to children, pregnant women, and other high-risk individuals.

In response to concerns about elevated nitrate levels in District groundwater, the entire Upper Big Blue NRD is designated as a Groundwater Management Area for Quality (GWMA#2). The District's long-range goals for groundwater quality are:

I. To use education, research, management practices, and incentives to reduce the potential for non-point source contamination of groundwater while not adversely affecting the economy of the area.

II. To develop monitoring and evaluation programs for non-point source contamination.

III. To encourage the use of "Best Management Practices" and the adoption of equipment and techniques to reduce nitrate leaching.

Twelve nitrate "management zones" have been formed. All zones began in Phase I of the action plan. Phase I prohibits the application of anhydrous ammonia fertilizer prior to November 1st. It also prohibits the application of other forms of nitrogen fertilizer prior to March 1st.

Two hundred (200) wells across the District were selected by the U.S. Geological Survey to be used as monitoring wells for non-point source groundwater contamination. These wells were chosen after three years of study to identify the wells that would best represent the aquifer conditions. These wells are monitored in each zone to determine the nitrate level in the groundwater.

Zones which have nitrate levels of 7 ppm or more will enter Phase II management. Zones with 10 ppm or more will enter Phase III management. Phase II farm operators must attend nitrogen and irrigation management training, take deep soil samples, schedule irrigation, and submit annual reports to the District on these activities. In addition to the Phase II requirements, Phase III farm operators must conduct more intensive soil sampling and must use a nitrification inhibitor if they apply anhydrous ammonia before March 1.

Under the GWMA#2, awareness efforts include supplements to the District's quarterly Blueprint newsletter, various brochures, traveling displays, staff presentations to service clubs, schools and other organizations.

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Aquifer Quality Well Abandonment Cost-Share Assistance Program (AQWACAP)

The Aquifer Quality Well Abandonment Cost-share Assistance Program (AQWACAP) provides cost-share assistance to encourage landowners to properly seal and abandon wells. AQWACAP serves as a companion program to the Abandoned Well Verification Program (see page 11 "Abandoned Well Verification Program"). Together, these programs will identify abandoned wells and ensure that they are correctly sealed.

Legally reported wells need not be identified through the Abandoned Well Verification Program to be eligible for cost-share assistance.

Key Programs:

The following are just a few of the many successful projects where the Upper Big Blue NRD has assisted District communities with in recent years.

Well Construction Permits

All wells with a capacity of more than 50 gallons per minute must be permitted by the District prior to construction. A well designed and constructed to pump less than 50 gallons per minute is exempt from permitting in groundwater control and management areas unless it is clustered or joined with another well or wells and that the combined capacity of the wells is 50 or more gallons per minute. All permitted wells are required to have a District approved flowmeter installed.

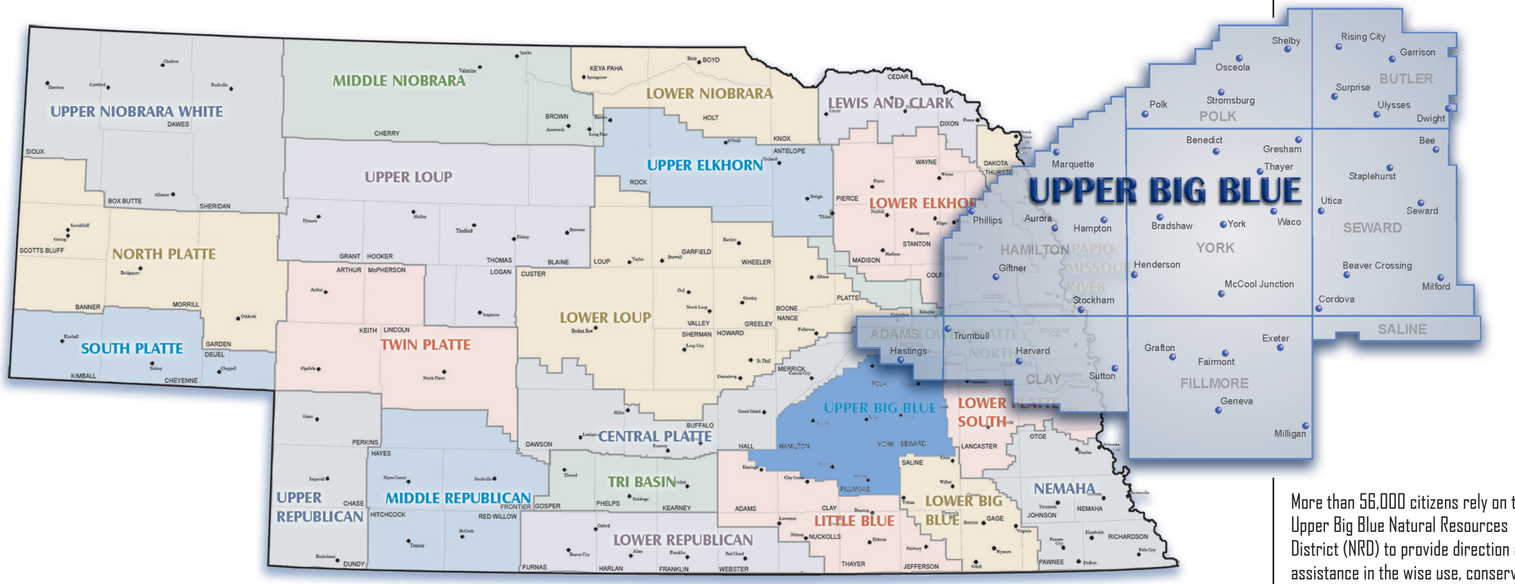
Groundwater Transfer Permits

Any person who intends to develop facilities to transfer groundwater from the overlying tract or tracts of land, either with a new or existing water well or series of wells, shall before commencing construction, apply with the District for such transfer on forms provided by the District. A groundwater user may not use a well to transfer groundwater to a government survey section that is not directly adjacent to the tract of land on which the well is located. A groundwater user may use a well to transfer groundwater from one tract to an adjacent tract. A well used for this purpose shall not be used to transfer groundwater to more acres than the total acreage of the tract on which the well is located. If a groundwater user has transferred groundwater from a well to an adjacent tract of land to serve a larger number of acres before July 1, 1990, he or she may continue to do so, however, the number of acres served by the well on the adjacent tract may not be increased.

Municipal Water System Assistance Program

This program provides financial assistance to communities for improvements in their water system to mitigate the impacts of non-point source groundwater contamination for the protection and public health of the community's residents. The reasons for system improvements must be related to the impacts of contamination from pollution sources which are non-point in nature. Possible projects include new well construction and/or water treatment. The NRD funds up to 25% of a project. Funding ranges from $25,000 to $100,000.

NRD PROFILE



Natural Resources Districts...

... the greatest sources of the state's wealth and its assurance for future prosperity

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.

Once dismissed as "The Great American Desert," Nebraska now is known both nationally and abroad for its agricultural bounty and natural wonders. We sometimes take these wonders for granted, but they surround us from one corner of the state to another; from Niobrara to Red Cloud, from Scottsbluff to Omaha.

The Nebraska Legislature enacted a law in 1969 to combine 154 special purpose entities into 23 Natural Resources Districts (NRDs). NRDs were officially established on July 1, 1972. These Districts are unique to Nebraska and to the rest of the country. NRDs are local government units with broad responsibilities to protect our natural resources. Major Nebraska river basins form the boundaries enabling NRDs to respond best to local needs.

An elected Board of Directors governs each District. Much of their funding comes from local property taxes. In most cases, your local NRD typically uses 1-2 percent of all property taxes collected in the District.

NRDs help Nebraskans respond to natural resources challenges with local control and local solutions. Partnerships have been built with various agencies and organizations, including the USDA Natural Resources Conservation Service, the Nebraska Department of Natural Resources, other state and federal agencies, municipalities, counties, and private organizations.

Many NRD projects and programs leave long-lasting results: dams, terraces, drainage ditches, windbreaks, reservoirs, recreation areas (including parks, campgrounds, and trails), groundwater management (both quantity and quality), and irrigation and crop production educational opportunities.

The Nebraska Association of Resources Districts, a statewide association created by NRDs, provides administrative services, legislative representation, statewide communication, and coordination for the 23 independent Districts.

NRDs have experienced tremendous growth in the responsibilities given to them by state statute, especially in protecting groundwater.

The NRDs inform Nebraska's young people by supplying information, education, and other outreach efforts. It is vital that future generations understand the importance of securing Nebraska's natural resources.

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Large Water User Permit Requirements — Hydrologic Evaluation

To receive a well permit to pump 500 acre feet or more each year, or to receive a supplemental permit, an applicant must submit a hydrologic evaluation showing the impact of the intended withdrawal on the groundwater table and other groundwater users. A permit will not be issued if the hydrologic evaluation does not conform to accepted methods, or if the data used does not adequately represent actual hydrological conditions.

If the evaluation, or any other data/information shows that the withdrawal would have a reasonable probability of adversely impacting another groundwater user that would impair the ability of a groundwater user to withdraw groundwater, a permit will not be issued. Waivers of liability from potentially impacted groundwater users will be considered when determining whether to grant or deny a permit. Incidentally, the Upper Big Blue NRD was the first NRD in the state of Nebraska to incorporate a Large Water User Permit requirement in its rules and regulations. An example of a large water user would be an ethanol plant, municipal well field, or a manufacturing plant, etc.

Crop Water Use Reporting

The Crop Water Use Information Program promotes more efficient groundwater use by giving irrigators accurate, up-to-date information on crop water use. By targeting their crop's water requirements more precisely, irrigators may be able to reduce water use and save money on pumping costs, plus avoid the leaching of fertilizer and agricultural chemicals into the groundwater.

The Crop Water Use data is generated from an automated weather station at Recharge Lake west of York. The weather station monitors daily conditions such as temperature, relative humidity, wind-run and solar radiation. The data is then used to calculate the daily Crop Water Use information. Each day during the growing season, a computer at the University of Nebraska Lincoln dials up the weather station and downloads the weather data. The data is then processed and posted online, where it is readily available to anyone possessing the correct software applications. The Crop Water Use information is also reported daily by KAWL Radio of York and the *York News-Times*. County extension educators across the District access the information via the Internet and provide it to their local newspapers. It is also made available on their information hotlines. Historical and current crop water use data is available on the Upper Big Blue NRD website at www.upperbigblue.org

Domestic Well Testing Program

The Domestic Well Testing Program keeps rural residents of the Upper Big Blue NRD apprised of the quality of their drinking water. (In towns, the city government or water supplier is required to annually inform residents of their water quality). The NRD also provides free nitrate and bacteria testing for those who bring in their own samples. Please contact the NRD office for more information.

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Wellhead Protection Areas

The NRD assists communities with establishment and management of Wellhead Protection Areas (WHP area plans) throughout the Upper Big Blue Natural Resources District and neighboring communities in Adams, Butler, Clay, Fillmore, Hamilton, Polk, Saline, Seward and York counties. Wellhead areas are identified using computer map models that show where the public drinking water supply is expected to come from over the next 20 years. The Nebraska Department of Environmental Quality (NDEQ) and some NRDs are doing this work for public water suppliers for free.

Project GROW

In 2008, the City of York purchased 400 acres of farm ground east of the city. The property was developed into what is now the City of York Wellfield. Through the use of conventional tillage and limited crop rotations the wellfield acreage has diminished soil health.

In the summer of 2017, the Upper Big Blue Natural Resources District approached the City of York with a solution...Project GROW (Growing Rotational crops On Wellfield). Project GROW will focus on 160 acres of the total 400 acre wellfield. The project includes a community garden, a berry orchard, and an expanded pollinator habitat. Using no-till, diverse cover crops, and proven crop rotations, the demonstration will improve soil health, decrease soil erosion, and improve water holding capacity, all while maintaining profitability. The community garden and berry orchard will help supplement individual needs for locally-grown food.

NeRAIN: Nebraska Rainfall Assessment and Information Network

Approximately 500 volunteers comprise the NeRAIN network of rain gauge readers across Nebraska. The information that NeRAIN volunteers provide through their readings affect local, state, and National Weather Service reporting.

Through these daily readings, volunteers have had a direct impact on how weather conditions are reported in Nebraska. The daily rainfall reports provide accurate information for irrigation scheduling to prevent groundwater pollution and excess irrigation use in both rural and urban settings, as well as developing more definitive weather forecasting techniques that may be inherently unique to the State of Nebraska and individual NRDs. This daily data is also forwarded via the Internet to a central computerized clearing house stationed in the Nebraska Department of Natural Resources (NeDNR) where the data is immediately accessible to weather spotters, consultants, planners, and the public.

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Nebraska Agricultural Water Management Demonstration Network

This program began in May 2005 by installing atmometers and Watermark® sensors at twenty cooperator's farms throughout the Upper Big Blue NRD. In 2006, the number of cooperators jumped to 67 members involved with the network and currently over 60 cooperators remain in the program.

The purpose of the project is to track soil moisture use by crops across the District through measuring evapo-transpiration (ET) with the atmometers and keeping track of soil moisture at each atmometer site with four Watermark® sensors placed at 1-, 2-, and 3- foot depths. (The actual equipment may vary depending on specific needs at each site).

The cooperators agree to provide weekly readings and assist the NRD in compiling data, as well as the amount of rainfall and irrigation at the sites. The sensors and atmometers have become beneficial tools used to schedule irrigation culminating into groundwater savings. The weekly crop water use reading for several of these atmometers is available online through the NRD website: www.upperbigblue.org.

Irrigation Scheduling Equipment For Sale

Watermark® soil moisture sensors, readers, data loggers, atmometers and soil probes are available for sale at a substantially discounted price for all producers who operate farmland in the District.

Deep Soil Sampling

As part of the groundwater regulations, the Upper Big Blue NRD personnel perform deep soil sampling at each of the nine monitoring well sites every five years. The purpose is to collect data regarding nitrate levels in the soil, as well as the direction and speed the leaching nitrates are traveling.

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Chemigation Safety Equipment Inspection Program

Chemigation is the application of fertilizers, pesticides, and other agricultural chemicals through an irrigation system, usually a center pivot. According to the Nebraska Chemigation Act, anyone who chemigates must first receive a permit from his or her local NRD. Before a chemigation permit is issued, the NRD must inspect the chemigation safety equipment. The safety equipment, which includes check valves and automatic shut-off devices, is necessary to prevent chemicals from accidentally back-flowing into the well and contaminating groundwater.

Abandoned Well Verification Program

In 1989, the District began a program to determine the status of wells that have been reported as abandoned or not registered with the District. A public education program was launched to inform people of the hazards of incorrectly abandoning wells and the importance of notification. This effort is ongoing as Water Department staff conduct various field activities.



Upper Big Blue
Natural Resources District

Water Department

319 East 25th Street York, NE 68467 Ph: 402.362.6601 Fax: 402.362.1849
www.upperbigblue.org

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