

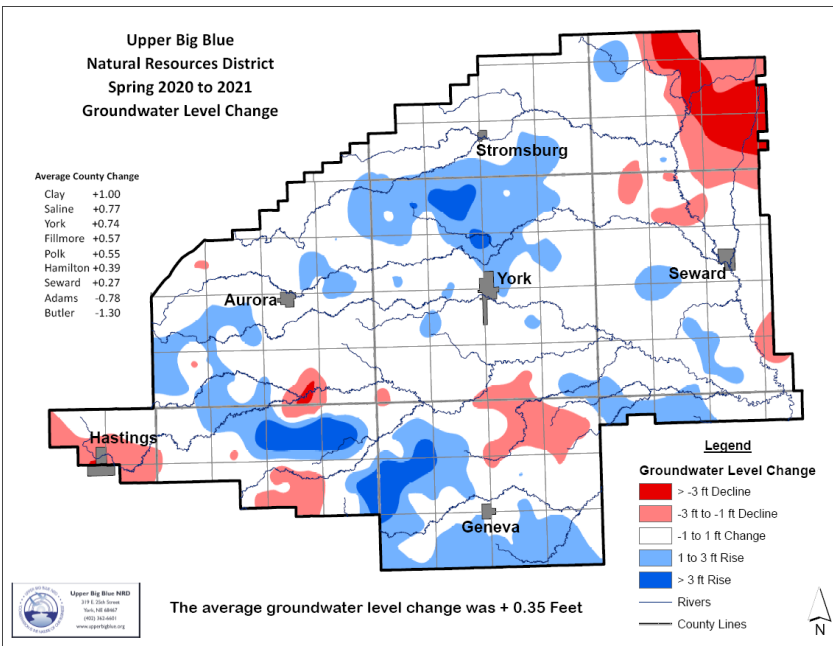
Blue River Compact (BBRC) Annual Meeting
 Blue River Compact Report - Upper Big Blue NRD (UBBNRD)
 Marie Krausnick, Water Department Manager
 Jack Wergin, Projects Department Manager
 May 13, 2021

Well Drilling Activities

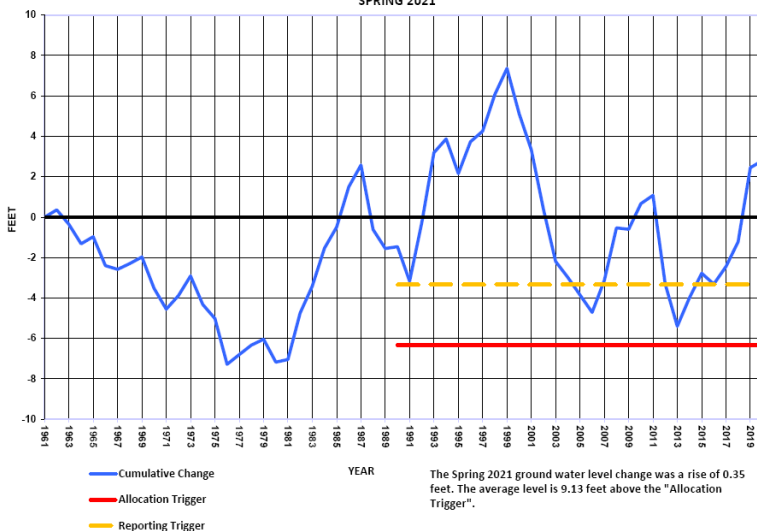
Fifty-nine permits were issued for irrigation wells (22 new & 37 replacements) during the 2020 calendar year. In January 2021, there were 12,200 irrigation wells in the District.

Groundwater Level Changes

The average groundwater level change for the District from spring 2020 to spring 2021 was a rise of 0.35 feet. The spring 2021 groundwater level is 9.13 feet above the District's allocation trigger level.



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

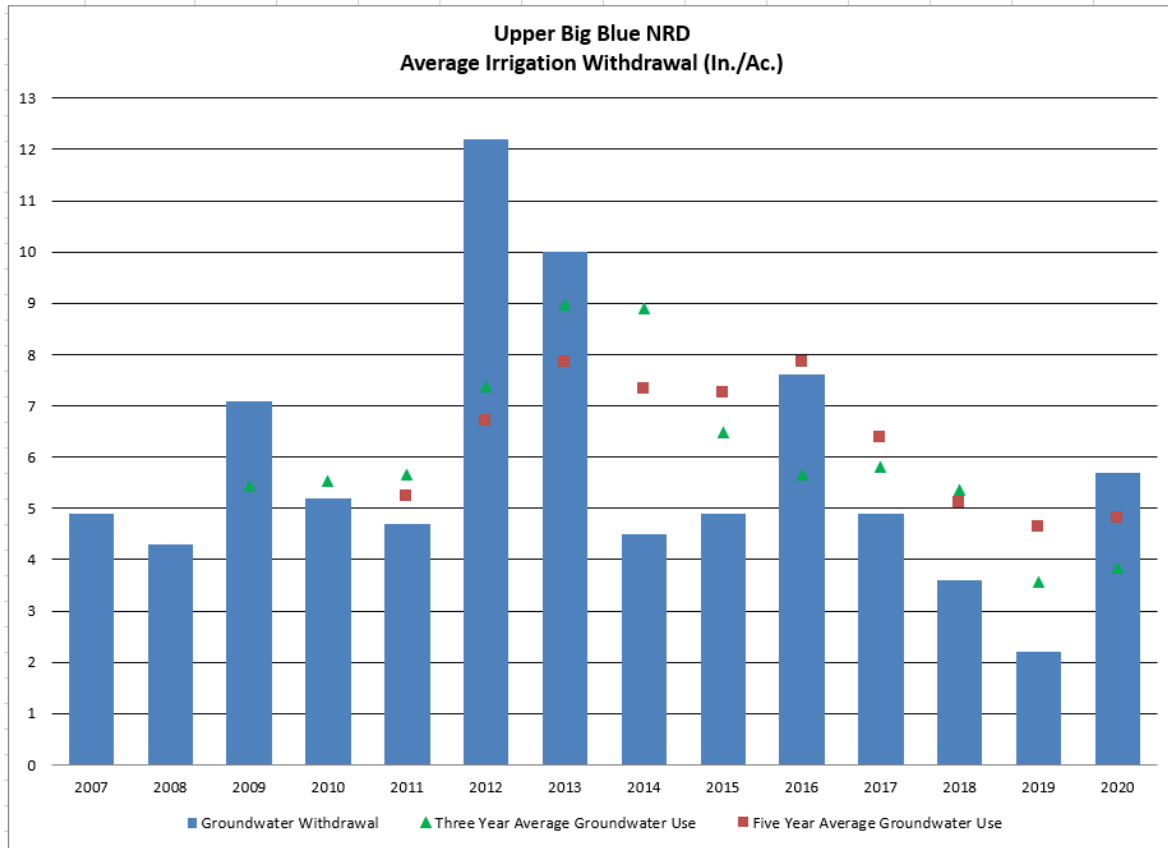


Certified Irrigated Acres

Mandatory reporting of irrigated acres and other water uses began in 2006. As of January 1, 2021, there were 1,241,880 groundwater irrigated acres certified by the NRD. This represents an increase of 2,379 acres since January 1, 2020.

Groundwater Withdrawal

Mandatory reporting of groundwater withdrawal began in 2007. 2020 was the 13th year that groundwater withdrawal reports were required in the District. Metering became mandatory on all wells effective January 1, 2016. Staff has inventoried all flowmeter installations and are now conducting routine inspections as needed. The average groundwater withdrawal for irrigation in 2020 was 5.7 inches per acre. The graph below shows the average annual withdrawal for irrigation over the past thirteen years.

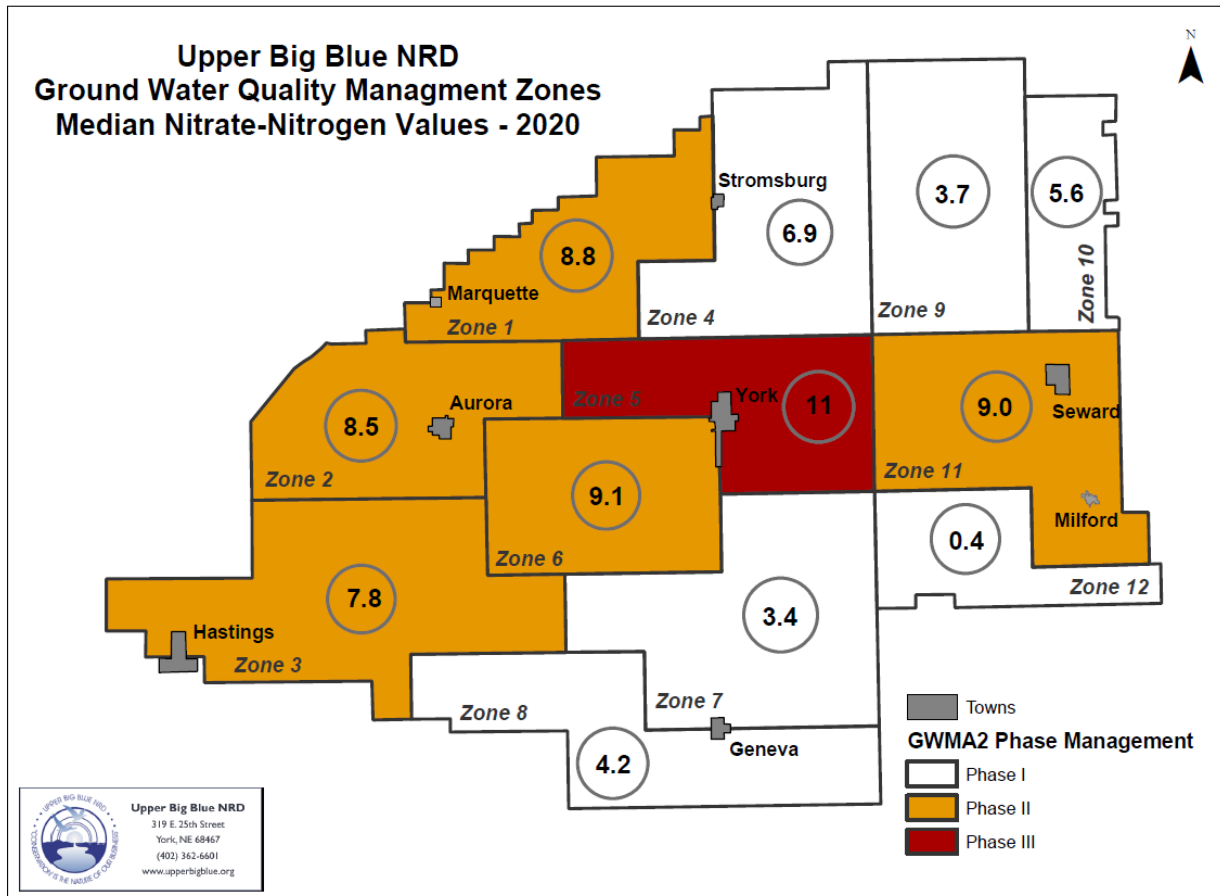


Groundwater Quality

Nitrate

The District is divided into twelve management zones for groundwater quality management. The primary groundwater quality management concern is nitrate. Five zones are currently designated Phase II Management Areas and one (Zone 5) is designated a Phase III Management Area. Phase II & III Management Areas require farm operators to attend a training session on best management practices related to fertilizer and irrigation management. It also requires deep soil sampling, irrigation scheduling and annual BMP reports. Farm operators in Phase II & III must schedule irrigation using soil moisture sensors in at least one field. In a Phase III Management Zone anhydrous ammonia fertilizer applied from November 1st through February 29th must include a nitrification inhibitor. The timing of application of nitrogen fertilizers is restricted District wide. There are currently over 1,073 farm operators in the District required to attend

nitrogen management training. The District is also working with the City of Hastings and the Little Blue NRD on a special water quality management area to address nitrate contamination in the Hastings Wellhead Protection Area.



Arsenic, Selenium and Uranium

Natural groundwater contaminants such as arsenic, selenium and uranium occur in many areas. These chemicals are associated with sediments in the aquifer as well as the unsaturated zone above the aquifer. Recent groundwater quality investigations near Hastings, Nebraska as well as other parts of the mid-west indicate that these naturally occurring contaminants may be released into the groundwater as a result of increased agriculture chemical contamination such as nitrate. The District is continuing to partner with the University of Nebraska to develop a monitoring program for arsenic, selenium and uranium. See *more under UNMC Project.*

Dakota Aquifer

In 2016 the District started a water sampling program for the Dakota aquifer. The Dakota is used in the eastern part of the District for domestic wells where other sources are very limited. High commodity prices and drought conditions in 2012 and 2013 prompted construction of irrigation wells in the Dakota. Concerns have been raised over the impact that Dakota aquifer irrigation wells may have on the domestic groundwater supply. The quality of water in the Dakota can be "hit and miss" as to suitability for domestic and irrigation uses. It is unclear to what degree further development of the aquifer could impact water quality or domestic supplies to existing wells.

University of Nebraska Medical Center (UNMC) Project

Over a minimum of two years, the District, in partnership with UNMC, will periodically collect drinking water samples to determine seasonal variability in contaminant concentrations which may be impacted by

fluctuations in the water table due to irrigation. Samples will be taken in April/May (pre-irrigation), June/July (during irrigation) and October/November (after irrigation) at up to 50 locations selected on the basis of proximity to known cases of pediatric cancer and the willingness of the homeowner to provide access to collect seasonal samples. The collection of samples will occur parallel to a survey to learn about the occupants, well history, well construction if known, and any radon measurements collected in the home. UNMC will evaluate the water samples for conventional water quality parameters (conductivity, solids, pH, etc.) as well as nitrate, atrazine, arsenic, uranium and uranium decay products.

Project Grow

Project GROW is a collaborative demonstration project between the City of York and the UBBNRD. It focuses on three areas of interest: a soil health demonstration, an awareness of the importance of pollinator habitat and a community garden for the citizens of York. The District is farming 140 acres of the City wellfield with a rotation of cover crops to promote soil health. This is the fourth growing season of the project. Not only is the District seeing success in GROW, but the City and citizens are taking notice to our work to protect groundwater quality, promote soil health practices, all while maintaining profitability.

The Nature Conservancy Cover Crop Interseeding Project

The UBBNRD, the Nature Conservancy, and University of Nebraska Extension have partnered on a project demonstrating soil health/sustainable agriculture practices. The partners are working with local producers from all corners of the District to interseed cover crops into growing cash crops to improve soil organic matter, increase water infiltration, provide weed suppression, and to improve overall soil health. In 2021, ten producers are participating in this demonstration. We are in year two of this three-year project with the hopes of extending the program another two years.

Nebraska Agricultural Water Management Demonstration Network

This program encourages producers to improve irrigation scheduling using Etagages and Watermark sensors to determine crop water needs. The Etagage simulates crop water use through evaporation through a ceramic and green canvas membrane. Watermark sensors are used to measure soil moisture in a nearby field to confirm the Etagage's accuracy. This program began in the UBBNRD in 2005 with a collaborative effort with the University of Nebraska Extension and 18 collaborators. The program is now being implemented in several NRDs and with over 2,000 collaborators. The District sells this equipment to irrigators at a reduced cost to encourage adoption of irrigation scheduling practices.

Groundwater Modeling

The District, in cooperation with the Lower Big Blue, Little Blue, Tri-Basin NRDs and the Department of Natural Resources are partnering in the development of a transient Blue River Basin Groundwater Model that can not only answer the question of interconnection between surface and groundwater, but other management questions NRDs ask when reviewing their groundwater management plans. These efforts are in the final stages of calibration with possible delivery by July 2021.

Wellhead Protection Planning

The District continues to assist communities to develop Wellhead Protection Area (WHP Area) Plans. The District also assists communities with implementation of some plan components. These include water sample collection and analysis from rural wells and soil samples collected from the unsaturated zone for nitrates.

Vadose Zone Study

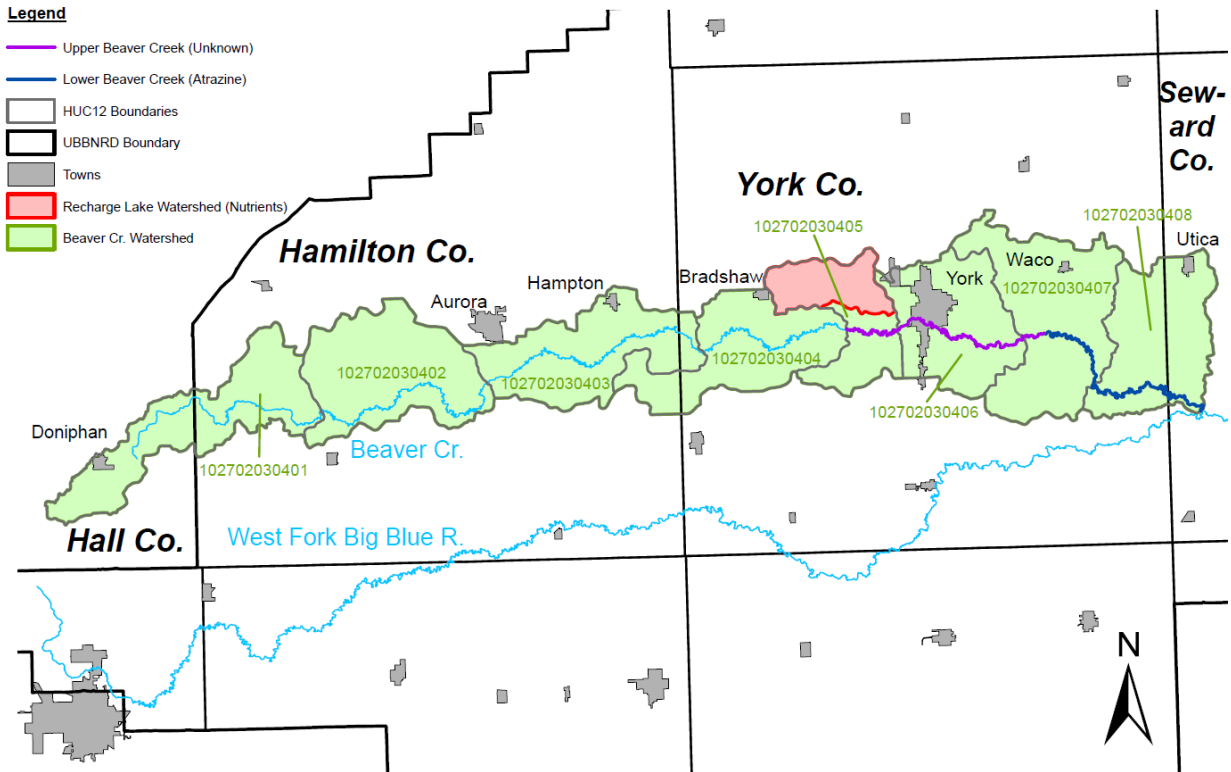
The UBBNRD is partnering with the University of Nebraska Water Center on a five-year district wide vadose zone study based on our Groundwater Quality Management Areas.

Municipal Water System Assistance Program

Municipal water quality is important to the UBBNRD. In 2017 the district began partnering with public water systems to provide financial support to address non-point source contamination.

Water Quality Management Plan

The Water Quality Management Plan (WQMP) has been accepted by Environmental Protection Agency (EPA) and the UBBNRD Board of Directors. Phase I of the Water Quality Management Planning process allowed the District to form a stakeholder group comprised of landowners and other interests from both the Recharge Lake and Beaver Creek watersheds. This stakeholder group assisted in identifying conservation practices that landowners/operators would be willing to implement to address the impairments in both priority areas. After stakeholder discussion, it was decided that filter/buffer strips and cover crops were the most acceptable practices. Phase II of the planning effort will utilize recommendations and feedback from the stakeholders to develop a more robust program to get conservation practices on the ground in both priority areas.



Resource Conservation Partnership Program (RCPP)

In 2020, the Nature Conservancy was awarded RCPP funds for the 'Nebraska Soil Carbon Project'. The project is a collaboration with the Natural Resources Conservation Service, Upper Big Blue NRD, Central Platte NRD, Ecosystem Services market Consortium, Cargill, Target, and McDonald's. The goal is to partner with 100 producers to install soil health practices on 100,000 acres of central Nebraska cropland over five years. Farmers who enroll will be compensated for adopting cover crops, no-till, and/or diverse rotations.

Soil and Water Conservation Cost-share Assistance

Through the District's Land Treatment Program, the District obligated funding for 37 soil and water conservation projects with a total cost share of \$176,180.79 in FY2021. Funded projects included terraces, sediment control basins, waterways, pasture plantings, and tree plantings for windbreaks & enhancing wildlife. Funding sources for the Land Treatment Program included \$75,203.89 from the Nebraska Soil and Water Conservation Program and \$100,976.90 from local NRD property tax revenues. This is a 43% increase in obligations from FY2020. Interest in land treatment projects continue to increase from 2019 when projects were lower primarily due to the weather conditions.

Nebraska Buffer Strip Program

Through the Nebraska Department of Agriculture, the District administers the Nebraska Buffer Strip Program. This program provides cost share funds for landowners to establish vegetative buffer strips along shorelines of wetlands, streams, and lakes. Funding comes from a fee assessed on all pesticides registered for use in Nebraska. In FY2020 the District administered 22 buffer strip contracts which provided a total cost share of \$31,183.17.

Variable Rate Irrigation Pilot Program

The District began a Variable Rate Irrigation Pilot Program in 2017. With over 10,000 center pivots the District believes that VRI can have a significant impact water use efficiency and may provide water savings. In FY2021 the District funded 1 VRI project with a total District contribution of \$2,116.75. Though the first 5 years of this program the District has funded 16 VRI projects with a total cost share of \$43,754.26 (average cost share of \$2,734.64).

Private Dams Program

Through District's Private Dams Program, the District provides planning, design, and financial assistance for the construction or reconstruction of dams located on private property. In FY2021 the District provided cost share assistance for 1 dam with a total \$50,000.00 of District funds. Construction of 2 other dams were canceled by the landowners. Through the first five years of the program the District has provided assistance for 15 dams with an average cost share of \$20,820 per dam.

Hastings NW Dam – Emergency Exercise

On February 10, 2021, the Upper Big Blue NRD, working with the City of Hastings, the Adams County Emergency Management Agency, and the Nebraska Department of Natural Resources, held a tabletop exercise for the Hastings NW Flood Control Structure. Hastings NW Dam is a high hazard dam located just north of the Hastings airport. Other agencies participating in the exercise included the Adams County Sheriff's Office, the Adams County Roads Department, and the Hastings Police Department.

Visit our Website

You can learn all about the District's programs and activities at www.upperbigblue.org.