Nebraska Department of Water, Energy & Environment 2025 Annual Report of 2024 Data

for the jointly developed

Lower Big Blue Natural Resources District Integrated Management Plan

Prepared by the
Nebraska Department of Water, Energy & Environment
November 18, 2025

INTRODUCTION

In 2022, the Lower Big Blue Natural Resources District (LBBNRD or District) and the Nebraska Department of Natural Resources (NeDNR or Department) completed work on a voluntary Integrated Management Plan[1] (IMP). The IMP was developed in accordance with the Nebraska Groundwater Management and Protection Act[2] and as such, was drafted in consultation with District stakeholders and includes goals and objectives for maintaining a desired balance between uses and supplies of both surface water and groundwater in the District. By order of the LBBNRD and NeDNR, the IMP–with its included surface water and groundwater controls and monitoring plan–became effective on April 6, 2022.

As of July 1, 2025, the Department of Natural Resources and the Department of Environment and Energy were merged to form the Department of Water, Energy, and Environment (Department or DWEE). The merger combined the functions of the two agencies with all previous agreements and statutes staying the same. All references to the "Department" prior to July 1, 2025, refer to legacy NeDNR. After July1, 2025, references to the "Department" refer to the newly formed DWEE.

This annual report covers the actions taken and data collected by NeDNR in 2024 for the implementation of the District's voluntary IMP. It was drafted to be consistent with the IMP's Monitoring Plan and includes data related to surface water uses and supplies in the District. The LBBNRD completed a separate report that describes the District's actions and data collected in implementing the voluntary IMP–with a focus on groundwater.

DEPARTMENT REPORTING

The IMP requires that DWEE report on the following water data within the LBBNRD on an annual Basis:

- Surface water new and cancelled permits,
- Transfers and transfer permits,
- Variances granted by the Department,
- Voluntary reporting of surface water irrigation,
- Manufacturing, and industrial uses,
- Groundwater permitting,
- Surface water administration,
- DWEE streamgages,
- Models and studies with new data or model/study results.

In addition to the required reporting, DWEE reports on other additional actions that are not required by the IMP.

[1] https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/blue-river/LBBNRD/April2022_LBBNRD_FINAL_IMP.pdf

[2] Neb. Rev. Stat. §46-715(1)(b), §46-715 to 46-717, and subsections (1) and (2) of §46-718

SURFACE WATER PERMITS

The Nebraska Department Wate, Energy and Environment is authorized by statute to oversee the permitting and adjudication of surface water appropriations in the State[3]. This section provides a summary of all active surface water appropriations in the Lower Big Blue NRD as of December 31, 2024, and includes details about all permitting actions taken by the Department in 2024.

This report addresses surface water appropriations in three categories: irrigation permits, storage permits, and 'other' permits. Irrigation permits include both direct flow irrigation and storage-use irrigation. Storage permits allow water from a naturally flowing source to be stored in a reservoir. 'Other' permits include permits for municipal, industrial, domestic, and environmental uses. A summary of all active surface water permits in the LBBNRD can be found in **Table 1**.

There are 414 direct flow irrigation permits in the LBBNRD that allow 27,654.78 acres to be irrigated at a maximum combined rate of 360.47 cfs. There are also 141 permits allowing 7,365.18 af of water from reservoirs to be applied on 13603.1 acres that are not already served by an IR appropriation.

There are 279 storage permits in the LBBNRD that allow 31,535.43 af of reservoir storage. The seven 'other' permits combined allow the use of 36.81 af of water annually and represent a relatively small proportion of surface water uses in the District.

HEADWATERS AND RE-USE PIT EXEMPTIONS

In the LBBNRD, there are 32 surface water appropriations that are exempt from administration under Neb. Rev. Stat. §§ 46-283 to 46-287. These exempt permits are for groundwater re-use pits that were built to capture and re-use runoff from groundwater irrigation, and for diversions from an ephemeral stream.

[3] Neb. Rev. Stat. §61-206 and all of Chapter 46, Article 2

Table 1: All surface water appropriations in the LBBNRD as of December 31, 2024.

ACTIVE SURFACE WATER APPROPRIATIONS IN THE LOWER BIG BLUE NRD as of December 31, 2024				
Purpose	**Number of Permits**	**Acres Approved for Irrigation**	**Grant (cfs)**	**Grant (af)**
Irrigation Permits				
Direct Flow Irrigation (Exempt)	31	1,686.1	24.52	N/A
Direct Flow Irrigation (Not Exempt)	383	25,968.68	335.95	N/A
Storage Use (Exempt)	1	131^	N/A	7.3
Storage Use (Not Exempt)	140	13,603.1	N/A	7,357.88
All Irrigation Permits	555	41,257.88	360.47	7,365.18
Storage (Exempt)	1	N/A	N/A	7.2
Storage (Not Exempt)	278	N/A	N/A	31,528.23
All Storage Permits	279	N/A	N/A	31,535.43
Domestic	1	0.6	0.02	N/A
Domestic Storage Use	1	N/A	N/A	0.05
Fish Culture	2	N/A	2.67	26.77
Wetlands	2	N/A	N/A	9.99
Livestock Watering	1	N/A	0.1	N/A
All Other Permits	7	0.6	2.70	36.81

^This is a supplemental irrigation permit for acres already counted under an existing direct flow irrigation right.

2024 SURFACE WATER PERMITTING ACTIONS

In 2024, the Department acted on seven surface water appropriations in the district. Eight of the actions were to approve new surface water appropriations (three direct flow irrigation, two storage use irrigation, two storage, one livestock watering), and two were to cancel appropriations (one In-Full, and one In-Part).

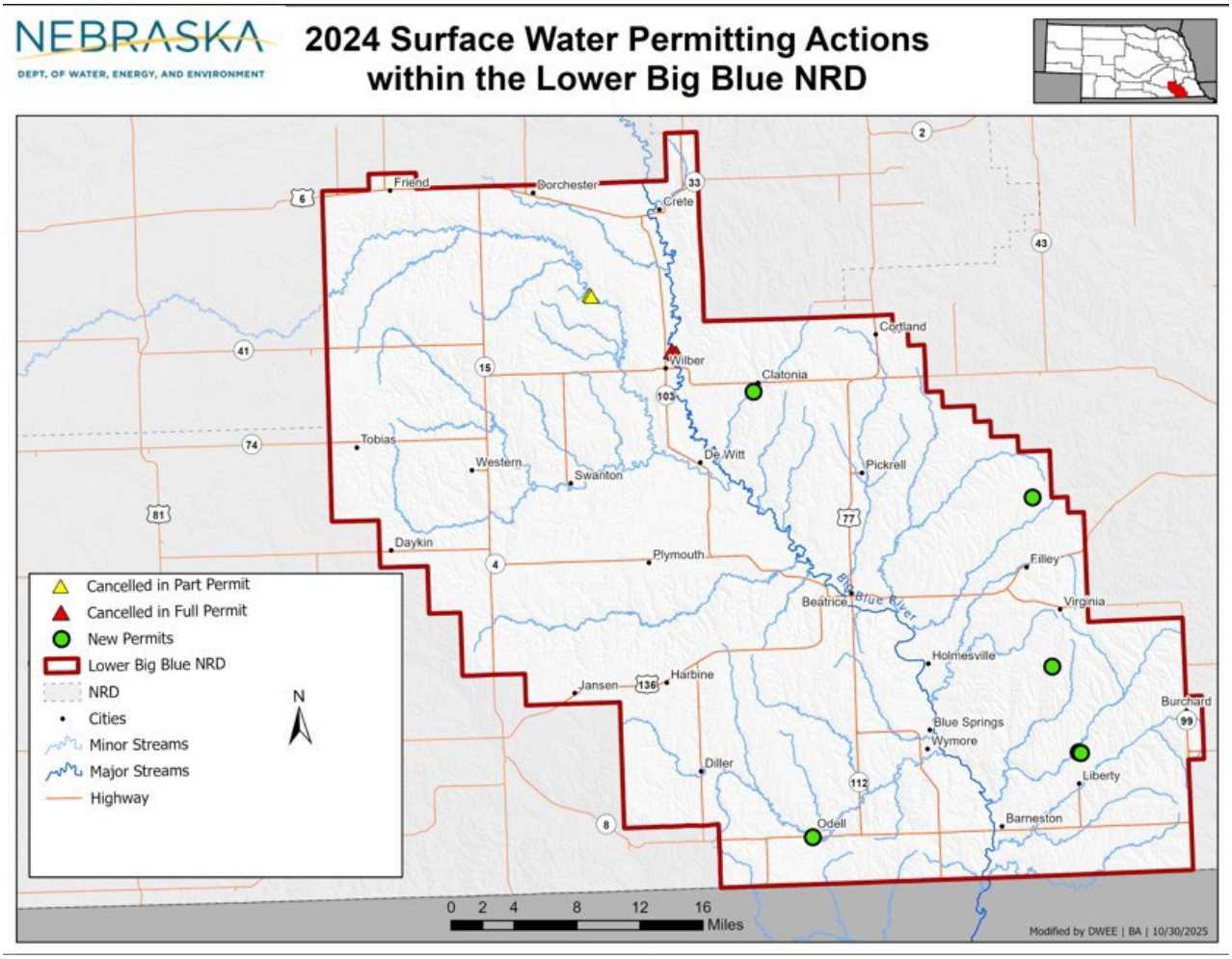


Figure 1: Surface water permitting actions in the LBBNRD in 2024.

NEW SURFACE WATER APPROPRIATIONS

In 2024, the Department approved five new appropriations in the LBBNRD allowing for irrigation on a total of 345.1 acres. Three of the new irrigation permits were for direct flow irrigation from a naturally flowing source and two were for storage use irrigation from a reservoir. Two new storage permits allowing a total of 28.9 af of storage were also approved by the Department in 2024. All new surface water permits approved in 2024 are summarized in **Table 2**.

Table 2: Surface water appropriations approved in 2024 in the LBBNRD.

SURFACE WATER APPROPRIATIONS APPROVED IN 2024 IN LOWER BIG BLUE NRD						
Appropriation Number	**Order Date**	**Use**	**Source**	**Acres**	**Grant**	**Diversion Location (S-T-R)**
A-19962	1/5/2024	Storage Use Irrigation	Ideus Irrigation Reservoir	101.0	N/A	S33-T5-R8E
A-19984	4/16/2024	Direct Flow Irrigation	Trib. to Clatonia Creek	14.4	0.21 cfs	S23-T6-R5E
A-20014	6/7/2024	Livestock Watering	Clatonia Creek	N/A	0.10 cfs	S27-T6-R5E
A-20015	7/9/2024	Direct Flow Irrigation	Wolf Creek	54.5	0.78 cfs	S25-T2-R8E
A-20016	7/9/2024	Storage	Trib. to Wolf Creek	N/A	3.90 af	S25-T2-R8E
A-20017	7/9/2024	Storage Use Irrigation	Otto Reservoir	54.5	N/A	S25-T2-R8E
A-20019	7/26/2024	Direct Flow Irrigation	Big Indian Creek	120.7	1.72 cfs	S24-T1-R5E
A-20029	10/18/2024	Storage	Trib. to Wild Cat Creek	N/A	25.00 af	S27-T3-R8E

CANCELLED SURFACE WATER APPROPRIATIONS

In 2024, DWEE cancelled one 167-acre direct flow irrigation permit in-full. The Department also issued an in-part cancellation for 40 acres of direct flow irrigation. Both cancellations were issued through voluntary relinquishment. There were no dismissed/denied permits in LBBNRD in 2024. Information about the cancelled appropriations can be found in **Table 3**.

Table 3: Surface water appropriations cancelled in 2024 in LBBNRD.

SURFACE WATER APPROPRIATIONS CANCELLED IN 2024 IN LOWER BIG BLUE NRD							
Appropriation Number	**Date Cancelled & Type**	**Use**	**Source**	**Acres Cancelled**	**Grant Cancelled**	**Reason for Cancellation**	**Diversion / Reservoir Location (S-T-R)**
A-12809	3/4/2024 In Full	Direct Flow Irrigation	Big Blue River	167.0	2.39 CFS	REL-10036	S10-T6-R4E
A-10877	12/11/2024 In Part	Direct Flow Irrigation	Turkey Creek	40.0	0.59 CFS	REL-10813	S26-T7-R3E

SURFACE WATER TRANSFERS

Expedited transfer permits are issued by DWEE and allow a permit holder to change the location of acres approved for surface water irrigation. Expedited transfers must meet the following requirements[4]:

- Must be an irrigation appropriation
- No increase in the number of acres
- Location of use may only change to adjacent lands
- Land must all be owned by the same landowner or be under the same irrigation district
- The point of diversion may not change significantly

In 2024, there were no surface water transfers in the LBBNRD.

VARIANCES ISSUED

No moratoriums exist in Blue River Basin, and no variances were sought from the Department to allow actions contrary to any other existing rule or regulation.

GROUNDWATER PERMITS

The Department issued no groundwater permits in the Lower Big Blue NRD in 2024.

PUMP SITE INSPECTIONS

The DWEE field office staff regularly inspects pump sites of surface water diversion points as conditions allow. Not all pump sites are inspected every irrigation season, and some pump sites may be visited more than once per season. In 2024 DWEE field office staff made a total of 427 inspections on 405 pump sites and observed that 181 of the sites were set up for irrigation. See **Table 4** and **Figure 2** below.

Table 4: Surface water pump site inspections in the LBBNRD in 2024.

SURFACE WATER PUMP SITE INSPECTIONS		
Number of Pump sites Inspected	**Number of Pump Sites Set up for Irrigation**	**Total Observations Made[5]**
405	181	427

[4] Neb. Rev. Stat. §46-291(1)
[5] Includes multiple visits to same site for water administration.

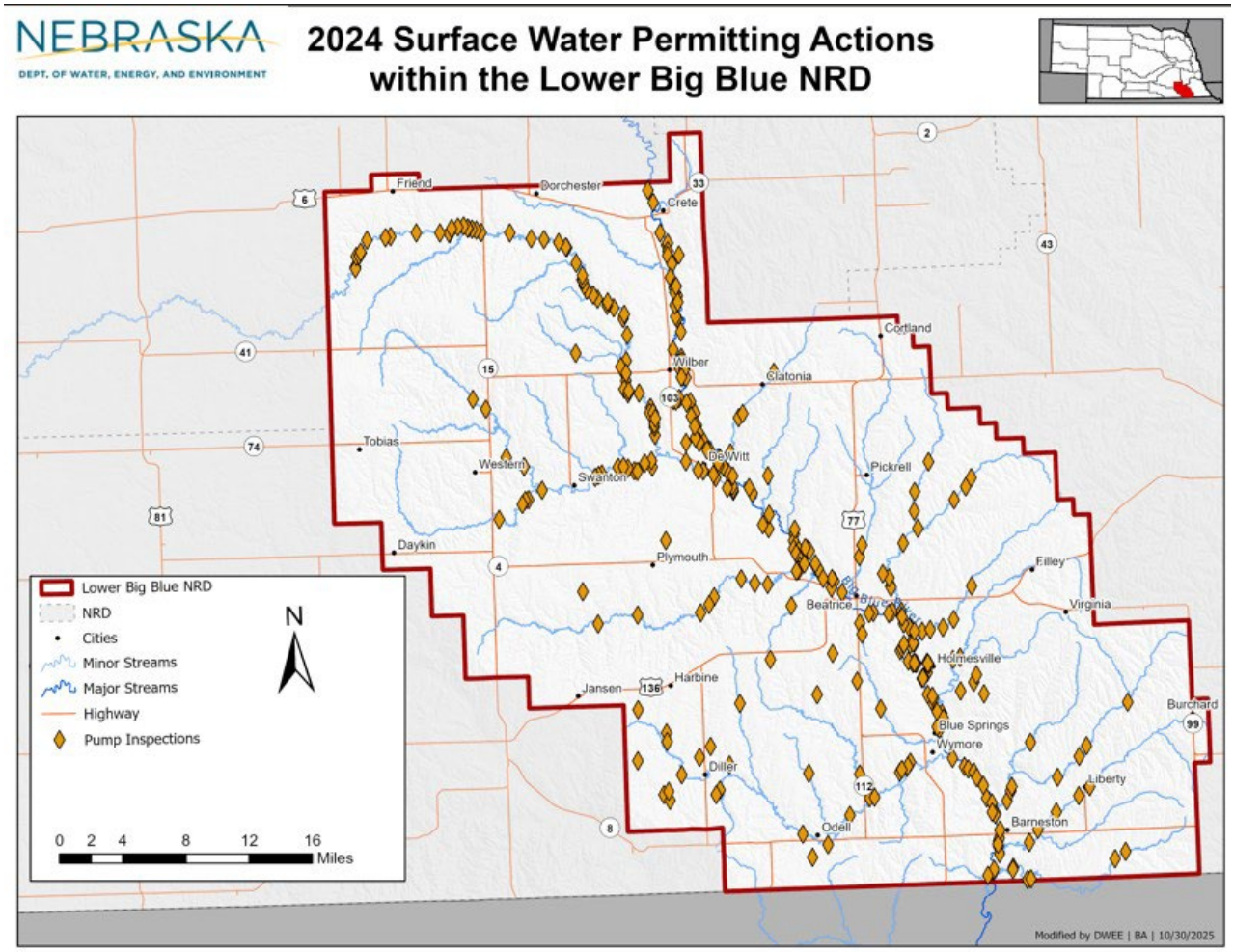


Figure 2: Pump site inspections within the LBBNRD in 2024.

VOLUNTARY WATER USE REPORTING

DWEE collects surface water use data in the LBBNRD through its voluntary water use reporting program. Surveys requesting information about the number of irrigated acres, estimated amount of water applied, type of crops grown and reasons for non-use are sent to all non-exempt surface water irrigation permit holders in the basin. See **Table 5** below for data compiled from 2024 voluntary water use surveys.

Table 5: Voluntary surface water reporting within the LBBNRD in 2024.

VOLUNTARY SURFACE WATER REPORTING IN LOWER BIG BLUE IN 2024						
Surveys Sent	**Surveys Returned**	**SW Irrigated**	**Reported Not Used**	**GW Irrigated[6]**	**SW Irrigated Acres**	**SW Inches Per Acre**
517	154	116	38	38	9,641	6.1

STREAMGAGING

There are currently five active streamgages in the LBBNRD (**Table 6**). Three gages monitor Big Blue River flows and two monitor flows in Turkey Creek as shown in **Figure 3**. DWEE operates two gages in the district, one on Turkey Creek near Wilbur (#06881200), and one on the Big Blue River near Beatrice (#06881500). Both gages have been in operation since 1994. Charts comparing 2024 streamgage data to the historical record are available in **Appendix A**. The United States Geological Survey (USGS) operates three gages in the District, one on the Big Blue River near Crete (#06881000), one on Turkey Creek near DeWitt (#06881380), which is partially funded by LBBNRD, and one near the state line on the Big Blue River at Barneston (#06882000).

[6] This number will include GW irrigated and comingled permits.

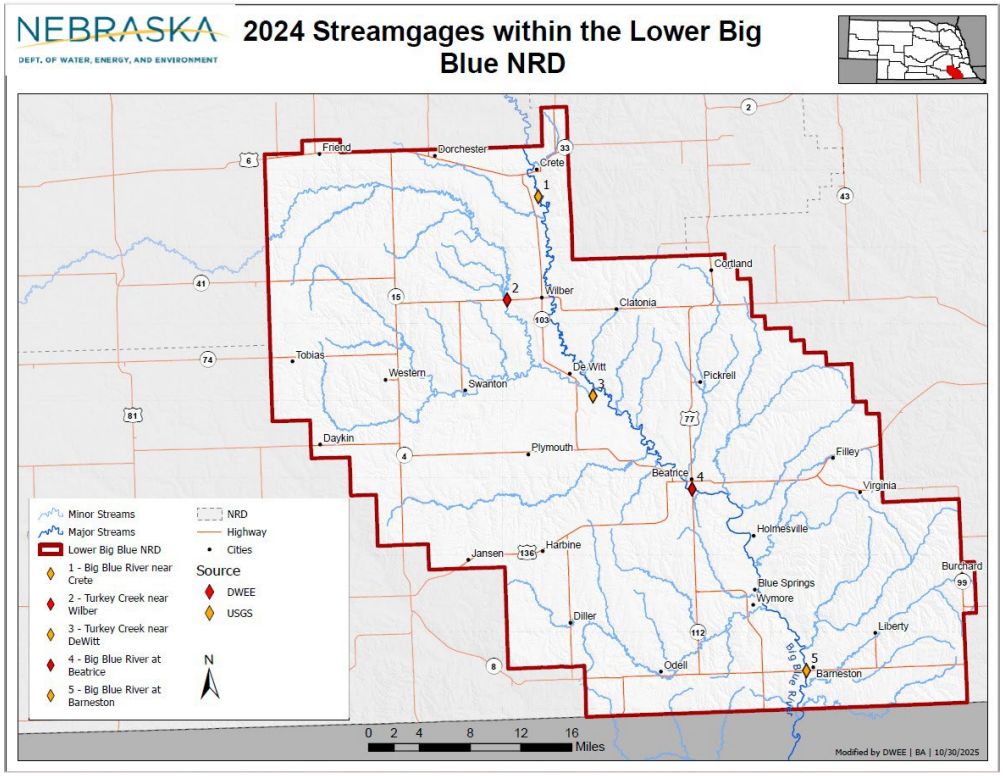


Figure 3: Active streamgages in LBBNRD.

Table 6: Active streamgages in LBBNRD

ACTIVE STREAMGAGES IN THE LOWER BIG BLUE NRD				
Name of Gage	**Funding Source(s)**	**Gage ID**	**Active Since**	**Operator**
Big Blue River near Crete	USACE / USGS	06881000	1954	USGS
Turkey Creek near Wilbur	DWEE	06881200	1994	DWEE
Turkey Creek near DeWitt	Lower Big Blue Natural Resources District / USGS	06881380	2002	USGS
Big Blue River at Beatrice	DWEE	06881500	1994	DWEE
Big Blue River at Barneston	Kansas-Nebraska Big Blue River Compact Association / USGS	06882000	1933	USGS

The USGS gage at Barneston is of particular interest because it is the official measurement point on the Big Blue River for compliance with the Kansas-Nebraska Big Blue River Compact[7]. As stated in the Compact, Nebraska must act when necessary to maintain the following minimum mean daily flows at the Barneston gage:

- May 45 cfs
- June 45 cfs
- July 80 cfs
- August 90 cfs
- September 65 cfs

[7] https://dnr.nebraska.gov/water-planning/big-blue-river-compact

Figure 4 below compares the 2024 mean daily discharge and cumulative volumetric discharge to the historical record for the gage. In 2024, the estimated cumulative volumetric discharge at the Barneston streamgage was 240,161 af, which is significantly lower than the period of record median of 523,087 af. The minimum annual volumetric discharge at the Barneston gage was observed in 1934 when approximately 95,568 af passed the gage.

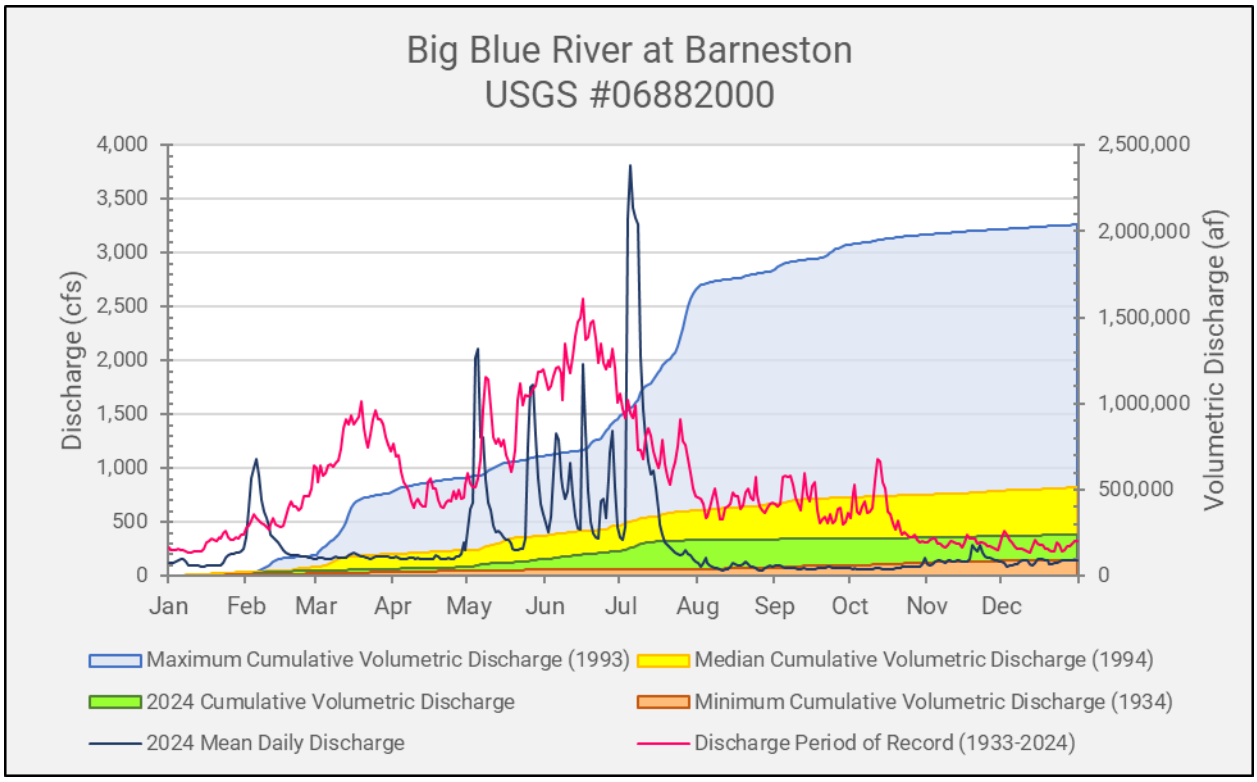


Figure 4: 2024 streamgage data for the Big Blue River at Barneston, NE, compared to the historical record.

SURFACE WATER ADMINISTRATION

Since 1895, Nebraska has had an administrative system overseeing the orderly use of the state's surface water resources. All diversions of surface water for irrigation, hydropower, industrial use, municipal use, domestic use, storage, and other uses require a state permit and each permit has certain responsibilities, limitations, and conditions associated with it. The Department has jurisdiction over all matters pertaining to surface water rights for storage, irrigation, power, manufacturing, instream flows, and other beneficial uses. This includes the distribution of available supply during times of water shortages and adjudication of established water rights. The activity of distributing the supply of surface water on a stream during shortages is called "surface water administration." Surface water administration is set out in Nebraska Revised Statutes, Chapter 46, and operates on a first-in-time, first-in-right principle.

In order to meet minimum mean daily discharge requirements, set forth in the Kansas-Nebraska Big Blue River Compact, DWEE prohibited surface water appropriations junior to November 1, 1968, from diverting water for a total of 20 days in 2024, see **Table 7** below.

Table 7: Surface water administration in the Lower Big Blue NRD in 2024.

SURFACE WATER ADMINISTRATION							
Water Division	**Date of Closure**	**Date Reopened**	**Days Closed**	**Permit Type**	**No. Affected**	**Reason for Closure**	**Reason for Reopening**
1D – Big Blue River Basin	8/7	8/16	9	Natural flow	408	Blue River Compact	Flows in excess of Compact target at Barneston
				Storage	389		
	8/23	9/3	11	Natural flow	409		
				Storage	389		

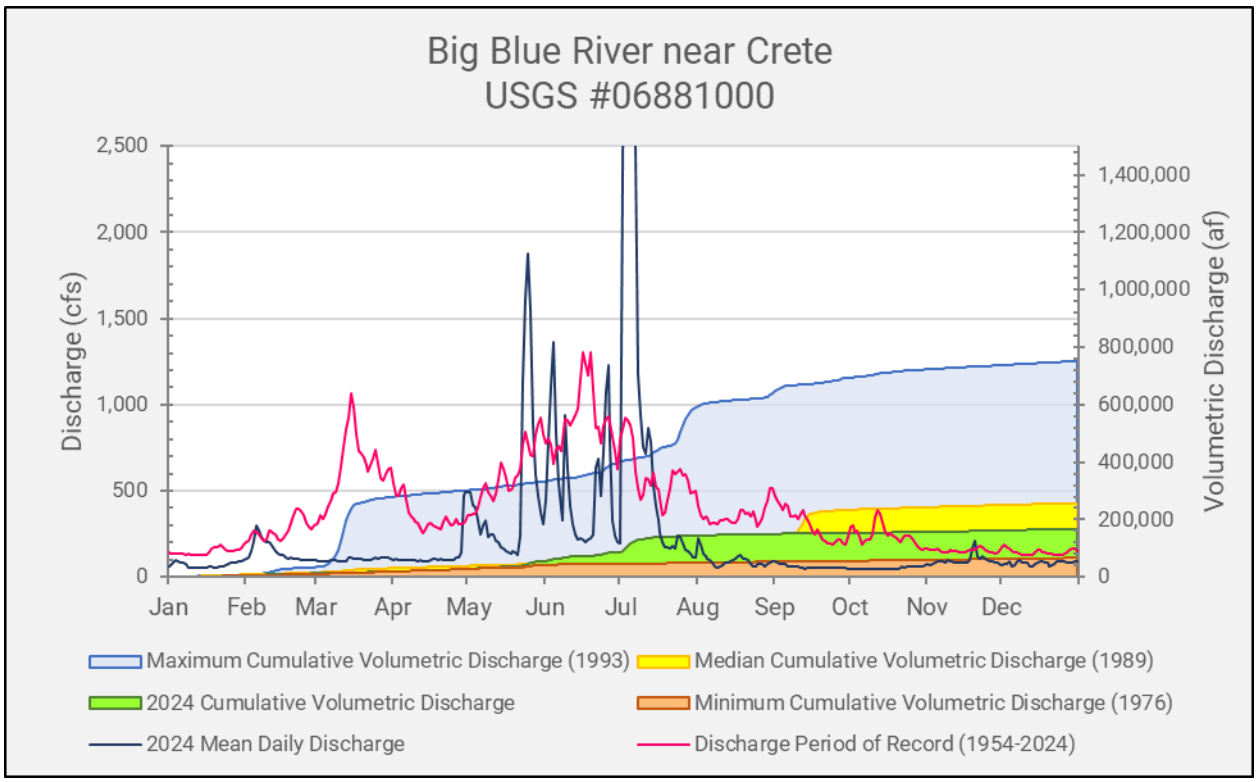
NEW DATA COLLECTED AND MODEL UPDATES

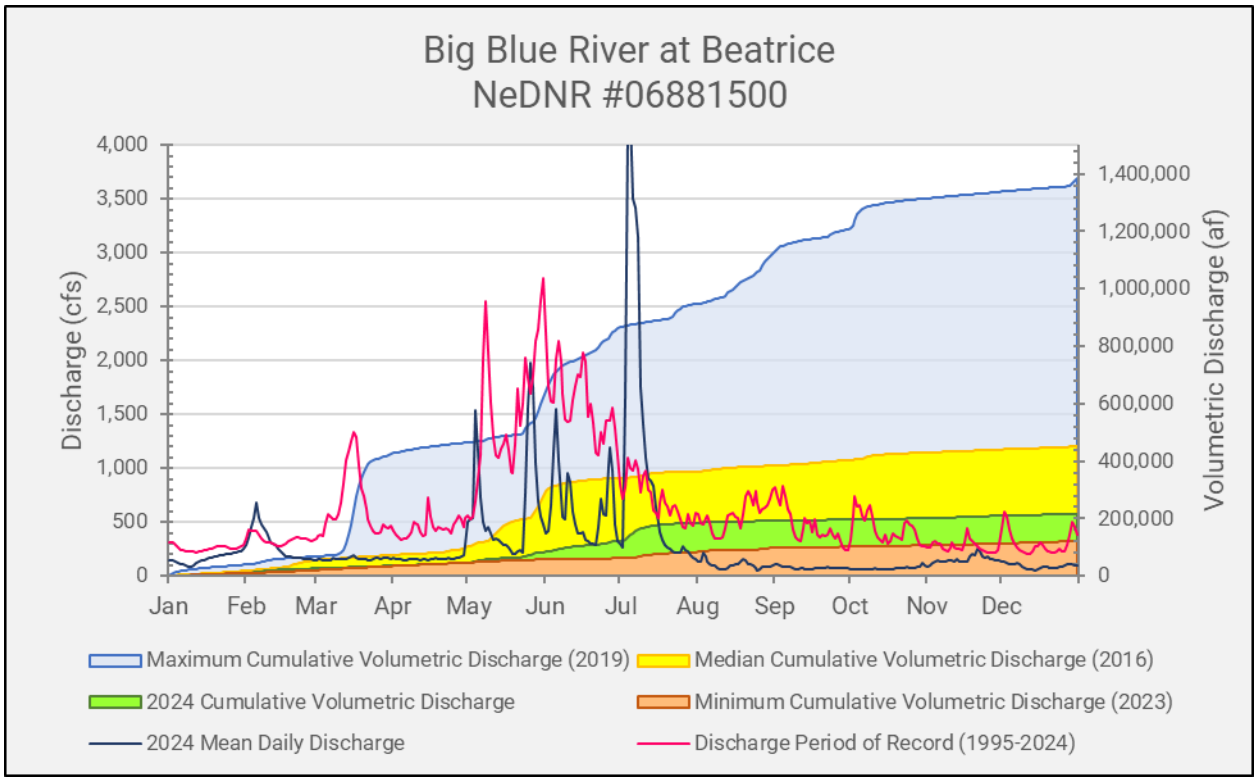
To increase the understanding of hydrologically connected water, LBBNRD is participating with the Tri-Basin, Upper Big Blue, and Little Blue NRDs and DWEE to develop a new numerical Blue Basin Groundwater Model. The model is intended to:

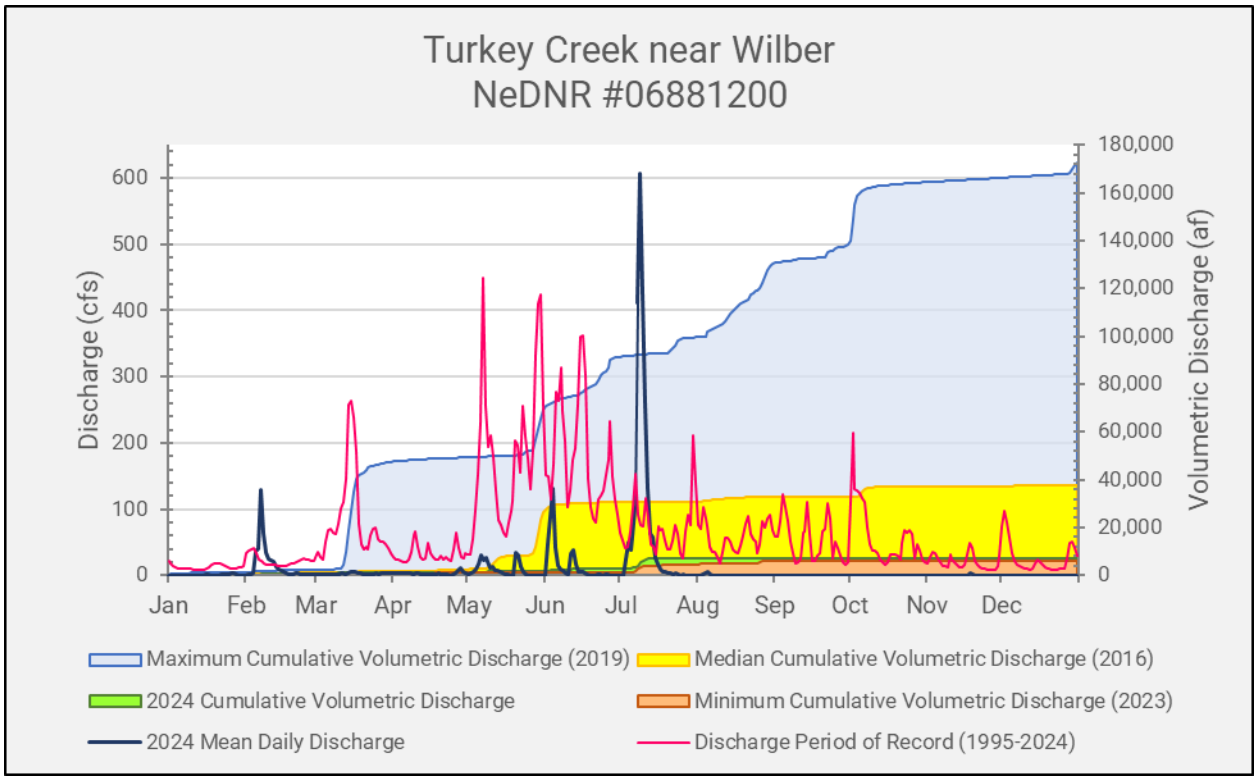
- Refine the delineations of hydrologically connected groundwater and surface water of the Blue River Basin.
- Simulate groundwater level changes and their impacts on stream baseflow and assess potential streamflow depletions, both spatially and temporally.
- Support DWEE's evaluation of the appropriation status of the Blue River Basin and other management decisions related to how groundwater pumping impacts streamflows; and
- Provide a platform and datasets representing the best available data for evaluation of local-scale water issues.

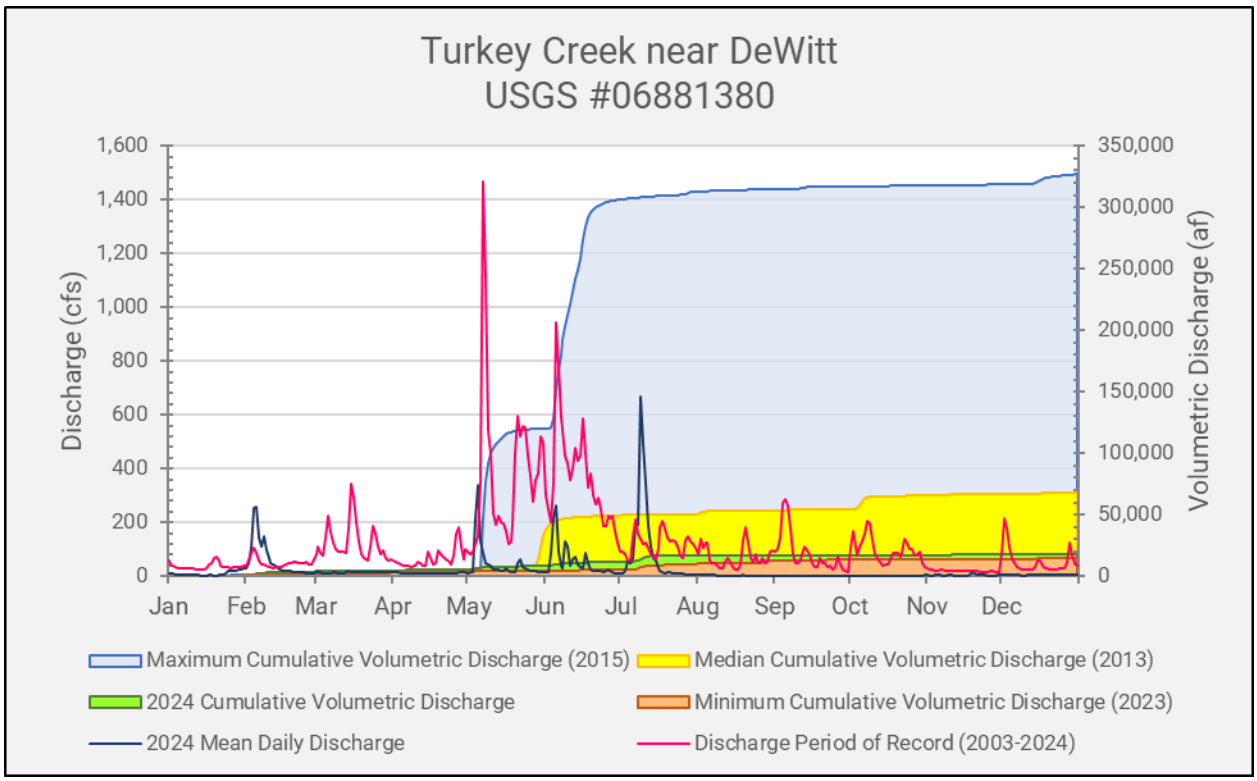
This project was completed near the end of 2023 and final documentation for the updated model was provided to the Department and the NRD partners. Since that time, the Department has undertaken a comprehensive review of the model and its documentation, which includes baseline and scenario model runs and a preliminary delineation of areas with hydrologically connected surface water and groundwater. This analysis is complete, and the Department has shared its findings with the Blue Basin NRDs as part of the 2024 IMP annual review meetings.

Appendix A


Big Blue River near Crete
USGS #06881000
Discharge (cfs)
Volumetric Discharge (af)
2,500
2,000
1,500
1,000
500
0
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Maximum Cumulative Volumetric Discharge (1993)
Median Cumulative Volumetric Discharge (1989)
2024 Cumulative Volumetric Discharge
Minimum Cumulative Volumetric Discharge (1976)
2024 Mean Daily Discharge
Discharge Period of Record (1954-2024)


Big Blue River at Beatrice
NeDNR #06881500
Discharge (cfs)
Volumetric Discharge (af)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Maximum Cumulative Volumetric Discharge (2019)
Median Cumulative Volumetric Discharge (2016)
2024 Cumulative Volumetric Discharge
Minimum Cumulative Volumetric Discharge (2023)
2024 Mean Daily Discharge
Discharge Period of Record (1995-2024)


Turkey Creek near Wilber
NeDNR #06881200
Discharge (cfs)
Volumetric Discharge (af)
0
100
200
300
400
500
600
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
160,000
180,000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Maximum Cumulative Volumetric Discharge (2019)
Median Cumulative Volumetric Discharge (2016)
2024 Cumulative Volumetric Discharge
Minimum Cumulative Volumetric Discharge (2023)
2024 Mean Daily Discharge
Discharge Period of Record (1995-2024)


Turkey Creek near DeWitt
USGS #06881380
Discharge (cfs)
Volumetric Discharge (af)
0
200
400
600
800
1,000
1,200
1,400
1,600
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Maximum Cumulative Volumetric Discharge (2015)
Median Cumulative Volumetric Discharge (2013)
2024 Cumulative Volumetric Discharge
Minimum Cumulative Volumetric Discharge (2023)
2024 Mean Daily Discharge
Discharge Period of Record (2003-2024)