Nebraska Department of Natural Resources

2024 Annual Report of 2023 Data

for the jointly developed

Tri-Basin Natural Resources District

(Little Blue River Basin portion)

Voluntary Integrated Management Plan

Prepared by the
Nebraska Department of Natural Resources

September 18, 2024

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DEPT. OF NATURAL RESOURCES

INTRODUCTION

In 2015, Tri-Basin Natural Resources District (TBNRD or District) and the Nebraska Department of Natural Resources (NeDNR or Department) began work on a jointly developed voluntary Integrated Management Plan (IMP). IMPs provide a framework for natural resources districts (NRDs) and the Department to collaboratively manage hydrologically connected surface water and groundwater at a local level. The Tri-Basin voluntary IMP (for the Little Blue portion of the District) was developed in accordance with the Nebraska Groundwater Management and Protection Act, and included consultation with stakeholders from TBNRD. In February 2020, the District and the Department reached agreement on a draft IMP, and a hearing was held to take testimony from the public. After considering testimony provided at the public hearing, the District and the Department agreed to adopt the IMP, which became effective on April 15, 2020.

As outlined in the IMP, TBNRD and NeDNR meet annually to share data, exchange annual reports, and discuss actions taken to implement the IMP. This annual IMP report is intended to facilitate the exchange of information between TBNRD and NeDNR, and to keep the public informed about integrated water management activities within the district. It covers the actions and progress made by NeDNR in 2023 to implement the IMP—with a focus on surface water. TBNRD completed a separate report that describes the actions and progress made in voluntary IMP implementation—with a focus on groundwater.

DEPARTMENT REPORTING

The Department annually reports on data related to the following as outlined in the IMP. Other data presented in this report are collected by the Department and shared to present a more complete picture of water management actions in the district.

- Data on existing streamgaging in the Little Blue portion of TBNRD.
- Data on water administration of surface water rights.
- Data on monitoring the use of surface water.
- Data on any new surface water appropriations.
- Data collected through a voluntary reporting program.
- Transfers of surface water rights.
- Variances acted upon, should a moratorium be placed on new surface water appropriations in TBNRD.

SURFACE WATER

This section provides a summary of all surface water appropriations in the Little Blue portion of Tri-Basin NRD and contains additional details about permitting activities that happened in the District in 2023. This report addresses surface water appropriations in three categories: irrigation permits, which allow for irrigation from a naturally flowing source or from a reservoir; storage permits, which allow water from a naturally flowing source to be stored in a reservoir; and 'other' permits, which include domestic, industrial, and environmental uses. Additionally, most surface water permits in the District are exempt from surface water administration because they reuse groundwater that is collected in irrigation reuse pits located within the drainage of an ephemeral natural stream[1]. Within the IMP area there are a total of 26 permits, of which only 9 are not exempt.

A summary of all the currently active surface water permit types and their use within the district can be found in **Table 1** and a detailed list of permits is presented in **Table 2**.

Table 1: Surface water appropriations in the Little Blue portion of Tri-Basin NRD

ACTIVE SURFACE WATER APPROPRIATIONS IN THE TRI-BASIN NRD as of December 31, 2023				
Purpose	**Number of Permits**	**Acres Approved for Irrigation**	**Instantaneous Grant cfs**	**Volumetric Grant af**
Irrigation Permits				
Direct Flow Irrigation Exempt	15	775.7	11.08	N/A
Supplemental Irrigation Exempt	1	36	N/A	108
Direct Flow Irrigation Not Exempt	N/A	N/A	N/A	N/A
All Direct Flow Irrigation	**16**	**811.7**	**11.08**	**108**
Storage Use Exempt	N/A	N/A	N/A	N/A
Storage Use Not Exempt	1	147.5	N/A	36.6
All Storage Use	**1**	**147.5**	N/A	**36.6**
All Irrigation Permits	**17**	**959.2**	**11.08**	**144.6**
Storage Permits				
Storage Exempt	1	N/A	N/A	108
Storage Not Exempt	8	N/A	N/A	447.13
All Storage Permits	**9**	N/A	N/A	**555.13**
All Exempt SW Permits	17	811.7	11.08	216
All SW Permits Not Exempt	9	147.5	N/A	483.73
All Surface Water Permits	**26**	**959.2**	**11.08**	**699.73**

[1] Neb. Rev. Stat. §§ 46-283 to 46-287

Table 2: Active permits in the Little Blue portion of Tri-Basin NRD

Surface Water Permits in TBNRD Voluntary IMP Area							
Permit Number	**Date Approved**	**Use**	**General Location**	**Source**	**Exempt**	**Acres**	**AF of Storage**
A-10107	12/14/1962	Storage	S18-T6N-R14W	Sand Creek, Trib. To	No	-	66.59
A-10159	3/29/1963	Irrigation from Natural Stream	S8-T5N-R13W	Sand Creek, Trib. To	Yes	25.0	-
A-10381	10/16/1964	Storage	S10-T5N-R14W	Sand Creek, Trib. To	No	-	76.24
A-11850	2/5/1970	Storage	S3-T6N-R14W	Sand Creek, Trib. To	No	-	18.0
A-12110	5/14/1971	Irrigation from Natural Stream	S2-T5N-R14W	Sand Creek, Trib. To	Yes	40.0	-
A-12111	5/14/1971	Irrigation from Natural Stream	S2-T5N-R14W	Sand Creek, Trib. To	Yes	40.0	-
A-12298	7/7/1971	Storage	S12-T5N-R14W	Sand Creek, Trib. To	No	-	15.1
A-12761	11/10/1972	Storage	S25-T5N-R14W	Blue River, Little, Trib. To	No	-	61.9
A-12942	9/27/1973	Storage	S19-T5N-R13W	Sand Creek, Trib. To	No	-	65.3
A-12948	3/15/1974	Irrigation from Natural Stream	S18-T5N-R13W	Sand Creek, Trib. To	Yes	19.7	-
A-12957	11/30/1973	Storage	S33-T5N-R14W	Blue River, Little, Trib.	No	-	36.6
A-12967	3/15/1974	Irrigation from Storage	S33-T5N-R14W	Olson Reservoir	No	147.5	36.6
A-14869	1/31/1978	Irrigation from Natural Stream	S11-T6N-R13W	Sand Creek	Yes	50.0	-
A-15084	11/15/1978	Irrigation from Natural Stream	S9-T6N-R14W	Sand Creek, Trib. To	Yes	99.1	-
A-15359	1/15/1979	Irrigation from Natural Stream	S16-T6N-R14W	Sand Creek, Trib. To	Yes	68.0	-
A-15361	1/15/1979	Irrigation from Natural Stream	S23-T7N-R13W	Cottonwood Creek, Trib. To	Yes	17.4	-
A-15376	1/15/1979	Irrigation from Natural Stream	S4-T7N-R13W	Cottonwood Creek, Trib. To	Yes	208.0	-
A-15390	2/15/1979	Irrigation from Natural Stream	S9-T6N-R13W	Sand Creek	Yes	30.0	-
A-16513	8/18/1986	Irrigation from Natural Stream	S17-T6N-R14W	Sand Creek, Trib. To	Yes	26.0	-
A-16541	3/16/1987	Irrigation from Natural Stream	S18-T5N-R14W	Blue River, Little	Yes	45.5	-
A-17285	6/17/1993	Irrigation from Natural Stream	S35-T6N-R13W	Sand Creek, South Branch	Yes	27.0	-
A-17904	11/14/2001	Storage	S7-T5N-R14W	Blue River, Little	Yes	-	108.0
A-17905	11/14/2001	Irrigation from Natural Stream	S7-T5N-R14W	Blue River, Little	Yes	36.0	-
A-17907	10/10/2000	Irrigation from Natural Stream	S33-T7N-R14W	Sand Creek, Trib. To	Yes	44.0	-
A-17924	1/25/2001	Storage	S32-T7N-R14W	Sand Creek	No	-	107.4
A-17989	11/14/2001	Irrigation from Storage	S7-T5N-R14W	Karen's Pond	Yes	36.0	108.0

NEW SURFACE WATER APPROPRIATIONS

In 2023, the department did not act upon any new surface water applications in the IMP area.

CANCELLED SURFACE WATER APPROPRIATIONS

In 2023, the department did not act upon any cancelled in full or cancelled in part permits in the IMP area.

SURFACE WATER TRANSFERS

In 2023, there were no transfers in the IMP area.

GROUNDWATER PERMITS

In 2023, there were no groundwater permitting actions in the IMP area.

VARIANCES ISSUED

In 2023, there were no variances acted upon in the IMP area.

PUMP SITE INSPECTIONS

As time and conditions allow, the NeDNR field office staff visit pump sites as mapped for each appropriation to collect various data. In 2023 the Department did not inspect any pump sites in the IMP area due to irrigation permits being exempt from NeDNR surface water regulation or administration according to Neb. Rev. Stat. §§ 46-285 to 46-287.

VOLUNTARY WATER USE REPORTING

In 2023 no voluntary water use surveys were sent to appropriators that hold an irrigation use permit in the Little Blue River basin IMP area because the permits are exempt from NeDNR surface water regulation or administration according to Neb. Rev. Stat. §§ 46-285 to 46-287.

STREAMGAGING

The upper portion of the Little Blue River Basin consists of the Little Blue River, Sand Creek, and Cottonwood Creek watersheds. These streams originate within Kearney County and are intermittent throughout TBNRD, meaning that they have no baseflow. As a result, no permanent streamgages are in operation in the Little Blue portion of TBNRD.

In 2015, NeDNR installed two pressure transducers to monitor streamflow along Sand Creek. Pressure transducers are less costly than permanent streamgages and are used to observe trends in water levels. NeDNR typically collects transducer data in the spring and the fall. NeDNR does calculate discharge at transducer sites, however, these calculations are generally less accurate than those from permanent streamgages because fewer measurements are taken.

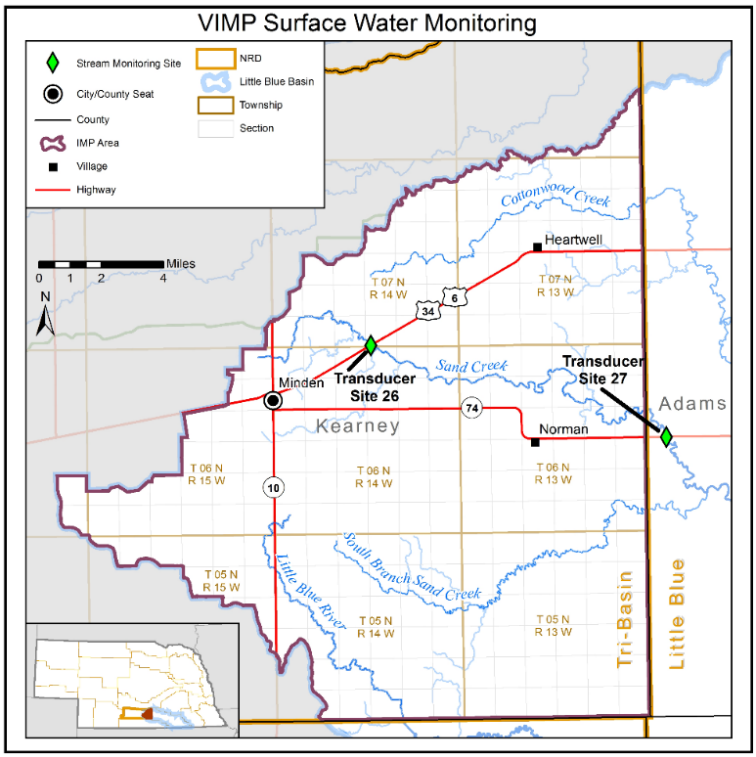

Figure 1: Location of pressure transducers within TBNRD

Figure 1 shows the location of the two transducer sites that monitor streamflow in the Little Blue Basin portion of TBNRD. Transducer site 26, is located on Sand Creek within TBNRD, about three miles northwest of Minden, NE, and has provisional data available through 2023 and beyond. In 2023 transducer 26 (**Figure 2**) had recorded water in the stream for a total of 217 days[2]. Transducer site 27 is located just outside the IMP area within the Little Blue Natural Resources District, about four miles east of Norman, NE. Data for transducer site 27 is available through June 26, 2019. The Little Blue River and tributaries within the LBNRD have dedicated streamgages further downstream of the IMP area.

[2] Transducer #26, additionally recorded 32 zero days for a total record of 251 days.

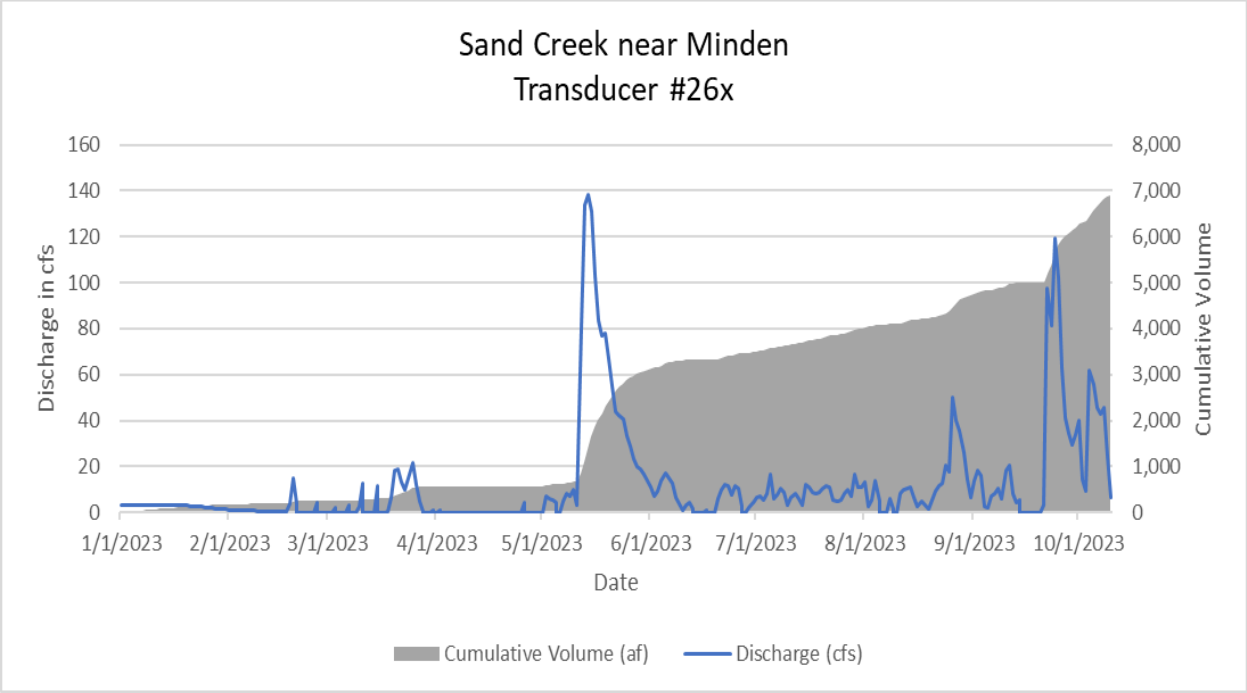

Figure 2: Transducer #26, Sand Creek near Minden

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. NeDNR has jurisdiction over all matters pertaining to these water rights. 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 rules and regulations are set out in Nebraska Revised Statutes, Chapter 46, and operate on a first-in-time, first-in-right principle.

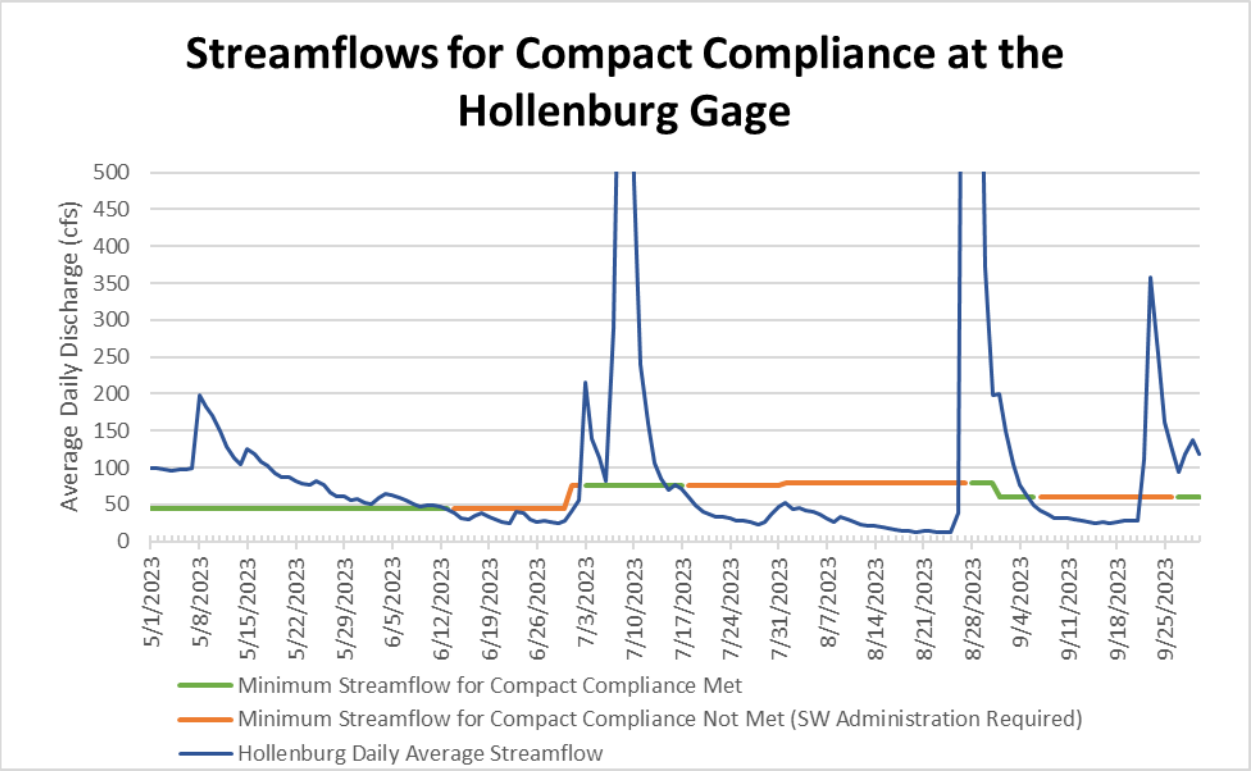

Figure 3: Hollenburg gage with surface water closure periods.

In order to meet minimum mean daily discharge requirements, set forth in the Kansas-Nebraska Blue River Compact, NeDNR prohibited surface water appropriations junior to November 1, 1968, from diverting water for a total of 78 days in 2023. **Figure 3**[3] above shows the 2023 closures for Compact compliance due to low flows at the Hollenburg, KS streamgage; see **Table 3** below for additional details on closures dates and number of affected permits.

Table 3: Surface Water Administration in the Little Blue Basin in 2023.

SURFACE WATER ADMINISTRATION							
Water Division	**Date of Closure**	**Date Reopened**	**Days Closed**	**Permit Type**	**No. Affected**	**Reason for Closure**	**Reason for Reopening**
1C- Little Blue River Basin	6/14	7/3	19	Natural flow	123	Streamflow insufficient for Blue River Compact compliance	Minimum streamflow available for Blue River Compact compliance
				Storage	142		
	7/18	8/28	41	Natural Flow	124		
				Storage	142		
	9/7	9/25	18	Natural flow	125		
				Storage	142		

[3] To better show low flow periods, peak discharges of 1080 cfs and 2060 cfs on 7/9 and 8/28 respectively are not shown.

The IMP states: "The Department will institute mandatory reporting for all high-capacity (greater than 50 gallons per minute) surface water irrigation uses when a trigger is met. The trigger is 24 average days (over the past 20 years of record) of closure for surface water administration, between the period of July 1 and August 31. The Department reserves the right to institute mandatory reporting prior to the trigger being met, if deemed appropriate." **Table 4** shows the number of days of closure in the Little Blue River Basin, between July 1 and August 31 from 2004 to 2023. It also includes the 20-year rolling average for each year.

Table 4: Days of closure in the Little Blue River Basin in July and August

Year	Days of Closure (July1 – August 31)	Days of Closure 20-year Rolling Average (July 1 – August 31)
2004	0	11.3
2005	22	12.4
2006	25	13.6
2007	0	13.6
2008	0	11.1
2009	14	11.6
2010	0	11.6
2011	0	4.6
2012	38	6.5
2013	26	7.8
2014	19	8.8
2015	4	9.0
2016	34	10.7
2017	14	11.4
2018	18	12.3
2019	0	12.3
2020	0	12.3
2021	0	12.3
2022	32	12.3
2023	44	14.5

There were 44 days of closure between July 1 and August 31 in 2023, which changed the 20-year rolling average from 12.3 to 14.5 days of closure. This is below the 24-day trigger outlined in the IMP. However, drought conditions and low flows at the state line are concerning to the Department and mandatory water use reporting may be implemented prior to reaching the trigger. **Figure 4** below charts the annual number of days of closure and the 20-year rolling average for each year.

ADDITIONAL CLOSURES WITHIN THE LITTLE BLUE RIVER BASIN

Since the Kansas-Nebraska Big Blue River Compact requires Nebraska to maintain minimum flows at the state line from May through September, surface water administration can sometimes take place outside the July-August reporting window. **Table 5** shows any additional days of closure outside of the July-August window, and total days of closure in the Basin alongside the 20-year rolling average if all days of administration are counted (May-September).

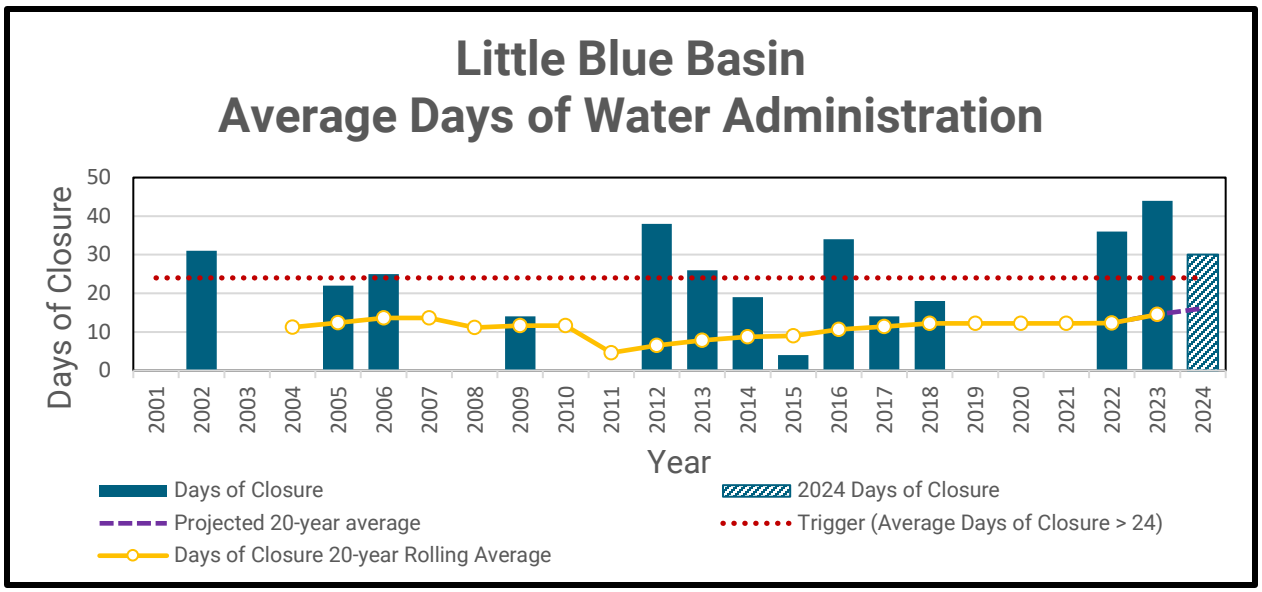

Figure 4: The average number of days of closure in the Little Blue Basin with projected 2024 data.

Table 5: Total days of closure for Compact compliance

Year	Days of Closure (Before June 1 and after August 31)	Total Closure Days (May 1-September 30)	Days of Closure 20-year Rolling Average (May 1-September 30)
2004	10	10	12.1
2005	0	22	13.2
2006	0	25	14.5
2007	0	0	14.5
2008	0	0	12.0
2009	0	14	12.5
2010	0	0	12.5
2011	0	0	5.5
2012	30	68	8.9
2013	20	46	11.2
2014	0	19	12.1
2015	5	9	12.6
2016	0	34	14.3
2017	25	39	16.2
2018	0	18	17.1
2019	0	0	17.1
2020	0	0	17.1
2021	0	0	17.1
2022	30	62	18.3
2023	34	78	22.2

NEW DATA COLLECTED AND MODEL UPDATES

To increase the understanding of hydrologically connected water in the Blue basin, TBNRD, along with the Little Blue, Upper Big Blue, and Lower Big Blue NRDs and NeDNR worked with a consultant 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 NeDNR'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 NeDNR 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. Progress on this review is underway and the Department expects to share its findings with the NRD partners in late 2024.