



Nebraska Department of Natural Resources 2023 Annual Report of 2022 Data

for the jointly developed

Little Blue Natural Resources District Integrated Management Plan

Prepared by the
Nebraska Department of Natural Resources
September 22, 2023

NEBRASKA

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DEPT. OF NATURAL RESOURCES

INTRODUCTION

The Little Blue Natural Resources District (LBNRD or District) and the Nebraska Department of Natural Resources (NeDNR or Department) jointly adopted a voluntary Integrated Management Plan (IMP) which became effective on August 15, 2019.

This IMP annual report is intended to facilitate the exchange of information between the LBNRD and NeDNR, and to provide transparency to the public, regarding integrated water management activities. The report covers the actions taken and progress made by NeDNR in 2022 to implement the voluntary IMP, with a focus on surface water. The LBNRD completed a separate report that describes the actions and progress made by the District in implementing the IMP, with a focus on groundwater.

NeDNR SURFACE WATER MONITORING

1. Streamgaging

There are six active streamgages in the District, with an additional gage located near the Nebraska-Kansas state line on the Little Blue River near Hollenburg, Kansas (Table 1). Five of the gages monitor Little Blue River flows, and two gages monitor flows that contribute to the Little Blue River along Big Sandy Creek and Rose Creek. Four gages, including the Hollenburg gage, are operated by the USGS, and the remaining three gages are operated by the Department. Several entities contribute funds to operate and maintain the District's streamgages in addition to the District, Department, and USGS.

Two of the Department-operated gages were installed in 2017 to better monitor flood flows upstream of Fairbury and Hebron and further understand contributing flows along Rose Creek. The remaining Department-operated gage has been in operation since 1979 and collects streamflow data above the confluence of the Big Sandy Creek and the Little Blue River. The USGS-operated Hollenburg gage has the most extensive record, beginning in 1974, and is used for administration of the Blue River Compact. Charts summarizing average streamflow at the gages below can be found in **Attachment A**.

Table 1: Active streamgages within Little Blue NRD

Streamgages in the Little Blue NRD ¹				
Name of Gage	Funding Source(s)	Gage ID	Active Since	Operator
Little Blue River near Deweese	USGS	6883000	1990	USGS
Little Blue River at County Line at Deshler	Little Blue NRD, Thayer and Jefferson Counties, City of Hebron, USGS	6883530	2017	USGS
Little Blue River at Hebron,	Little Blue NRD and NeDNR	6883555	2017	NeDNR
Big Sandy Creek at Alexandria	NeDNR	6883940	1979	NeDNR
Little Blue River near Fairbury	U.S. Army Corps of Engineers, USGS	6884000	1991	USGS
Rose Creek at HWY 15 near Fairbury	Little Blue NRD and the Nebraska Department of Natural Resources	6884005	2017	NeDNR
Little Blue River at Hollenburg, Kansas	USGS, Big Blue River Compact Administration	6884025	1974	USGS

¹ Streamgage data may be found at: <https://nednr.aquaticinformatics.net>.

2. Administering Surface Water Rights According to State Law

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. Each permit has certain responsibilities, limitations, and conditions associated with it. A summary of all surface water permits in the LBNRD is presented in Table 2. 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"².

Table 2: All active surface water permits in LBNRD as of December 31, 2022.

ALL ACTIVE SURFACE WATER PERMITS IN THE LITTLE BLUE NRD as of December 31, 2022				
Use	Number of Permits	Acres Approved for Irrigation	Grant (cfs)	Grant (af)
Irrigation				
IR - Diversion from naturally flowing source for irrigation	479 (277)	27,138.99 (12,506.4)	374.91 (178.04)	-
SI - Supplemental Irrigation: Irrigation from reservoir on lands also covered by a natural flow appropriation	9	591.1*	61.4	450.53
SO - Stor-only: Irrigation from a reservoir on lands not covered by a natural flow appropriation	62 (4)	7324.3 (389)	-	3584.91 (27.6)
All Irrigation Permits	550 (281)	34,463.29 (12,895.4)	436.31 (178.04)	4035.44 (27.6)
Storage				
ST - Storage	135 (6)	-	-	12,842.67 (46.84)
SS - Supplemental storage	10	-	-	864.2
All Storage Permits	145 (6)	-	-	13,706.87 (46.84)
Other Permits				
CO - Cooling	1	-	-	16.7
DO - Domestic	1	1.99	-	0.46
FW - Fish and Wildlife	1	-	-	10
All Other Permits	3	1.99	-	27.16
Text in purple represents permits exempt under Neb. Reb. Stat. §§ 46-283 to 46 287. SI acres are counted under existing IR permits and therefore not included in total acres calculation.				

² Surface water administration is set out in Nebraska Revised Statutes, Chapter 46, Article 2.

Headwaters and Re-use Pit Exemptions

In the LBNRD, nearly half of all surface water appropriations in LBNRD 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. The exempt permits are captured in purple text in Table 2.

Surface Water Administration

In 2022, it was necessary to issue closing notices in the Little Blue Basin in to maintain compliance with the Kansas-Nebraska Big Blue River Compact.

Table 3: Days of closure in the Little Blue River Basin.

Year	Days of Closure	Days of Closure 20-year Rolling Average
2003	0	n/a
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

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 3 shows the number of days of closure in the Little Blue Basin between July 1 and August 31.

On average, over the past 20 years, there were 12.3 days of closure in the Basin. 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 1 charts the annual number days of closure and the 20-year rolling average for each year. There have been 44 days of closure in 2023, which will change the rolling average to 14.5 average days of closure.

Additional Closures within the LBNRD

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 continue outside the July-August reporting window. Table 4 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 the additional closures within the month of September are included in the reporting. Table 3 shows the rolling average would increase to 18.3 average days of closure through

the 2022³ reporting year. In 2023, there were additional closures during the months of June and September. As of the 22nd of September 2023, the Basin is still closed.

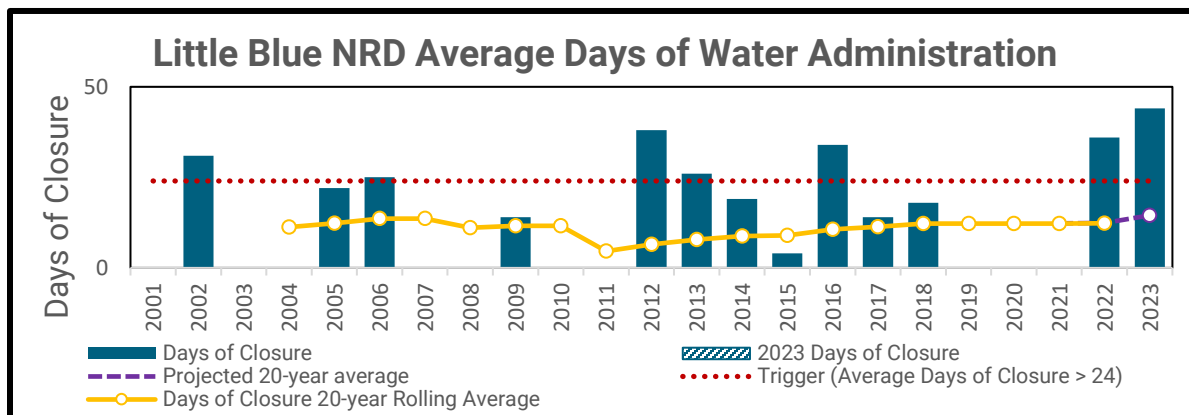


Figure 1: The average number of days of closure in the Little Blue NRD with projected

Table 4: Additional days of closure for Compact compliance

Year	Days of Closure (September)	Total Closure Days (Additional)	Days of Closure 20-year Rolling Average (Additional)
2003	0	0	n/a
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

³ In 2022 there were a total of 62 days of surface water administration. An additional 30 days of closure, outside of the July 1 – August 31 window detailed in the IMP, were necessary for Compact compliance.

3. Monitoring Use of Surface Water to Make Sure that Unauthorized Irrigation is Not Occurring

As time and conditions allow, the NeDNR field office staff visit pump sites for each appropriation to check for compliance and collect various data.

In 2022, the Department made 292 pump site inspections within the LBNRD area. Of the sites visited, 134 had pump sites set up and 22 of those were running.

4. Tracking Acres Permitted to be Irrigated with Surface Water

There are 252 irrigation permits from a naturally flowing source, including the appropriations located in the Big Blue River Basin, within the LBNRD, that are not exempt, allowing the use of surface water for irrigation on a maximum of 14,632.59 permitted acres.

Storage and supplemental storage permits are allowed to store a total of 13,832.93 acre-feet of water per year. Storage-use for irrigation is allowed on a maximum of 7,324.3 permitted acres not covered by an irrigation-from-natural-flow permit.

4.1. New Appropriations

In 2022, the Department approved two applications for a new surface water appropriation. Both permits allow for irrigation from a natural stream. The two permits approved in 2022 are summarized in Table 4.

Table 4: Applications for new surface water appropriations approved in 2022

Applications Approved in 2022 in the Little Blue NRD						
Appropriation Number	Approval Date	Use	Source	Acres	Grant	Diversion / Reservoir Location (S-T-R)
A-19796	1/12/2022	IR	Big Sandy Creek	19	0.27 cfs	S17-T3-R1E
A-19849	6/23/2022	IR	Little Blue River	49.7	0.71 cfs	S15-T2-R2E

4.2. Cancelled Appropriations

In 2022, there was one fully cancelled surface water appropriations in LBNRD. The Department did not have any cancelled in part actions for the year. This action is summarized in Table 5.

Table 5: Surface water appropriations cancelled in-part in 2022

Surface Water Appropriations Cancelled in-part January 1, 2022, to December 31, 2022, Within the Little Blue NRD									
Appropriation Number	Cancelled Date	River Basin	Location of Diversion (S-T-R)	Use	Begin Acres	Cancelled Acres	Cancelled Grant in cfs	Cancelled Grant in af	Basis for NeDNR Action
A-15144	1/28/2022	Little Blue	S25-T5N-R7W	SO	0	54.00	0.82	14.60	REL-9538

The legal basis for the Department's action pertains to one of the following authorities.

- Preliminary determination of non-use (PDNU): After a field investigation found the appropriation had not been used in the last five years, the owner did not successfully contest the preliminary determination of nonuse.
 - Authority upon which the action was based: *Neb. Rev. Stat. §§ 46-229.02(1) through 46-229.02(6)* which state that if the NeDNR makes a preliminary determination that an appropriation has not been used for more than five consecutive years, and the owner of said appropriation does not successfully contest the determination, then NeDNR may cancel said appropriation in whole or in part.
- Relinquishment (REL): Appropriator filed a voluntary relinquishment of water appropriation.
 - Authority upon which the action was based: *Department Rules for Surface Water, Neb. Admin. Code. Title 457, Chapter 3*, which specifies that any appropriation, or part of any appropriation, may be voluntarily relinquished.
- Beneficial Use Cancellation (BUC): Occurs when any non-irrigated portion of a new irrigation water right is cancelled following a beneficial use investigation, after a three-season period of time in which to perfect a water right.

4.3 Transfers

There were no transfers of surface water rights in the LBNRD in 2022. Expedited transfers have additional parameters that the proposed changes must meet. According to *Neb. Rev. Stat. §46-291(1)*, "expedited transfers" are restricted to the following but not limited to:

- Appropriations that are for irrigation
- 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

5. Voluntary Water Right Use Reporting

For the 2022 water year, the Department received 87 responses to the voluntary survey for surface water appropriators in the LBNRD.

There were 58 respondents with permits to use surface water for irrigation from a naturally flowing source (IR). Of those, 42 reported that they irrigated during the 2022 water year and 16 reported that they did not. Those who irrigated in 2022 reported applying an average of 5.7 inches per acre on a total of 4,033.61 acres.

There were 27 respondents with permits to irrigate with storage water only. Of those, 12 reported that they irrigated in 2022 and 15 reported that they did not. Those who irrigated in 2022 reported applying an average of 5.6 inches per acre on a total of 1429.22 acres. Additionally, there were 2 respondents with permits for supplemental irrigation (SI). Both were irrigated in 2022 and applied a total of 5 inches per acre on a total of 192.9 acres.

6. Variances Filed in Areas Under Moratorium

Since 2004, the Department has had a moratorium on new surface water applications in both the Republican River Basin and Upper Platte River Basin. No variances were filed in 2022 within the Republican River Basin or the Upper Platte River Basin.

No moratoriums exist in either the Big Blue River Basin or the Little Blue River Basin; therefore, no variances were sought in 2022.

7. NeDNR Methodology for Tracking Depletions

The Department notes that trigger levels have not been met for mandatory reporting of surface water use. 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.

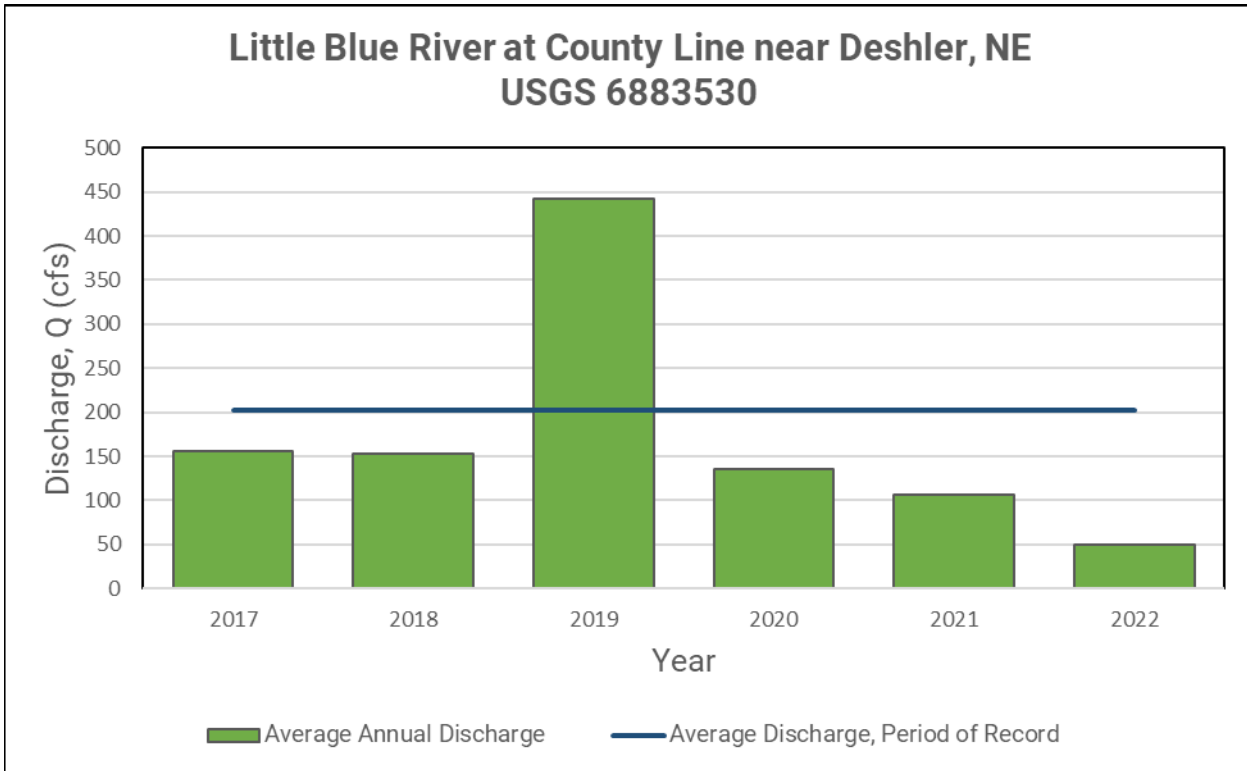
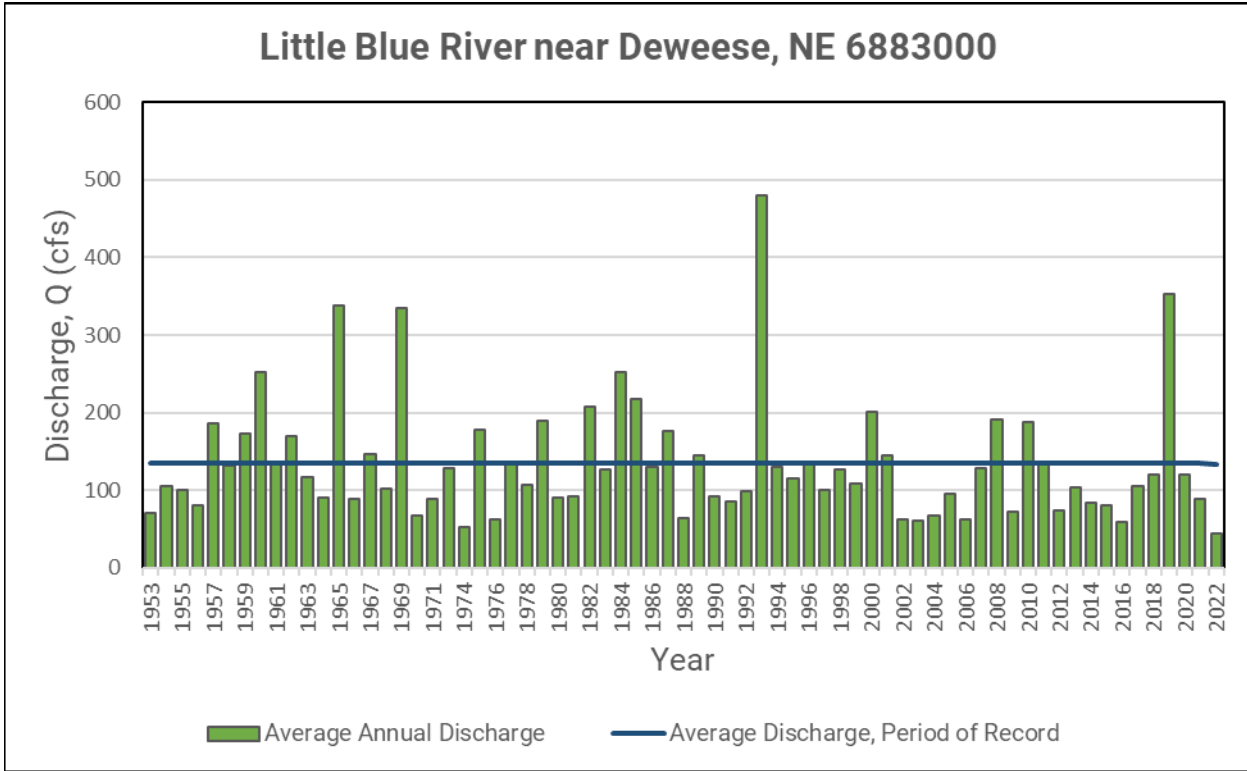
8. Modeling Tools, and Data Analysis

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

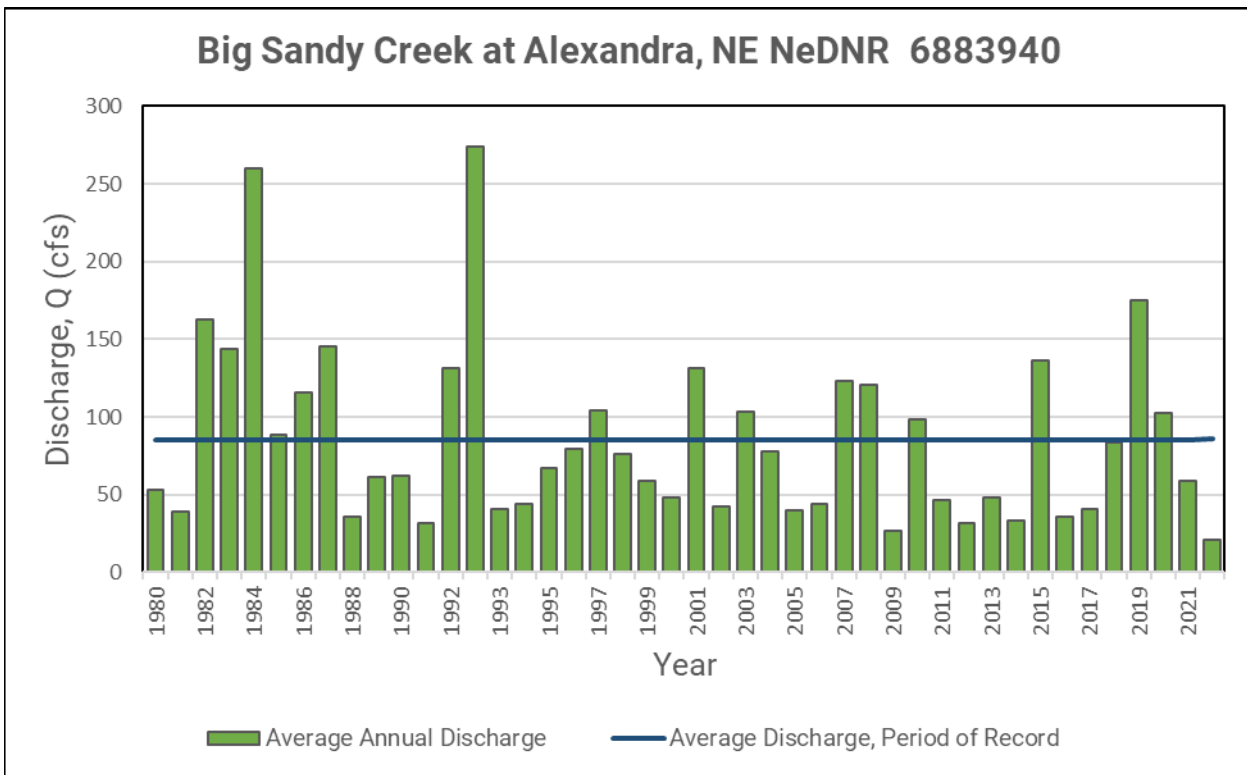
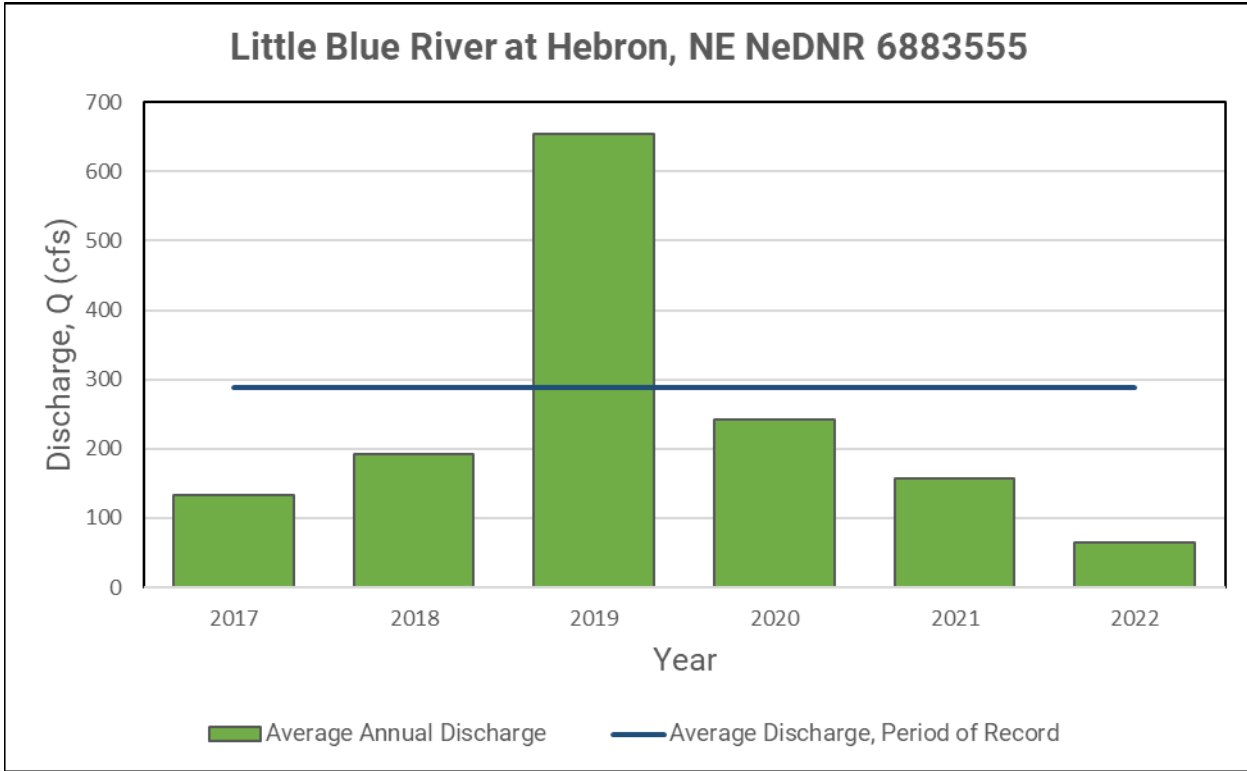
- Refine the delineations of hydrologically connected groundwater and surface water of the Blue River Basin.
- Simulate groundwater level changes and their impacts on stream baseflow and assess potential streamflow depletions, both spatially and temporally.
- Support NeDNR's evaluation of the appropriation 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.

Much of 2022 was spent working on and finalizing calibration of the model. As of September 2023, model documentation has been completed and is being reviewed by the project partners. The model is expected to be ready for use by the end of 2023.

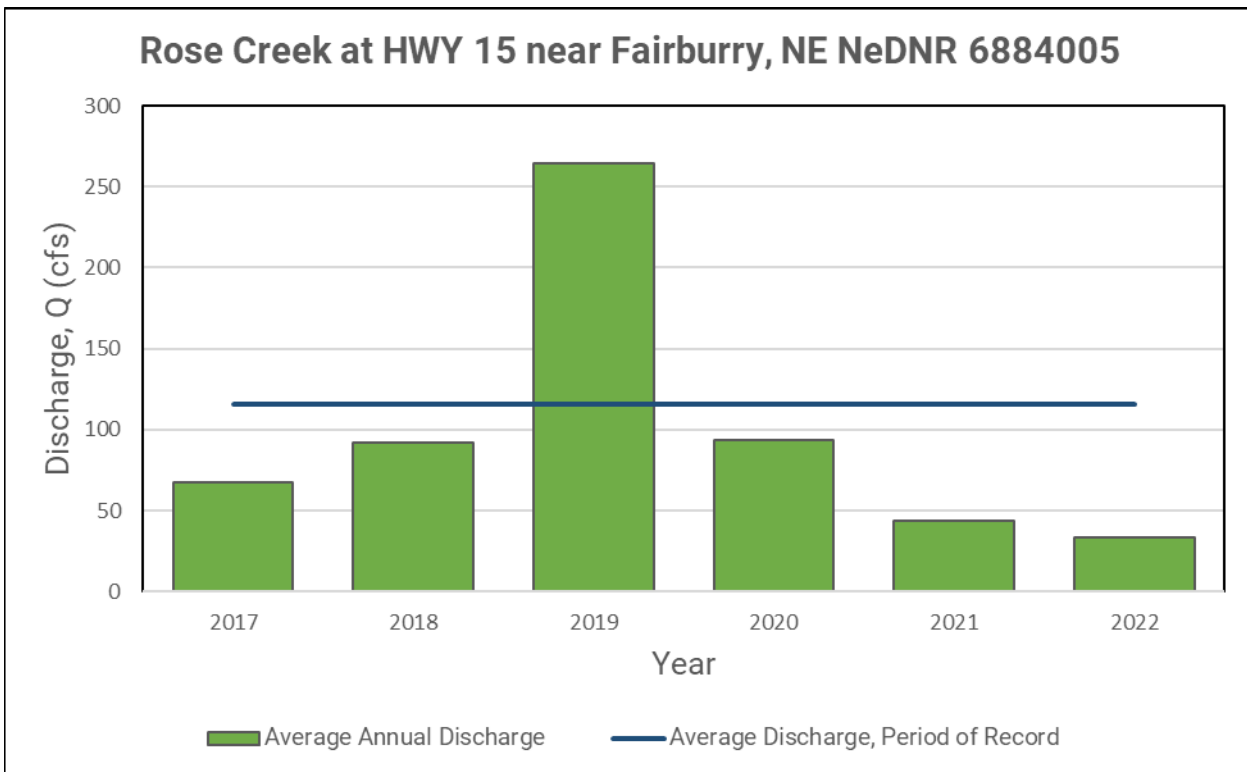
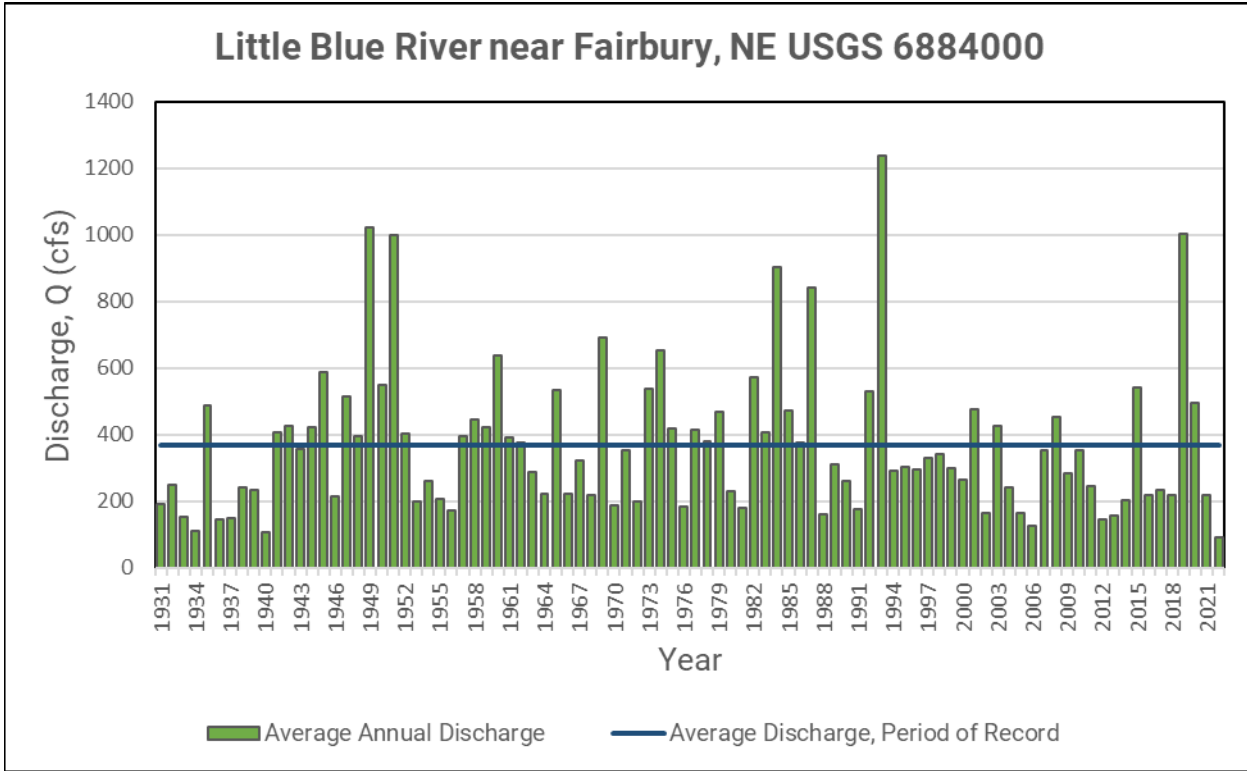
Attachment A



Attachment A



Attachment A



Attachment A

