



Nebraska Department of Natural Resources 2023 Annual Report of 2022 Data

for the jointly developed

Lower Big Blue Natural Resources District Integrated Management Plan

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

NEBRASKA

Good Life. Great Water.

DEPT. OF NATURAL RESOURCES

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 Plan¹ (IMP). The IMP was developed in accordance with the Nebraska Groundwater Management and Protection Act² 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.

This annual report covers the actions taken and data collected by NeDNR in 2022 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.

SURFACE WATER

The Nebraska Department of Natural Resources is authorized by statute to oversee the permitting and adjudication of surface water appropriations in the State³. This section provides a summary of all active surface water appropriations in the Lower Big Blue NRD as of December 31, 2022, and includes details about all permitting actions taken by the Department in 2022.

This report addresses surface water appropriations in three categories: irrigation permits, storage permits, and 'other' permits. Irrigation permits include diversions from a naturally flowing source for irrigation (IR), supplemental irrigation from a reservoir on acres with an existing IR appropriation (SI), and store-only irrigation from a reservoir on acres not covered by an existing IR appropriation. Storage permits allow water from a naturally flowing source to be stored in a reservoir. 'Other'

IMP SECTION 12.1 TRACKING AND REPORTING WATER USES

The Department is responsible for collecting, tracking, evaluating, and reporting the following activities:

- Irrigation surface water use
- Municipal and industrial surface water use
- New surface water appropriations granted (natural flow, storage, groundwater recharge, etc.)
- New groundwater permits issued
- Variances granted by the Department that allow an action contrary to an existing rule or regulation, including the purpose, location, and length of time for which the variance is applicable, and the reasoning behind approval of the variance
- Transfer permits granted by the Department allowing the point of withdrawal, location of use, type of use, or addition of a type of use, including all information provided with the application and used in the approval of the transfer
- Stream gage measurements from Department-maintained gages
- Transfers/cancellations of surface water appropriations
- Surface water administrative actions taken
- New data collected or model/study results (conservation measures, riparian ET, etc.)

¹https://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

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

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 410 IR permits in the LBBNRD that allow 27,540.08 acres to be irrigated at a maximum combined rate of 358.27 cfs. Fourteen SI permits provide an additional 814.8 af of water for irrigation from a reservoir on 1,257.6 acres that are already served by an IR appropriation. There are also 121 permits allowing 6,260.8 af of water from reservoirs to be applied on 13,417.2 acres that are not served by an IR appropriation.

HEADWATERS AND RE-USE PIT EXEMPTIONS

In the LBBNRD, there are 33 surface water appropriations 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.

Table 1: All surface water appropriations in the LBBNRD as of December 31, 2022.

ACTIVE SURFACE WATER APPROPRIATIONS IN THE LOWER BIG BLUE NRD as of December 31, 2022				
Purpose	Number of Permits	Acres Approved for Irrigation	Grant (cfs)	Grant (af)
Irrigation Permits				
IR - Diversion from naturally flowing source for irrigation ¹	410	27,540.08	358.27	N/A
SI - Supplemental Irrigation: Irrigation from a reservoir on lands also covered by a natural flow appropriation ²	14	1,257.6	N/A	814.8
SO - Store-only: Irrigation from a reservoir on lands not covered by a natural flow appropriation	121	13,471.2	N/A	6,260.8
All Irrigation Permits	545	41,011.28*	358.27	7,075.6
Storage Permits				
(ST) Storage ³	265	N/A	N/A	31,053.84
(SS) Supplemental storage	9	N/A	N/A	359.47
All Storage Permits	274	N/A	N/A	31,413.31
Other Permits				
DO - Domestic	1	0.6	0.02	N/A
DS - Domestic Storage Use	1	N/A	N/A	0.05
FC - Fish Culture	2	N/A	2.67	26.77
WT - Wetlands	2	N/A	N/A	9.99
All Other Permits	6	0.6	2.69	36.81
¹ There are 31 exempt IR permits, approved to irrigate 1,686.1 acres at a maximum rate of 24.52 cfs. ² There is 1 exempt SI permit to apply a maximum of 7.3 af of water on 131 acres with an existing IR permit. ³ There is 1 exempt ST permit to store 7.2 af of water. *Does not include SI acres.				

There are 265 ST permits in the LBBNRD that allow 31,053.84 af of reservoir storage, and an additional 9 SS permits that allow for 359.47 af of supplemental storage. The remaining '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.

NEW SURFACE WATER APPROPRIATIONS

In 2022, the Department approved three new IR appropriations in the LBBNRD allowing a total 230.4 acres to be irrigated from a naturally flowing source at a combined rate of 3.29 cfs. One supplemental irrigation (SI) appropriation was approved allowing 1 af of additional water from a reservoir on 123.2 acres of land with an existing IR appropriation. The Department also approved three SO permits in 2022, allowing for a total of 195.5 af of water from a reservoir to be applied to 340.3 acres not already approved for a natural flow appropriation. Five new ST permits allowing a total of 184.2 af of storage and one new SS permit allowing 41.7 af of supplemental storage were also approved by NeDNR in 2022. All new surface water permits approved in 2022 are summarized in Table 2.

Table 2: Surface water appropriations approved in 2022 in the LBBNRD.

SURFACE WATER APPROPRIATIONS APPROVED IN 2022 IN THE LOWER BIG BLUE NRD						
Appropriation Number	Approval Date	Use	Source	Acres	Grant	Diversion/ Reservoir Location (S-T-R)
A-19880	12/6/2022	IR	Trib. to Big Blue River	60	0.86 cfs	S28-T8-4E
A-19852	8/25/2022	IR	Big Indian Creek	123.2	1.76 cfs	S3-T1-6E
A-19803	3/8/2022	IR	Turkey Creek	47.2	0.67 cfs	S29-T6-4E
				230.4	3.29	
A-19854	8/25/2022	SI	Big Indian Creek Reservoir 2-B	123.2	123.2 af	S10-T1-6E
				123.2	123.2	
A-19847	7/1/2022	SO	Big Indian Creek Reservoir 17-A	90	90 af	S13-T2-4E
A-19875	11/9/2022	SO	Meints Reservoir	131.1	40 af	S4-T5-3E
A-19845	8/4/2022	SO	Wiens Sec 22 Reservoir	119.2	65.5 af	S22-T3-5E
				340.3	195.5	
A-19853	8/25/2022	SS	Big Indian Creek	-	41.7 af	S3-T1-6E
					41.7	
A-19806	7/20/2022	ST	Trib. to Cedar Creek	-	49.5 af	S33-T5-8E
A-19827	5/12/2022	ST	Trib. to Plummers Branch	-	25 af	S4-T5-3E
A-19874	11/9/2022	ST	Trib. to Plummers Branch	-	40 af	S4-T5-3E
A-19844	7/21/2022	ST	Trib. to Sicily Creek	-	65.5 af	S22-T3-5E
A-19879	11/9/2022	ST	Wildcat Creek	-	4.2 af	S16-T2-8E
					184.2	

VOLUNTARY WATER USE REPORTING

The Department received 143 responses to the voluntary survey for surface water appropriators in the LBBNRD for the 2022 water year.

There were 117 respondents with IR permits. Of those, 90 reported that they irrigated during the 2022 water year and 27 reported that they did not. Those who irrigated in 2022 reported applying an average of 5.9 inches per acre on a total of 6,870.4 acres.

There were 24 respondents with SO permits. Of those, 23 reported that they irrigated in 2022 and one reported that they did not. Those who irrigated in 2022 reported applying an average of 6.0 inches per acre on a total of 1,946.0 acres.

CANCELLED SURFACE WATER APPROPRIATIONS

In 2022 the NeDNR cancelled one IR permit to irrigate 56.7 acres of land with Big Blue River water and two SO permits to irrigate a total of 141 acres from reservoir storage. In total, 197.7 acres approved for surface water irrigation were cancelled. One 25 af ST permit was also cancelled. All four cancelled appropriations were voluntary relinquishments. Information about the cancelled appropriations can be found in Table 3.

Table 3: Surface water appropriations cancelled in 2022 in LBBNRD

SURFACE WATER APPROPRIATIONS CANCELLED IN 2022 IN LOWER BIG BLUE NRD							
Appropriation Number	Cancellation Date	Use	Source	Acres	Grant	Reason for Cancellation	Diversion/Reservoir Location (S-T-R)
A-19674	1/28/2022	IR	Big Blue River	56.7	0.81 cfs	Voluntary Relinquishment	S1-T5-R4E
A-11208	1/19/2022	SO	Schwisow Reservoir	69.2	58.34 af	Voluntary Relinquishment	S26-T5-R2E
A-19073	7/1/2022	SO	Big Indian Creek Reservoir 17-A	71.8	71.8 af	Voluntary Relinquishment	S13-T2-R4E
A-19827	11/9/2022	ST	Tributary to Plummers	-	25 af	Voluntary Relinquishment	S4-T5-R3E

SURFACE WATER TRANSFERS

Expedited transfer permits are issued by NeDNR and allow a permit holder to change the location of acres approved for surface water irrigation. Expedited transfers must meet the following requirements⁴:

- 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

⁴ Neb. Rev. Stat. §46-291(1)

In 2022 NeDNR approved one surface water transfer, summarized in Table 4. More details associated with this transfer can be found in Appendix A.

Table 4: Surface water Transfers in LBBNRD in 2022

SURFACE WATER TRANSFERS IN 2022 IN LOWER BIG BLUE NRD							
Appropriation Number	Order Date	Use	Source	Acres	Grant	Modification Number	Diversion Location (S-T-R)
A-6635R	3/8/2022	IR	Turkey Creek	33.0	0.24cfs	EXT-9488	S29-T6-R4E
EXT-9488 was for a reconfiguration of irrigated acres in the same location. There were no new acres added and the change of location posed no apparent conflict.							

GROUNDWATER PERMITS

The Department has issued no groundwater permits in the Little Blue NRD.

VARIANCES ISSUED

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

STREAMGAGING

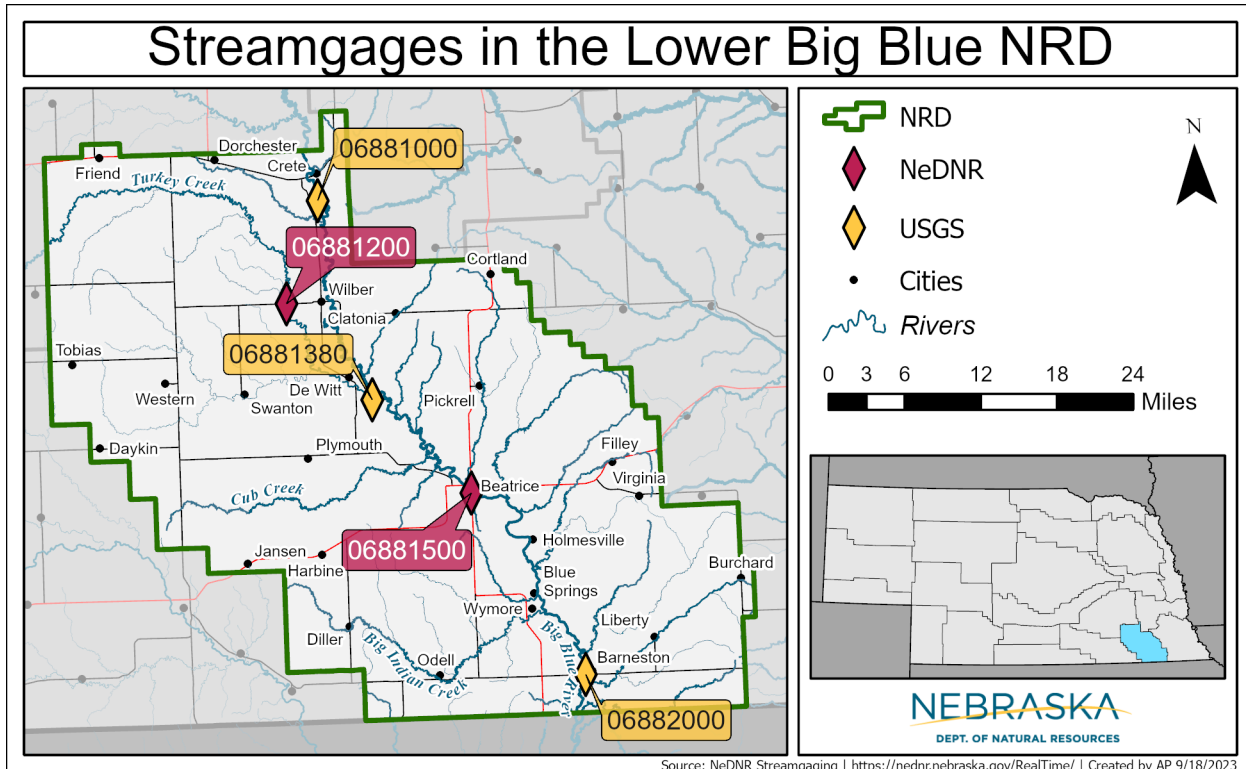


Figure 1: Active streamgages in LBBNRD.

There are currently five active streamgages in the LBBNRD (Table 5). Three gages monitor Big Blue River flows and two monitor flows in Turkey Creek as shown in Figure 1. NeDNR 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 2022 streamgage data to the historical record are available in Appendix B. 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).

Table 5: 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	NeDNR	06881200	1994	NeDNR
Turkey Creek near DeWitt	Lower Big Blue Natural Resources District / USGS	06881380	2002	USGS
Big Blue River at Beatrice	NeDNR	06881500	1994	NeDNR
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 Compact⁵. As stated in the Compact, Nebraska must take action 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

Figure 2 compares 2022 mean daily discharge and cumulative annual volumetric discharge at the Barneston gage, to historical data. In 2022, mean daily discharge was consistently lower than averages for the period of record (1934-2022). Cumulative volumetric discharge at the Barneston gage in 2022 was approximately 282,431 af, which was lower than 77% of all years in the gage’s period of record. 1993 saw the highest estimated cumulative discharge with 2,038,510 af, 2021 saw the median estimated discharge with 523,078 af, and 1933 saw the lowest cumulative discharge on record with 166,915 af.

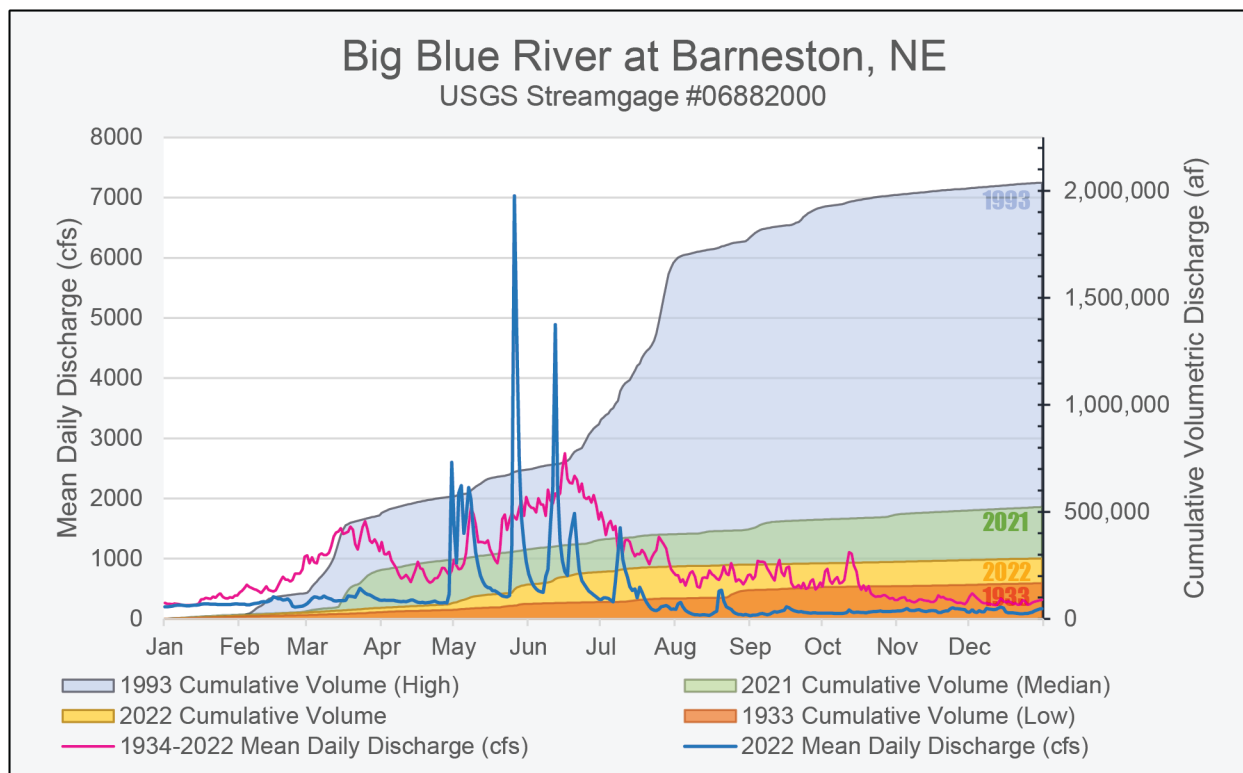


Figure 2: 2022 streamgage data for the Big Blue River at Barneston, NE, compared to the historical record.

⁵ <https://dnr.nebraska.gov/water-planning/big-blue-river-compact>

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, NeDNR prohibited surface water appropriations junior to November 1, 1968, from diverting water for a total of 18 days in 2022.

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 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 the 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.

Appendix A

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES

APPROVAL OF EXPEDITED TRANSFER EXT-9488 FOR WATER APPROPRIATION A-6635R

AND MAP NUMBER 20886

WATER DIVISION 1-D

BACKGROUND

1. Records on file in the Department of Natural Resources (Department) show that surface water appropriation A-6635R is held by David L. and Lisa Maly.
2. Appropriation A-6635R has a priority date of August 24, 1954, and authorizes the use of water for irrigation of the 33.0 acres of land described below. The water may be diverted from Turkey Creek at a point of diversion located on the left bank of the stream in the SW¹/₄NE¹/₄ of Section 29, Township 06 North, Range 04 East of the 6th P.M. in Saline County. Water diverted shall not exceed the ratio of one cubic foot per second (cfs) for every 140 acres irrigated at a maximum rate of 0.24 cfs.

Township 06 North, Range 04 East of the 6 th P.M. in Saline County		Acres
Section 29:	NW ¹ / ₄ NE ¹ / ₄	17.7
	NE ¹ / ₄ NE ¹ / ₄	10.7
	SW ¹ / ₄ NE ¹ / ₄	2.8
	SE ¹ / ₄ NE ¹ / ₄	<u>1.8</u>
	TOTAL	33.0

3. On January 24, 2022, David L. and Lisa Maly filed application EXT-9488 for a permit for an expedited transfer of the location of use for land authorized to be irrigated by appropriation A-6635R and map number 20886 showing land proposed to be irrigated under this application.
4. On February 3, 2022, David Maly corrected filed map number 20886 showing the land proposed to be irrigated under appropriation A-6635R through transfer EXT-9488.

ORDER

IT IS HEREBY ORDERED:

1. Application EXT-9488 for a permit for an expedited transfer of the location of use and map number 20886 are APPROVED.
2. Appropriation A-6635R through transfer EXT-9488 authorizes the use of water to irrigate 33.0 acres of land described below and depicted on map number 20886, which is made a part of this Order. The water may be diverted from Turkey Creek at a point of diversion located on the left

Appendix A

bank of the stream in the SW¹/₄NE¹/₄ of Section 29, Township 06 North, Range 04 East of the 6th P.M. in Saline County, as depicted on map number 20886. Water diverted shall not exceed the ratio of one cfs for every 140 acres irrigated at a maximum rate of 0.24 cfs (108 gallons per minute). The total volume may not exceed 3 acre-feet per irrigated acre per year nor to exceed the least amount of water necessary for the production of crops in the exercise of good husbandry.

<u>Township 06 North, Range 04 East of the</u>		
<u>6th P.M. in Saline County</u>		<u>Acres</u>
Section 29:	NW ¹ / ₄ NE ¹ / ₄	17.4
	NE ¹ / ₄ NE ¹ / ₄	13.8
	SE ¹ / ₄ NE ¹ / ₄	<u>1.8</u>
	TOTAL	33.0

3. All terms and conditions of previous orders for appropriation A-6635 remain in effect unless specifically changed by this Order.
4. A measuring device, approved by the Department, may be required if so ordered by the Department.
5. This appropriation is subject to the provisions of the Blue River Compact and could be closed if Compact flows are not being met.
6. The appropriator must comply with all relevant statutes. These relevant statutory requirements include, but are not limited to, the following:
 - A. Notify the Department of any change in ownership or address.
 - B. Notify the Department of the name and address of the person responsible for the use of the water appropriation (this may include farm managers, tenants, or relatives that actually apply the water to the approved use).
 - C. Obtain approval from the Department prior to taking any action that changes the location of the point of diversion, the location of the place of use, the type of use, or the type of appropriation.

ADDITIONAL INFORMATION

Failure to comply with all laws and regulations pertaining to surface water appropriations, any orders issued by the Director of the Department of Natural Resources, or the provisions of this Order may cause cancellation of part or all of this appropriation, temporary closing of the appropriation, administrative penalty, criminal prosecution, or any combination thereof.

Nebraska law provides that failure to use a portion or all of a perfected appropriation for more than five consecutive years may result in cancellation of the appropriation.

Appendix A

This appropriation is not a guarantee that water will be available. Nebraska law gives priority to senior appropriations. This appropriation may be closed if there is insufficient water to satisfy senior appropriations.

DEPARTMENT OF NATURAL RESOURCES



March 8, 2022

Thomas E. Riley, P.E., Director

A copy of this Order was posted on the Department's website. Copies of this Order and map number 20886 were provided to the Department's field office in Lincoln, Nebraska. Copies of this Order and map number 20886 were mailed on March 8, 2022, to the following:

David L. and Lisa Maly
2094 County Road R
Wilber, Nebraska 68465

Appendix B

