Nebraska Department of Natural Resources

2021 Annual Report

of 2020 Data for the

Lower Platte River Basin Coalition's
Lower Platte River Basin-Wide
Water Management Plan

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1. INTRODUCTION

In April of 2013, The Nebraska Department of Natural Resources (NeDNR) and seven Natural Resources Districts (NRDs) entered into an Interlocal Cooperative Agreement to form the **Lower Platte River Basin Water Management Plan Coalition** (Coalition). The Nebraska Association of Resource Districts (NARD) serves as the coordinator on behalf of the Coalition. The members of the Coalition are:

- Lower Platte South NRD,
- Lower Platte North NRD,
- Papio-Missouri River NRD,
- Lower Loup NRD,
- Lower Elkhorn NRD,
- Upper Elkhorn NRD, and
- Upper Loup NRD
- NeDNR

The Lower Platte River Basin (Basin) is located in the central and eastern portion of the state (Figure 1). The Coalition recognizes the hydrologic connectivity of groundwater and surface water resources within the Basin, and desires to work together to manage the resources as one. The Coalition jointly developed and adopted the Lower Platte River Basin Water Management Plan (Plan) in early 2018. It is through this Plan that the Coalition will protect and sustain the long-term balance between the water uses and water supplies throughout the areas of the Basin that are within the seven represented NRDs. The Plan requires reporting on an annual basis, which this report serves to fulfill.

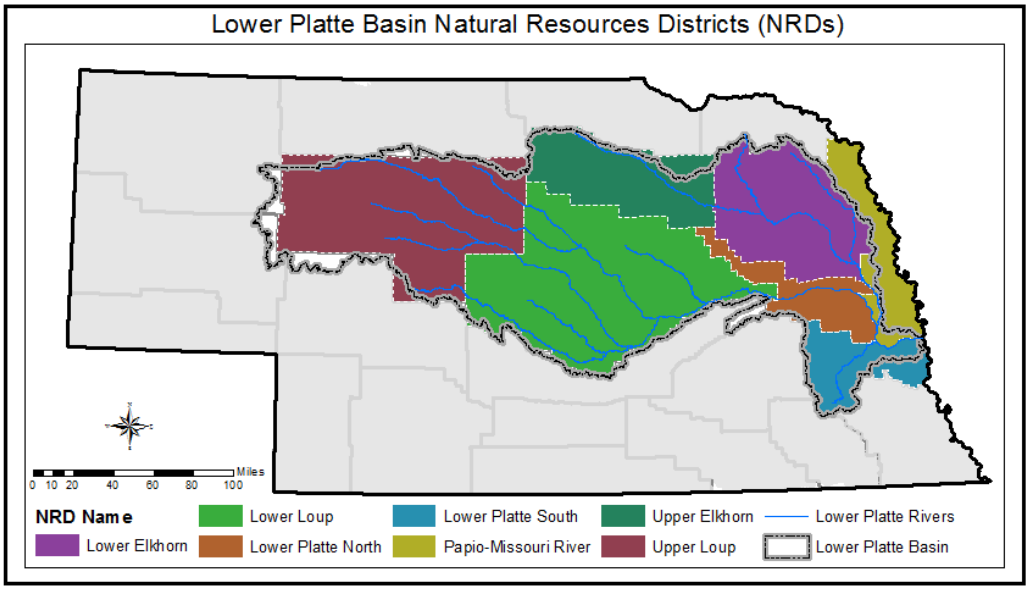

Figure 1. *Natural Resources Districts in the Lower Platte River Basin*

2. MONITORING OF SURFACE WATER AND GROUNDWATER

A. Streamgages Maintained by NeDNR in the Lower Platte River Basin

NeDNR maintains 21 streamgages within the Basin in order to measure various parameters of streams. The Plan requires NeDNR to list our maintained streamgages in this report. A listing of streamgages maintained by NeDNR is shown in Table 1. There are additional gages within the Basin that are maintained by the Unites States Geological Survey (USGS). The streamgage data for active gages maintained by both NeDNR and USGS in the Basin may be accessed at: https://nednr.nebraska.gov/RealTime/. All website data are provisional and subject to revision unless otherwise denoted.

Table 1. *Streamgages maintained by NeDNR within the Basin*

Streamgages Maintained by NeDNR in the Lower Platte River Basin		
Station Name	Station Number	River Basin
Middle Loup River at Rockville	6780000	Loup
Mud Creek near Sweetwater	6783500	Loup
Turkey Creek near Dannebrog	6784800	Loup
Calamus River near Harrop	6787000	Loup
Calamus River near Burwell	6787500	Loup
North Loup River at Ord	6788500	Loup
Mira Creek near North Loup	6788988	Loup
Cedar River near Spalding	6791500	Loup
Cedar River near Fullerton	6792000	Loup
Beaver Creek at Loretto	6793500	Loup
Loup River at Columbus	6794500	Loup
Willow Creek near Pierce	232500	Elkhorn
Elkhorn River near Atkinson	6796973	Elkhorn
South Fork Elkhorn River near Ewing	6798000	Elkhorn
Elkhorn River at Neligh	6798500	Elkhorn
Elkhorn River near Tilden	6798780	Elkhorn
Willow Creek near Foster	6799080	Elkhorn
Union Creek at Madison	6799230	Elkhorn
Pebble Creek at Scribner	6799385	Elkhorn
Logan Creek at Pender	6799450	Elkhorn
Elkhorn River near Winslow	6799510	Elkhorn

C. Measured Canal Diversions

NeDNR measures diversions of 21 canals located within the Basin. The list of canals measured by NeDNR is shown in Table 2. The canal diversion data may be accessed at: https://nednr.nebraska.gov/RealTime/. All website data is provisional and subject to revision unless otherwise denoted.

Table 2. *Irrigation canals within the Basin measured by NeDNR*

Canals Measured by NeDNR in the Lower Platte River Basin		
Canal Name	Canal Number	River Basin
Calamus Fish Hatchery inlet from Calamus	19800	Loup
Farwell (Sherman Feeder) Canal from Middle Loup River	47000	Loup
Farwell Main Canal from Sherman Reservoir	48000	Loup
Farwell South Canal from Sherman Reservoir	49000	Loup
Fullerton Canal from Davis Creek Reservoir	54700	Loup
Kent Canal from North Loup River	76500	Loup
Loup River Power Canal Return at Columbus	82100	Loup
Inlet Canal to Davis Cr. Res. from Mirdan	88500	Loup
Middle Loup Canal No. 1 from Middle Loup	90000	Loup
Middle Loup Canal No. 1 Pump from Middle	90200	Loup
Middle Loup Canal No. 2 from Middle Loup	91000	Loup
Middle Loup Canal No. 3 from Middle Loup	92000	Loup
Middle Loup Canal No. 4 from Middle Loup	93000	Loup
Middle Loup Canal No. 4 from Sherman Feeder Canal	93200	Loup
Mirdan Canal from Calamus Reservoir	100500	Loup
Taylor-Ord Canal from North Loup River	107000	Loup
Taylor-Ord Canal inlet to Mirdan Canal	107100	Loup
Taylor-Ord Canal outlet from Mirdan Canal	107200	Loup
Burwell-Sumter Canal from North Loup River	108000	Loup
Ord-North Loup Canal from North Loup River	109000	Loup
Sargent Canal from Middle Loup River	130000	Loup

D. Surface Water Pump Inspections by NeDNR Field Office

The NeDNR field office staff regularly inspect pump sites of permitted surface water diversions as conditions, time and staffing allow. Not all pump sites are inspected every year, and some pump sites may be visited more than one time per year. NeDNR field offices within the Basin are located in Lincoln, Norfolk, and Ord, Nebraska. Pump inspections conducted in 2020 are found in Table 3. As a part of inspections, field staff collect the following data:

- Evidence of pump site
- Pumps that are running
- Crops in fields
- Irrigation methods

Table 3. *Surface water pump inspections by NeDNR*

Surface Water Pump Inspections in 2020		
NRD	Number of Inspections	Number of Associated Appropriations
Lower Elkhorn	209	283
Lower Loup	703	935
Lower Platte North	75	76
Lower Platte South	153	153
Papio-Missouri River	9	11
Upper Elkhorn	53	68
Upper Loup	18	22
Total	**1,220**	**1,548**

E. Surface Water Administration

In the 2020 water year, surface water administration (enforcement of the prior appropriation doctrine principals of first in time, first in right, in times of shortage) did occur. On August 27, and 28, 2020, the Department issued closing notices or the benefit of the instream flow permits held by Nebraska Game and Parks Commission and by Central Platte Natural Resources District affecting storage and natural flow appropriations' with a priority date junior to November 30, 1993. Opening notices were sent to the appropriators between September 9, and 11, 2020. The summary of the water administration can be found in Table 4.

Table 4. *Surface Water Administration in 2020*

2020 Surface Water Administration in the Lower Platte River Basin							
Field Office	Effective Date	Action	Permit Type	Number Affected		Reason	Notes
				Loup Basin	Elkhorn and Salt Creek Basin		
Lincoln	27-Aug	Close	Storage	5		Instream flow	
Lincoln	27-Aug	Close	NF	3		Instream flow	
Norfolk	28-Aug	Close	Storage	5		Instream flow	
Norfolk	28-Aug	Close	NF	57		Instream flow	
Ord	28-Aug	Close	Storage	22		Instream Flow	
Ord	28-Aug	Close	NF	72		Instream Flow	
Lincoln	3-Sep	Close	NF		12	Instream Flow	
Lincoln	3-Sep	Close	Storage		64	Instream Flow	
Norfolk	3-Sep	Close	NF		65	Instream Flow	Lincoln
Norfolk	3-Sep	Close	Storage		19	Instream Flow	Lincoln
Norfolk	9-Sep	Close	NF	1		Instream flow	A-19726
Lincoln	11-Sep	Open	Storage	5	64	Instream flow	Instream flow met
Lincoln	11-Sep	Open	NF	3	12	Instream flow	Instream flow met
Norfolk	11-Sep	Open	Storage	5	19	Instream flow	Instream flow met
Norfolk	11-Sep	Open	NF	59	65	Instream flow	Instream flow met
Ord	11-Sep	Open	Storage	22		Instream Flow	Due to Rainfall
Ord	11-Sep	Open	NF	72		Instream Flow	Due to Rainfall

F. Active Surface Water Permits Previously Issued for Induced Groundwater Recharge

No new induced groundwater recharge surface water permits were issued and no changes to existing permits occurred in 2020. Induced groundwater recharge permits have no reporting requirements as a condition of the permit.

Currently, the two appropriators of induced groundwater recharge permits within the Basin are (1) the City of Lincoln and (2) Metropolitan Utilities District (MUD). Table 5 provides a summary of the induced groundwater recharge permits within the Basin. The associated municipal groundwater transfer permits, although not surface water, are covered here, and summmarized in Table 6, because the groundwater permits are associated with the induced groundwater recharge surface water permits.

Table 5. *City of Lincoln and MUD surface water permits for induced groundwater recharge*

Surface Water Permits for Induced Groundwater Recharge						
Permit Holder	Appropriation Number	Priority Date	Associated GW Municipal Transfer Permit[1]	Number of Wells	Rate in Cubic feet per second (cfs)	Required Reporting
City of Lincoln	A-17312	1/21/1964	A-10367[2]	31	704 - Summer	No
					200 - All Other Seasons	
		1/1/1970	A-16917[2]	7	No additional streamflow	No
		1/1/1980		6	No additional streamflow	
		1/1/1990		2	No additional streamflow	
		1/1 /1993		2	No additional streamflow	
MUD	A-17310	1/1/1970	A-10538[3]	38	480	No
		1/1/1990		1	20	
	A-17318	10/6/1993	A-17356[3]	42	160	No

[1] See Table 6 for a summary of these permits.
[2] The City of Lincoln has one induced groundwater recharge surface water permit, A-17312, with two associated municipal groundwater transfer permits (Table 6) for the Ashland wellfield.
[3] MUD has two induced groundwater recharge surface water permits, each with an associated municipal groundwater transfer permit (Table 6), for each of its two wellfields: A-17310 and A-10538 in the south wellfield: A-17318 and A-17356 in the west wellfield.

In contrast to the surface water appropriations listed in Table 5, Table 6 provides a summary of the permitted maximum water withdrawals for the City of Lincoln's and MUD's Municipal Groundwater Transfer Permits. The annual reports submitted by City of Lincoln and MUD for these permits are available upon request.

Table 6. *Municipal groundwater transfer permits held by the City of Lincoln and MUD*

Municipal Groundwater Transfer Permits					
Permit Holder	Appropriation Number	Priority Date	Maximum Daily Withdrawal	Total Annual Withdrawal	Required Reporting
City of Lincoln	A-10367	6/15/1931	60 Million Gallons	NA	Yes
	A-16917	1/25/1990	50 Million Gallons	NA	Yes
MUD	A-10538	2/15/1965	60 Million Gallons	NA	Yes
	A-17356	3/1/1994	104 Million Gallons	19 Billion Gallons	Yes

G. Active Groundwater Permits Previously Issued by NeDNR

The data provided by permit holders of groundwater pumped in 2020, for the applicable permits listed in Table 7 are available electronically upon request. The types of groundwater permits shown in Table 7 are authorized as follows:

- "Municipal" is a Municipal Groundwater Transfer Permit pursuant to *Neb. Rev. Stat*. §46-613.01, §§46-639 - 46-650
- "Industrial Transfer" is an Industrial Groundwater Transfer Permit pursuant to *Neb. Rev. Stat*. §§46-675 – 46-689
- "Municipal Notice of Intent" is a notice pursuant to *Neb. Rev. Stat*. §46-655.01

Table 7. *Previously issued groundwater permits*

Current Groundwater Permits Previously Issued by NeDNR in the Lower Platte River Basin				
Index Number	Permit Holder	Appropriation Number	Approval Date	Permit Type
3	Lincoln, City of	A-10367	5/28/1964	Municipal
4	Fremont, City of	A-10411	8/21/1964	Municipal
8	Wakefield, City of	A-10531	3/8/1965	Municipal
9	Plattsmouth, City of	A-10533	3/8/1965	Municipal
11	Metropolitan Utilities District	A-10538	6/9/1965	Municipal
17	Leigh, Village of	A-10578	5/10/1965	Municipal
18	Laurel, City of	A-10579	5/10/1965	Municipal
24	Ashland, City of	A-10589	5/10/1965	Municipal
26	Lincoln, City of	A-10595	5/10/1965	Municipal
27	Columbus, City of	A-10596	5/10/1965	Municipal
32	Fremont, City of	A-12171	4/29/1971	Municipal
33	Fremont, City of	A-13909	2/19/1976	Municipal

Current Groundwater Permits Previously Issued by NeDNR in the Lower Platte River Basin				
Index Number	Permit Holder	Appropriation Number	Approval Date	Permit Type
34	Columbus, City of	A-15704	10/17/1980	Municipal
41	Wayne, City of	A-16525	1/16/1987	Municipal
42	Laurel, City of	A-16530	1/16/1987	Municipal
49	Howells, Village of	A-16888	12/8/1989	Municipal
51	Howells, Village of	A-16911	4/6/1990	Municipal
52	Lincoln, City of	A-16917	8/31/1990	Municipal
53	Wayne, City of	A-16927	6/25/1990	Municipal
54	Bruno, Village of	A-16964	7/12/1990	Municipal
57	Howells, Village of	A-17082	9/16/1991	Municipal
58	Valparaiso, Village of	A-17086	9/16/1991	Municipal
63	Valparaiso, Village of	A-17212	9/29/1992	Municipal
71	Columbus, City of	A-17325	12/11/1995	Municipal
72	Pleasant Dale, Village of	A-17351	4/11/1994	Municipal
73	Eagle, Village of	A-17352	10/27/1994	Municipal
74	Metropolitan Utilities District	A-17356	12/10/1998	Municipal
78	St. Paul, City of	A-17426	1/4/1996	Municipal
121	Clarkson, City of	A-17556	4/2/1998	Municipal
158	Humphrey, City of	A-17807	3/7/2001	Municipal
194	Palmer, Village of	A-17949	2/19/2002	Municipal
128	Ceresco, Village of	A-18018	8/27/2002	Municipal
199	Cuming County Rural Water District #1	A-18024	6/13/2005	Municipal
218	Weston, Village of	A-18070	6/13/2005	Municipal
212	Springfield, City of	A-18104	4/14/2006	Municipal
225	Cass County Rural Water District #2	A-18163	5/3/2006	Municipal
109	Tyson Fresh Meats, Inc.	I-4	10/22/1996	Industrial Transfer
110	Nebco, Inc.	I-5	9/27/1996	Industrial Transfer
270	Nebco, Inc.	I-5A	7/31/2006	Industrial Transfer
141	Hormel Foods Corp.	I-6	1/5/1999	Industrial Transfer
423	Coleridge, Village of	MNI-22	1/22/2014	Municipal Notice of Intent
261	Waverly, City of	MT-13	9/12/2007	Municipal
262	Cuming County Rural Water District #1	MT-14	6/7/2006	Municipal
263	Pierce, City of	MT-15	7/12/2007	Municipal
264	Madison, City of	MT-16	1/11/2007	Municipal
268	Papillion, City of	MT-18	11/6/2018	Municipal
284	Louisville, City of	MT-23	9/29/2006	Municipal
332	Wayne, City of	MT-24	7/12/2007	Municipal
351	Palmer, Village of	MT-27	10/5/2007	Municipal
375	Broken Bow, City of	MT-35	11/30/2009	Municipal
391	Waverly, City of	MT-38	2/25/2011	Municipal
473	Archer Daniels Midland Company and Vantage Corn Processing, LLC	I-25	5/1/2020	Industrial Transfer

3. NeDNR SURFACE WATER AND GROUNDWATER PERMITTING ACTIVITY

A. New Surface Water Applications Approved

Surface water applications approved from January 1, 2020, to December 31, 2020, within the Lower Platte Basin Coalition NRDs and the area within the Lower Platte Basin, are summarized in Table 8. Permit use codes are as follows:

- IR (Irrigation) is a permit to divert water from natural flow for irrigation
- MF (Manufacturing) is a permit to divert water for manufacturing, construction, or industrial uses
- MU (Municipal) is a permit to divert water for municipal uses
- SO (Storage-only) Irrigation from a reservoir on lands not covered by a natural flow appropriation
- SS (Supplemental Storage) is a permit to store water in a reservoir with a previous storage appropriation
- ST (Storage) is a permit to store water

Table 9 contains new surface water applications that were approved within the seven NRDs in calendar year 2020, but that lie outside of the Lower Platte Basin. While these permits do not count as new uses within the Lower Platte Basin, these permits are included to meet the reporting requirements for those NRD's IMPs.

Table 8. *Surface water applications approved in 2020 within the Lower Platte River Basin*

Surface Water Applications Approved between January 1, 2020, to December 31, 2020										
NRD	Appropriation Number	Date Approved	Source	Location of Diversion/ Reservoir	Sub-basin	Use	Grant in cfs	Grant in af	Acres	New Acres
Lower Loup	A-19666	1/8/2020	Calamus Reservoir	S6-T21N-R16W	North Loup River	SO	NA	156.6	52.2	NA
	A-19665	1/8/2020	Davis Creek Reservoir	S30-T17N-R12W	North Loup River	SO	NA	20.4	6.8	NA
	A-19662	2/21/2020	Sherman Reservoir	S1-T15N-R14W	Middle Loup River	SO	NA	161.9	161.9	NA
	A-19677	2/21/2020	Oak Creek	S15-T15N-R13W	Middle Loup River	IR	0.12	NA	8.6	8.6
	A-19680	2/21/2020	Loup River	S6-T16N-R4W	Lower Loup River	IR	0.59	NA	41.6	41.6
	A-19726	9/4/2020	Loup River	S24-T17N-R2W	Lower Platte River Above North Bend	MF[4]	0.20	10.0	NA	NA
Lower Platte North	A-19732	12/21/2020	Gruenewald Reservoir	S8-T15N-R1E	Lower Platte River Above North Bend	SO	NA	60.5	128.0	NA
Lower Platte South	A-19703	5/15/2020	Salt Creek	S1-T8N-R6E	Lower Platte River North Bend to Louisville	MF[5]	4.90	NA	NA	NA
	A-19713	5/27/2020	Salt Creek, Trib. To	S2-T8N-R6E	Lower Platte River North Bend to Louisville	MF[6]	4.90	NA	NA	NA
	A-19728	10/29/2020	Pawnee Creek	S22-T12N-R10E	Lower Platte River North Bend to Louisville	SS	NA	9.1	NA	NA
	A-19730	10/29/2020	Pawnee Creek, Trib. To	S22-T12N-R10E	Lower Platte River North Bend to Louisville	ST	NA	9.1	NA	NA
Upper Elkhorn	A-19678	2/13/2020	Cedar Creek, Trib. To	S22-T24N-R6W	Elkhorn River Above Norfolk	IR	2.23	NA	156.4	156.4
Upper Loup	A-19664	1/14/2020	Loup River, Middle	S32-T21N-R21W	Middle Loup River	IR	0.13	NA	9.4	9.4

[4] A-19726 is a temporary permit that will expire one year from approval date.
[5] A-19703 is a temporary permit that will expire one year from approval date.
[6] A-19713 is a temporary permit that will expire one year from approval date.

Table 9. *Surface water applications approved in 2020 outside of the Basin*

Surface Water Applications Approved between January 1, 2020, to December 31, 2020 (Outside of the Lower Platte River Basin but Within Coalition NRDs)									
NRD	Appropriation Number	Date Approved	Source	Location of Diversion or Reservoir (S-T-R)	Sub-basin	Use	Grant in cfs	Grant in af	Acres
Lower Platte South	A-19725	8/31/2020	Missouri River	S28-T10N-R14E	Missouri River	MF[7]	0.33	10.0	NA
Papio-Missouri River	A-19676	1/29/2020	Omaha Creek, Trib to	S30-T27N-R9E	Missouri River	ST	NA	157.0	NA
	A-19727	10/15/2020	Missouri River	S5-T18N-R12E	Missouri River	MU	2.23	1,615.0[8]	NA
	A-19731	11/30/2020	Ponca Creek	S18-T16N-R13E	Missouri River	MU[9]	0.29	NA	NA

[7] A-19725 is a temporary permit to divert water for the purpose of drilling and hydrostatic testing
[8] Total combined diversions under this appropriation A-19727, with A-16120, A-17923, and A-18384, shall not exceed 21,440,000 gallons per day.
[9] A-19731 is a temporary permit to divert water for the purpose of wastewater management

B. Cancellations and Transfers of Surface Water Appropriations

Table 10 shows the Basin surface water appropriations that expired, were cancelled in full, or cancelled in part, in 2020. Table 11 shows the surface water appropriations that expired, were cancelled in full, or cancelled in part, that are not within the Lower Platte River Basin but are within Coalition NRDs. NeDNR must follow statutory requirements when proceeding with any cancellation, in full or in part, of a surface water appropriation. The basis for cancellations listed in Tables 10 and 11 are found below. Table 12 summarizes the appropriation granted a "Non-Expedited" transfer. Table 13 summarizes the appropriation granted an "Expedited Transfer"[10]. Tables 14 and 15 summarize the "Provisional Relinquishments" and "Reassignments" filed by the Twin Loups Reclamation District. Table 16 summarizes District Transfer DST-7883. No other types of transfers were acted upon in 2020.

Permit use codes are as follows:

- CO (Cooling) is a permit to divert water for cooling
- IR (Irrigation) is a permit to divert water from natural flow for irrigation
- MF (Manufacturing) is a permit to divert water for manufacturing, construction, or industrial uses
- NL (Diversion from a Natural Lake) is a permit to divert water from a natural lake per *Neb. Rev. Stat.* § 46-801
- SO (Storage-only) Irrigation from a reservoir on lands not covered by a natural flow appropriation
- ST (Storage) is a permit to store water
- WT (Wetland) is a permit to divert water to create a wetland

NeDNR's basis for cancellation pertains to one of the following authorities:

- BUC (Beneficial Use Cancellation): The field offices conduct an investigation for all new appropriations after the time period given in the approval order to perfect the water right. If for any reason the appropriation had not been perfected, and water has not been put to beneficial use as stated in the approval order, it may be cancelled in full or in part.
    - Authority upon which the action was based: *Neb. Rev. Stat.* §46-229.02(7) "A water appropriation that has not been perfected pursuant to the terms of the permit may be canceled by the department without complying with sections 46-229.01 to 46-229.04 if the owner of such appropriation fails to comply with any of the conditions of

[10] 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; and the point of diversion may not change significantly.

approval in the permit, except that this subsection does not apply to appropriations to which subsection (2) of section 46-237 applies."

- PDNU (Preliminary Determination of Non-use): After a field investigation found the appropriation had not been used in the last five years, and 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.
- REL (Relinquishment): Appropriator filed a voluntary relinquishment of water appropriation.
    - Authority upon which the action was based: Department of Natural Resources *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.
- Temporary permits: Temporary permits may not be granted for a term of more than one year. These permits expire one year from the order date and are cancelled without further action by the Department as of that date.

Table 10. *Surface water appropriations expired, cancelled in full, or cancelled in part, in 2020*

Surface Water Appropriations Expired, Cancelled in Full or Cancelled in Part from January 1, 2020, to December 31, 2020												
NRD	Appropriation Number	Cancelled Date	Source	NeDNR Action	Location of Diversion (S-T-R)	Use	Begin Acres	Cancelled Acres	Cancelled Grant in cfs	Cancelled Grant in af	Estimated Date of Last Use	Basis for NeDNR Action
Lower Elkhorn	A-16611B	1/14/2020	Maple Creek, East Fork	Cancelled in Full	S22-T19N-R4E	IR	60.0	60.0	0.86	NA	1991	REL-7838
	A-16907A	1/14/2020	Union Creek	Cancelled in Full	S14-T22N-R1E	IR	57.5	57.5	0.82	NA	1994	REL-7839
	A-18674	1/14/2020	Elkhorn River	Cancelled in Part	S1-T23N-R1W	IR	39.1	10.3	0.15	NA	2004	BUC-7810
	A-17865A	4/22/2020	Logan Creek	Cancelled in Full	S15-T24N-R7E	IR	64.0	64.0	0.46	NA	2019	REL-7762
	A-6100	8/12/2020	Elkhorn River	Cancelled in Full	S24-T24N-R3W	IR	20.0	20.0	0.14	NA	2005	PDNU-9002
	A-19574	9/16/2020	Logan Creek, North	Cancelled in Full	S23-T29N-R3E	IR	195.2	195.2	2.79	NA	Not Used	BUC-9086
	A-11514	12/15/2020	Maple Creek, Middle Fork	Cancelled in Full	S15-T20N-R3E	IR	87.0	87.0	1.24	NA	1983	REL-9234
Lower Loup	A-3213	1/8/2020	Mud (Beaver) Creek	Cancelled in Full	S8-T12N-R14W	IR	6.0	6.0	0.05	NA	2019	REL-7812
	A-10635	4/1/2020	Mud (Beaver) Creek	Cancelled in Full	S14-T15N-R18W	IR	20.4	20.4	0.29	NA	2000	REL-8904
	A-2051A	5/4/2020	Mud (Beaver) Creek	Cancelled in Part	S31-T15N-R17W	IR	135.5	51.7	0.74	NA	2010	REL-7859
	A-11216	6/24/2020	Lewin Reservoir	Cancelled in Full	S19-T17N-R16W	SO	87.0	87.0	NA	19.80	2020	REL-8997
	A-10344R	10/7/2020	Mira Creek	Cancelled in Full	S28-T18N-R13W	IR	72.0	72.0	1.03	NA	2012	REL-9139
	A-17889A	10/15/2020	Loup River	Cancelled in Full	S6-T16N-R4W	IR	50.0	50.0	0.71	NA	2001	REL-9140
Lower Platte North	A-17526	3/6/2020	Wahoo Creek	Cancelled in Full	S35-T13N-R9E	IR	146.6	146.6	2.09	NA	1998	REL-8890
	A-19525	10/29/2020	Gruenewald Reservoir	Cancelled in Full	S8-T15N-R1E	SO	128.8	128.8	NA	47.50	Not Used	BUC-9177
	A-19573	12/7/2020	Platte River	Cancelled in Full	S1-T14N-R9E	WT	1.0	1.0	0.11	NA	Not Used	BUC-9217
Lower Platte South	A-19462	9/29/2020	Cedar Creek	Cancelled in Full	S7-T11N-R12E	IR	112.7	112.7	1.61	NA	Not Used	BUC-9133
Papio-Missouri River	A-18588	1/14/2020	Zwiebel Creek	Cancelled in Part	S30-T13N-R13E	DO	1.8	0.7	0.00	NA	2019	REL-7809
	A-17155	1/29/2020	Steavenson Reservoir	Cancelled in Full	S16-T18N-R9E	SO	26.2	26.2	NA	34.7	2007	REL-7852

Table 10. Continued. *Surface water appropriations cancelled in full or cancelled in part in 2020*

Surface Water Appropriations Expired, Cancelled in Full or Cancelled in Part from January 1, 2020, to December 31, 2020												
NRD	Appropriation Number	Cancelled Date	Source	NeDNR Action	Location of Diversion (S-T-R)	Use	Begin Acres	Cancelled Acres	Cancelled Grant in cfs	Cancelled Grant in af	Estimated Date of Last Use	Basis for NeDNR Action
Papio-Missouri River	A-19671	8/29/2020	Elkhorn River	Permit Expired	18-17-10E	MF	NA	NA	0.56	10.0	2019	Temp. Permit
Upper Elkhorn	A-11736	3/6/2020	Elkhorn River	Cancelled in Full	S21-T29N-R13W	IR	42.95	42.95	0.61	NA	Late 1990s	PDNU-7851
	A-12194	3/6/2020	Elkhorn River	Cancelled in Full	S4-T29N-R14W	IR	38.4	38.4	0.55	NA	2005	PDNU-7854
Upper Loup	A-19556	9/30/2020	Penny Poke Lake	Cancelled in Full	S4-T24N-R23W	NL	235.0	235.0	2.00	NA	Not Used	BUC-9134

Table 11. *Surface water appropriations located outside of the Lower Platte River Basin cancelled in full or cancelled in part in 2020*

Surface Water Appropriations Cancelled in Full or Cancelled in Part from January 1, 2020, to December 31, 2020 (Outside of the Lower Platte River Basin but Within Coalition NRDs)												
NRD	Appropriation Number	Cancelled Date	Source	NeDNR Action	Location of Diversion (S-T-R)	Use	Begin Acres	Cancelled Acres	Cancelled Grant in cfs	Cancelled Grant in af	Estimated Date of Last Use	Basis for NeDNR Action
Lower Elkhorn	A-14753	1/8/2020	Stump Ditch, Trib to	Cancelled in Full	S15-T14N-R24W	IR	267.6	267.6	3.82	NA	2019	REL-7773
Papio-Missouri River	D-1072	4/8/2020	Missouri River	Cancelled in Full	S31-T14N-R14E	CO	NA	NA	365.42	NA	No Indication	REL-8903
	A-17248	4/22/2020	Papillion Creek, Big, Northwest	Cancelled in Full	S16-T18N-R10E	IR	22.0	22.0	0.3	NA	Late 1990s	REL-8933
	A-9884	4/29/2020	Stewart Creek	Cancelled in Full	S28-T19N-R11E	IR	14.0	14.0	0.2	NA	2005	REL-8931
	A-14393	4/29/2020	Papillion Creek, Big, Trib. To	Cancelled in Full	S13-T18N-R10E	IR	13.0	13.0	0.2	NA	2005	REL-8934
	A-10181	4/29/2020	Fish Creek	Cancelled in Full	S9-T19N-R11E	IR	57.3	57.3	0.8	NA	1990	REL-8932
	A-13739	4/29/2020	Papillion Creek, Big, Trib. To	Cancelled in Full	S13-T18N-R10E	IR	64.0	64.0	0.9	NA	2005	REL-8935
	A-14149	6/17/2020	Stratbucker Reservoir	Cancelled in Part	S13-T17N-R12E	SO	80.0	22.4	NA	57.6	Not Used	REL-8900
	A-13809	7/8/2020	Papillion Creek, Big	Cancelled in Full	S29-T18N-R11E	IR	88.6	88.6	1.3	NA	2005	PDNU-8988 REL-8948
	A-16631	7/8/2020	Papillion Creek, Big	Cancelled in Full	S16-T17N-R11E	IR	112.0	112.0	1.6	NA	1992	PDNU-8990
	A-13910	5/15/2020	Fish Creek, Trib. To	Cancelled in Full	S16-T18N-R11E	IR	30.6	30.6	0.4	NA	1991	REL-8938

Surface Water Appropriations Cancelled in Full or Cancelled in Part from January 1, 2020, to December 31, 2020 (Outside of the Lower Platte River Basin but Within Coalition NRDs)												
NRD	Appropriation Number	Cancelled Date	Source	NeDNR Action	Location of Diversion (S-T-R)	Use	Begin Acres	Cancelled Acres	Cancelled Grant in cfs	Cancelled Grant in af	Estimated Date of Last Use	Basis for NeDNR Action
Papio-Missouri River	A-19670	9/4/2020	Cameron Ditch	Expired	7-18-12E	MF	NA	NA	1.34	NA	2020	Expired

Table 5. *Appropriation granted a Change of Appropriation*

Surface Water Appropriations Approved for a Change of Appropriation (Non-Expedited Transfer[11])from January 1, 2020, to December 31, 2020									
NRD	Appropriation Number	Approval Date	Source	Use	S-T-R of Diversion	Acres Transferred	Grant in cfs Transferred	Increase in Acres?	Application for a Transfer Number
Lower Elkhorn	A-12976	6/5/2020	Willow Creek	IR	3-25-3W	77.7	1.11	No	NEX-7890

Table 13. *Appropriation granted a transfer in the location of use in 2020*

Surface Water Appropriations Approved for an Expedited Transfer[12] from January 1, 2020, to December 31, 2020									
NRD	Appropriation Number	Approval Date	Source	Use	S-T-R of Diversion	Acres Transferred	Grant in cfs Transferred	Increase in Acres?	Application for a Transfer Number
Lower Elkhorn	A-4297A[13]	4/22/2020	Logan Creek	IR	15-24-7E	33.0	0.46	No	EXT-8901

[11] According to *Neb. Rev. Stat*. § 46-291(2), Application for a Change of Appropriation NEX-7890 "cannot be approved pursuant to subsection (1) of this section," and therefore was processed as a "*Non-Expedited Transfer"* pursuant to *Neb. Rev. Stat. §§* 46-291(2) through 46-294.

[12] 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; and the point of diversion may not change significantly.

[13] A-4297A prior to the transfer allowed a rate of diversion for each acre irrigated that was less than the maximum allowed by law (1/70), at one cfs for every 140 acres irrigated, or 0.46 cfs. Application EXT-8901 requested to reduce the number of acres irrigated from 64.0 to 33.0 without changing the grant, therefore changing the rate of diversion to one cfs for every 72 acres irrigated (1/72) with the grant remaining at 0.46 cfs.

Table 64. *Filings by Twin Loup Reclamation District in 2020*

Provisional Relinquishments and Reassignments[14] Filed by Twin Loups Reclamation District in NeDNR in 2020							
Appropriation Number	Source	Provisional Relinquishment	Acres Provisionally Relinquished	Grant Provisionally Relinquished (cfs)	Reassignment	Acres Reassigned	Grant Reassigned
A-9642	Calamus River	PREL-7527	25.2	0.36	REA-7532	12.3	0.18
A-11282R	Calamus River	PREL-7528	8.3	0.12	REA-7533	8.3	0.12
A-15088	Loup River, North	PREL-7529	25.2	0.36	REA-7534	12.3	0.18
A-17602	Calamus Reservoir	PREL-7530	20.5	NA	REA-7535	12.3	NA
A-18290	Calamus Reservoir	PREL-7531	4.7	NA	NA	0	NA

Table 15. *Twin Loup Reclamation District's Filings, above in Table 14, listed by Source*

Summary of Provisional Relinquishments and Reassignments filed by Twin Loups Reclamation District by Source				
Source	Acres Provisionally Relinquished	Grant Provisionally Relinquished (cfs)	Acres Reassigned	Grant Reassigned
Calamus River	33.5	0.48	24.6	0.30
Loup River, North	25.2	0.36	12.3	0.18
Calamus Reservoir	25.2	NA	12.3	NA

[14] When an appropriation is held in the name of an irrigation district, a reclamation district, a public power and irrigation district, a mutual irrigation company or canal company, or the United States Bureau of Reclamation, such appropriator has the latitude provided by *Neb. Rev. Stat*. § 46-229.04 (5); within five years after an order of cancellation issued by the department following the filing of a voluntary relinquishment of the water appropriation; to assign the right to use that portion of the appropriation to other land within the district or the area served by the company. The department shall be notified of any such assignment within thirty days after such assignment. Such appropriators are bound by all terms and conditions set forth in the appropriation, and in no way does this relinquishment/reassignment allow any increase in the number of acres irrigated by surface water.

Table 16. *District Transfer Approved by the Loup Basin Reclamation District, Farwell Irrigation District*

District Transfer[15] DST-7883 Approved by Loup Basin Reclamation District, Farwell Irrigation District, on August 5, 2020				
Appropriation Numbers Associated with DST-7883	**Use**	**Source**	**Total Number of Acres Transferred Out**	**Total Number of Acres Transferred In**
A-4423	IR	Loup River, Middle	196.5	196.5
A-18311	SI	Sherman Reservoir		
A-18310	IR	Loup River, Middle		
A-15660	IR	Turkey Creek		
A-17307	SI	Sherman Reservoir		
A-5710	IR	Loup River, Middle		
A-10470	IR	Loup River, Middle		
A-16399	IR	Loup River, Middle		
A-16806	IR	Loup River, Middle		
A-17306	IR	Loup River, Middle		
A-4423A	IR	Loup River, Middle		
A-10260A	SI	Sherman Reservoir		
A-16400	SI	Sherman Reservoir		
A-16814	SI	Sherman Reservoir		

[15] Pursuant to *Neb. Rev. Stat.* §§ 46-2,127 through 46-2,130 "After obtaining approval of an application for transfer and map pursuant to sections 46-2,122 to 46-2,126, the board of directors of any irrigation district, reclamation district, public power and irrigation district, rural water district, or mutual irrigation or canal company may transfer an appropriation of water distributed for agricultural purposes from a tract or tracts of land within the district or served by the company to another tract or tracts of land within the boundaries of the district or served by the company…" The Department does not issue an order for this action. The appropriator is responsible for following statutory requirements related to this type of transfer.

C. Municipal and Industrial Surface Water Permitting Activity

In the reporting period, NeDNR had the following surface water permitting activity within the Basin for the following uses:

- Cooling Permits – Outside of the Basin, but within a Coalition NRD, one cooling permit was cancelled in full. This was a permit for cooling within a power plant that no longer exists (Table 11).
- Induced Groundwater Recharge Permits — No cancellations or new permits issued.
- Manufacturing Permits — Within the Lower Platte River Basin, three new temporary manufacturing permits were approved in 2020 (Table 8), are all temporary (one year) and granted to divert water for road construction, or for pipeline replacement related construction. Outside of the Basin, but within a Coalition NRD, the Department approved one temporary manufacturing for hydrostatic testing (Table 9). Two temporary Manufacturing permits expired in 2020, one in the Lower Platte River Basin, one outside of the Basin (Tables 10 and 11)
- Municipal Permits — No cancellations or new permits issued within the Basin. Two permits were granted, one being a temporary permit, both outside of the Basin, as shown in Table 9.

D. Groundwater Permitting Activity

The following is a listing of all the types of groundwater permits authorized by statute to be issued by NeDNR. In 2020, NeDNR had no groundwater permitting activity within the Basin for the following uses:

- Application to Drill Without Regard to Spacing —No cancellations or new permits issued
- Industrial Groundwater Transfers —No cancellations or new permits issued
- Industrial Transfer Notice —No cancellations or new permits issued
- Municipal Groundwater Transfers —No cancellations and one new permit (I-25) approved on 5/1/2020, and located in Lower Loup NRD for a new use of existing wells in the amount of 11,200 acre-feet per annum at a peak rate of 8,000 gallons per minute (gpm). According to the approval Order, "any stream depletion caused by increasing groundwater withdrawals up to the maximum amount requested under the permit will be addressed by the limits established with the Lower Loup Natural Resources District's Integrated Management Plan (IMP) and thus not harm downstream domestic, municipal, agricultural and environmental surface water users. In addition, approximately 50% of the groundwater pumped at the facility, after being processed at ADM's wastewater treatment plant, is returned to the Platte River via the Columbus-Genoa Power Canal Return".
- Municipal Notice of Intent —No cancellations or new permits issued
- Permit to Violate Well Spacing —No cancellations and one new permit (WSP-122) approved on 1/14/2020, for an irrigation well located in Section 7, Township 17 North, Range 4 East, in Colfax County within Lower Platte North NRD.
- Permit to Transfer to Adjoining State —No cancellations or new permits issued

4. ESTIMATED STREAM DEPLETIONS FOR NEWLY PERMITTED SURFACE WATER APPROPRIATIONS

The Plan provides an overview of the agreed-upon methodology to calculate stream depletions for newly permitted irrigated acres. In line with this methodology, NeDNR applied the Net Corn Crop Irrigation Requirement to estimate stream depletions for new uses and newly permitted surface water acres (see Table 8 for a listing of permits). The net stream depletion estimates by NRD are shown in Table 17. The permit use codes shown in Table 17 are defined as follows:

- IR (Irrigation) is a permit to divert water from natural flow for irrigation
- MF (Manufacturing) is a permit to divert water for manufacturing, construction, or industrial uses
- SO (Storage-only) Irrigation from a reservoir on lands not covered by a natural flow appropriation
- ST (Storage) is a permit to store water
- SS (Supplemental Storage) is a permit that has a prior appropriation for storage.

There are also corrections to previously reported stream depletion data resulting from any expired permits and various permits that were granted, but never used since the plan implementation date. These are listed in Table 18. For ease of tracking Basin accounting, all new depletions and accretions that have been reported since the first annual Basin-Wide report are shown in Table 19 along with a net total of depletions.

Table 17. *Estimated stream depletion by NRD for newly permitted surface water uses and acres*

Estimated Stream Depletion for New Uses and Acres Using Surface Water Permitted January 1, 2020, through December 31, 2020								
NRD	Appropriation Number	Use	Sub-basin	Net Irrigation Requirement	Newly Permitted Acres	Annual Consumptive use in acre feet (af)	Peak Season Stream Depletion in af	Non-Peak Season Stream depletion in af
Lower Loup	A-19666	SO[16]	North Loup River	Grant = 156.6 af	52.2	156.6	0	157
	A-19665	SO	North Loup River	Grant = 20.4 af	6.8	20.4	0	20
	A-19662	SO	Middle Loup River	Grant = 161.9 af	161.9	161.9	0	162
	A-19677	IR	Middle Loup River	7.622	8.6	8.6*7.622 = 65.5492 ac-in 65.5492/12 = 5.46	6	0
	A-19680	IR	Lower Loup River	8.65	41.6	41.6 * 8.65 = 359.84 ac-in 359.84/12 = 29.986	30	0
	A-19726	MF[17]	Lower Platte River Above North Bend	Grant = 10 af	NA	10	10	0
Lower Platte North	A-19732	SO	Lower Platte River Above North Bend	Grant = 60.5 af	156.4	61	0	61
Lower Platte South	A-19703	MF[18]	Lower Platte River North Bend to Louisville	NA	NA	2	2[19]	0
	A-19713	MF[20]	Lower Platte River North Bend to Louisville	NA	NA	0	0[21]	0
	A-19728	SS	Lower Platte River North Bend to Louisville	Grant = 9.1 af	NA	9	0	9
	A-19730	ST	Lower Platte River North Bend to Louisville	Grant = 9.1 af	NA	9	0	9
Upper Elkhorn	A-19678	IR	Elkhorn River Above Norfolk	6.48	156.4	156.4 * 6.48 = 1013.472 1013.472 /12 = 84.59	85	0
Upper Loup	A-19664	IR	Middle Loup River	10.8772	9.4	9.4 * 10.8772 = 102.24568 102.24568/12 = 8.52047	9	0
						Total	**142**	**418**

[16] All permits with a use of "SO" are to divert water from a reservoir for irrigation, thus the depletions to streamflow are during the offseason.
[17] A-19726 is a temporary permit that will expire one year from approval date.
[18] A-19703 is a temporary permit that will expire one year from approval date.
[19] This volume was extrapolated from water quantity data provided by appropriator.
[20] A-19713 is a temporary permit that will expire one year from approval date.
[21] A-19703 & A-19713 were issued to the same appropriator. Only A-19703 was used.

Table 18. *Corrections (Estimated accretions) due to miscellaneous actions*

Corrections (Estimated Stream Accretions) for Previously Calculated Depletions Which No Longer Occur									
NRD	Appropriation Number	Purpose of Use	Sub-basin	Acres	First Year Depletion Taken	Final Year Depletion Taken	Original Depletion Peak/Nonpeak	Resulting Peak Season Stream Accretion in af	Resulting Nonpeak Season Stream Accretion in af
Lower Elkhorn	A-18674	IR	Elkhorn River Norfolk to Waterloo	10.3[22]	2016	2019	6.6/0	6.6	0
	A-19574	IR	Elkhorn River Norfolk to Waterloo	195.2	2018	2019	97/0	97	0
Lower Platte North	A-19525	SO	Lower Platte River Above North Bend	128.8	2016	2019	0[23]	0	0
Lower Platte South	A-19462	IR	Lower Platte River North Bend to Louisville	112.7	2018	2019	0[24]	0	0
Papio-Missouri River[25]	A-19573	WT	Lower Platte River North Bend to Louisville	NA	2018	2019	0.3/0	0.3	0
Papio-Missouri River	A-19671	MF	Elkhorn River Norfolk to Waterloo	NA	2019	2019	10/0	10	0
Upper Loup	A-19556	NL	North Loup River	235.0	2018	2019	38/89	38	89
							Total	**151.9**	**89**

[22] Partial cancellation: cancelled 10.3 of the original 39.1 acres, leaving 28.8 active acres. The original depletion calculation: 39.1 acres, average NIR 7.7 with a total depletion of 25 af. Prorated for the remaining 28.8 acres, 18.4 af of peak season depletion remains and 6.6 af of originally calculated depletions needs corrected.

[23] 19525 is reported here to give a complete record of actions while depletion corrections are not made because non-peak season depletions were not calculated for the 2016-2017 report for any of the new surface water uses in any NRD and have not been evaluated at this point in time.

[24] A-19462 is included here to give a complete record of actions while depletion corrections are not made because this permit was inadvertently excluded from the originally reported 2018 depletion calculations.

Table 19. *Total estimated stream depletions and accretions since 2016*

Estimated Stream Depletions and Accretions Resulting from NeDNR Surface Water Permitting Activity Since 2016														
NRD	2016-2017		2018		2019				2020				Net Total Depletions	
	Depletions		Depletions		Depletions		Accretions		Depletions		Accretions			
	Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak
Lower Elkhorn	117	NA[26]	97	0	70	60	0	0	0	0	103.6	0	180.4	60
Lower Loup	0	NA	305	0	130	638	0	0	46	339	0	0	481	977
Lower Platte North	0	NA	0	0	0	0	0	0	0	61	0	0	0	61
Lower Platte South	65	NA	10	0	0	0	10	0	2	18	0	0	67	18
Papio-Missouri River	67	NA	0.3	0	10	0	0	0	0	0	10.3	0	67	0
Upper Elkhorn	0	NA	0	0	0	0	0	0	85	0	0	0	85	0
Upper Loup	118.0	NA	345.32	89.41	0	0	65	0	9	0	38	89	369.32	0.41
Total Basin-Wide[27]	**367**	**NA**	**758**	**89**	**210**	**698**	**75**	**0**	**142**	**418**	**152**	**89**	**1250**	**1116**

[26] Non-Peak season depletions were not calculated for the 2016-2017 report for any of the new surface water uses in any NRD and have not been evaluated at this point in time.
[27] Total Basin-Wide values are rounded

5. OTHER BASIN PLAN IMPLEMENTATION ACTIONS

A. Ongoing Efforts to Complete the 5-year Comprehensive Review

Annual Reporting Database

Since the Basin Plan began in 2018 the Coalition has been implementing action item A of Objective 2 under Goal 1[28] of the Basin Plan. The Coalition has been working with HDR, Inc. to create a database tool for annual reporting. Additionally, NeDNR received a USGS grant to assist in this effort for the Basin Plan and statewide. The database tool being developed has two primary functions:

(1) A tool for members of the Coalition to report and store data on new uses reported annually

(2) A tool that NeDNR can use statewide for collecting, storing, and reporting water use types not related to irrigated agriculture, that are part of the USGS Water Census.

The reason for development of a single database tool with the flexibility and capability to meet both functions is that many of the elements related to the development of the database tool will overlap. While one purpose for this database is to provide for the reporting of new uses, a second purpose is to be a standard source of data for the development of new modeling and analyses of the balance of water uses and water supplies, which will be used to assist the Coalition members in determining allowable depletions in future plan increments. The creation of an annual reporting database with standard formatting and content will improve the efficiency of including this data in the 5-year comprehensive review.

Lower Platte Missouri Tributary Model

The NeDNR completed the Lower Platte Missouri Tributaries (LPMT) model[29] in December of 2018. The LPMT model covers the northern and central portion of eastern Nebraska, an area that previously had no regional model.

The model uses the most up-to-date modeling techniques to provide the Department a scientific basis on which to make informed decisions on the aquifer-stream interaction for the rivers in the area including the Lower Platte River, and Elkhorn River.

Lower Elkhorn NRD Modeling & AEM Investigations

The LENRD and the NeDNR have completed a contract with JEO Consulting Group (JEO) to develop a district-wide project[30] for the LENRD. This project was designed to test incorporating airborne electromagnetic survey (AEM) data into a sub-regional flow model at a pilot scale to inform efficiently processing the AEM data into a flow model to cover the entire NRD.

In this project, the partners worked to overcome discrepancies between the AEM and geologic data that became obvious during the establishment of the hydrogeologic framework for the pilot-scale

[28] Goal 1: Develop and maintain a water supply and use inventory based on the best available data and analysis. Objective 2: Monitor current and future water demands in the Basin; Action Item A: Develop a standard data collection and reporting system for all NRDs in the Lower Platte River Basin for documenting water uses in the Basin.

[29] Goal 1: Develop and maintain a water supply and use inventory based on the best available data and analysis. Objective 1.1: Develop and maintain a comprehensive inventory of the location and source of the Basin's current and future water supplies, water uses and outflows

[30] Goal 1: Develop and maintain a water supply and use inventory based on the best available data and analysis. Objective 1.1: Develop and maintain a comprehensive inventory of the location and source of the Basin's current and future water supplies, water uses and outflows.

model. The consultants customized an approach that combines the AEM and geologic data to provide a solution that allowed them to move the project forward.

JEO calibrated the model to observed groundwater levels and stream baseflows in different parts of the model area. They also provided a geospatial assessment (performed a geospatial analysis to understand the differences between the framework created from the AEM data and geologic framework from geologic logs; this was delivered in a GIS Geodatabase format).

Completion of the pilot study allowed LENRD and NeDNR to better understand how AEM data can most effectively be utilized throughout the remainder of the NRD in a sub-regional model. The consultant's work has yielded invaluable lessons working with both the geologic logs and the AEM data.

The process enabled the LENRD and NeDNR to clearly understand the most effective ways to maximize the investment that has been made into AEM data. At the time of this report, work has begun on developing a district-wide groundwater model incorporating AEM data. The hydrogeologic framework of this model is nearly complete.

Building on the work from the pilot-scale study the LENRD and NeDNR are expanding the coverage region to include the entire LENRD district, which will result in a district-wide scale groundwater model. The district-wide model incorporates the lessons learned during the pilot-scale model and has an expected completion date of Spring 2021.

Lower Platte North NRD Modeling & AEM Investigations

Jacqueline Polashek, a UNL School of Natural Resources graduate student, completed a project for which groundwater levels were tracked at selected well sites corresponding geographically to AEM flight lines within the LPNNRD's SQS2 area in Platte and Colfax Counties.[31] The monitoring network is now online and contains groundwater level data for time periods dating back to the establishment of the network. LPNNRD is currently working on uploading historic groundwater level data into the network.

Data collected through the monitoring network will help staff from NeDNR, LPNNRD, and UNL evaluate how coupling hydrostratigraphic modeling methods and LPNNRD hydrographs can improve modeling efforts.

UNL and NeDNR have created an assistantship for another School of Natural Resources graduate student to continue integrating AEM data into future hydrogeologic interpretations. The student will investigate the impact of refining groundwater models using AEM data to add more detail to the geologic framework of a model. The results of this work will help NeDNR and the NRDs decide how best to use AEM data in the modeling process and what level of detail is appropriate for the groundwater models.

The modeling data obtained from this study will also assist the LPNNRD staff and board in considering how to best address midsummer groundwater declines in confined aquifers. More information on these efforts can be found in LPNNRD's 2020 annual report for the Lower Platte River Basin Water Management Plan.

[31] Goal 1: Develop and maintain a water supply and use inventory based on the best available data and analysis.
Objective 1.1: Develop and maintain a comprehensive inventory of the location and source of the Basin's current and future water supplies, water uses and outflows.

The purpose of both the LENRD and LPNNRD modeling efforts is to improve upon the geologic representation of data within the Lower Platte Missouri Tributaries model, so that this product could be used for a future 5-year comprehensive plan review. The current anticipated timeline for these projects would not allow sufficient time for incorporation of this data prior to the December 2021 plan deadline.

CENEB / ELM Comparison Investigations

In order to make more informed water management decisions in Central Nebraska including the Loup and Elkhorn river basins, NeDNR, working with UENRD, LENRD, ULNRD, and LLNRD, has contracted with Olsson to compare the two groundwater models which cover the region, the Central Nebraska (CENEB) model and the Elkhorn Loup Model (ELM).

CENEB was developed by NeDNR and is used by NeDNR to assess groundwater use impacts to streamflow in the region, while ELM was developed by USGS and is used by LLNRD for assessing management actions. This investigation compares the data sourcing, model design and datasets between CENEB and ELM as well as modeled water budgets and scenario comparisons to better understand how, where, and why the two models differ. Currently the project is paused while the project contract is revised, but the comparison is approximately 75% complete.

B. Lower Platte River Consortium Background and Update

Beginning in 2016, the Lower Platte River Consortium (made up of the Lower Platte Basin NRDs, Metropolitan Utilities District, Lincoln Water System, and Nebraska Department of Natural Resources) embarked on a collaborative effort to develop a drought contingency plan[32] for the Lower Platte River Basin in Nebraska.

The focus of this first increment of the Drought Plan is on augmenting surface water supplies in the Lower Platte River near Ashland. It is believed that in addressing the municipal and industrial water supply shortages in the Lower Platte River, ancillary benefits to the remaining sectors would exist including irrigation, power, environmental, and recreational.

There are a wide range of stakeholder interests in the Lower Platte River Basin. The Consortium solicited stakeholder input throughout the planning effort. Two stakeholder workshops and two public open houses were held, and written comments were accepted via comment forms and a project email posted on the project website open to the public.

A final plan was accepted by the BOR in September of 2019. This plan was then approved by each NRD Board in December of 2019. In calendar year 2020 the drought implementation group met via zoom meeting several times to discuss the ongoing water supply conditions in the Lower Platte Basin and monitored sources of drought data as called for in the Drought Plan. In 2021 the group is planning a tabletop exercise to further explore mitigation actions and responses to various drought scenarios.

[32] Goal 1: Develop and maintain a water supply and use inventory based on the best available data and analysis. Objective 1.5: Evaluate variations in water inventory due to climate cycles.