



2023

# LOWER PLATTE RIVER BASIN COALITION ANNUAL REPORT



March 1, 2024

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**2023 ANNUAL DOCUMENTATION OF WATER USE ACTIVITIES IN THE LOWER LOUP NRD  
REQUIREMENT OF LOWER PLATTE RIVER BASIN COALITION (LPRBC)  
BASINWIDE WATER MANAGEMENT PLAN**

**CERTIFIED IRRIGATED ACRES**

The Lower Loup Natural Resources District (LLNRD or District) began the process of irrigated acres certification in 2006 and it was completed January 1, 2008. The District required that both groundwater, surface and comingled water irrigated acres be certified through its processes. The acres to be certified must be capable of receiving groundwater and/or surface water through irrigation works, mechanisms or facilities at the time. The certification must include a completed District certification form, an assessor document with a raised seal, and FSA aerial photo with irrigated fields delineated. A Geographic Information System (GIS) dataset of the field boundary was created using GIS software to allow accounting and compliance reviews.

Subsequent to January 1, 2008, to certify a property as being irrigated, a landowner must show proof of irrigation at least 2 out of the 10 years for the period from 1997 – January 1, 2008. Certification is constantly tracked through GIS, and field boundary adjustments take place as needed. Additionally, the entire District is flown and imaged for active chlorophyll measurements recorded through infrared photography. Irrigation totals are measured and policed to prevent deviation from the original certification by NRD staff. The 4-band imagery is collected in August into early September to ensure crop maturity and further differentiate those areas impacted by irrigation.

Detailed data regarding amount and water source of certified irrigated acres in the period between January 1, 2018, and December 31, 2023, can be found in **TABLE 1. Certified Acres** below. The LLNRD GIS has been synched with its data management system to allow for more accurate drawings and better database access through the District program. This process assists with identification of duplicates and erroneously drawn fields and allows staff to regularly “clean” the database.

**TABLE 1. CERTIFIED ACRES 2018 THROUGH 2023**

<b>Year</b>	<b>Total Acres Certified</b>	<b>Acres of Groundwater</b>	<b>Acres of Surface Water</b>	<b>Acres of Co-Mingled</b>
<b>2023</b>	<b>1,232,274.9</b>	<b>1,034,032.0</b>	<b>154,804.3</b>	<b>43,438.6</b>
2022	1,230,788.6	1,032,302.9	155,013.9	43,471.8
2021	1,226,619.1	1,028,003.6	154,568.29	44,047.21
2020	1,225,343.3	1,025,409.78	154,023.50	45,910.02
2019	1,222,623.19	1,021,728.46	153,680.81	47,213.92
2018	1,220,592.42	1,018,792.98	153,789.92	48,009.51

## MUNICIPAL AND INDUSTRIAL GROUNDWATER USE

The LLNRD is in the eighth year of collecting municipal water use data. Developing and maintaining a comprehensive inventory of the location and source of the District's current and future water supplies, water uses, and outflows was Objective 1.1 of the Integrated Management Plan developed by the NRD and the Nebraska Department of Natural Resources. To collect this data, a Municipal Accounting Form was developed and sent to the water operators of each community.

All 43 public water supplies have sent in their water accounting information for 2023. Each year, the NRD calculates the daily use per person. This year, due to less rain and drought conditions throughout much of the District, overall use was 259 gallons, per capita, per day. This number was very similar to last year's average of 260 gallons, per capita, per day. The Village of Comstock had a leak in their system and repainted the water tower this past summer. This is likely the reason for the high usage of 1,164 gallons, per capita, per day that was reported. The 2020 Census provided the population numbers for each community.

To comply with the implementation of *Rule 15, Commercial or Industrial Use and Accounting* that was adopted into the LLNRD's Groundwater Management Area Rules & Regulations, 2023 usage information was sought from owners/operators that had registered commercial/industrial wells. This includes high-capacity livestock wells (pump 50 gallons per minute or more). The LLNRD is in its fifth year collecting this type of well use information. Commercial/industrial water use was collected, but due to the proprietary nature of this information it is not included in this report.

**TABLE 2: 2023 WELL USAGE (IN GALLONS) FOR LLNRD COMMUNITIES**

City Name	Annual Water Pumped	Population	Gal/per capita/per day	Connections
City of Albion	134,732,421	1699	217.3	850
City of Broken Bow	348,765,050	3506	272.5	1750
City of Burwell	70,830,000	1087	178.5	620
City of Columbus	2,121,260,095	24028	241.9	9504
City of Fullerton	92,333,000	1244	203.3	700
City of Genoa	54,525,000	894	167.1	475
City of Loup City	69,200,000	1053	180.0	600
City of Ord *	435,525,000	2367	504.1	1334
City of Ravenna	147,613,000	1441	280.7	640
City of Saint Edward	112,467,384	725	425.0	330
City of Saint Paul	139,343,000	2416	158.0	1019
City of Sargent	35,353,000	500	193.7	392
Village of Ansley	44,274,400	459	264.3	265
Village of Anselmo	15,879,600	104	418.3	100
Village of Arcadia	56,631,700	283	548.3	205
Village of Arnold	76,983,800	592	356.3	395
Village of Ashton	34,437,000	198	476.5	115
Village of Bartlett	15,269,600	109	383.8	70
Village of Belgrade	28,388,970	103	755.1	82
Village of Boelus	9,520,000	181	144.1	110
Village of Cairo	79,537,000	822	265.1	365
Village of Callaway	86,069,197	563	418.8	318

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Village of Cedar Rapids	38,358,000	382	275.1	265
Village of Comstock	28,902,000	68	1164.5	61
Village of Dannebrog	10,595,200	273	106.3	154
Village of Duncan	19,846,000	392	138.7	172
Village of Elba	6,303,300	192	89.9	125
Village of Ericson	20,334,500	89	626.0	32
Village of Farwell	12,378,000	138	245.7	60
Village of Greeley Center	31,725,730	402	216.2	243
Village of Litchfield	36,800,400	220	458.3	160
Village of Mason City	15,345,200	151	278.4	115
Village of Merna	31,038,000	345	246.5	
Village of Monroe	24,692,000	296	228.5	139
Village of North Loup *	0	254	0.0	0
Village of Palmer	30,747,000	439	191.9	242
Village of Petersburg	30,108,000	332	248.5	210
Village of Pleasanton	25,457,000	361	193.2	188
Village of Primrose	5,717,000	55	284.8	43
Village of Rockville	3,143,000	89	96.8	48
Village of Scotia	30,274,900	301	275.6	150
Village of Spalding	15,608,000	408	104.8	289
Village of Wolbach	47,346,000	224	579.1	190

\*City of Ord provides water for the Village of North Loup and Green America Biofuels Ethanol Plant

-Population numbers were updated by the 2020 Census

**TABLE 3: AVERAGE USAGE NUMBERS CALCULATED FOR ALL LLNRD COMMUNITIES**

<b>Lower Loup Natural Resources District</b>	
<u>Year</u>	<u>Gallons/per capita/per day</u>
2016	265.0
2017	260.1
2018	230.3
2019	211.8
2020	252.6
2021	263.5
2022	260.3
2023	258.5
<b>8 Year Average</b>	<b>250.3</b>

**NEW GROUNDWATER CONSUMPTIVE USE – WELL CONSTRUCTION PERMITS GRANTED**

The LLNRD established a well moratorium in 2007. Before this date, all high-capacity wells (greater than 50 gallons per minute) were required to be permitted via a certified well permit issued by the LLNRD as dictated by the Groundwater Management Plan. New well permits are still required for all high-capacity wells and may still

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be issued for supplemental and replacement wells. Any new high-capacity irrigation well must be previously approved through the variance process (see “Variance” portion of this report). LLNRD has approved 72 well permits in 2023 for varied uses as reported in the table below.

LLNRD affirms that any new water well or replacement well that is constructed after May 09, 2016, may be subject to additional restrictions as the Board of Directors deems reasonable and necessary considering hydrologic conditions within the District.

In accordance with District Rule 6.H, a permit to Construct a Water Well issued by the District shall specify all regulations and controls relevant to the construction or utilization of the water well or replacement well. As of April 15, 2023, all new wells requiring a permit shall have a flow meter, approved by the District, installed and operational prior to operation of the well.

**TABLE 4: APPROVED GROUNDWATER WELL PERMITS IN THE LLNRD IN 2023**

Groundwater Well Permit Types	Number of Permits	Average Pump Capacity (gpm)
Domestic	0	0
Livestock	3	108.0
Commercial	0	0
Industrial	2	300.0
Other	1	
<b>Irrigation (Total)</b>	<b>66</b>	<b>706.4</b>
(Irrigation) Transfer	11	750.0
(Irrigation) Supplemental	6	683.0
(Irrigation) Well Agreement	3	530.0
(Irrigation) New Acre	5	790.0
(Irrigation) Replacement	41	779.0
<b>Total</b>	<b>72</b>	<b>583.1</b>

### APPROVED WATER TRANSFERS

The LLNRD Rules and Regulations allow any person to transfer groundwater irrigation rights from one location to another if the acres are certified by the District. Transfers can only occur downstream or to the adjacent section and cannot have a net increase impact on any stream based on the most recent stream depletion factor from the best groundwater model available. Acre transfers are only allowed to occur once per year. The deadline for application for transfer is March 1 of each year. In 2023, the LLNRD approved 67 **Agreements to Transfer Certified Irrigated Acres & Right to Use Groundwater**. There were no denials to any transfer requests. See the summary in Table 5 below. Transfer agreements are classified both by landowners who are moving their irrigated acre rights (off) and those that are receiving the rights in another location (in). Wells resulting from an approved transfer may not be reflected in the “Well Permit Granted” table under the current year.

**TABLE 5: APPROVED CERTIFIED IRRIGATED ACRES TRANSFERS IN THE LLNRD IN 2023**

County	# of Agreements Receiving Land owners	# of Agreements Transferring Land owners	Acres Transferred in	# New wells resulting from Transfer	Acres Transferred off	Avg Transferred In SDF	Avg Transferred Off SDF
Boone	26	25	591.09	3	550.29	.70	.78
Custer	5	6	85.52	1	111.52	.16	.28
Garfield	2	5	28.9	0	217.0	.42	.51
Greeley	10	8	269.4	1	187.1	.32	.36



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County	# of Agreements Receiving Land owners	# of Agreements Transferring Land owners	Acres Transferred in	# New wells resulting from Transfer	Acres Transferred off	Avg Transferred In SDF	Avg Transferred Off SDF
Hall	0	1	0	0	26.83	0	.62
Howard	3	1	41.23	0	5.4	.43	.63
Nance	2	2	3.8	0	4.8	.9	.72
Platte	7	5	210.7	2	209.4	.26	.3
Rock	0	8	0	0	354.8	0	.28
Sherman	6	1	299.8	2	74	.23	.60
Valley	4	3	88.3	2	56.67	.67	.58
Wheeler	2	2	176.0	1	100.1	.53	.59
<b>Total</b>	<b>67</b>	<b>67</b>	<b>1,794.74</b>	<b>12</b>	<b>1897.91</b>	<b>.39</b>	<b>.52</b>

### WATER BANKING

The LLNRD requires that all transfers result in no new net increase in depletions to any stream utilizing the most current stream depletion number extracted from each section. The section number is averaged from the best available groundwater/surface water model for use by LLNRD. The 2023 section-assigned stream depletion factor (SDF) was utilized using the USGS Elkhorn-Loup Model (ELM) in its Phase 3 capacity. Any transferring of irrigated acre rights from a low to a higher SDF requires an offset. Acres transferred from a higher SDF to a lower SDF are only allowed at a 1:1 ratio, with the LLNRD banking the remaining difference. As a result of the 67 transfers that took place in 2023, the LLNRD has banked a total of **448.72** groundwater-irrigated acres. Additional information regarding the ELM project can be found here:

<https://pubs.er.usgs.gov/publication/sir20185106>

**TABLE 6: LLNRD TOTAL BANKED ACRES REPORTED DURING FIRST INCREMENT**

Lower Loup Natural Resources District	
Year	Irrigated Acres
2016 (34)	638.06
2017 (34)	223.92
2018 (48)	346.35
2019 (31)	133.97
2020 (22)	141.88
2021 (47)	1,294.7
2022 (75)	723.39
<b>2023 (67)</b>	<b>448.72</b>
<b>8 Year Total</b>	<b>3,950.99</b>

### EXPEDITED VARIANCES

The LLNRD Board of Directors has designated a set of conditions under which specific requests for a variance may be approved by methods other than the Variance Committee process. An expedited variance is a variance that meets LLNRD Board pre-approved conditions and as such does not need to be reviewed by the NRD Variance Committee. These expedited variances all have a Supplemental Well Agreement. There were no

denials to any expedited variance requests. In 2023, there were a total of 10 expedited variances (Table 7) that were approved through NRD processes. Supplemental wells have a requirement of historical use prior to 2006.

**TABLE 7: APPROVED EXPEDITED VARIANCES IN 2023 IN THE LLNRD**

County	# of Supplemental Well Agreements	Permit Approved	Agreement Approved, but waiting on a Permit
Boone	1	0	1
Greeley	1	0	1
Howard	2	1	1
Loup	1	0	1
Merrick	1	0	1
Nance	1	1	0
Platte	3	2	1
<b>Total</b>	<b>10</b>	<b>4</b>	<b>6</b>

### NRD MANAGEMENT: WELL AGREEMENTS

In 2023, there were 4 well agreements approved. These well agreements were granted based on the stipulation that the landowner relinquish all or part of the existing surface water right held through the Department of Natural Resources processes. There were no denials of any variances with a well agreement request. The 2023 Variances include all surface water relinquishments and added groundwater depletions due to decisions recommended by the NRD Variance Committee.

**TABLE 8: APPROVED WELL AGREEMENTS IN THE LLNRD IN 2023**

County	# of Well Agreements	SW Agreed upon to be Relinquished: full or partial	Permit Approved	SW Right Relinquishment Date
Buffalo	1	A-3205 (Full)	1	7/17/2023
Howard	1	A-5661, A-37012 (Full)	0	10/20/23
Platte	1	A-3517	1	Not relinquished as of 2/21/24
Howard	1	A-11915		12/21/23
<b>Total</b>	<b>1</b>		<b>1</b>	

### SURFACE WATER ALLOCATION CONVERSION TO GROUNDWATER USE

As surface water rights are either converted to groundwater acres or completely retired, the LLNRD has initiated a tracking mechanism that incorporates the basin-wide depletion accounting and its effect on the available acre-feet of depletions. According to the LLNRD and consultants who developed the tracking mechanism for depletions, an overall credit can be claimed to the affected basin for the unused depletions and applied to the existing allowable acre-foot depletion balance if proper procedures are met. These procedures are enacted when surface water rights are fully relinquished and converted to groundwater acres, if those surface water rights are located along stream reaches impacted by baseflow and are not associated with irrigation district water rights. Credit is being claimed by the LLNRD for these surface water retirements. Appropriate credit is determined by subtracting the difference of the full depletion amount of the surface water right from the groundwater impacts using stream depletion, net irrigation requirement in feet and number of acres associated with the conversion. The LLNRD can provide historical evidence of irrigation through infrared photography



collected since 2006. The NeDNR is expected to provide field inspection reports and adhere to the adjudication process defined by Nebraska Revised Statutes.

**NRD MANAGEMENT: ACRE ROTATIONS**

Acre rotations are agreements set forth by a participating landowner and the LLNRD, which allows the landowner an option to choose how they distribute certified acres over a tract of land. In 2023, there were five acre rotations approved by the LLNRD. Acre Rotation Agreements have 2 or 3 options the landowner can choose in one calendar year. Acres remain in this rotation pattern until the landowner notifies the LLNRD otherwise. Enforcement is conducted by the LLNRD through annual infrared imagery and field personnel visitation.

**TABLE 10: APPROVED ACRE ROTATIONS IN THE LLNRD IN 2023**

County	# of Acre Rotation Agreements Approved
Buffalo	1
Custer	3
Nance	1
<b>Total</b>	<b>5</b>

**FLOW METER DATA**

The LLNRD has collected groundwater and surface water use information for irrigation on an annual basis since 2010. Flow meters have been cost-shared across the District on a voluntary basis since 2009. However, the LLNRD required that all high-capacity irrigation wells in Groundwater Management Area 28 be outfitted with a flow meter to track irrigation total withdrawals starting in 2016. The two newest groundwater quality management areas, SubAreas 29 and 30, also require flow meters. Groundwater quality management areas constitute 543 of all flow meters in the District. The NRD-approved drought plan also can indicate designated Groundwater Quantity Areas that would require flow meters on all high-capacity wells.

In 2023, LLNRD collected records of usage from 1,241 flow meters verified as having an actual irrigation total water volume. The District average pumping withdrawals for irrigation for the 2023 season was 11.17 inches, down from 12.66 inches in 2022. The potato crop was the highest consumer of irrigation water with an average of 16.95 inches/acre pumped in 2023, with corn crop averaging 12.09 inches/acre. Except for Butler County (only 1 flow meter), the county with the least average irrigation recorded was Garfield County at 7.11 inches/acre pumped. Wheeler County had the highest average irrigation rates at 13.02 inches/acre.

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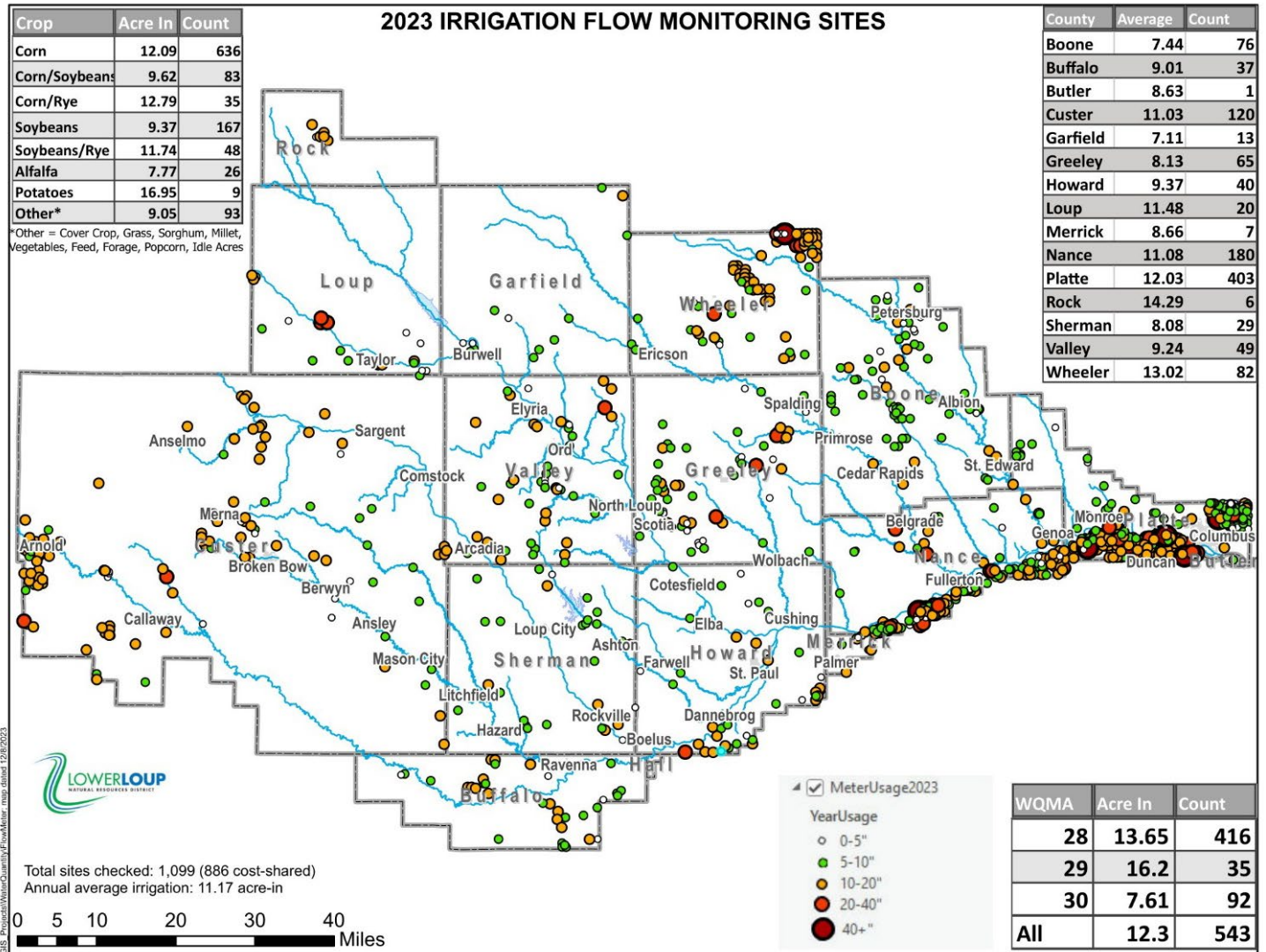


FIGURE 1: IRRIGATION MEASURING AND REPORTING SITES IN THE LLNRD IN 2023

GROUNDWATER ACRES ALLOCATIONS

The LLNRD has the option to issue additional groundwater acre allocations each year based on the conditions of water resources in the District. During the April 2023 Board of Directors Meeting, it was decided that due to ongoing drought conditions in most of the Loup Basin, lower than normal stream flows, and instream flow numbers that were causing administrative action requirements on instream flow rights no additional irrigated acres would be allocated during the 2023 application period. This results in a net loss of 0 acre-feet to the Lower Loup NRD depletion accounting due to new groundwater acre allocations.

DEPLETION ACCOUNTING

As mentioned in “Approved Water Transfers,” LLNRD Rules and Regulations allow any person to transfer irrigation rights from one location to another if they meet the criteria set forth by the District. Because of the established criteria of not allowing any new net increase in depletions to any stream, the net amount of acre-foot impact should be either relatively similar by a transfer or decreased due to any transferring of irrigated acre rights to a higher SDF, which would require an offset in acres. Transfers from a higher SDF to a lower SDF are

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only allowed at a 1:1 ratio. The same agricultural methodologies used to apply towards groundwater acre application was applied to transfers. Both the transferring location, where the acres were removed, and the newly developed acres, where the right was transferred to, were assessed. Table 13 represents the net effect of all transfers in acre-feet through year 2023.

From the 2023 transfers, the sum impact of the transferred depletions removed was 164.84 AF on 67 total transfer agreements, while the impact of the receiving acres with new development was 150.09 AF. The difference and beneficial impacts were 14.75 AF back to the basin as a positive gain.

**TABLE 13: SUMMARY OF ALLOWABLE DEPLETION IMPACT**

<b>Lower Loup Natural Resources District</b>	
<b>Project</b>	<b><u>11,908.00 AF</u></b>
2016 New Irrigated Acres	-204.52
2016 Transfers	+69.66 <sup>a</sup>
2017 New Irrigated Acres	-164.65
2017 Transfers	+40.88 <sup>a</sup>
2018 New Irrigated Acres	-275.30 <sup>b</sup>
2018 Transfers	+66.67 <sup>a</sup>
2019 New Irrigated Acres	-245.48 <sup>c</sup>
2019 Transfers	+19.85
2020 New Irrigated Acres	-216.02 <sup>d</sup>
2020 Transfers	+19.98
2020 Variances	-29.30
2016-2020 SW/GW Conversion	+558.15
2021 New Irrigated Acres	-310.38 <sup>e</sup>
2021 Transfers	+47.15
2021 Variances	-85.95 <sup>e</sup>
2021 SW/GW Conversion	+105.6
2022 New Irrigated Acres	-89.55
2022 Variances	-21.18
2022 Transfers	+136.08
2023 New Irrigated Acres	0
<b>2023 Variances</b>	3.01
<b>2023 Transfers</b>	+14.75
<b>Allowable Depletion Total</b>	<b>11,341.42 AF</b>

<sup>a</sup> revised February 2020; corrections made to some transfers for 2016, 2017, and 2018

<sup>b</sup> revised June 2019; not all approved acres were certified by applicants in 2018

<sup>c</sup> revised August 2020; not all approved acres were certified by applicants in 2019

<sup>d</sup> revised August 2021; not all approved acres were certified by applicants in 2020

<sup>e</sup> revised August 2022; not all approved acres were certified by applicants in 2021

## GROUNDWATER ELEVATION DATA

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One of the LLNRD's primary responsibilities since its inception in 1972 has been collecting groundwater elevation data. Each year, District personnel measure groundwater elevations in both the spring and fall to compare against historical levels. Spring levels are used to report the status of groundwater, whether increasing or decreasing, and to determine if potential changes are needed in the District. Fall levels are used as an indicator of stress that has been placed on the aquifer during the irrigation season. The District has employed the use of pressure transducers to get continual monitoring. To date, the LLNRD has 77 active transducers across the District recording water levels every 8 hours. Additionally, the District implemented a real-time transducer network in the Columbus vicinity as part of the recharge project. Dedicated monitoring wells contain telemetry equipment that collects an hourly reading on 5 monitoring well sites, as well as an artificial lake in the area that will be used as part of the recharge basin.

In spring 2022, the LLNRD staff collected groundwater level depths on 454 sites which includes both dedicated monitoring and irrigation wells. The District average decreased from 2021 readings by -1.35 feet. The District average still maintains a level well above the 1982 levels by 5.66 feet. The 1982 level is used by the Lower Loup NRD's Groundwater Management Plan as the keystone level to implement additional management action.

## NEW DATA COLLECTED OR MODEL/STUDY RESULTS

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The LLNRD Drought Management Plan, accepted by the Board of Directors on November 17, 2022 provides several measures to monitor drought severity and susceptibility across the entire NRD. Triggers for additional management are based on spring static water level measurements, the State Drought Monitor Map status, stream flows, localized well issues, and filed reports. A majority of 2023 saw significant drought across the majority of the Lower Loup NRD.

LLNRD began working on the Buffalo County Groundwater Model (BC Model) with LRE and The Flatwater Group in spring 2023. The BC Model focus area contains the northern portion of Buffalo County which overlaps the LLNRD. Potential uses for the model include but are not limited to managing aquifer recharge potential, irrigation well development, water quality management, evaluate effectiveness of District regulations and reviewing simulations of surface and groundwater options before action. It will be refined using hydrogeologic records such as CSD test holes, geologic logs, and Buffalo County AEM block-flight data surrounding the focus area using the ELM Phase III model grid. Static water level and AEM data from both LLNRD and CPNRD will be utilized. BC Model deliverables are anticipated in late 2024.

## COLUMBUS AREA GROUNDWATER RECHARGE PROJECT

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The Columbus Area Recharge Project was developed because of significant groundwater depletions in an area on the southeast edge of Columbus, NE. The LLNRD initiated the project and gathered partners including Archers Daniel Midland, City of Columbus, Platte County, and the Christopher's Cove Homeowners Association that worked collectively to develop and complete the project. The project fundamentals involve providing the area

with additional groundwater recharge by conveying supplemental surface water to areas of high potential recharge. The surface intake pump station transfers surface water from the nearby Loup Tailrace Canal and discharges it into the Lost Creek channel near the city. The water infiltrates into the mostly dry creek channel, recharging the area's groundwater. The project also discharges recharged water from an auxiliary well into Christopher Cove, which is a nearby water body used by the project for additional groundwater recharge storage. The recharged water provided by the project offers more stable groundwater levels for public use, especially in dry years.

The 2023 operating season began on March 20, 2023, and ended on December 12, 2023. The water pumping systems operated multiple periods where runtime varied from a few days up to several weeks. The runtime duration was based on several factors including groundwater levels, surface water levels, weather conditions and channel conditions. The surface intake pump station operated 129 days for an approximate total of 998 ac/ft of water. The auxiliary well operated 226 days for an approximate total of 545 ac/ft of water. The 2023 operating season estimated groundwater recharge amount is 958 ac/ft of water. The calculations consider volume of water pumped, recharge area, potential recharge rates, evapotranspiration rates, and additional factors that may affect groundwater recharge. The recharge estimates do not consider amounts from Christopher's Cove although groundwater recharge is evident when comparing pumped volumes to measured lake water levels. Project groundwater modeling demonstrated Christopher's Cove effectively retains and retimes water in the project area.

#### NON-ACTION/REPORTING ITEMS

The Coalition members are responsible for reporting on several items that are currently not included as part of the LLNRD day-to-day operations. These Items include:

- Retirement of Groundwater Consumptive Uses
  - The LLNRD does not currently have a need for large retirement of groundwater consumptive use.
- Stream Flow Accretion Activities
  - Transfers allowed by the NRD do not have a negative net impact on the stream and theoretically result in neutral or positive effects on streamflow, see "APPROVED WATER TRANSFERS" above.
  - Under "NRD MANAGEMENT: WELL AGREEMENTS" the LLNRD is taking proactive measures to reduce surface water allocations, switching those primary sources to groundwater which would result in an immediate reduction to streamflow impacts and likely cause accretion to flows in the impacted stream.
- Stream gage measurements on NRD maintained gages
  - LLNRD has no stream gages under its operational jurisdiction at this time; however, the LLNRD is a partner with both the NeDNR and USGS in the operations of various streams across the Loup Basin.
- Instream Flow Requests
  - The LLNRD submitted a request for an instream flow application to the Nebraska Department of Natural Resources. An order of approval was received by the NRD on May 31, 2022. The application is in consideration of the value of benefits to fish, wildlife, recreation, out-of-stream uses and economic impacts. The flow reach begins at the confluence of the North and Middle Loup Rivers near St. Paul and extends to the Loup Public Power Canal near Genoa. The

application included supporting scientific, economic, biological, and hydrological data and information.

- The instream flow request at the confluence of the North Loup River and Middle Loup River varies dependent on the time of year. This instream flow is the sum of flows at gages on each river near St. Paul. A review of the daily stream flow data for calendar year 2023 shows that requested flows were not met on 96 days during the year.

### Summary of 2023 Instream Flows

Time Period	Flow Req.	Days with flow less than Flow Req.	Daily Average	
			Period	Year
Jan 1 - Feb 28	1,700	0	2558	2196
Mar 1 - May 31	2,400	41	2516	
Jun 1 - Aug 1	1,700	36	1764	
Sep 1 - Dec 31	1,600	19	2105	
Total*		96		

\* Includes 8 days where ice affected gage readings