



Upper Elkhorn

Natural Resources District

**Annual Report for the Lower Platte River Basin Coalition
Basinwide Water Management Plan**

Reporting Dates: 01/01/2023 – 12/31/2023

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INTRODUCTION

This report was prepared to review activities within the Upper Elkhorn Natural Resources District (UENRD or District) in accordance with the Lower Platte River Basin Coalition Basinwide Water Management Plan. This is the 7th report compiled by UENRD and covers the dates January 1, 2023 to December 31, 2023. This report covers only activities within the Lower Platte River Basin (thick black line) of UENRD (in pink), see map below; thus eliminating part of Northern Antelope County and other sections outside the Lower Platte River Basin (LPRB).

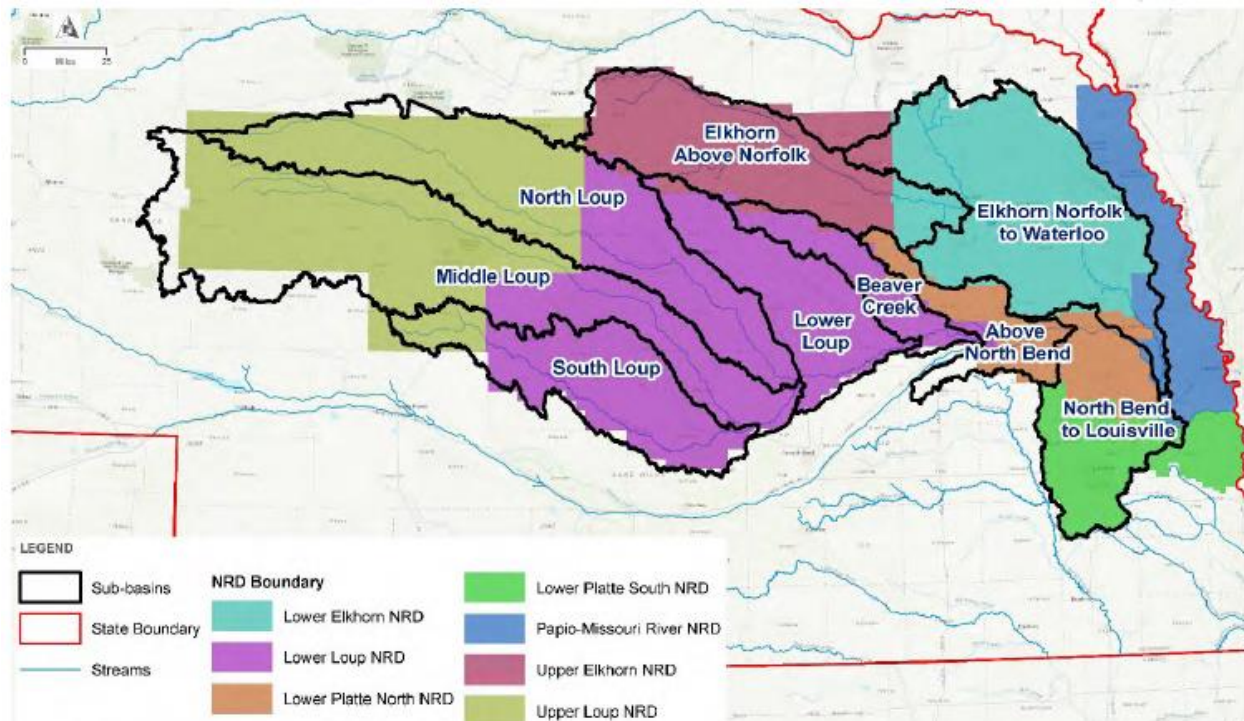


Figure 1: Boundary of the Lower Platte River Basin. From the Lower Platte River Basin Coalition Basinwide Water Management Plan, 2017.

CERTIFIED IRRIGATED ACRES

The UENRD is in the process of Groundwater Irrigated Acre Certification. Acre certification initially was based off of 2010 County Assessor data. Landowners who paid irrigated tax during 2010 received a certification letter for each parcel listed as irrigated. Once the landowner received their letter, they needed to compile documentation showing the amount of irrigated acres for that legal. Documentation could either be in the form of a FSA form 578 or county assessor tax records. Since UENRD started the process the landowner has been updated with new County Assessor data.

Due to the 3 different designated areas within the Upper Elkhorn NRD, landowners were instructed in their certification letter as to which years their documentation should include. Landowners with

groundwater irrigated acres that have been irrigated at least once within the Lower Niobrara River Basin fully appropriated designation during the calendar years of 2003 through October 16, 2007; the Lower Platte River Basin designation between the calendar years of 2004 and December 16, 2008; and the previously undesignated area of Holt and Northern Antelope Counties between the years of 2008 through October 1, 2012 will be certified at 100% with proper documentation.

Historically groundwater irrigated acres currently enrolled in the Conservation Reserve Program, Conservation Reserve Enhancement Program, Environmental Quality Incentive Program or other federal, state, or local conservation program or irrigated prior to the basin designations must also be certified in order to irrigate in the future. Acres that were historically irrigated in the Lower Niobrara River Basin prior to 2003, Lower Platte River Basin prior to 2004, and previously undesignated areas of Holt and Northern Antelope Counties prior to 2008 and have proper documentation may receive 95% certification for the total amount of irrigated acres (see “WATER BANKING ACTIVITIES” on Page 7), should the landowner decide to reactivate a field for irrigation purposes. Any irrigated acres that are not certified prior to the certification deadline will not be allowed to have groundwater applied to them for any purpose.

- **Current Certified Groundwater Irrigated Acres:** 486,325.69 acres (as of 02-09-2024)
- **Total Certified Groundwater Irrigated Acres:** Unknown until the certification is complete, but estimated at roughly 500,000 acres.

MUNICIPAL AND INDUSTRIAL/LIVESTOCK USES

1) Municipal Use

UENRD contacted municipalities within the LPRB of the District for annual pumping data. Municipal baseline data and pumping rates had not previously been recorded by the District, as such, not all municipality data is available in this report. **Appendix A** has 01/01/2023 – 12/31/2023 gallons pumped, per capita use, population served, baseline pumping rates, and number of wells per municipality (Atkinson, Bassett, Chambers, Clearwater, Elgin, Ewing, Neligh, Newport, Oakdale, O'Neill, Page, and Stuart. Information is also included for Summerland Public School since it is a public water supply.)

2) Industrial/Livestock Use

UENRD does not track water usage of industries or livestock operators within the District. **Appendix B** shows all registered wells which have the capacity to pump ≥ 50 gallons per minute (GPM) for commercial/industrial (C) and livestock (S) uses.

NEW CONSUMPTIVE USES

Expansion of Groundwater Irrigated Acres

UENRD opened up groundwater irrigated acre expansion for the 2024 growing season, held in the fall of 2023. For the 2024 expansion, 1 application was approved for 5.45 acres within the LPRB, an estimated groundwater depletion of 0.3 acre-feet. See **Appendix C**.

The depletion estimate in acre-feet (AF) was estimated using the following formula:

$$Depletion\ Estimate = Number\ of\ Acres * NIR * SDF * \% Depletion$$

Where:

NIR = net irrigation requirement in feet, based on the Department of Natural Resources’ INSIGHT data for corn irrigation requirements

SDF = stream depletion factor percent, based on the Department of Natural Resources’ CENEB stream depletion values for the Loup River and upper portions of the Elkhorn River Basins

% Depletion = 0.30 (30 %) for all groundwater irrigated farmland

RETIREMENT OF CONSUMPTIVE USES

UENRD did not retire any consumptive groundwater uses between 01/01/2023 and 12/31/2023.

TRANSFERS

UENRD approved 2 transfers in the Lower Platte River Basin between 01/01/2023 and 12/31/2023, totaling 97.22 acres, all irrigated farmland. The depletion estimate in acre-feet (AF) was estimated using the Depletion Estimate Formula above (see “NEW CONSUMPTIVE USES”). The change in depletion was calculated by subtracting the depletion estimate of the “FROM” location from the “TO” location. Overall, UENRD increased the depletion of groundwater by 0.00 acre-feet.

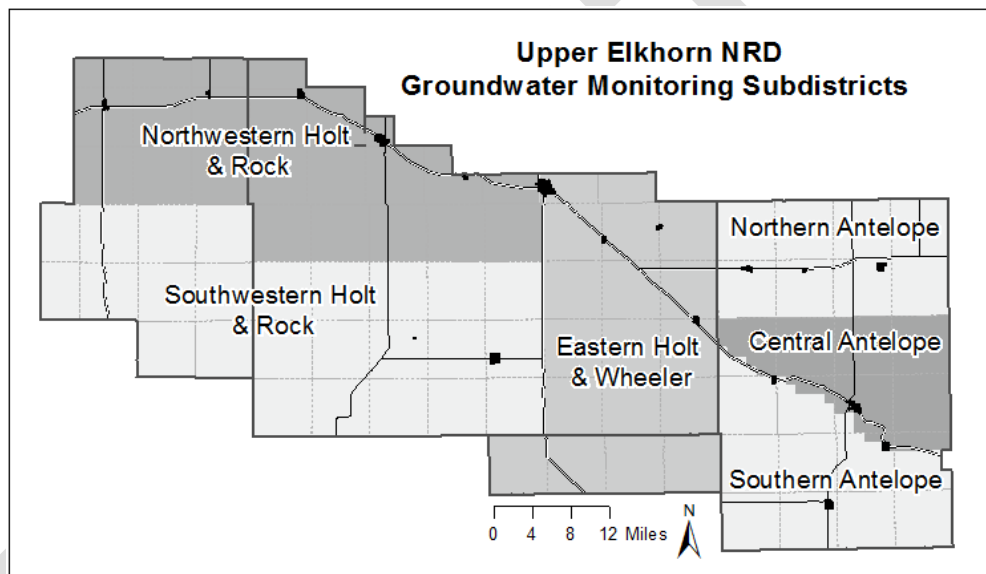
	Number of Acres	Transfer FROM	FROM Depletion Estimate (AF)	Transfer TO	TO Depletion Estimate (AF)	Change in Depletion
	48.61	SW 33-25-11	0.79	NW 33-25-11	0.79	0.00
	48.61	SW 33-25-11	0.79	NE 33-25-11	0.79	0.00
TOTAL	102.30					0.00
The transfers highlighted in yellow involved acres either coming into or moving out of the LPRB.						

WELL CONSTRUCTION PERMITS

UENRD issued 19 well construction permits for groundwater wells within the LPRB between 01/01/2023 and 12/31/2023. See **Appendix D**. UENRD requires a permit for all new, helper, replacement, commercial/industrial, municipal, or livestock wells that pump ≥ 50 GPM. Permits are issued in accordance with the UENRD Groundwater Management Plan Rules and Regulations.

FLOWMETER DATA

Since October 2010, flowmeters have been required on all new wells (new, helper, expansion, transfer, or replacement) permitted in the UENRD which pump ≥ 50 GPM. Designated flowmeters are checked annually by UENRD staff. Flowmeter data is analyzed within UENRD Subdistricts, see map below.



Average inches pumped per year and the 10-year average (2012 – 2022) inches pumped are below:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	AVG
NW Holt & Rock	15.62	12.90	12.89	14.36	14.64	9.19	6.81	14.07	15.22	20.08	14.39	13.65
SW Holt & Rock	12.26	5.59	4.78	8.00	9.66	9.55	4.17	6.38	11.07	14.00	8.23	8.52
Eastern Holt & Wheeler	16.11	12.84	10.96	12.39	14.37	8.22	8.01	14.10	14.80	19.45	14.09	13.21
Northern Antelope	10.94	5.95	9.16	10.89	11.75	5.28	8.11	11.33	12.17	16.88	13.43	10.53
Central Antelope	11.39	5.77	6.62	8.61	8.89	4.17	5.18	10.18	9.96	15.16	10.82	8.80
Southern Antelope	15.39	9.32	8.26	9.71	11.46	6.46	5.34	10.84	11.11	14.72	10.94	10.32

WATER BANKING ACTIVITIES

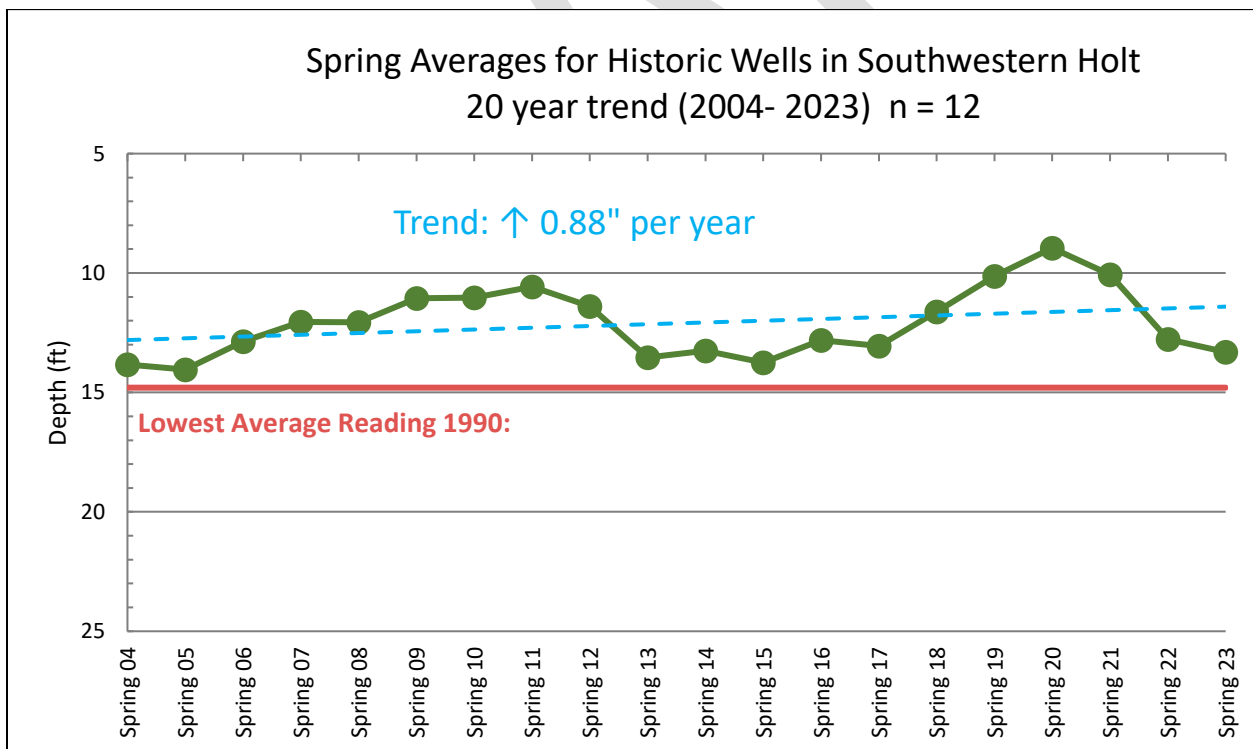
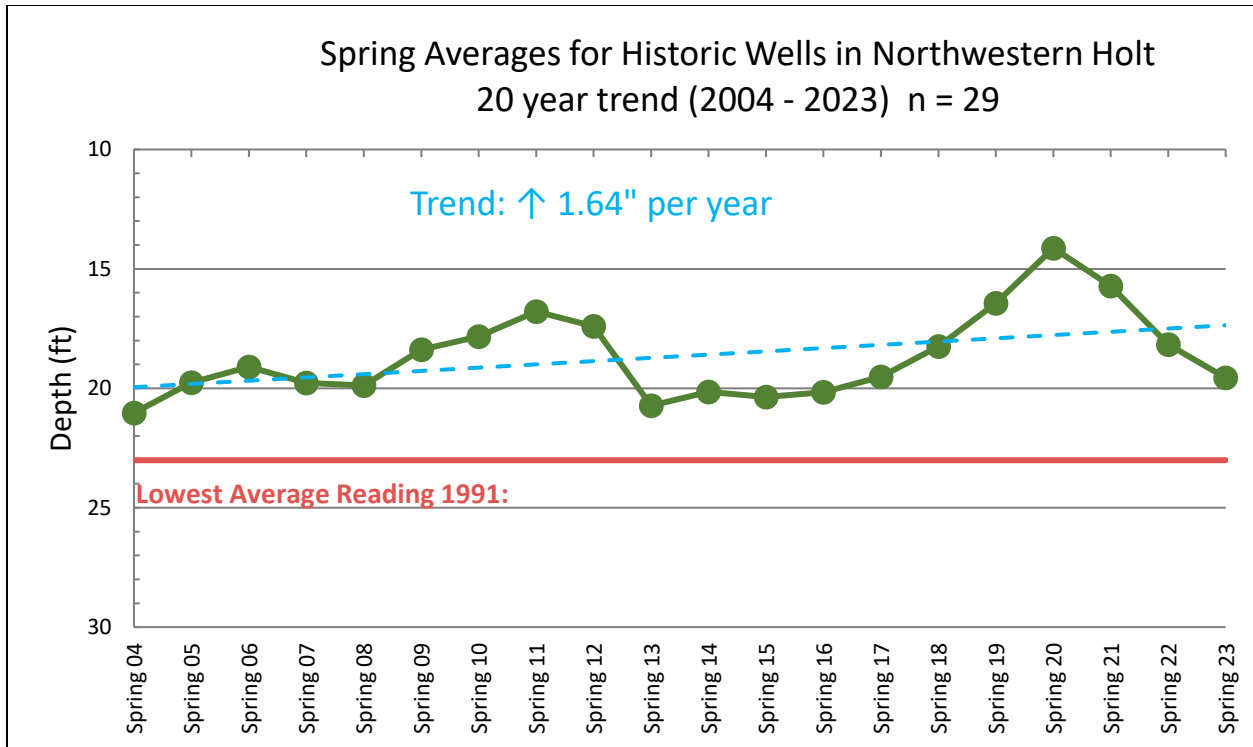
UENRD performed no formal water banking activities between 01/01/2023 and 12/31/2023. However, in conjunction with our Acre Certification, UENRD is certifying historically groundwater irrigated acres at 95% should the landowner decide to reactivate a field for irrigation purposes, and “banking” the 5% (see “CERTIFIED IRRIGATED ACRES” on Pages 3-4). UENRD is still in the processes of completing acre certification. Currently, UENRD has 486,325.69 certified groundwater irrigated acres, of which 41,827.88 are historic groundwater irrigated acres. Of those 41,827.88, 95% are certified as historical groundwater irrigated acres (39,736.49 acres), and 5% are banked acres (2,091.39 acres; see below). UENRD has not determined the future management implications or uses of the 5% of historical groundwater irrigated acres which have been banked, but they may be used to offset new groundwater uses in the future.

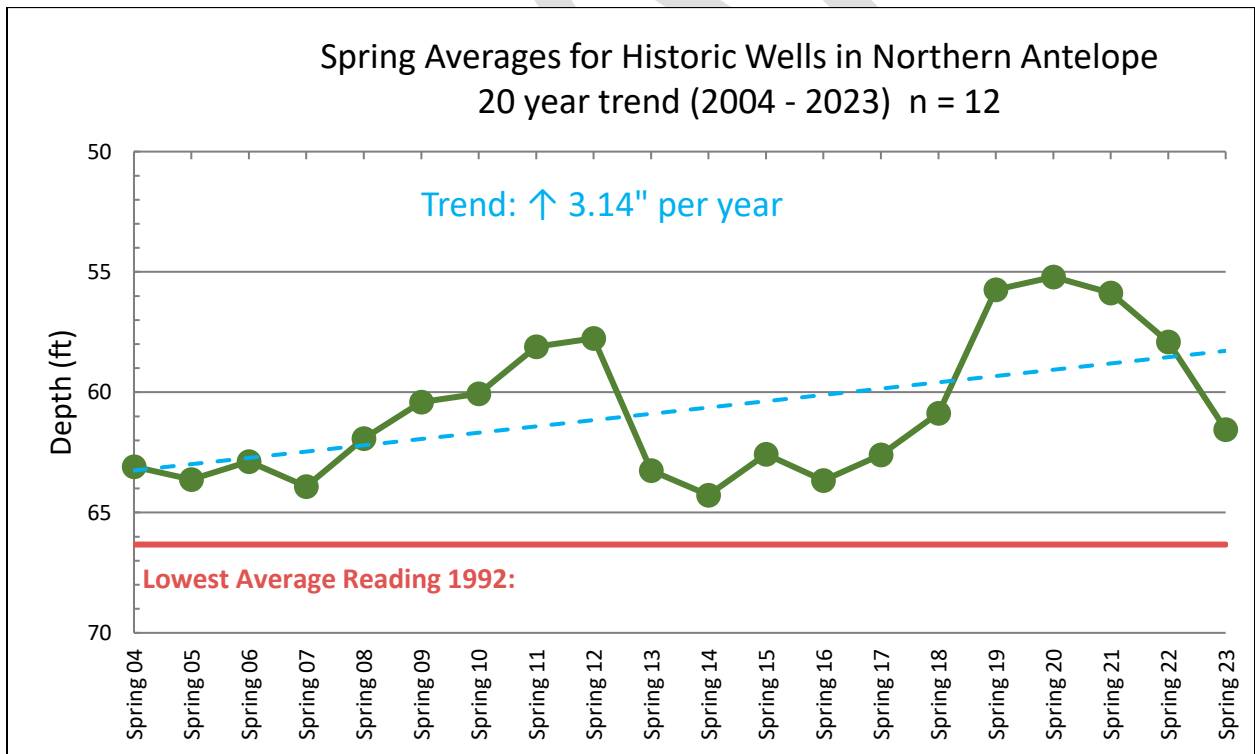
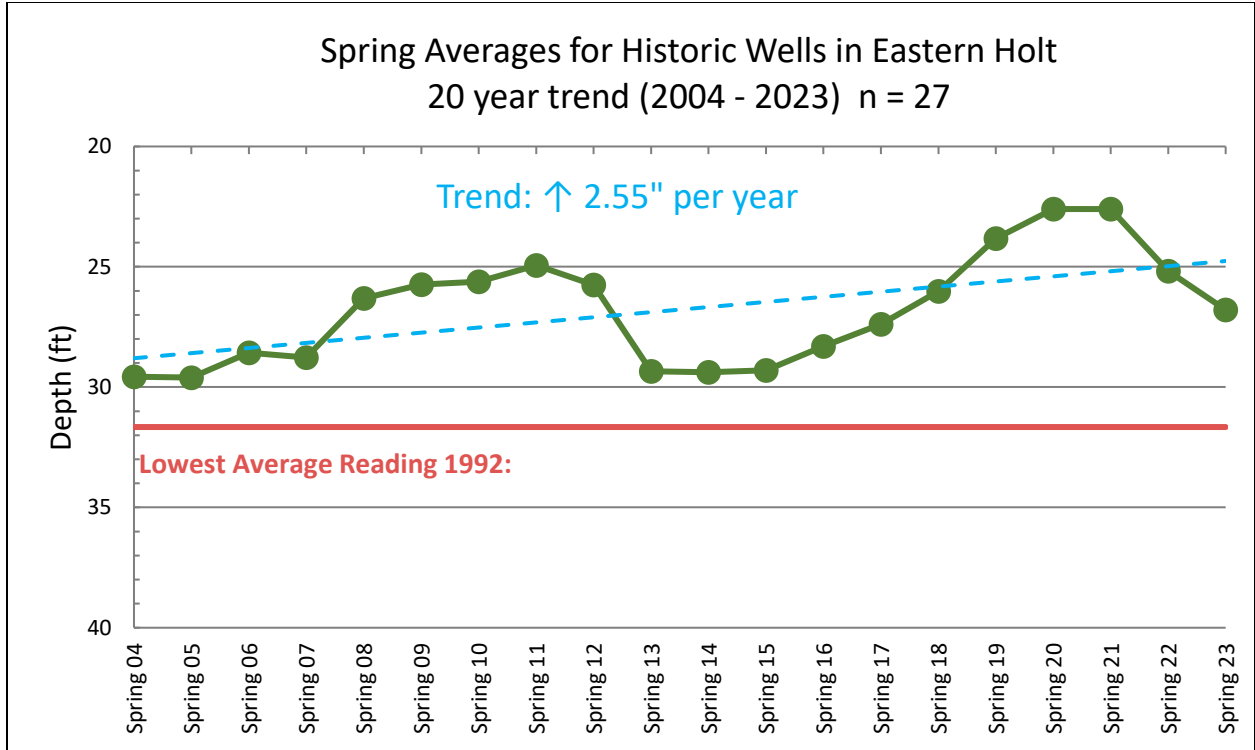
- 41,827.88 historic acres x 95% = 39,736.49 certified historical acres
- 41,827.88 historic acres x 5% = 2,091.39 banked acres (as of 02-09-2024)

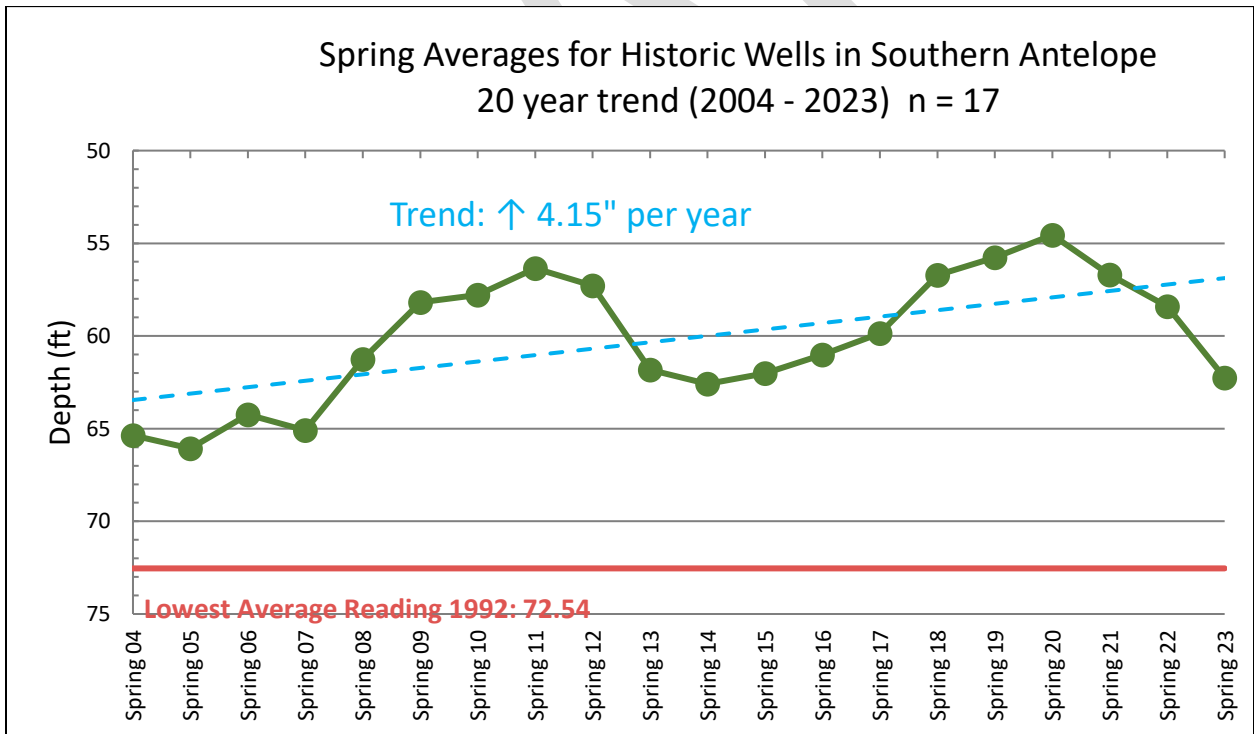
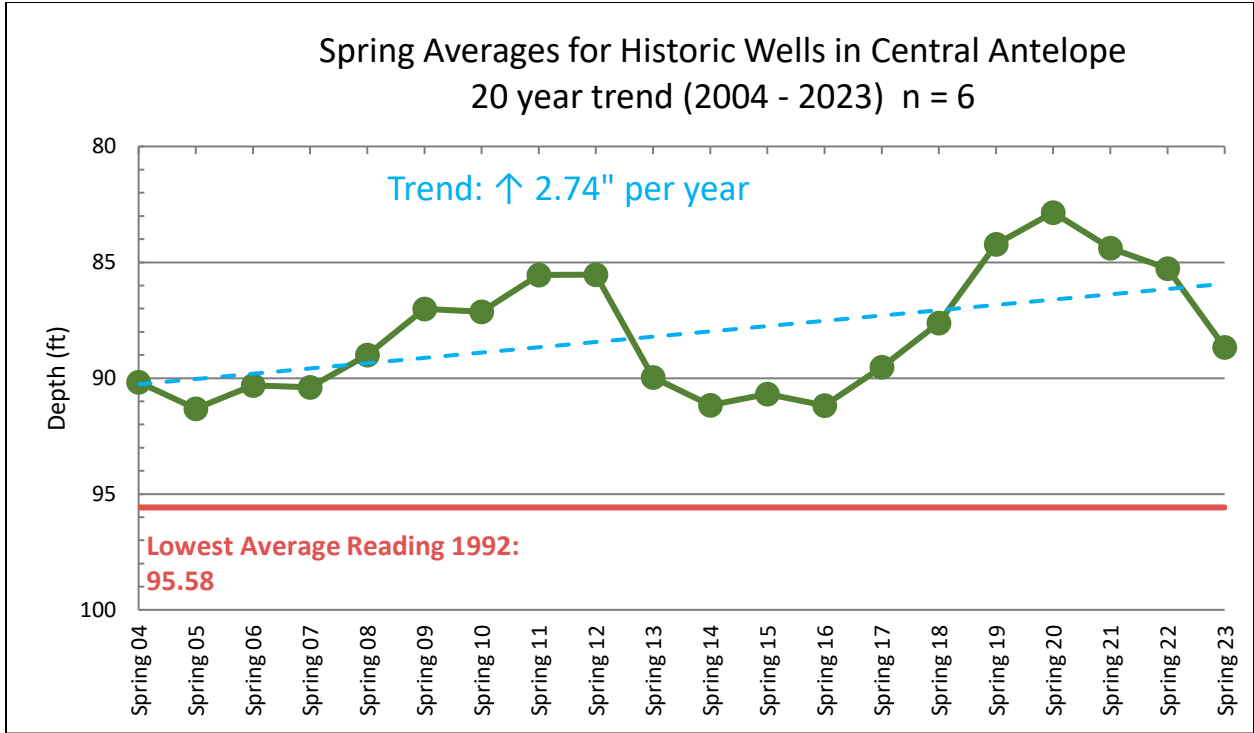
GROUNDWATER ELEVATION DATA

The UENRD has maintained a static groundwater level monitoring program since 1975. This program has expanded to include 362 wells: 103 long-term historical irrigation wells, 59 District monitoring wells, and 200 new irrigation wells added in 2015. Depth to groundwater readings are collected every spring and fall and the data is used by the District to recognize changes in groundwater levels over time and better interpret the status of the aquifer. Static water levels and trends are analyzed by UENRD subdistricts. See map on Page 6 for UENRD subdistricts.

Only spring readings from historic irrigation wells are used to manage groundwater levels in UENRD. In general, the 20-year static groundwater level trendlines show that all 6 subdistricts (NW Holt & Rock, SW Holt & Rock, Eastern Holt & Wheeler, Northern Antelope, Central Antelope, and Southern Antelope) have increasing groundwater levels. Data from the past 20 years, as well as 20-year trendlines are provided by subdistrict in the following graphs:







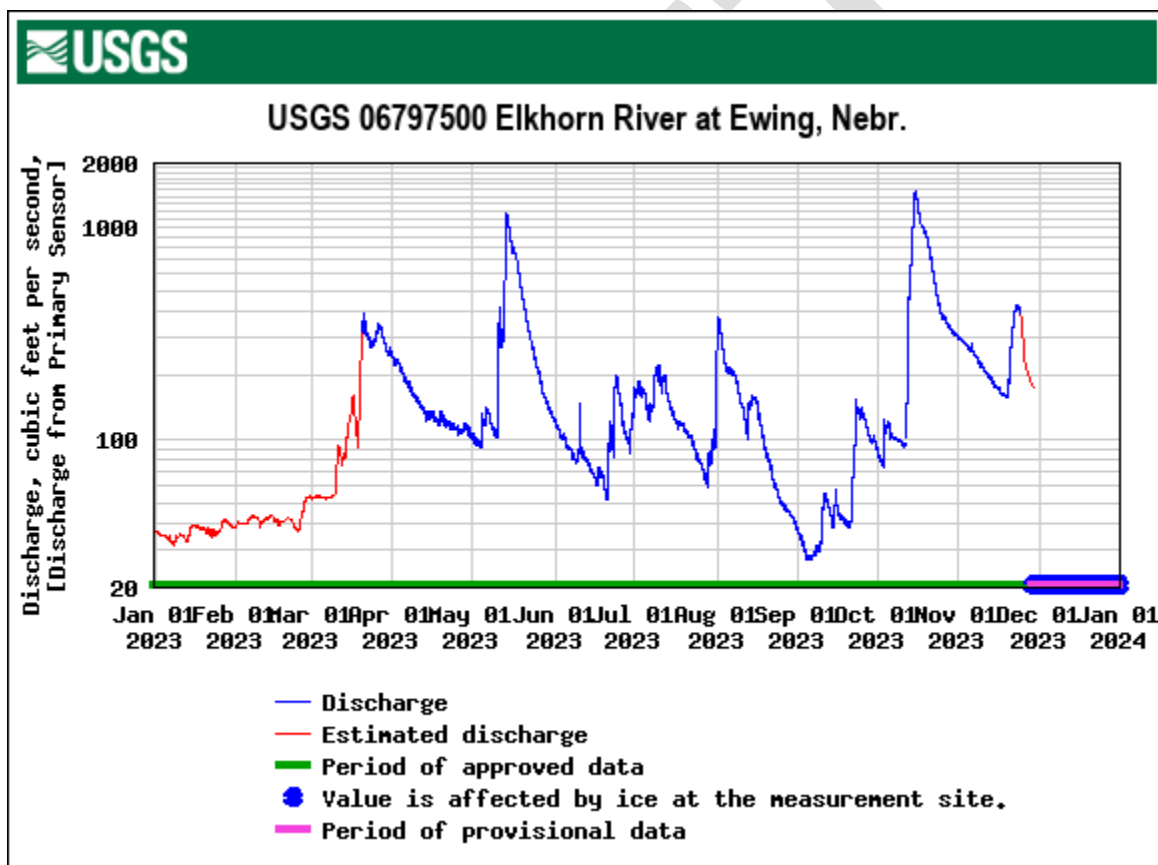
STREAM FLOW ACCRETION ACTIVITIES

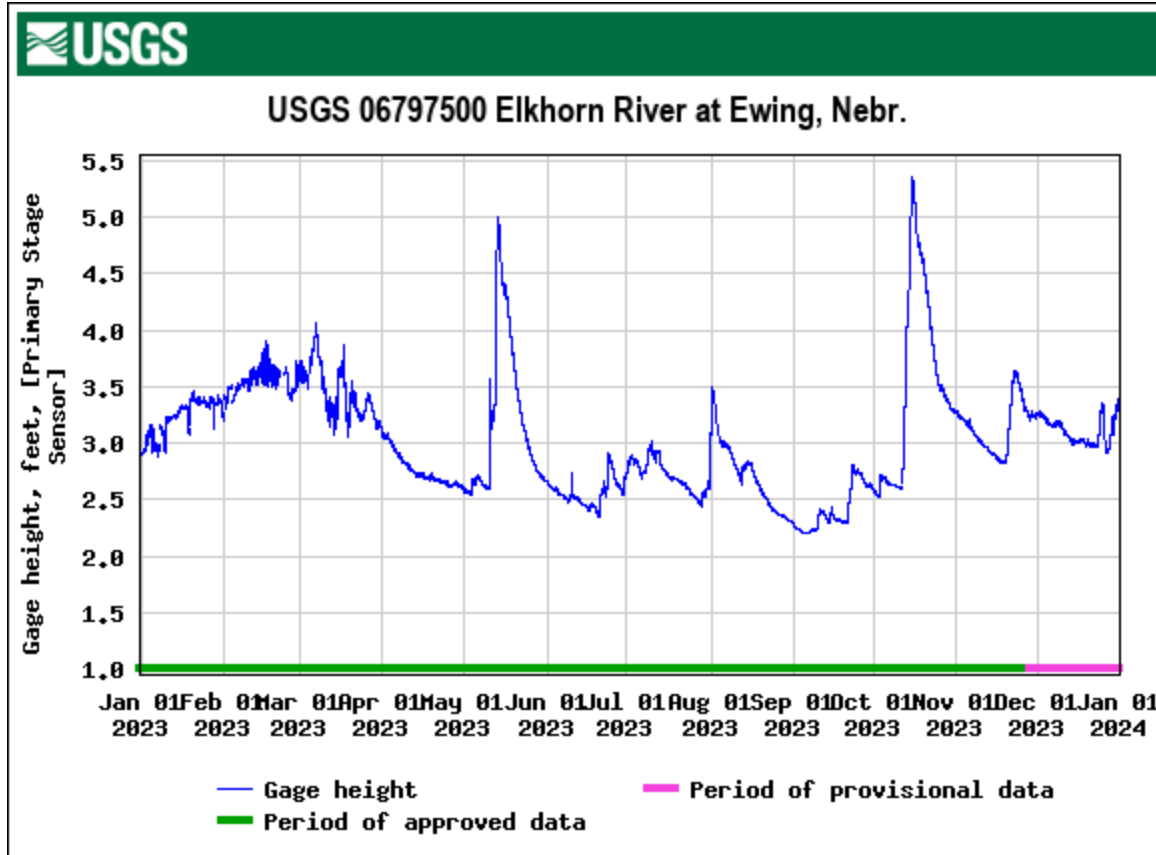
UENRD performed no stream flow accretion activities between 01/01/2023 and 12/31/2023.

STREAM GAGE MEASUREMENTS

UENRD provides funding for the USGS Gaging Station at Ewing, NE on the Elkhorn River. Below are 2 graphs showing the discharge in cubic feet per second from 01/01/2023 to 12/31/2023, as well as the gage height in feet.

Data from: <https://nwis.waterdata.usgs.gov/ne/nwis/current/?type=flow>.





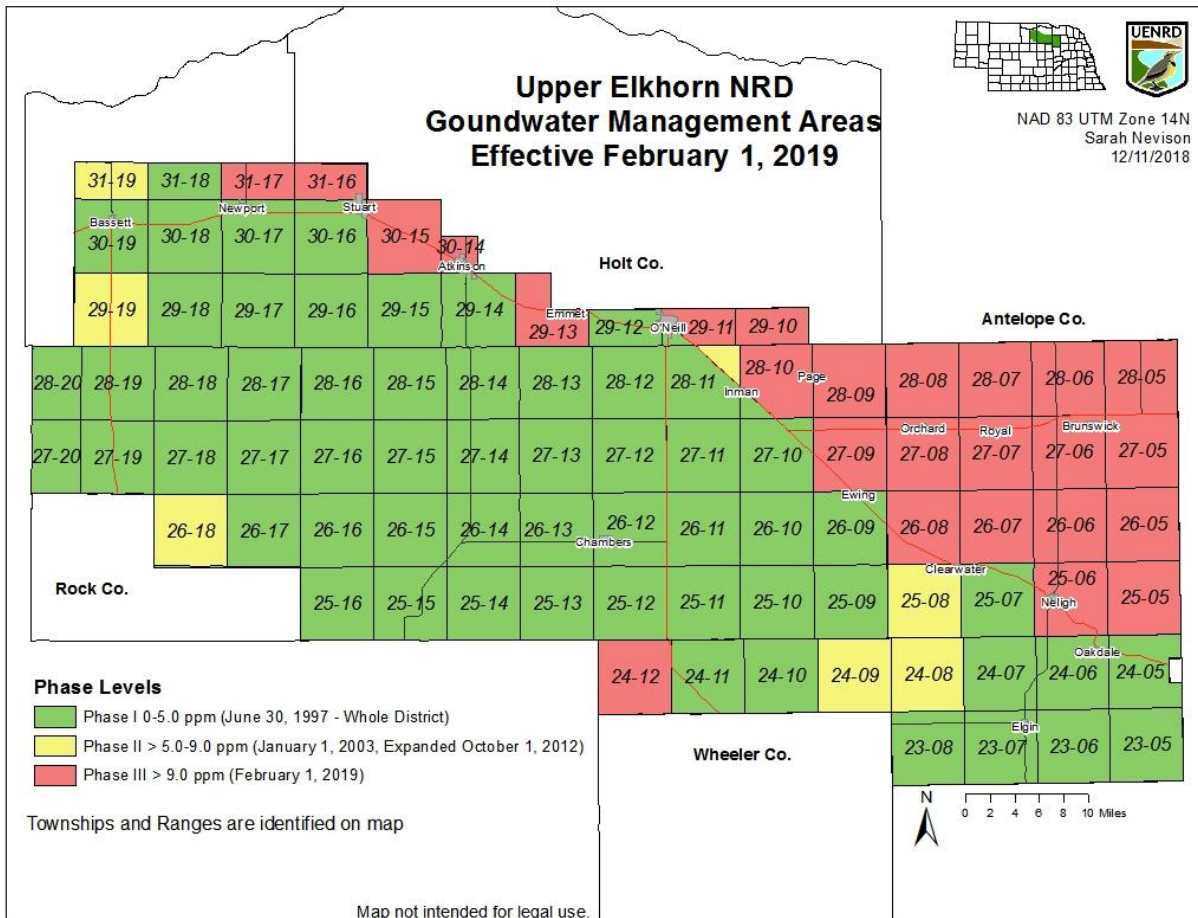
NRD REGULATIONS/MANAGEMENT ACTIVITIES

UENRD has designated Groundwater Quality Management Areas, known as Phase I, Phase II, and Phase III, to address groundwater nitrate contamination throughout the District. Phase I, Phase II, and Phase III designations can be viewed on the map on page 13. Phase levels are designated by township nitrate averages from samples collected by UENRD. Phase I includes areas where the average groundwater concentration of nitrate-nitrogen is 0.0 – 5.0 ppm. Phase II includes areas where the average groundwater concentration of nitrate-nitrogen is > 5.0 – 9.0 ppm. Phase III includes areas where the average groundwater concentration of nitrate-nitrogen is > 9.0 ppm.

- Phase I was initiated 06/30/1997 and encompasses the entire District. Phase I requires anyone who makes nitrogen application decisions (of more than 50 lbs of nitrogen per acre and on more than 1 acre) to be Nitrogen Certified through UENRD or a neighboring NRD every 4 years. Additionally, all irrigation water wells must be sampled every 4 years and the nitrate-nitrogen results submitted to UENRD.
- Phase II was first designated on 01/01/2003 and encompassed the “Page Triangle” near Page, NE in Holt County and Crawford Township in Antelope County. Additional Phase II Areas were designated on 10/01/2012 (see map). Phase II requirements include all Phase I requirements

and in addition require annual deep soil samples, Phase II Reporting Form submission, and Best Management Practices (BMPs) are strongly encouraged.

- Phase III was designated 02/01/2019. The Board of Directors approved the rules and regulations at the December 17, 2018 board meeting. Twenty-five whole or partial townships were designated as Phase III (see map). Phase I and II rules and regulations will remain in effect unless modified or negated by Phase III requirements. Phase III requirements include annual irrigation water samples and district conducted soil sampling to identify fields (larger than 40 acres with more than 50 lbs/ac of actual nitrogen applied) with high residual soil nitrate-nitrogen.



NEW DEPLETIONS ACCOUNTING REPORT

First Increment (2016-2021)

The Lower Platte River Basin Coalition Basinwide Water Management Plan designated the first 5-year increment allowable development by Basin and by NRD. UENRD was allowed to develop (deplete) 1,504 acre-feet for the first 5-year period, 50% for surface water and 50% for groundwater. At the end of the first increment, UENRD had approximately 1,134 acre-feet in allowable depletions left to split between ground and surface water at the conclusion of the first 5-year increment.

Second Increment (2022-2026)

In 2022, the Lower Platte River Basin Coalition Basinwide Water Management Plan designated the second 5-year increment allowable development by Basin and by NRD. UENRD was allowed to develop (deplete) a total of 2,965 acre-feet, 50% for surface water and 50% for groundwater. Of the total acre-feet depletion allowed, 1,134 acre-feet are carryover from the first increment and 1,831 acre-feet are new from the second increment.

Depletion Data

Below is UENRD's accounting report of depletions from groundwater irrigated acre expansion (2017 – 2024 growing seasons) and transfers (2016 – 2023). Surface water depletion numbers are supplied by the Nebraska Department of Natural Resources (NeDNR).

	1st Increment	UENRD	NeDNR
1,504.00	Starting Allowable Depletion	752.00	752.00
2016 - 2017	2017 Acre Expansion	57.23*	
	2018 Acre Expansion	50.20	
	2016 & 2017 Transfers	0.14*	
	Total	107.57	0.00
1,396.43	Starting Allowable Depletion	698.22	698.22
2018	2019 Acre Expansion	45.66*	
	2018 Transfers	-0.12*	
	Total	45.54	0.00
1,350.89	Starting Allowable Depletion	675.45	675.45
2019	2020 Acre Expansion	26.32	
	2019 Transfers	-12.68	
	Total	13.64	0.00
1,337.25	Starting Allowable Depletion	668.63	668.53
2020	2021 Acre Expansion	50.41	
	2020 Transfers	2.87	
	2020 Surface Water Permit		85.00
	Total	53.28	85.00

1,198.97	Starting Allowable Depletion	599.49	599.49
2021	2022 Acre Expansion	65.52	
	2021 Transfers	-0.41**	
	2021 Surface Water Permit		0.39
	Total	65.11	0.39
1,133.47	End of 1st Increment	566.74	566.74

*revised February 2021; corrections made for cancelled expansion and transfers not in LPRB.

**revised February 2023; correction made for incorrect calculation.

	2nd Increment	UENRD	NeDNR
2,965.00	Starting Allowable Depletion	1,482.50	1,482.50
2022	2023 Acre Expansion	37.62	
	2022 Transfers	0.13	
	Total	37.75	0.00
	2,927.25	Starting Allowable Depletion	1,463.63
2023	2023 Acre Expansion	0.30	
	2023 Transfers	0.00	
	Total	0.30	0.00
	2,926.95	Starting Allowable Depletion	1,463.48

Depletion Revisions

A couple revisions were made to the depletions for the 2017 Acre Expansion, 2016 & 2017 Transfers, 2018 Transfers, and 2019 Acre Expansion. The 2017 Acre Expansion had included an expansion that was canceled. Excluding this expansion changed the depletion from 60.63 AF to 57.23 AF. The 2016 & 2017 Transfers included both portions of a transfer that went from outside the LPRB to inside. After adjusting, the change in depletion went from 0.95 AF to 0.14 AF. A change in the 2018 Transfers was corrected previously but the change was never reflected in the summary. The acre feet depletion changed from 3.17 AF to 0.12 AF. An 2019 Expansion number included a cancelled expansion. The exclusion of this expansion changed the depletion from 51.99 AF to 45.66 AF The layout of the table was also adjusted to reflect how the allowable depletions are shared by UENRD and NeDNR. An additional revision was

required to the 2021 Transfers after a typo was discovered in the calculations. The change in depletion in the 2022 Transfers went from -1.17 AF to -0.41 AF and the total depletion for 2021 went from 64.35 AF to 65.11 AF.

NEW DATA COLLECTED OR MODEL/STUDY RESULTS

No new models or studies were conducted within UENRD which directly benefitted the Lower Platte River Basin Coalition. However, in July of 2016 aerial electromagnetic (AEM) surveys were flown and data was collected in the Bazile Groundwater Management Area, which covers Northern Antelope County in UENRD, and parts of Pierce and Knox Counties in Lower Elkhorn, Lewis and Clark, and Lower Niobrara NRDs. These surveys provided insight into the hydrogeology of the area, including 3D profiles, water storage capabilities, and recharge areas in the Bazile Groundwater Management Area. More information can be found at <https://www.enwra.org/coop.html>.

In June 2017, the UENRD Board of Directors voted to discontinue funding the Nebraska Mesonet weather stations in Newport, Brunswick, and Chambers, NE. These weather stations were maintained through the Nebraska State Climate Office at the University of Nebraska and provided data to local, state, regional, and national organizations. In summer 2021 the station at Elgin was discontinued leaving only the station in O'Neill active. The Station in O'Neill is still funded through Mesonet/UNL. UENRD no longer has ET data from the Newport, Brunswick, Chambers, and Elgin stations.



APPENDIX A – Municipal Water Use

Municipality	1/1/23 - 12/31/23 Gallons Pumped	Per Capita Use (gals/person/day)	Population Served	2020 Census Data	2006 - 2015 Average Annual Gallons Pumped	Baseline Pumping Rate	Number of Wells
Atkinson	102,601,000	215.06	1,306	1,298	98,922,370	218	3
Bassett	57,027,000	223.04	700	538	54,020,000	239	3
Chambers ⁴				268	NA ¹	NA ¹	3
Clearwater	29,775,200	254.75	320	320	NA ¹	NA ¹	2
Elgin	69,988,000	267.75	717	712	NA ²	NA ²	3
Ewing	32,337,500	229.37	386	377	41,170,250	291	3
Neligh	83,544,700	143.68	1,592	1,516	NA ¹	NA ¹	4
Newport	7,864,000	269.13	80	69	NA ¹	NA ¹	2
Oakdale ⁴				322	NA ¹	NA ¹	2
O'Neill	239,279,000	176.87	3,704	3,547	233,851,800	173	5
Page	5,335,400	88.00	166	167	NA ¹	NA ¹	2
Stuart	58,033,600	326.93	486	482	67,884,530	315	3
Summerland Public School ³	4,679,875 ³	23.30 ³	550	NA ³	NA ³	NA ³	1

Per Capita Use was estimated using 01/01/2022 – 12/31/2022 gallons pumped, divided by the population served in that period, divided by 365.25 days (1 year). Baseline Pumping Rates was estimated using 2006 – 2015 (10 year) average annual gallons pumped, divided by the 2010 Census Data, divided by 365.25 days. All data provided by municipalities.

¹ Several municipalities are still working on getting previous years pumping data to UENRD: Chambers, Clearwater, Neligh, Newport, Oakdale, and Page.

² Elgin’s data only went back to 2009, so an average annual baseline pumping rate (2006 – 2015) was unable to be calculated.

³ Summerland Public School’s well was new in August 2021 so there is no data before this time. Also not part of census.

⁴ 2023 pumping data not reported to UENRD when report submitted.

APPENDIX B – Industrial/Livestock Water Use

Well Registration #	Name	Legal			Use	GPM
		S	T	R		
G-136694	Agriliance LLC	2	24	6	C	100
G-092895	Antelope County Partners	2	25	5	S	100
G-086547		2	25	5	S	72
G-086548		2	25	5	S	72
G-186075	Atkinson Fertilizer Inc	30	30	14	C	95
G-094434	Central Valley Ag Coop	12	23	5	C	90
G-073246		32	29	11	C	100
G-088467	Sargent Irrigation Company Inc	30	25	6	C	800
G-148010	Elkhorn River Holdings LLC	1	28	11	C	600
G-094916	Glen Larson	22	24	5	S	90
G-146271	Green Plains Atkinson LLC	25	29	12	C	600
G-143983		4	29	14	C	530
G-053742		4	29	14	C	800
G-174310	Sandhills Washout LLC	24	30	15	C	100
G-064726	Emme Ventures LLC	2	26	12	C	400
G-137716	Lawrence & Sharon Hinrichsen Sand & Gravel	1	26	9	C	200
G-089661	Platte Center West LLC	15	26	10	S	100
G-123842		15	26	10	S	90
G-182536	Matt & Stacy Klabenes	20	26	7	S	300
G-046339	Nebraska Game & Parks Commission	26	25	11	C	1,250
G-097213	Niewohner Brothers Inc	8	23	7	S	300
G-071104	Olson Industries Inc	4	29	14	C	80
G-116635	Jon and Holly Young	17	29	17	S	100
G-112729	Rick Schindler	29	25	6	C	400
G-177969	Thiele Dairy	14	25	8	S	600
G-128917	Tinsley Grain	18	25	8	C	65

APPENDIX C – 2024 Growing Season Acre Expansion

Approved expansion groundwater irrigated acres for the 2024 growing season within the LPRB.

- 5.45 acres, 0.3 acre-feet depletion (see formula on Page 5)

Legal	Number of Acres	NIR (ft)	SDF %	% Depletion	Depletion Estimate (AF)
NE 28-24-08	5.45	0.65	0.29	0.3	0.30
TOTAL	5.45				0.30

DRAFT

APPENDIX D – Well Construction Permits

UENRD well construction permits for groundwater wells within the LPRB between 01/01/2023 and 12/31/2023, over 50 GPM. Permits are issued in accordance with the UENRD Groundwater Management Plan Rules and Regulations.

UENRD Permit Number	Well Registration #	Name	Location	Number of Acres	GPM	Date Permit Approved	Classification Type
UE-23-001 <R>	G-196851	Alice M Kallhoff Rev. Tr	SW 35-26-06	132.71		1/19/2023	Replacement Well
UE-23-002	G-196843	Christensen Brothers Partnership	SWSW 29-27-07	NA		3/10/2023	New Well; livestock well
UE-23-003	G-198944	Donald E. & Laurie Adamson	NENW 31-29-10	262		3/10/2023	New Well
UE-23-004	G-196864	Michelle J. Childers	NE 30-24-08	64.75		3/10/2023	New Well
UE-23-005 <R>	G-038882	Herd Company	SE 31-24-12	146.84		3/17/2023	Replacement Well
UE-23-006 <R>	G-011620	The Welsh Connection LLC % Joe Evans	NE 05-24-05	129		3/31/2023	Replacement Well
UE-23-007	1	Loren Broberg	NE 23-24-05	126.2		4/21/2023	New Well
UE-23-008 <R>	G-068713	Christina Coulthard Childers & Cathlina Frederick	SE 3-25-13	131.1		5/9/2023	Replacement Well
UE-23-009	1	Wayne M Monahan	NWNW 23-29-14	133.79		5/9/2023	New Well
UE-23-010 <R>	G-052509	Bernard & Jo Ellen Kamphaus	NW 12-26-12	136.92		5/12/2023	Replacement Well
UE-23-011 <R>	1	COCO LLC	SWSE 20-30-14	130.8		5/15/2023	Replacement Well
UE-23-012	G-198313	Bar K Bar LLC	SE 33-25-11	97.22		6/2/2023	New Well
UE-23-013 <R>	1	Joanne M Rudnick	SE 14-24-05	89.76		5/26/2023	Replacement Well
UE-23-014 <R>	G-164179	Dick & Alden Grosch	NE 20-29-10	130		5/26/2023	Replacement Well
UE-23-015	G-197702	Nebraska Board of Educational Lands & Funds	SW 16-28-10	527		6/5/2023	New Well
UE-23-017	1	Harold Heithoff Rev Tr / Kathy Seier, Tammy Nolan & Theresa Simons	SW 24-23-7	154.5		7/26/2023	New Well
UE-23-018 <R>	1	HMP Farms	NE 23-24-08	135		9/21/2023	Replacement Well
UE-23-019 <R>	1	HMP Farms	NW 33-24-06	157.3		9/21/2023	Replacement Well
UE-23-020 <R>	1	Fredrick J & Marlene V Knievel	NW 4-24-08	126		9/21/2023	Replacement Well

¹ As of report completion date, wells had not been completed & well registration number not assigned.