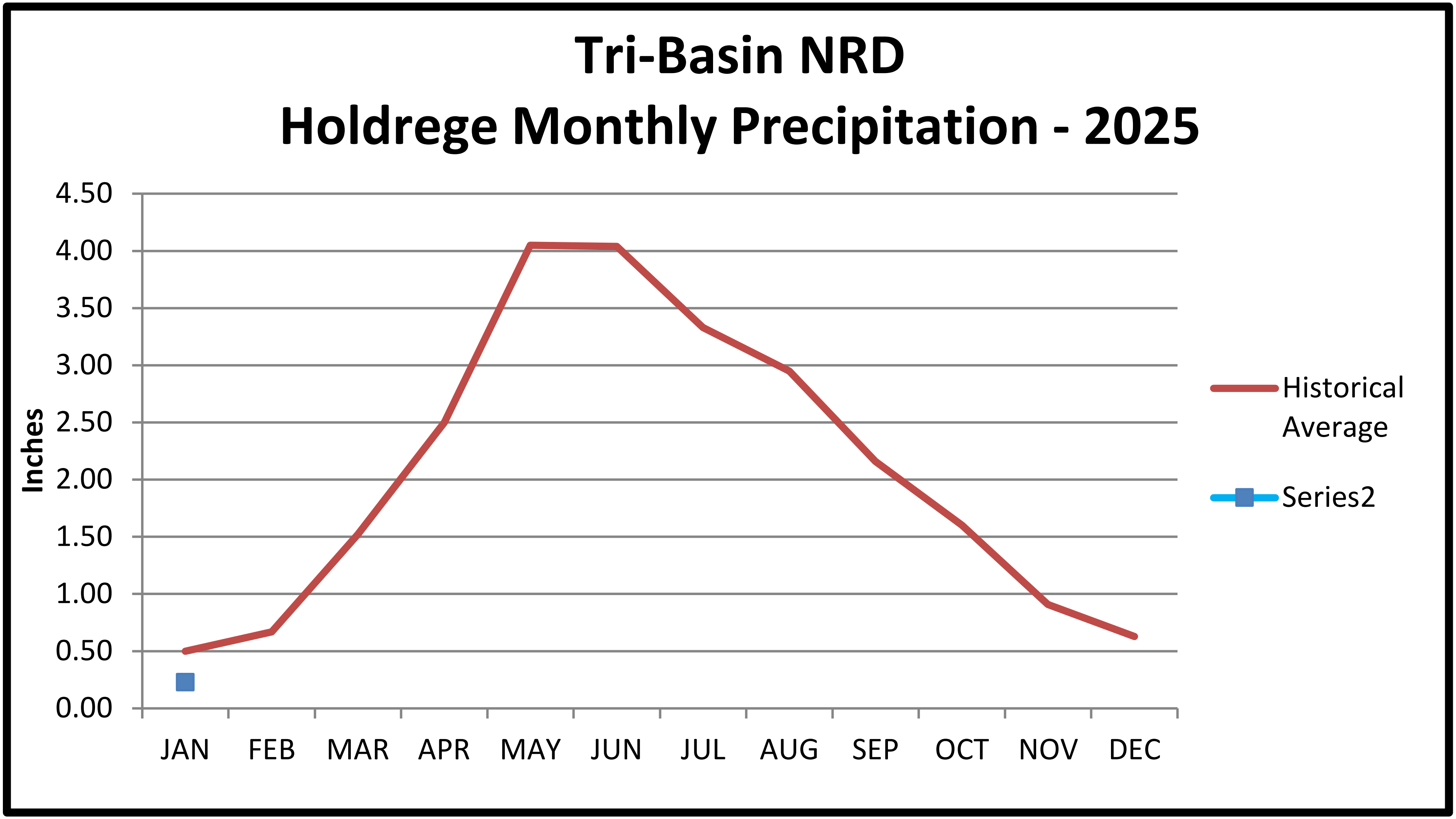
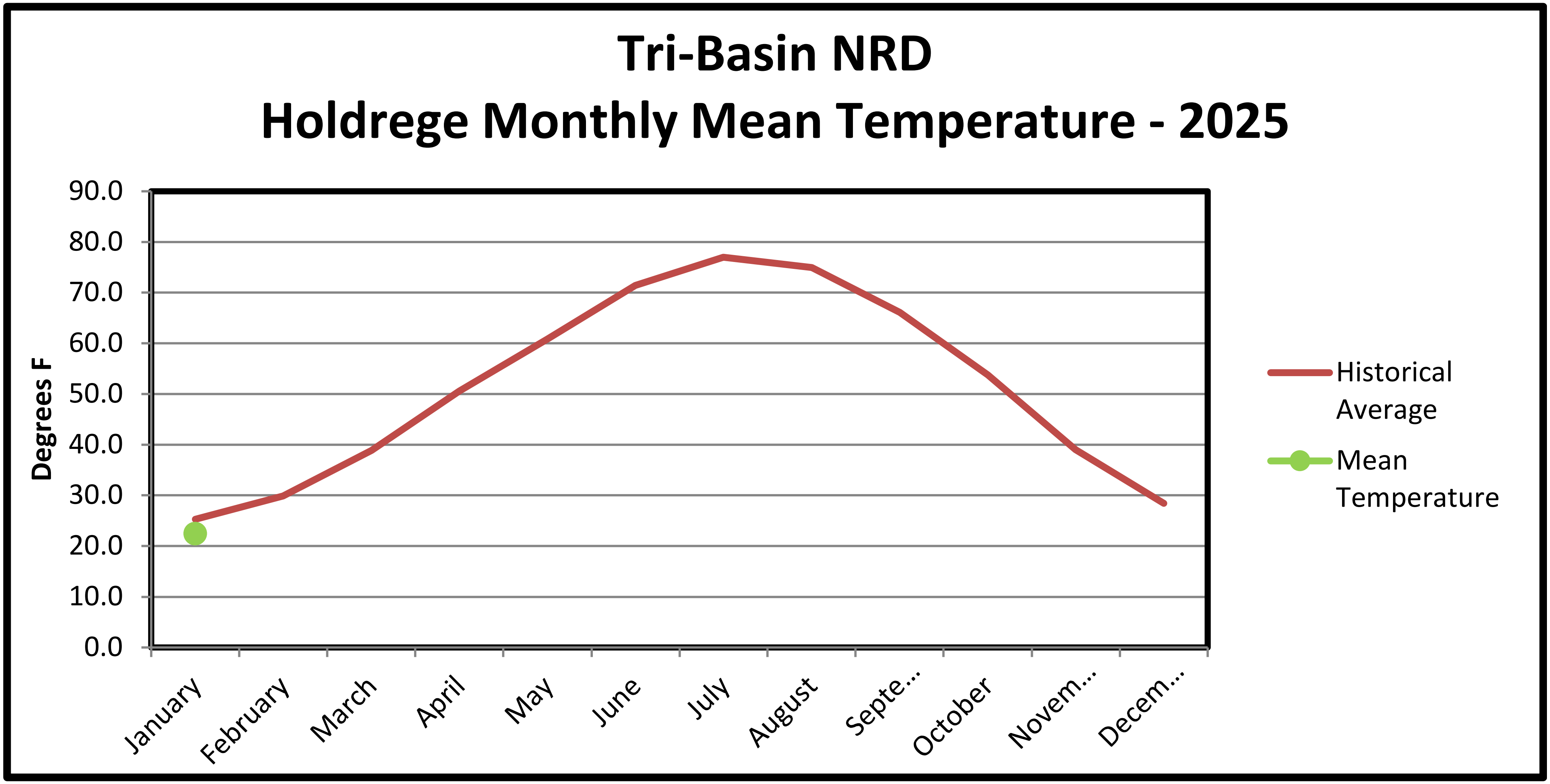

Tri-Basin NRD
Holdrege Monthly Precipitation - 2025
Inches
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Historical Average
Series2


Tri-Basin NRD
Holdrege Monthly Mean Temperature - 2025
Degrees F
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
January
February
March
April
May
June
July
August
Septe…
October
Novem…
Decem…
Historical Average
Mean Temperature

Tri-Basin NRD
1723 Burlington
Holdrege, NE 68949

Phone: (308) 995-6688
Fax: (308) 995-6992
Email: tribasin@tribasinnrd.org

Tri Basin Natural Resources District

January 2025 - Holdrege

Temperature: (°F)

* High: 61° (Recorded January 29)
* Low: -6° (Recorded January 6)

* Mean: 22.45° (Normal for January 25.2")
  Mean High: 34.6° (Normal: 51.5°)
  Mean Low: 10.3° (Normal: 27.4°)

NOTES:

Precipitation for January 2025: .23"
(Normal for January: .47")
Precipitation for the year through January:.23"
(Normal for the year through January: .47")

NOTES: Noted 2 days rain
Trace noted 3 days
Glaze noted 1 day
Fog noted 1 day
Snow noted 1 day

January 2024

Temperature:		Precipitation:	
High:	61°	For the month:	.62"
Low:	-15°	For the year:	.62"
Mean:	19.9°	Snow for January:	8.00"

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE

(03-09)

Jan | 2025

RECORD OF RIVER AND CLIMATOLOGICAL OBSERVATIONS

STATE	COUNTY	RIVER
NE	Phelps	

TIME (local) OF OBSERVATION RIVER	TEMPERATURE	PRECIPITATION	STANDARD TIME IN USE
	08:00	08:00	

TYPE OF RIVER GAGE	ELEVATION OF RIVER GAGE ZERO	FLOOD STAGE	NORMAL POOL STAGE

High 61°

mean High 34.6

mean 22.45

mean Low 10.3°

Low -10°

DATE	TEMPERATURE 24 HRS ENDING AT OBSERVATION MAX	MIN	AT OBSN	PRECIPITATION 24 HR AMOUNTS Rain, melted snow, etc. (In and hundredths)	Snow, ice pellets, hail (Ins. and tenths)	AT OB Snow, ice pellets, hail ice on ground (In)	WEATHER (Observation Day) Mark 'X' for all types occurring each day: Fog	Ice pellets	Glaze	Thunder	Hail	Damaging winds	Time of occurrence if different from above	RIVER STAGE Condition	Gage reading at ___ AM	Tendency	REMARKS (SPECIAL OBSERVATIONS, ETC.)
1	30	15	19	0.00	0.0	0											
2	41	13	19	0.00	0.0	0											
3	29	19	24	0.00	0.0	0											
4	30	17	17	0.00	0.0	0											
5	20	9	9	0.12	3.0	3			X								
6	11	-7	-6	T	T	3											
7	16	-6	16	0.00	0.0	2											
8	20	-1	2	0.00	0.0	2											
9	27	-1	21	0.00	0.0	1											
10	35	13	15	0.10	1.0	2											
11	34	11	26	0.00	0.0	2											
12	42	20	20	0.00	0.0	1											
13	30	10	13	0.00	0.0	T											
14	42	12	18	0.00	0.0	0											
15	24	17	17	0.00	0.0	0	X										
16	47	17	25	0.00	0.0	0											
17	53	24	31	0.00	0.0	0											
18	49	14	14	0.00	0.0	0											
19	26	-1	-1	0.00	0.0	0											
20	7	-6	0	0.00	0.0	0											
21	9	-10	-4	0.00	0.0	0											
22	39	-4	26	0.00	0.0	0											
23	38	20	20	0.00	0.0	0											
24	27	11	16	0.00	0.0	0											
25	50	15	20	T	0.0	0											
26	40	12	14	T	0.0	0											
27	35	10	11	0.00	0.0	0											
28	55	11	22	0.00	0.0	0											
29	61	19	20	0.00	0.0	0											
30	56	20	36	0.00	0.0	0											
31	50	27	30	0.00	0.0	0											
	34.6	10.3	SUM	0.22	4.0		Fog	Ice pel	Glaze	Thund	Hail	Dam winds					

CONDITION OF RIVER AT GAGE

A. Obstructed by rough ice
B. Frozen, but open at gage
C. Upper surface smooth ice
D. Ice gorge above gage
E. Ice gorge below gage
F. Shore ice
G. Floating ice
H. Pool stage

CHECK BAR (for wire weight) NORMAL CHECK BAR

READING	DATE

OBSERVER

SUPERVISING OFFICE
GID Hastings

STATION INDEX NO.
25-3910-08

First Quarter 2025 Overton Stream Guage

	Jan Act	Jan Tar	We	Feb Act	Feb Tar	Well	Mar Act	MarTar	Well Ran
1	1180	1000			1800			3350	
2	1140	1000			1800			3350	
3	1500	1000			1800			3350	
4	Ice	1000			1800			3350	
5	Ice	1000			1800			3350	
6	Ice	1000			1800			3350	
7	Ice	1000			1800			3350	
8	Ice	1000			1800			3350	
9	Ice	1000			1800			3350	
10	Ice	1000			1800			3350	
11	Ice	1000			1800			3350	
12	931	1000			1800			3350	
13	1390	1000			1800			3350	
14	1210	1000			1800			3350	
15	1510	1000			3500			3350	
16	1180	1000			3500			1800	
17	1330	1000			3500			1800	
18	1290	1000			3500			1800	
19	Ice	1000			3500			1800	
20	Ice	1000			3500			1800	
21	Ice	1000			3500			1800	
22	Ice	1000			3500			1800	
23	661	1000			3500			2400	
24	757	1000			3500			2400	
25	421	1000			3500			2400	
26	1180	1000			3500			2400	
27	716	1000			3500			2400	
28	660	1000			3500			2400	
29	1040	1000						2400	
30	920	1000						2400	
31	1200	1000						2400	

		First Quarter 2025 Grand Island Stream Guage Data						
	Jan Act	Jan Tar	Well Run	Feb Act	Feb Tar	Well Run	Mar Act	Mar Tar
1	663	1000			1800			3350
2	Ice	1000			1800			3350
3	Ice	1000			1800			3350
4	Ice	1000			1800			3350
5	Ice	1000			1800			3350
6	Ice	1000			1800			3350
7	Ice	1000			1800			3350
8	Ice	1000			1800			3350
9	Ice	1000			1730			3350
10	Ice	1000			1800			3350
11	Ice	1000			1800			3350
12	Ice	1000			1800			3350
13	Ice	1000			1800			3350
14	Ice	1000			1800			3350
15	Ice	1000			3350			3350
16	Ice	1000			3350			1800
17	Ice	1000			3350			1800
18	Ice	1000			3350			1800
19	Ice	1000			3350			1800
20	Ice	1000			3350			1800
21	Ice	1000			3350			1800
22	Ice	1000			3350			1800
23	Ice	1000			3350			2400
24	Ice	1000			3350			2400
25	Ice	1000			3350			2400
26	Ice	1000			3350			2400
27	Ice	1000			3350			2400
28	Ice	1000			3350			2400
29	Ice	1000			3350			2400
30	Ice	1000			3350			2400
31	Ice	1000			3350			2400

Tri-Basin NRD
1723 Burlington St.
Holdrege, NE 68949

(308) 995-6688
Fax: (308) 995-6992
tribasin@tribasinnrd.org

Tri Basin
Natural Resources District

January 27, 2025

Patrick M Burchell
624 37 Rd
Minden, NE 68959

Dear Mr. Burchell:

Our records indicate that you have not turned in all your water use reports for **2024**. Tri-Basin NRD rules and regulations **require** that annual water use reports be submitted on all active wells in the Republican basin watershed, new wells permitted after September 15, 2004, and wells using groundwater transfer permits and on all wells that received cost share funds to put on a flow meter. Your NRD needs this information to calculate the consumptive water use of these wells.

A list of missing water use reports for wells owned or operated by you is enclosed. **If our records are incorrect, or you no longer farm this property, you need to call our office as soon as possible.**

If you need assistance filling out water use reports, please contact our office. If the status of the well in question is not correct and should no longer require a meter or water use report, please contact our office to update the status with the state. If you did not use the well in question for the past crop year, please provide the information you can and write in the meter reading spaces "well not used". If you will not be able to complete your water use reports, you can sign an agreement stating your intention to comply with the rules and regulations of Tri-Basin.

All water use reports must be received in our office by February 11, 2025. If your water use reports are not in our office by this date, you will be summoned for a hearing before Tri-Basin NRD's Board of Directors. If, as a result of this hearing, you are found to be out of compliance, you may be subject to a cease-and-desist order. This is a court order to shut off your irrigation wells. You may also be held liable for as much as half of the cost of the hearing.

PLEASE contact our office toll free (877) 995-6688 as soon as possible. We want to work with you to avoid legal action. **THANK YOU** for your cooperation.

Sincerely,

John Thorburn

cc: TBNRD Directors
Jeffrey M Cox, TBNRD Legal

TRI-BASIN NATURAL RESOURCES DISTRICT COMPLIANCE AGREEMENT

I ______________________, acknowledge that I am the owner and/or operator of agricultural land lying within the boundaries of Tri-Basin Natural Resources District;

I also acknowledge that I have been notified by Tri-Basin Natural Resources District that I may be in violation or may have violated one or more of the rules and regulations of the Groundwater Management Area established by the Board of Directors of Tri-Basin Natural Resources to protect groundwater quantity;

I also acknowledge that I have been notified by Tri-Basin Natural Resources District about the nature of the alleged violation or violations and about the corrective actions that I must undertake in order to bring me into full compliance with the District Rules and Regulations

Therefore, I accept as true and correct that the alleged violation or violations have occurred or are occurring, and I consent to cease and desist from continuing or allowing recurrence of such violation or violations.

Furthermore, I agree to undertake the corrective measures necessary to bring me into compliance with Tri-Basin Natural Resources District's Groundwater Management Area Rules and regulations by ____February 11, 2025____.

(Signatures on reverse side)

TRI-BASIN NATURAL RESOURCES DISTRICT REQUEST FOR HEARING

I ______________________, acknowledge that I am the owner and/or operator of agricultural land lying within the boundaries of Tri-Basin Natural Resources District.

I also acknowledge that I have been notified by Tri-Basin Natural Resources District that I may be in violation or may have violated one or more of the rules and regulations established by the Board of Directors of Tri-Basin Natural Resources to protect groundwater quality;

I also acknowledge that I have been notified by Tri-Basin Natural Resources District about the nature of the alleged violation or violations and about the corrective actions that I must undertake in order to bring me into full compliance with NRD rules and regulations.

I **do not accept** as true and correct that the alleged violation or violations have occurred or are occurring.

Furthermore, I request that I be granted a formal hearing before the Board of Directors of Tri-Basin Natural Resources District in accordance with the Rules and Regulations of the District, and that I be notified in writing of the date, time and place of said hearing. I also understand and accept that if, after said hearing, I am found to be in violation of the rules and regulations of the District, I may be held liable for a portion of the costs of said hearing.

(Signatures on reverse side)

Tri Basin
Natural Resources District

1723 Burlington
Holdrege, NE 68949
308. 995.6688
FAX 308.995.6992
tribasin@tribasinnrd.org

February 5, 2025

Allocation Summary for Union Township, Gosper County 2023 - 2025

Dear Irrigator:

Enclosed is a report for land in Union township showing certified irrigated acres and total inches for allocation period 2023 – 2025. Everyone began this allocation period with 9" per certified acre for 3 years and an additional 9" carry over, a total of 36" per acre. Sometimes, due to conservation programs such as CREP, some acres are not active during the allocation period. Acres in a parcel can change due to transfers or being released from a conservation program. Total allocations shown in the report represent total inches for the three years. If you think there is an error in the number of certified acres used for the allocation period, please contact Tammy at the NRD office.

If you have pooled parcels, you will notice parcels listed with acres and usage as well as an accumulated total of inches for the three years and a combined usage total. The total gallons of all the meters in the pool are combined and divided by all eligible certified acres. To pool parcels either the owner or the operator of the pooled parcels must be the same; if there has been a change in ownership or operators, please contact our office with correct information.

All meters MUST BE in working condition at the start of the irrigation season. If your meter stopped working and needs to be repaired or replaced, we will notify you or you may call us to get it on our list. Repairing Meters in Union township is the responsibility of TBNRD. Our staff will uninstall the meter and take it in to be fixed. TBNRD is responsible for both parts and labor. We have read meters and have beginning readings for 2025. Irrigation season defined by TBNRD is between May 1 and September 30. You may run your well for fall crops, but that water use will be added to next year's water use.

If you would like to discuss allocations in Union Township and other water related issues in Gosper County with me, feel free to call or stop by the NRD office. If you have any questions concerning the past or present allocation period, please contact our office toll free at 1-877-995-6688.

Sincerely,

John Thorburn

John Thorburn, Manager

Tri-Basin NRD --- Allocation Record --- 2023 - 2025

Operator	Joel Monter
Phone	
Parcel	370001494
Location	NE 1/4 Section 5-5-22W
Field Name	Glen's
Pool Number	

Certified Acres	106.04
Acre Adjustment	
Acres for Allocation Period	106.04

Annual Allocation	954.36
2023 -- 2025	2863.08
Carry Over	954.36
Total beginning inches	3817.44

Notes

Allocation Adjustments, wells & meters

Yearly Usage

	2023	2024	2025
Gallons Used	36,329,900	31,466,200	0
IPA Used	12.62	10.93	0.00
Allocation Used	1,337.92	1,158.81	0.00
Remaining in total "	2,479.52	1,320.71	1,320.71
Remaining IPA per year	23.38	12.45	carry over

Notes and Comments:

1723 Burlington
Holdrege, NE 68949
308. 995.6688
FAX 308.995.6992
tribasin@tribasinnrd.org

Tri Basin
Natural Resources District

January 29, 2025

Mr. Lyndon Vogt, General Manager
Central Platte NRD
215 Kaufman Ave.
Grand Island NE 68803

Dear Lyndon:

The purpose of this letter is to inform you, in accordance with Section 2. B. of the Streamflow Augmentation agreement between Tri-Basin NRD and Central Platte NRD, that it will not be necessary for Central Platte NRD to augment Platte streamflows on behalf of Tri-Basin NRD in 2023. This determination was made after discussion with Nebraska Department of Natural Resources staff regarding Tri-Basin NRD's Platte IMP offset requirements. Even though we don't anticipate that we will need any streamflow augmentation credits from canals operated by Central Platte this year, mainly as a result of diversions of high flows into CNPPID canals, Tri-Basin NRD values the agreement we have with Central Platte, and we consider it a very important element of our Platte basin integrated management compliance plan.

Sincerely,

John Thorburn
Manager

Cc: TBNRD Directors
Jennifer Schellpeper, NDNR

LETTER AGREEMENT
FOR PROFESSIONAL SERVICES

February 4, 2025

Tri-Basin Natural Resources District
Attn: John Thorburn
1723 Burlington Street
Holdrege, NE 68949

Re: **LETTER AGREEMENT FOR PROFESSIONAL SERVICES**
Tri-Basin Natural Resources District Groundwater Evaluation (the "Project")
Holdrege, Nebraska

Dear Mr. Thorburn:

It is our understanding that Tri-Basin Natural Resources District ("Client") requests Olsson, Inc. ("Olsson") to perform the services described herein pursuant to the terms of this Letter Agreement for Professional Services, any exhibits attached hereto and Olsson's General Provisions (all documents constitute and are referred to herein as the "Agreement") for the Project.

Olsson has acquainted itself with the information provided by Client relative to the Project and based upon such information offers to provide the services described below for the Project. Client warrants that it is either the legal owner of the property to be improved by this Project or that Client is acting as the duly authorized agent of the legal owner of such property. Client acknowledges that it has reviewed any exhibits attached hereto and the General Provisions, which are expressly made a part of and incorporated into the Agreement by this reference. In the event of any conflict or inconsistency between this Letter Agreement, and the General Provisions regarding the services to be performed by Olsson, the terms of the General Provisions shall take precedence.

Olsson shall provide the following services ("Scope of Services") to Client as more specifically described in "Scope of Services" attached hereto. Should Client request work in addition to the Scope of Services, Olsson shall invoice Client for such additional services (Optional Additional Services) at the standard hourly billing labor rate charged for those employees actually performing the work, plus reimbursable expenses if any. Olsson shall not commence work on Optional Additional Services without Client's prior written approval.

Olsson agrees to provide all of its services in a timely, competent and professional manner, in accordance with applicable standards of care, for projects of similar geographic location, quality and scope.

SCHEDULE FOR OLSSON'S SERVICES

Unless otherwise agreed, Olsson expects to perform its services under the Agreement as follows:

Anticipated Start Date:	February 17, 2025
Anticipated Completion Date:	December 31, 2025

Olsson will endeavor to start its services on the Anticipated Start Date and to complete its services on the Anticipated Completion Date. However, the Anticipated Start Date, the Anticipated Completion Date, and any milestone dates are approximate only, and Olsson reserves the right to adjust its schedule and any or all of those dates at its sole discretion, for any reason, including, but not limited to, delays caused by Client or delays caused by third parties.

COMPENSATION

Olsson's Scope of Services will be provided on a time-and-expense basis not to exceed $170,500, as further outlined in the attached Scope of Services.

TERMS AND CONDITIONS OF SERVICE

We have discussed with you the risks, rewards and benefits of the Project, the Scope of Services, and our fees for such services and the Agreement represents the entire understanding between Client and Olsson with respect to the Project. The Agreement may only be modified in writing signed by both parties.

Client's designated Project Representative shall be Nolan Little.

If this Agreement satisfactorily sets forth your understanding of our agreement, please sign in the space provided below. Retain one original for your files and return an executed original to Olsson via email: jschneider@olsson.com. This proposal will be open for acceptance for a period of 30 days from the date set forth above, unless changed by us in writing.

OLSSON, INC.

By ______________________
James Schneider, Ph.D.

By ______________________
Mallory Morton, P.E.

By signing below, you acknowledge that you have full authority to bind Client to the terms of the Agreement. If you accept the terms set forth herein, please sign:

TRI-BASIN NATURAL RESOURCES DISTRICT

By ______________________
Signature

Print Name John Thorburn

Title Manager

Dated 2/5/25

SCOPE OF SERVICES

This exhibit is hereby attached to and made a part of the Letter Agreement for Professional Services dated February 4, 2025, between Tri-Basin Natural Resources District ("Client") and Olsson, Inc. ("Olsson") providing for professional services. Olsson's Scope of Services for the Agreement is indicated below.

PROJECT DESCRIPTION AND LOCATION

Project will be located at: Tri-Basin Natural Resources District, Nebraska

Project Description: Groundwater Evaluation and Net Recharge Management Tool

SCOPE OF SERVICES

Olsson shall provide the following services (Scope of Services) to Client for the Project:

GENERAL

Olsson will complete this project in two phases. Phase 100 will focus on developing and calibrating a comprehensive water balance and building a Net Recharge Management Tool to support groundwater management decisions. Phase 200 will provide guidance, documentation, training, and additional evaluation of recharge projects while ensuring ongoing support for the tool's implementation.

Phase 100 – Water Balance Development and Recharge Tool Creation

Task 101 – Develop Water Balance Calculations

Olsson will develop a comprehensive water balance for the entire Tri-Basin NRD and each individual township. This assessment will include recharge, groundwater pumping, streamflow, evapotranspiration, runoff, and inflows/outflows. The COHYST model will be used as the primary tool for these calculations, supplemented by additional datasets, such as climate records and the Tri-Basin NRD's water level database. The final water balance will establish a foundation for assessing sustainable groundwater management.

Task 102 – Calibrate Water Budget

Olsson will analyze groundwater storage changes from 1954 to 2022 (or as data availability allows) to refine water balance estimates. Adjust key parameters, including vadose zone travel time, streamflow leaving the area, groundwater flux at the study area boundary, canal seepage based on diversions, and specific yield, to minimize errors in the water balance calculations. The calibration process will include scripting and automation to enhance model efficiency before groundwater simulations are conducted.

Task 103 – Evaluate Key Factors

Olsson will conduct a sensitivity analysis on the primary factors affecting groundwater storage and availability. This analysis will include the evaluation of precipitation, evapotranspiration, groundwater flux, recharge sources, irrigation efficiency, and aquifer properties. The goal of this task is to determine which variables have the most significant impact on the water balance and groundwater availability. Separate model versions will be maintained to document these sensitivity analyses and will be provided to the Client.

Task 104 – Develop Net Recharge Management Tool
Olsson will develop a desktop application with a graphical user interface (GUI) to allow users to input and modify key water budget components, including:

- Annual precipitation
- Surface water diversions, including on-farm deliveries and canal seepage
- Annual groundwater pumping rates
- Recharge from stored water volumes
- Annual evapotranspiration (ET) estimates

The tool will communicate with the Groundwater Evaluation Toolbox (GET) Engine via a series of application programming interface (API) calls and utilize cloud computing resources to run modeling code. It will integrate the watershed model, which will generate MODFLOW WEL (pumping) and RCH (recharge) files, and link to the groundwater model to simulate aquifer responses under different management scenarios.

The tool will be designed to be flexible and adaptable, allowing for future integration of updated datasets, refinements to modeling approaches, and expanded capabilities as needed.

Phase 100 Budget: $116,400

Phase 200 – Implementation, Training, and Additional Evaluations

Task 201 – Provide Tool Input Support
Olsson will develop guidance materials for Client staff, including an input spreadsheet with recommended data ranges for variables such as precipitation, groundwater pumping, and evapotranspiration. These materials will ensure that users can confidently modify parameters and run realistic groundwater management scenarios.

Task 202 – Provide Tool Design Report
Olsson will prepare a comprehensive design report documenting the tool's methodology, calculations, and assumptions. The report will include sensitivity analysis results, recommendations for future data collection, and detailed user guidance. It will also provide an overview of how precipitation variability, irrigation practices, and climate factors influence groundwater recharge and availability.

Task 203 – Evaluate Groundwater Recharge Projects
Olsson will evaluate 1–2 existing or proposed recharge projects using the tool. Olsson will also train Client staff to independently analyze additional recharge locations. This task will provide hands-on guidance to ensure staff can effectively use the tool to assess recharge project impacts.

Task 204 – Meetings and Presentations
Olsson will conduct progress meetings with the Client to review findings, gather feedback, and discuss next steps. Meeting minutes will be prepared and distributed. At the conclusion of the project, the team will provide a final

presentation to the Tri-Basin NRD Board, demonstrating the functionality of the tool and summarizing key findings.

Task 205 – Grant Reporting
Olsson will assist the Client with grant reporting requirements, including preparing the necessary documentation for the WaterSMART Grant. This will ensure compliance with funding requirements and facilitate project reimbursement.

Phase 200 Budget: $54,100

DELIVERABLES

- Calibrated water balance
- Sensitivity analysis
- Fully functional Net Recharge Management Tool
- Report documenting methodology, assumptions, and guidance
- Example input spreadsheets for tool usage
- Final presentation and project summary

Should Client request work in addition to the Scope of Services, Olsson shall invoice Client for such additional services (Optional Additional Services) at the standard hourly billing labor rate charged for those employees actually performing the work, plus reimbursable expenses if any. Olsson shall not commence work on Optional Additional Services without Client's prior written approval.

Olsson agrees to provide all of its services in a timely, competent and professional manner, in accordance with applicable standards of care, for projects of similar geographic location, quality and scope.

Olsson 2025 Billing Rate Schedule

Description	Range		
Principal	$152.00	-	$472.00
Project Manager	$133.00	-	$287.00
Project Professional	$99.00	-	$258.00
Assistant Professional	$74.00	-	$182.00
Designer	$95.00	-	$238.00
CAD Operator	$64.00	-	$150.00
Survey	$59.00	-	$230.00 *
Construction Services	$53.00	-	$305.00 *
Administrative/Clerical	$49.00	-	$300.00

Note:

1. Special Services not included in above categories will be provided on a Special Labor Rate Schedule
2. Rates subject to change based upon updates to Billing Rates for upcoming year.

REIMBURSABLE EXPENSE SCHEDULE

The expenses incurred by Olsson or Olsson's independent professional associates or consultants directly or indirectly in connection with the Project shall be included in periodic billing as follows:

Classification	**Cost**
Automobiles (Personal Vehicle)	$0.70/mile*
Suburban's and Pick-Ups	$0.75/mile*
Automobiles (Olsson Vehicle)	$95.00/day
Other Travel or Lodging Cost	Actual Cost
Meals	Actual Cost
Printing and Duplication including Mylars and Linens	
In-House	Actual Cost
Outside	Actual Cost+10%
Postage & Shipping Charges for Project Related Materials including Express Mail and Special Delivery	Actual Cost
Film and Photo Developing	Actual Cost+10%
Telephone and Fax Transmissions	Actual Cost+10%
Miscellaneous Materials & Supplies Applicable to this Project	Actual Cost+10%
Copies of Deeds, Easements or other Project Related Documents	Actual Cost+10%
Fees for Applications or Permits	Actual Cost+10%
Sub-Consultants	Actual Cost+10%
Taxes Levied on Services and Reimbursable Expenses	Actual Cost

*Rates consistent with the IRS Mileage Rate Reimbursement Guidelines (Subject to Change).

TBNRD Staff and Board Members.

Thank you so much for the schefflera plant, in memory of Mary Jo.

We are grateful for your kindness.

Kevin + Nolan

YOUR KIND EXPRESSION OF SYMPATHY

AND FRIENDSHIP WILL

ALWAYS REMAIN IN OUR MEMORIES.

THANK YOU FOR YOUR THOUGHTFULNESS.

415 Lincoln St.
P.O. Box 740
Holdrege, NE 68949-0740

CENTRAL
Nebraska Public Power
and Irrigation District

Phone: (308) 995-8601
Fax: (308) 995-5705
Web: www.cnppid.com

December 31, 2024

Dear Customer,

At the October 7, 2024 board meeting, the Central Board of Directors voted to increase the water delivery cost for the 2025 irrigation season by 2.5%. Below are the approved 2025 Irrigation water rates:

Incremental Pricing Program (IPP), 9" base fee:	\$ 43.86 per acre
IPP per acre-inch delivery rate between 9" to 18":	\$ 1.53 per acre-inch
Non IPP rates 18" contracts:	\$ 57.63 per acre
Non IPP rates 12" Supply Canal contracts:	\$ 48.45 per acre

You have the option each year to schedule water delivery in a fourteen-day or seven-day rotation; please confirm your selection for each account with your Irrigation Service Specialist (ISS). If you have signed up for interruptible service, please let your ISS know which days you would like to run. We will work to accommodate interruptible service requests unless the canal or pipeline serving your farm cannot meet the demand. As a reminder, remaining Conservation Credits were detailed on your 2024 October water bills. Any remaining credits will continue to be automatically applied for half of the water delivery charge for use *over* 9 acre-inches/per acre until they expire.

Dry Year Lease Program – Program details and eligibility to receive \$160 per acre are on the back of this letter.

Pivots going over the canal

As a reminder, below are a couple of items that are conditions for those who operate under a permit from Central allowing a pivot to cross over a canal:

- Per the permit, pivot tracks must be filled in so that they don't create ruts. We recommend cobblestone or crushed concrete.
- Chemigating or fertigating over the canal is regulated by the Nebraska Chemigation Act and administered by Tri-Basin NRD. Nutrients such as phosphorus and nitrogen entering the canal enhance aquatic plant growth that can clog irrigation systems.

Irrigation Projects Update - Investments to secure future water deliveries that are reliant on Central's system.

- ***Elwood Dam Seepage Mitigation Repair - \$6 Million Investment*** – Construction is complete which now safely allows full use of the water storage facility.
- ***New E-65 Siphon - \$29 Million Investment*** – Addresses aging infrastructure for water delivery to the E-65 Canal system and Elwood Reservoir that secures irrigation delivery to over 40,000 acres. Engineering Design is ongoing.
- ***Canal Lateral Automation – Potential \$14 Million Investment –*** Central staff continues to review the opportunities to provide near On-Demand deliveries to surface water irrigation customers.
- ***Kingsley Dam –*** Refacing Kingsley Dam is being evaluated and could range up to \$250 million or more. This investment is intended to extend the life of the facility for many years to come.

Please visit our website to learn more about these projects and as always, please call the Irrigation Department at (308) 995-3572 with questions to discuss irrigation projects you have in mind.

Have a great 2025 and thank you for your support of Central,

Scott Dicke

Scott Dicke
Irrigation and Water Services Division Manager

CENTRAL
Nebraska Public Power and Irrigation District

2025 Water Leasing Program

Central is once again providing an option for irrigation customers to lease their surface water acres during a full irrigation season.

- The lease term begins when Central's board approves the agreement. It expires at the end of the 2025 irrigation season.
- A maximum of 3,000 acres total will be leased. If applications exceed 3,000 acres, lands will be selected through a random drawing until the 3,000 acre threshold is met.
- The account must **not** be in termination to be eligible for the program.
- The acres leased must not be irrigated by surface or groundwater during the 2025 irrigation season. The landowner must agree to allow inspection of the crop to ensure that it was not irrigated in 2025.
- Central will pay the irrigation customer a total of **$160 per acre leased**. The initial $80 per acre (50%) will be paid by May 15, 2025 and the remaining 50% by November 1, 2025 or after verification that lands were not irrigated.
- Water service charges will still be the responsibility of the landowner. All previous water service charges must be paid.
- Acres to be leased must have been irrigated with surface water or enrolled in the Water Leasing Program during the past five years.

The application period begins Jan. 1, 2025 and ends on February 15, 2025. All applications MUST be signed by the landowner by March 15th

Call the Holdrege Irrigation Division at 308-995-3572 to schedule an appointment or to ask any questions.

8100 S. 15h St. Suite B
Lincoln, NE 68508

nard@nrdnet.org
(402) 471-7670

Nebraska's Natural Resources Districts
www.nrdnet.org

Protecting Lives • Protecting Property • Protecting the Future

January 28, 2025

Testimony in support of LB 145

Chairman DeKay and members of the Agriculture Committee:

I am John Thorburn (SPELL), manager of Tri-Basin NRD in Holdrege. Tri-Basin Natural Resources District and the Nebraska Association of Resources Districts support LB 145 and urge you to advance it out of committee to the floor of the Unicameral.

Tri-Basin NRD is responsible for protecting the soil and water resources of Gosper, Phelps and Kearney counties in South-Central Nebraska. Our NRD helped organize both the Platte Valley Weed Management Area and the Twin Valleys Weed Management Area. NRD staff work with these entities, helping to identify areas that need treatment and making contact with affected district landowners to secure their cooperation with Phragmites control efforts on their properties. We have also provided as much as $20,000 of our local funds annually for the past 15 years to support the Platte Valley Weed Management Area.

I personally worked with former state senator Tom Carlson to develop LB 98 back in 2009. This act created the Noxious Weed and Invasive Species Assistance Fund, which is the subject of our discussions today. That fund was created to address a crisis. At the time, the Republican River below Harlan County Dam was choked with phragmites to such an extent that the weeds held up streamflows and caused lowland flooding. Phragmites was also expanding into the Platte River. Working with the state department of Ag, we used state funds to leverage local contributions and got the Weed Management Areas, or WMAs, up and running. Within three years, we nearly eradicated Phragmites on the Republican River and cleared it from the main channels of the Platte as well.

Over the past 15 years, WMAs have received modest, but steady funding from several sources and have utilized those dollars extremely effectively, keeping invasive riparian plants under control in our river systems. Steady, predictable funding is key to effective management of invasive plants. This can't be an on again/off again process. Missing even one spray season could unravel the progress that we've achieved over the past 15 years. We don't expect the state to pay all the cost of managing invasive riparian plants, but we do need a reliable, predictable partner.

I thank Senator Ibach for introducing this bill. I also thank the committee for your consideration of this proposal and urge advancement to General File.

Respectfully,

John Thorburn

John Thorburn,

Tri-Basin NRD Manager

In-Season Nitrogen Management for Irrigated Corn

Richard Ferguson, Extension Soils Specialist
Javed Iqbal, Extension Soils Specialist
Guillermo Balboa, Research Assistant Professor of Nutrient Management and Digital Agriculture
Bijesh Maharjan, Extension Soils Specialist
Nicolas Cafaro La Menza, Extension Cropping Systems Specialist
Joe Luck, Precision Agriculture Engineer
Dean Krull, Research Technologist

Overview

With developments in sensor technologies and fertilizer application systems over the past 10 years, the University of Nebraska-Lincoln (UNL) recommends that irrigated corn growers adopt sensor-based in-season nitrogen (N) management. This approach offers clear advantages in profitability and N use efficiency (NUE) compared to traditional N management approaches. Fall N application, and significant N application prior to planting in the spring, is not recommended for irrigated corn. In-season application of the majority of fertilizer N through the irrigation system (fertigation) or with a high-clearance applicator is encouraged to maximize N use efficiency and profit. A base rate of 50–100 lb N/acre should be applied at or near planting, with the majority of fertilizer N applied during the growing season between V8 and R2 growth stages. In-season N application is an effective strategy to maximize the profitability of N fertilizer use and reduce the environmental impact of corn production in Nebraska.

Current Nitrogen Management Recommendations

Current UNL fertilizer nitrogen recommendations for corn originate from research conducted across the state over the past 50 years and longer. These recommendations have the goal of maximizing profit and minimizing environmental impacts of fertilizer application for corn production. Nitrogen fertilizer recommendations include components of fertilizer rate, timing, placement and source, and consider all sources of nitrogen available to the crop other than fertilizer before calculating a fertilizer recommendation. Nebraska's primary corn N rate algorithm resulted from research conducted over 81 site-years in Nebraska from 1976 to 1981. Grain yield from these studies typically averaged around 100 bu/acre for dryland and 150 bu/acre for irrigated corn. A detailed study to review and potentially revise the UNL corn N rate algorithm was conducted from 2002 through 2004, involving 34 irrigated site-years, mostly on producer fields. (Dobermann et al., 2011). A primary motivation for the study was that corn grain yield levels increased significantly during the 1980s and 1990s, and there was concern about the validity of the corn N rate algorithm with higher yield levels. The average corn grain yield from this study was 235 bu/acre. This study, conducted about 25 years after the previous research, confirmed that the general form of the UNL corn N rate algorithm continued to be accurate, despite higher yield levels. The study refined the corn N rate algorithm to include adjustments for application timing and economic considerations, based on the price of fertilizer and the price of corn. Current nitrogen fertilizer recommendations for corn can be found in Extension publications EC117, *Nutrient Management Suggestions for Corn*, and EC155, *Nutrient Management for Agronomic Crops in Nebraska*.

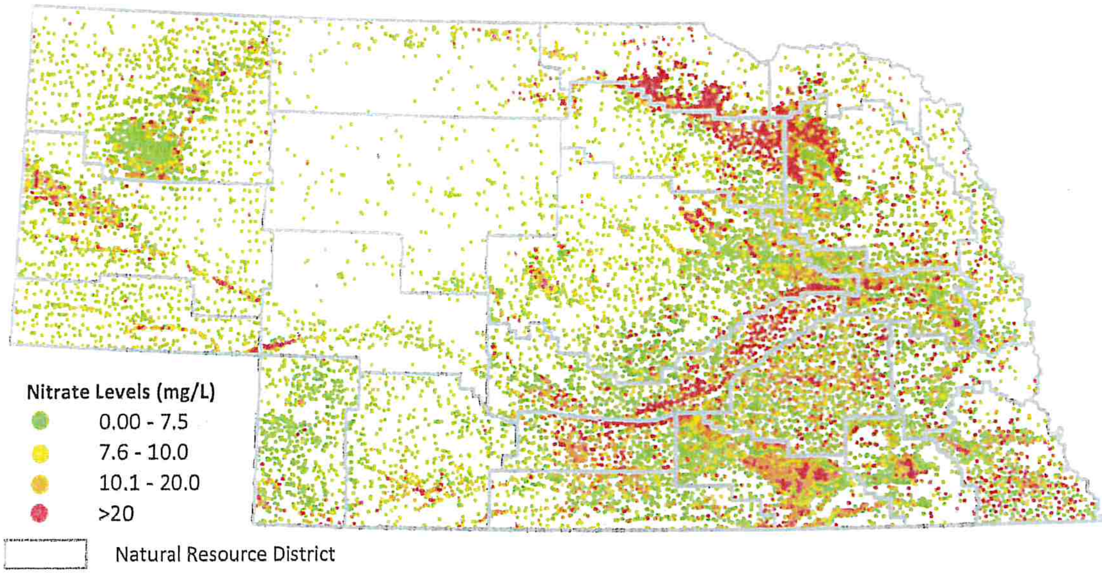


Figure 1. Groundwater nitrate-N concentration from 142,259 samples from an average of 5,786 wells of all types, 2000-2019. Nebraska Groundwater Quality Monitoring Report, 2022.

In one sense, it is not surprising that the general equation for fertilizer nitrogen recommendation for corn based on late 1970s research was still valid 25 years later, since the equation uses a mass balance approach. This approach is based on research by George Stanford (Journal of Environmental Quality, 1973), which showed a relatively constant relationship between corn grain yield and nitrogen uptake from all sources of N of 1.2 lb N/bu corn. (Stanford's paper included data from research in Nebraska). Thus, a nitrogen fertilizer rate recommendation that accounts for yield potential will naturally increase as yield level increases, all other factors being equal. It is also important to note that Stanford considered other sources of N, especially residual mineral N present in soil and that mineralized from soil organic matter, as credits to be considered before determining a fertilizer N rate.

The value of 1.2 lb N uptake/bu of corn is often mistakenly viewed as a fertilizer N requirement, which is inaccurate. The current UNL N rate algorithm for corn starts with corn uptake of 1.2 lb N/bu, then credits N from various sources. These N credits include N mineralized from soil organic matter, soil residual inorganic N, N contributed from irrigation water, N from manure, and N credit from previous legume crops. Once N credits from these various sources are accounted for, the remaining N requirement is filled with inorganic fertilizer.

The current UNL N rate algorithm for corn grain is:

$$[35 + (1.2 \times EY) - (8 \times NO_3\text{-}N\ ppm) - (0.14 \times EY \times OM) - \text{other N credits}] \times Price_{adj} \times Timing_{adj}$$

EY = Expected yield, bu/acre

NO_3-N ppm = nitrate-N concentration in soil, in parts per million

OM = Soil organic matter, %

$Price_{adj}$ = adjustment factor for N fertilizer and corn prices

$Timing_{adj}$ = adjustment factor for N application timing

and is available as an online corn N rate calculator at https://agritools.unl.edu/tools/nitrogen, and in the Extension Circular, EC117, *Nutrient Management Suggestions for Corn*. The online calculator allows the inclusion of credits from soil organic matter, soil residual N, irrigation water nitrate, manure and the previous crop, and includes factors of expected yield, fertilizer price, corn price, and application timing to calculate the recommended fertilizer rate.

It should be noted that this is an empirical equation, not a mechanistic model. The numbers in front of the factors for NO_3-N ppm and EY*OM are regression coefficients based on data from the 1976–1981 and 2002–2004 research studies. These coefficients provide the best fit for the equation under conditions in which the studies were conducted—namely Nebraska soils and weather. Consequently, the application of this equation outside Nebraska conditions may produce recommendations with uncertain accuracy.

Water Quality and Nitrogen Use Efficiency Trends

There has been concern about elevated nitrate-N levels in Nebraska groundwater since the early 1960s, following the rapid adoption by Nebraska farmers of inorganic nitrogen fertilizers starting in the early 1950s. Figure 1 illustrates areas of Nebraska with groundwater nitrate-N levels that are of concern. Since the early 1980s there have been a variety of regulations and educational efforts to influence farmer fertilizer management practices, mostly through Nebraska Natural Resources Districts (NRDs). These educational and regulatory efforts, based

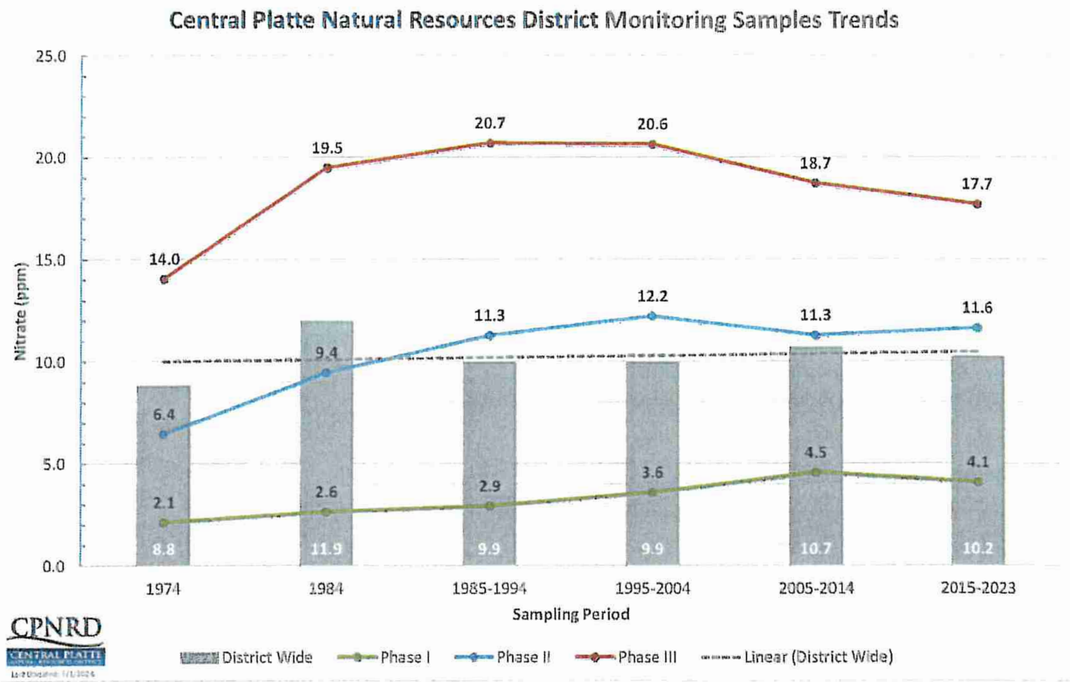


Figure 2. Groundwater nitrate-N trends, Central Platte Natural Resources District. Data is from CPNRD monitoring wells. Phases I, II and III are areas within the NRD with increasing average groundwater nitrate-N concentrations, and thus increasing restrictions on when N is applied.

on University of Nebraska-Lincoln research and Extension publications, have resulted in significant gains in how efficiently Nebraska farmers use nitrogen fertilizer. Figure 2 illustrates data from the Central Platte Natural Resources District (CPNRD), showing declines in groundwater nitrate-N levels since 2004 in the most contaminated areas (Phase III). The CPNRD was the first to implement a Groundwater Management Area (GWMA) due to elevated nitrate levels, which required farmers in the area to attend training sessions on nitrogen and irrigation management, and restricted when fertilizer could be applied. The CPNRD has been able to slow or reverse the trend of increasing nitrate concentrations in the most impacted areas, but on average there is a gradual trend for increasing nitrate concentrations, and the most contaminated areas remain above the EPA drinking water standard of 10 ppm NO_3-N. In much of Nebraska this trend for continuing increase in groundwater nitrate-N levels is partially due to the transit time of nitrate through the vadose zone (the unsaturated zone between the root zone and the aquifer). Due to the depth of the aquifer, nitrate entering the aquifer may have leached from the root zone several years to several decades ago and does not reflect current crop management practices. However, areas of the state with shallow aquifers also continue to see increasing groundwater nitrate concentrations (Juntakut et al., 2019), suggesting that more should be done to reduce nitrate loss from commercial fertilizers. Research at UNL in collaboration with NRDs calculated the partial N balance (difference between N inputs and grain N removal) across corn producers over several years as a proxy of N losses to the environment (Tenorio et al., 2021). About 70% of corn producers had a surplus N balance, indicating that N inputs were higher than N removal with grain. Corn producers with a large surplus of N were consistently over-applying N over the years.

Predictive Nitrogen Management

The accuracy of the UNL corn N rate algorithm for corn has been generally validated through many demonstration projects, on-farm research, and detailed research studies in Nebraska from 2004 through 2023. On average the algorithm produces a nitrogen fertilizer recommendation approaching the economic optimum fertilizer N rate (EONR), though the accuracy will vary with location and year. For most fields in Nebraska, the UNL corn N rate algorithm will be within ± 30 lb N/acre of EONR. Over the past twenty years there have been many regional and national studies investigating approaches to developing

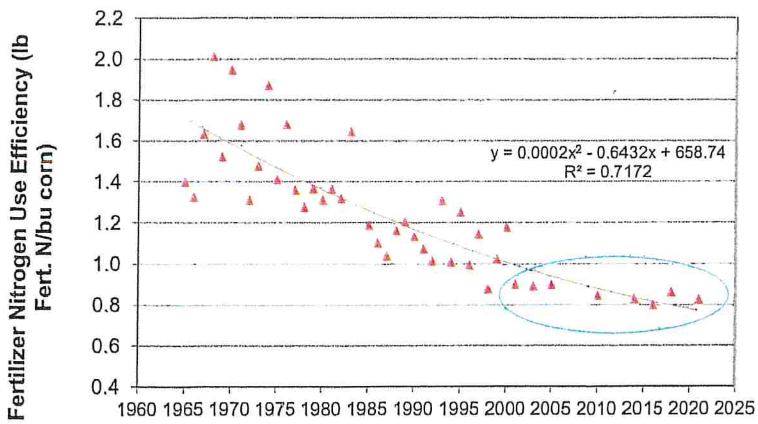


Figure 3. Fertilizer nitrogen application for corn in Nebraska, 1965–2021. Summary produced from data reported by producers in USDA National Agricultural Statistics Service (NASS) surveys, and the Nebraska Department of Agriculture.

EONR recommendations for corn. A significant review paper by Morris, et al. (2018) documented these efforts. Authors of this review in 2018 stated that "*Nitrogen recommendations for the foreseeable future in humid regions will poorly predict the amount of N needed for corn at individual fields*". A major research project conducted over eight states across the Corn Belt, including Nebraska, at 49 sites from 2014 through 2016 evaluated N recommendations tools for corn (Kitchen, et al., 2017). A recent publication from this study (Ransom, et al., 2023) found that individual N recommendation tools across all 49 sites poorly estimated EONR ($R^2 \leq 0.24$), while combining three at-planting N rate recommendation tools improved the ability to predict EONR with an R^2 of 0.46. (R^2 is a statistical measure of the ability of the model to fit the data; an R^2 of 1 means the model perfectly fits the data). While combining EONR prediction tools increased the accuracy of EONR prediction over the use of a single tool, an R^2 of 0.46 still reflects a relatively poor ability to accurately predict the correct N rate.

Figure 3 illustrates that fertilizer N application by corn producers in Nebraska has gradually reduced over the past 50 years from around 1.7 lb fertilizer N/bu corn grain in 1965 to around 0.8 lb fertilizer N/bu corn grain in 2021. This is a tremendous improvement in fertilizer use efficiency, resulting in increased profit for Nebraska farmers and reduced environmental impact. Unfortunately, there continue to be significant areas of Nebraska with groundwater nitrate-N in excess of the EPA drinking water standard of 10 ppm. There has also been little change in the amount of fertilizer N applied per bushel of corn over the past 20 years, as shown in Figure 3 (blue outline), with average grower fertilizer N application of around 0.8–0.9 lb fertilizer N/bu corn grain from 2000–2021. This lack of further reduction in N application per bushel raises the question of whether we've reached a limit to improving NUE, or if broad adoption of different practices is needed to further improve NUE. A recent survey in Nebraska found that 45% of farmers apply all N in early spring (33% pre-plant and 12% at planting), 14% in the fall, 12% during the growing season, and 29% use split application (Balboa et al., 2023). The survey also found corn producers applying an average of 169 lb N/acre, with 80% using soil lab recommendations and 67% relying on personal experience/intuition. More advanced N recommendation tools generally had low adoption (crop models 23%, sensor-based algorithms 11%, and other digital tools 11%), indicating there is potential for growth in use of these tools.

Our overall inability to accurately predict EONR for corn can be explained by the complexity of N interactions with soil and the environment. Nitrogen exists in many organic and inorganic forms in soil, which are highly influenced by weather—particularly rainfall and temperature. Nitrogen is subject to loss from the soil via leaching and gaseous emissions (N_2O and NH_3). Consequently, our ability to predict N dynamics in soil, and availability of N from soil and fertilizer to the crop, is dependent on our ability to predict weather. Until we can perfectly predict weather, we cannot perfectly predict N availability to a crop. We are comfortable using the Nebraska N rate algorithm for corn as a good predictive model available for Nebraska. However, our research shows that reactive management strategies, applying most of the N fertilizer during the growing season, and basing the application rate on crop N status, can increase profit and NUE for most growers, particularly for irrigated fields capable of fertigation.

Reactive In-Season Management

Significant crop uptake of N for corn begins around the V6 growth stage (Figure 4). From that point until around the R2 growth stage, N uptake is rapid and at a fairly linear rate. Less than 50 lb N/acre is needed to reach the V8 growth stage, but around 150 lb N/acre is needed by the R2 growth stage. (These N amounts are from all sources, not just fertilizer). An ideal N fertilization approach would

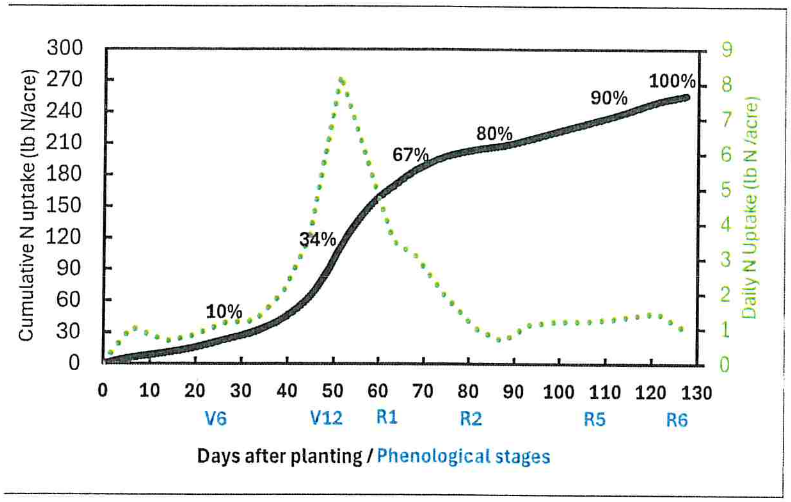


Figure 4. Typical cumulative nitrogen uptake for corn (black line) and daily N uptake (green line) (from all sources). Based on Bender et al., 2013, with a yield of 220–230 bu/acre.

steadily provide the N needed by the crop during the period of rapid N uptake between V8 and R2 growth stages and would leave little excess N available for environmental loss. Instead of attempting to predict EONR for corn *before* the growing season, reactive methods seek to prevent or minimize crop N deficiency *during* the growing season, using sensors measuring light reflected from the crop canopy. Crop canopy sensing approaches use light reflected from the crop in both visible and near-infrared wavebands to detect developing N deficiency in the crop before it becomes visible to the human eye. Sensing approaches can be either passive (using the sun as a light source) or active (using an integral, pulsed light source unaffected by sunlight). Sensing systems can be ground-based (handheld or vehicle-mounted) or aerial (UAV, airplane or satellite). Substantial research over the last 25 years has documented the ability of optical sensing techniques to detect developing N deficiency in crops and to improve NUE with sensor-informed in-season fertilization (Raun, et al., 2002; Solari, et al., 2008; Solari, et al., 2010).

Active Crop Canopy Sensor Management with High-Clearance Applicator

Project SENSE (Sensors for Efficient N Use and Stewardship of the Environment) was a research and extension project conducted in Nebraska from 2015-2021. The project conducted trials of sensor-based in-season N application for corn with over 80 site-years on farmer-cooperator fields. The project compared standard grower N management practices to in-season N application using a high-clearance applicator, with N rate controlled by an active (light-emitting) crop canopy sensor. Sensor-based application occurred once during the growing season, between V8 and V12 growth stages. This approach is not purely reactive, in that an algorithm is used to predict the remaining N requirement for the crop based on canopy reflectance at these growth stages. Averaged over all site-years, sensor-based in-season management reduced N application by 33 lb N/acre compared to grower practices (NOFRN Results 2020). Although yield on average was slightly less (1.2 bu/acre) with sensor management compared to grower management, it still averaged 221 bu/acre and partial profit increased significantly with sensor management compared to grower management—from $10–24/acre, depending on the price of N fertilizer and corn. Nitrogen fertilizer applied per bushel with sensor-based management improved to 0.72 lb fertilizer N/bu of corn, compared to the average grower application of 0.86 lb fertilizer N/bu of corn.

Passive Crop Canopy Sensor (Satellite) with Fertigation

A development from Project SENSE has been the use of satellite imagery instead of high clearance vehicle-mounted active sensors to manage N in-season. This approach uses similar multispectral crop canopy reflectance to detect developing N stress in the crop. Instead of simultaneously sensing stress and applying N fertilizer, a satellite-based approach requires that imagery be obtained by the satellite, followed by data processing to determine if additional N is needed, followed by fertilizer application. The advent of satellite systems with short revisit times (as often as daily) combined with sufficient spatial resolution (≤ 30 ft) of multispectral sensors has made satellite sensing practical for in-season N management, with a short interval between detection of developing crop N stress and fertilizer application. One company using approaches developed at the University of Nebraska-Lincoln for satellite-based in-season N management is Sentinel Fertigation (https://www.sentinelfertigation.com). The Nebraska On-Farm Research Network partnered with Sentinel Fertigation, Nebraska Natural Resources Districts (NRDs), and several farmer-cooperators from 2021-2023 to evaluate in-season N application based on satellite information. Over this three-year period at 24 sites, satellite-based in-season N application decreased average N rate by 56 lb N/acre compared to standard grower practices, while reducing grain yield by only 3 bu/acre (average sensor-based yield was 249 bu/acre). Despite the slight reduction in yield, average partial profit increased by $24/acre with sensor-based in-season management. Fertilizer N application reduced to 0.60 lb fertilizer N/bu corn, compared to 0.84 lb fertilizer N/bu corn with grower management (OFRN Results 2022; OFRN Results 2023).

There are several differences between high clearance applicator—active sensor and satellite sensor—fertigation approaches to in-season N application. High clearance—active sensor in-season application normally occurs only once during the season, between V8 and V12 growth stages. This is because most applicators cannot clear the canopy height once it exceeds V12, and due to the cost of additional trips over the field by an applicator. Consequently, an algorithm is used to estimate the remaining N needed for the crop to reach maturity based on canopy reflectance. This approach can be more accurate than pre-season prediction algorithms in estimating EONR due to use of crop information during the growing season, and the much-reduced risk of environmental N loss. In contrast, satellite-based fertigation management can be purely reactive. If developing N stress is detected, N application is recommended (typically around 30–60 lb N/acre). After fertigation is triggered, crop canopy reflectance continues to be monitored, and if pending N stress develops again, fertigation is again recommended. An interval of at least a week between fertigation events is recommended to allow time for the crop to respond to fertilization. This approach of monitoring and fertilization can occur through the season between V8 and R2 growth stages. Growers typically fertigate 1–3 times during the growing season using this approach.

Components of High Clearance Applicator—Sensor-Based N Fertilization

1. Availability of a high clearance applicator.
2. Canopy sensors and control system mounted on the high clearance applicator.
3. Application of N fertilizer to the field ahead of sensing at a rate below the expected optimum N rate. Most often the base fertilizer N application should be at or near planting, at a rate around 25% of the expected total N application (usually 50–100 lb N/acre). Use of nitrification and/or urease inhibitors to reduce potential N loss is encouraged, depending on fertilizer source and application method. Some active sensor approaches require calibration blocks with N rates below and above the expected total N application applied at planting.
4. At the time of in-season N application (between V8-V12 growth stages), calibration of canopy reflectance is required. The process of calibration may vary with the type of active sensor used. This can be done by measuring crop canopy reflectance from pre-installed N rate calibration blocks, or by creating a virtual reference by measuring reflectance over a portion of the field, according to directions from the sensor manufacturer.
5. A single in-season N application. Based on canopy sensor information, an algorithm in the control system calculates a Sufficiency Index (SI) from reference and bulk field sensor readings, then determines the remaining fertilizer N needed for the crop to reach maturity (Holland and Schepers, 2010). The system then applies the needed fertilizer on the go.

Components of Sensor-Based N Fertilization

1. A fertilizer injection pump and fertilizer storage tank for the irrigation system.
2. Base N rate below the expected optimum N rate. Most often the base fertilizer N application should be at or near planting, at a rate around 25% of the expected total N application (50–100 lb N/acre). Use of nitrification and/or urease inhibitors to reduce potential N loss is encouraged, depending on fertilizer source and application method.
3. Inclusion of blocks in the field with N applied at rates slightly above and slightly below the base N rate, which serve as crop reflectance calibration points to calculate a Sufficiency Index. Alternatively, a virtual reference approach may be used, based on non-stressed areas of the field.
4. Sensor information processed by a commercial advisory service, such as Sentinel Fertigation, to monitor crop N status and generate a fertilizer N rate recommendation as needed between V8 and R2 growth stages. Growers may need 1–3 fertigation events for a field, applying 30–60 lb N/acre at each fertigation event.
5. Alternatively, in-season application with a high-clearance applicator can be used, with application timing and rate informed by satellite sensors, if the applicator will clear the crop canopy.

Fertigation allows growers to use their irrigation system as the fertilizer application device, with the addition of a fertilizer injection pump and storage tank. This method enables multiple applications of fertilizer N periodically

Figure 5. Fertigation system with programmable injection pump.

during the season as needed, based on seasonal N uptake by corn (Figure 4). Satellite-based fertigation most often uses a uniform N rate applied across the field for each fertigation event. However, if the irrigation system is capable, fertilizer N rate can vary within pie-shaped sections of the field, based on satellite reflectance information. Figure 5 illustrates a programmable fertilizer injection pump, capable of varying fertigation rate in pie sections, enabling precise N management tailored to specific field conditions detected by satellite imagery.

Keep in mind that appropriate check valves must be in place and inspected by Natural Resources District staff, and the operator must be certified to conduct chemigation, before fertigation can occur. One aspect of relying on fertigation to apply the majority of N needed for the growing season is that the need for N may occur earlier in the season than the need for water. Growers should anticipate this potential and be prepared to irrigate earlier in the season and be able to fertigate with a small amount of water—perhaps 0.25 -0.5 in/acre—to apply fertilizer.

Fertigation Without Sensor Information

University of Nebraska N recommendations have always encouraged split application, with a significant amount of the total N fertilizer applied after the growing season starts. Soil is a poor place to store nitrogen fertilizer. As soon as nitrogen fertilizer is applied to soil it is subject to various loss processes in the soil. While fertilizer source selection, timing, and use of inhibitors (both urease and nitrification inhibitors, or stabilizers) can help reduce risk of N loss, the risk is still there. The longer fertilizer N remains in the soil, the greater the risk of loss. Application of fertilizer N after the wettest months of the year (May and June) decreases the risk of N loss due to leaching or denitrification.

Components of In-Season Fertilization without Sensors

1. Use the UNL corn N rate calculator (https://agritools.unl.edu/tools/nitrogen) to calculate a total fertilizer N rate, then apply a base rate of about 25% of the recommended total N rate (around 50–100 lb N/acre) at or near planting. Use of nitrification and/or urease inhibitors is encouraged, depending on fertilizer source and application method.

2. If fertigation is an option, split the remaining N needed into 2–3 applications, with timing evenly spaced between V8 and R2 growth stages. Figure 4 illustrates cumulative N uptake, daily N uptake and an illustration of N required between growth stages for 250 bu/acre corn. Application may include ground-based application if equipment will clear the crop canopy. The amount of nitrogen applied during a single fertigation event should not exceed 75 lb N/acre, to reduce risk of runoff loss or potential leaf burn. Any observed evidence in the crop of N deficiency should result in adjustment of in-season timing and rate.

Summary

- The closer N fertilizer is applied to crop use, the more efficiently it will be used by the crop.
- Irrigated corn growers should target application of 60% or more of total fertilizer N during the growing season. Fall and significant spring pre-plant applications are not recommended.
- Typically apply 50–100 lb N/acre as a base rate around planting time. Use of enhanced efficiency fertilizer (nitrification inhibitor, urease inhibitor, or controlled release formulation) is encouraged.
- Nitrogen application using a high clearance applicator and active crop canopy sensors should occur between V8 and V12 growth stages.
- Fertigation using satellite imagery to determine rate and timing should occur between V8 and R2 growth stages.
- Fertigation without use of sensor information should occur between V8 and R2 growth stages, with overall rate based on the UNL corn N calculator.
- For growers unable to use sensor-based management or to fertigate, sidedress remaining fertilizer N needed (based on UNL corn N calculator) between crop emergence and V8 growth stage.

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University of Nebraska Lincoln

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Brad Lundeen
Letter to the Editor 1/21/25

At a meeting this fall in Heartwell, there was discussion on how to get water levels back to 1981-85 levels, which is the threshold that Tri Basin NRD uses to implement phase 2 ground water management rules. Drought and lack of recharge have caused declines in part of Tri Basin NRD 580,000 irrigated acres. There are a couple of reasons for the decline. One is the conversion of gravity irrigation to pivots, which are more efficient but cause less water to infiltrate into our aquifer. The other is the overuse of conditional supplemental wells which were allowed by the NRD when Central had a couple of years of curtailed deliveries. Another problem is not fully utilizing existing surface water appropriations when water is available. What does it cost this area to not fully utilize all existing appropriations when we have an adequate water supply in Kingsley Dam. Nonuse of existing water appropriations causes needless groundwater depletions and added pumping costs. How much extra energy does it cost for every 10 feet of increase in pumping levels? It takes 2.61 extra hp for every 10 feet of increased pumping levels. At today's Southern Public Power rates for any time interruptible, it costs an extra $1.06 per acre for the producer. On 580 thousand acres, that is $614,800 dollars per year and for 10 years a staggering $6,148.000, needlessly spent. Much can be done to reverse this situation by fully utilizing Central's system in innovative ways that have not been done in the past. Fully utilizing Platte River excess flows and directing them to specific areas in the district that are in groundwater decline. Fully utilizing existing reuse pits and repurposing them for intentional recharge in areas around Minden and Heartwell and Axtell will go a long way in rebalancing our water supply. We must encourage producers and landlords to invest in infrastructure that will enable us to use surface water when it is available and use ground water as a backup when it is short. We must understand that an investment in pumps and infrastructure is not only a good investment now, but more importantly, an insurance policy that our land will be as productive in the future as it is today.

Our future in this area is brighter than any other state in the USA. While water shortages and water wars are in the news every week, we have a unique set of circumstances in this tri-county area to ensure our future for our families, our schools and our communities. Some modifications to be able to use either surface water or ground water are fairly simple and cheap, but in other circumstances could cost up to $50.000.
If you, or you landlords chose to invest $50.000 in a project to fully use Centrals water, that is only 2 and half percent of the value of your farm. a small price to pay to protect your investment in land. Ask the people in Kansas, Texas, and California what they would pay to protect their water.

HDC 1/30/25

Kansas woman provides insights into 1935 Republican River Flood

A Goodland, Kas., woman provided insights into all the difficulties people encountered in the 1935 Republican River Flood, at the South-Central Water Conference on Jan. 23 in Holdrege.

Joy Hayden, who worked for the National Weather Service in Goodland, Kas., for 20 years, showed photos of the flood and told interesting stories about each Kansas and Nebraska town affected.

The rain started falling heavily in northeast Colorado on May 30, 1935. The crest came at 3 a.m. She said that it took three days for the flood to build up and spread across three states.

A newly-built bridge at St. Francis, Kas., in northwest Kansas, wasn't needed anymore because the Republican River changed channels in the flood. One picture showed mules swimming in deep water. "The animals were seeking shelter as well," she said. Cows tried to enter houses.

An Olympic-size swimming pool of water was rushing through Max, Neb., every second in the flood, according to her. A woman and two children sat on a car surrounded by water at Benkelman. Newspaper reporters from cities came to write about the 1935 flood. They were stranded at the Benkelman train station and stayed there several days, until a train could be brought there. Benkelman's residents took care of them while they were there.

Mrs. Hayden told those at the water conference in Holdrege that J.W. Rogers went outside in the morning to do chores on his Trenton farm. The flood came and he spent until 10 p.m. in a tree. When he came down, his dog pulled his 65-year-old master to shore at night and helped him avoid quicksand. Someone later stole the furry black-and-white dog, but he returned home to Trenton eventually.

The flood isolated McCook for several days. Roads were covered by water and supplies could only come by air.

The McCook power plant stood at the bottom of the Republican River. The building was strong and had steel doors. "But the flood of 1935 was different," she said. Pretty soon flood waters surrounded the power plant and men who worked there climbed onto the roof.

Her slide showed some cables strung across the river to the building. Two people were rescued by pulling themselves over the lines. Robert French fell into the river, got out but later died because of the bad water he'd swallowed. One day after the flood swamped the power plant located where Barnett Park is now, it collapsed.

When they cleaned out the building after the flood, workers founded 200 poisonous snakes and a bobcat. Men moved the McCook power plant to higher ground. "It was amazing how people worked together," the Kansas woman remarked.

A McCook drug store that sold ice cream lost its electricity in the storm and flood. So the store invited children to have free ice cream at the store because it was going to melt anyway.

"Cambridge was devastated," the author of "The 1935 Republican River Flood" told the Phelps County Ag Center audience. Eleven people survived by staying on a roof. One woman carried supper for her and her five children to the roof. She showed pictures of people traveling by boat in Cambridge.

She told the story of a minister and his wife. Flood waters entered their house in Cambridge. Mrs. Bragg kept pushing debris away but the flood waters rose toward the ceiling. The Rev. Bragg told her in his last words, "I must go now." He fell and water began covering him. He drowned and his body was found later outside the front door, which she called a "terrible tragedy." One man used mules and straps to move their house back to land.

The late Roy Pearson of Holdrege was a member of the 35th Division of the National Guard. She said that this National Guard group formed chain gangs and rescued many people in the flood waters at Alma.

She showed a picture of Mr. Pearson and his second wife, Mary, and another of his entire National Guard division.

Flood waters left Nebraska at Superior and headed to Clyde, Kas., where a farm couple lost everything. One photo showed Concordia, Kas., on June 2, 1935 with the flood covering the whole town. A plane dropped sandwiches to people.

"It became the story that was in newspapers across the nation," Mrs. Hayden said. She displayed a big, black headline in the Denver Post that said: Flood spreads in NE Colo.

She remarked, "The '35 flood was like a hinge on a door. It did start to bring a change and bring help to farmers." Now there's great recreation areas in the same area where the Republican flooded, she said.

Mrs. Hayden concluded, "I feel it's our duty to preserve the past."

Also speaking at the water conference were: Shannon Sand, extension educator, on carbon markets; Bridger Corkill, Nebraska Department of Energy and Environment, on nitrates in drinking water study update; and Nick Simonson, :Lower Republican Natural Resources District; Craig Scott, U.S. Bureau of Reclamation; Nolan Little, Tri Basin Natural Resources District; and Tyler Thulin, Central Nebraska Public Power and Irrigation District; all gave a water resources update.

University of Nebraska Extension, CNPPID, Tri-Basin Natural Resources District, Natural Resources

Weather

LOCAL FORECAST

TONIGHT: A 20 percent chance of rain before midnight. Mostly cloudy during the early evening, then gradual clearing, with a low around 28. North northwest wind 5 to 15 mph, with gusts as high as 20 mph.

FRIDAY: Sunny, with a high near 56. North northwest wind 5 to 15 mph becoming south southwest in the afternoon. Winds could gust as high as 20 mph.

FRIDAY NIGHT: Mostly clear, with a low around 28. South wind 5 to

Low Wednesday a.m.	19F
High Wednesday	56F
Low Thursday a.m.	20F
High year ago	61F
Low year ago	23F

PRECIPITATION

2025 to date	.26"
2024 to date	.59"

EXTENDED FORECAST

SATURDAY: Partly sunny, with a high near 58. South wind 5 to 10 mph becoming west in the afternoon.

SUNDAY: Partly sunny, with a high near 56.

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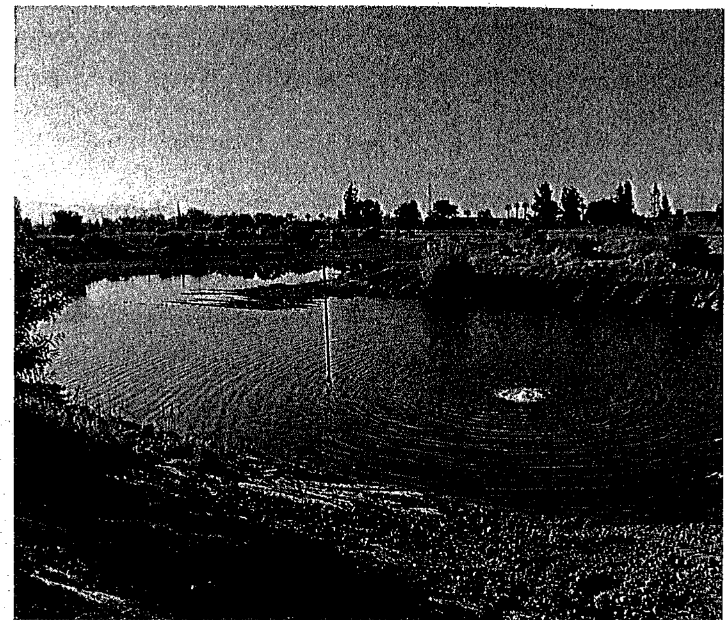
Michael Hagman of the Lindmore Irrigation District: Balancing Accounts With Groundwater Recharge

An operating 38-acre recharge pond in LID.



The City of Lindsay's Mariposa storm water basin, operating with surface supply from the Friant-Kern Canal.

Growing downstream demands and shrinking water supply in California's Central Valley are forcing big changes on agricultural operators and the water districts that supply them. In response, annual water allocations for Central Valley farmers are being maintained by new efforts to replenish groundwater, allowing more permitted use of the rivers and canals. Michael Hagman, the general manager of the Lindmore Irrigation District (LID) and the executive director of the East Kaweah Groundwater Sustainability Agency (EKGSA) tells us more about the efforts being made to keep irrigation water flowing under challenging conditions.

Irrigation Leader: Please tell us about your background.

Michael Hagman: I finished college in 1996 with a master's degree in public administration. I began working for Friant Water Authority (FWA) in 2005. LID, a member agency of the FWA, hired me in 2007. In 2016, LID and other Central Valley Project (CVP) agencies started and began managing the EKGSA. Today, I run my farm, LID, and the EKGSA.

Irrigation Leader: Please tell us about LID.

Michael Hagman: LID is located next to the city of Lindsay, up against the Sierra Nevada mountain range halfway between Bakersfield and Fresno. We are also located in the Kaweah subbasin, which is part of the Tulare Lake basin. The district is 27,500 acres in size. We have about 525 customers. About 65 percent of them grow citrus; the rest are mostly split among nuts, olives, and vines. We have some berries, but not a lot. We had quite a bit of alfalfa, cotton, and feed corn, but that is all getting replaced by permanent crops. Some are being fallowed or dryland farmed in oats or wheat.

LID was formed in 1937, when California began the CVP for water supply. At that time, the Lindmore area sat over the Lindsay cone of depression—a severely overdrafted space in the groundwater aquifer. This overdraft resulted from the fact that while this is a perfect place to grow highly valuable and productive crops such as citrus and nuts, it lacked enough water supply. Citrus farming began in the late 1800s in this area.

When the CVP came along, it provided a federal water rights contract to deliver surface water into LID. Ever since we got access to the CVP supply, we've drawn all we can from it for delivery to our farms.

Until 2006, groundwater levels had been rising; the average depth from the surface in LID was 60 feet. After 2006, a drought hit, and the insecurity of our federal water supply hit us too. We also now had more farming to our west. All these pressures increased at the same time. In 2022, our average well depth to groundwater was 176 feet, so we lost about 110 feet of groundwater elevation in about 15 years.

We are now on the mend a little bit because California's Sustainable Groundwater Management Act has directed us not to overdraft. Rules are now in place that ultimately mean landowners must pump less groundwater than before.

Irrigation Leader: Do the overdraft and ground subsidence issues go back to the 1930s?

Michael Hagman: The whole basin began overdrafting groundwater as early as 1880, although I think subsidence did not start in the eastern portion of the subbasin until the 1980s. Surface supply back then was a lot more plentiful, but a lot of new farm demand came along, and landowners turned to groundwater to meet their demand.

Irrigation Leader: What are the proportions of the various sources in your water portfolio?

Michael Hagman: LID has a 33,000 acre-foot class 1 water contract for water that can be stored behind Friant Dam in Millerton Lake. LID also has a 22,000 acre-foot class 2 water contract, which is water that is provided only as available, meaning we take it when it comes. Between those two, we could get up to 55,000 acre-feet per year if everything turned out right.

Historically, the district was built on getting just enough water to physically apply to the farmed acreage when it was needed. When I first got to the district, my job was to take the allocation from the Bureau of Reclamation, deliver it to the 25,000 assessed acres, charge them for it, spend money to keep the system going, and report profits and losses.

That routine has changed substantially since then. When it is a wet year, we take all the water we can to store it underground. Our system was only designed to take water on demand, so the district added about 500 acres of groundwater recharge basins. My job now has the added complexity of running a recharge program, getting as much water from the CVP into our system as we can, and maxing out the queue on gravity pipelines that run water to our landowners. Often, our agriculture demand is close to zero, but we are maximizing our gravity lines to the recharge basins.

Irrigation Leader: What is the relationship between LID and the FWA?

Michael Hagman: LID is a member agency of the FWA. The FWA was formed by the federal water contractors that take water from the Friant-Kern Canal, the CVP canal that delivers water from Friant Dam to the Kern River. The FWA operates and maintains the canal. Another agency operates and maintains the Chowchilla-Madera Canal. Each member of the FWA has one vote on the operations, maintenance, and administration of the canal, regardless of its size. LID is a middle-sized agency; other members are twice our size.

Irrigation Leader: Are LID and the EKGSA institutionally connected in any way aside from the fact that you oversee both?

Michael Hagman: The EKGSA was formed by federal water contractors along the east side of the Kaweah subbasin: the City of Lindsay, Exeter Irrigation District, Ivanhoe Irrigation District, LID, Lindsay-Strathmore Irrigation District, Stone Corral Irrigation District, Tulare County, and a couple of water companies. These entities together formed the EKGSA because they wanted to make sure the import of surface supply from Millerton Lake was well represented in the Kaweah subbasin. In wet years, the old method of just taking the water that we needed to irrigate crops has been replaced by the new practice of taking as much flood or surplus water as our class 2 contracts allow and placing it in our respective districts or in the subbasin.

Irrigation Leader: Please tell us about the district's investments into groundwater recharge. 116

Michael Hagman: My job when I first got here was simply to get water from Reclamation; give it to landowners; charge them; and operate, maintain, and administer LID's delivery system. Around 2010, the federal government settled a lawsuit on the San Joaquin River The settlement created the San Joaquin River Restoration Program. This required more water to be delivered down the San Joaquin River than would have been delivered to the FWA contractors. The LID board members realized they needed to do something different.

In 2016, an opportunity came to buy about 30 acres on one of our main gravity lines. LID bought the land for $300,000. The person selling the land cut us a deal because he was retiring and wanted to help conservation. We quickly put recharge basins on this property. We ran water to it in late 2016 and early 2017, recharging about 3,500 acre-feet in about 10 months. Some of that water evaporates, but 95 percent goes into the aquifer.

LID's board began looking at other groundwater enhancement opportunities. A landowner on our west end sold us 320 acres. We developed a canal and basins on half that land. We are studying the northern 160 acres for other recharge opportunities.

Early on, LID worked with the state and the EKGSA and got a grant to install a turnout from one of our larger laterals into the City of Lindsay's Mariposa storm water basin. We cleaned out 16–18 inches of silt and put about 800–900 acre-feet of clean mountain water into that basin in 1 year. The basin sits on top of a city-owned well that cannot be used anymore due to water quality issues. We hope the addition of this fresh mountain water next to the well will allow the city to operate its $800,000 well with fresh potable water supply.

Lindmore received another state grant for a siphon that goes from the Friant-Kern Canal to Lewis Creek. The project is called the Lewis Creek Siphon. The siphon is 36 inches in diameter with a capacity of about 55 cubic feet per second. We operated in April and May at about 20 cubic feet per second. That water either enters the aquifer or is used by our members.

Irrigation Leader: Do you get some sort of credit for the volume of water you are recharging?

Michael Hagman: The FWA operates the Friant-Kern Canal and reads meters installed and approved by Reclamation. It reports what it reads to the EKGSA. Last year, we moved about 60,000 acre-feet through our system. It was a very wet year. That water is recorded as a delivery of surface supply to LID and is reported to the EKGSA. That is partially offset by added groundwater recharge as measured through the spectral analysis of satellite imagery. The actual evapotranspiration measures how much water is transferred from the earth's surface to the air daily.

Let's say Lindmore receives 60,000 acre-feet for surface supply and deducts 40,000 acre-feet to total evapotranspiration. That means 20,000 acre-feet are not removed from the basin. Those 20,000 acre-feet are then presumed to be entering the groundwater aquifer and are allocated, as directed by the board, to the individual landowners. Extra water becomes available based on the amount of our recharge additions to groundwater supply.

Irrigation Leader: Would you tell us about your other infrastructure projects?

Michael Hagman: We replaced 2½ miles of pipeline last year at a substantial cost. We are also repairing the subsidence of the Friant-Kern Canal in the basin to our south. There was an agreement between the FWA and the next groundwater agency to our south for overextracting groundwater supply and creating subsidence along the canal alignment. Because of this subsidence, the Friant-Kern Canal sank, and continues to sink, so a peripheral canal was built next to the old one. Now, water is run down both canals to meet the design capacity. That was an expensive venture. Reclamation and the state gave the FWA grants to cover about 60 percent of the cost, but the balance must be funded by landowners who use the Friant-Kern Canal.

Irrigation Leader: Has LID also received federal and state grants?

Michael Hagman: The district has received three grants. We received a $200,000 federal grant for a $500,000 project to upgrade our pumping plant electronic controls in 2015. That investment substantially reduced our electrical use because it allowed us to operate to meet demand instead of pumping and storing water to deliver it to a landowner. This was a big help; it saves us about $30,000 annually and helps us deliver water more efficiently to the landowners.

Grants from the State of California partially funded the two projects we talked about previously—the Mariposa storm water basin in Lindsay and the Lewis Creek Siphon project. Revenues collected from landowners funded everything else.

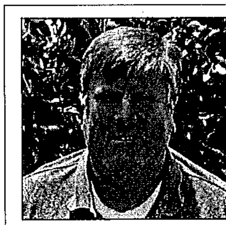
An example of how we generated revenue for our aging infrastructure and projects is that we formed a power agency and developed hydropower projects at Friant Dam. Those power projects generate $1.25 million a year. The district used to use that power revenue to reduce the cost of water delivered to landowners in Lindmore. Now, those revenues are used to maintain our aging structure and to add recharge capacity.

When I first got here in 2007, our water from Reclamation cost $40 an acre-foot, and we charged the landowners $42 an acre-foot. That cost didn't include the cost of moving the water down the Friant-Kern Canal or through LID's pipeline system. We then used assessments, power revenues, and interest earnings on invested reserves to make up the difference between the rate paid and the cost to operate and maintain the system. We would pretty much break even or come out a little bit ahead every year. However, in 2010, the board of directors moved away from this method of managing and financing the system.

This year, the rate is $200 an acre-foot to cover the expenses of operating and maintaining the system; funding these projects; and buying water that isn't going directly to a landowner's meter, such as recharge water. In addition to these projects, the Friant-Kern Canal fix needs to be paid for. Friant contractors also pay for water delivered through the Delta-Mendota Canal system to meet an exchange agreement as well as for other activities. All these inputs cost money. I think $200 per acre-foot is the bottom end of where we will be in the future.

Irrigation Leader: What is your vision for the future of LID?

Michael Hagman: We must continue to reduce groundwater overdraft. We need to continue working to firm up our surface water supply. Every district in the CVP must do that. When I first got here, the average acreage in the district was 20–25 acres per landowner. Now, that number is about 50. The top 50 landowners own about 75 percent of the land. We have moved away from the small farmer. Now, economies of scale favor larger, more efficient farming entities. That is where I think things are headed. That said, there may also be gentleman or gentlewoman farmers who have retired from their day jobs and want 20 acres to live on and farm or pay somebody else to farm. They can enjoy the beauty of fruit, nut, olive, and avocado trees around their homes. That is also part of where I see this area headed in the future. IL



Michael Hagman is the general manager of the Lindmore Irrigation District and the executive director of the East Kaweah Groundwater Sustainability Agency. He can be reached at mhagman@lindmoreid.com or (559) 562-2534.

Utilizing CNPPID Storage Water for Groundwater Recharge
9/11/2012, Revised 2/11/25

Tri-Basin NRD (TBNRD) seeks to lease storage water from Central NE Public Power and Irrigation District (CNPPID) and its customers. Water leased will be delivered within CNPPID's irrigation service area at times and to locations mutually agreed upon by CNPPID and TBNRD.

CNPPID will offer water for lease by TBNRD under a multi-year (10 years or more) agreement, at rates consistent with irrigation water delivery rates with the understanding that delivery of recharge water won't occur at times when it could interfere with CNPPID's irrigation delivery requirements.

CNPPID reserves the right to suspend deliveries of recharge water for TBNRD during times when surface water supplies are insufficient to allow CNPPID to deliver a nine-acre-inch allocation to its irrigation customers. Such diversions and resulting recharge under this program will be tracked separately from diversions for other uses.

All diversions, returns, and deliveries will be measured. Such measurements will form the basis for billing by CNPPID to TBNRD. Any water diverted for recharge which is returned to the Platte River or one of its tributaries through a wasteway or similar return or release structure will be deducted from any diversion for recharge.

The goal is to take advantage of all excess flow opportunities to maximize intentional recharge.

Formula:

$$\boxed{\frac{\textit{(One-time lateral prep cost + Annual Service + Operational Cost)}}{\textit{Lateral Delivery Requirement}}} + \boxed{\textbf{E65 Canal Recharge Rate}}$$

One-time lateral prep cost = (of sites on the lateral * prep cost)

Note: regardless of where the pit is located on the canal, all sites on a lateral will be prepped to prevent damage and to allow for the addition of pits without going back out.

Annual prep Cost = (Site service cost)

Note: This is the cost to remove and reinstall irrigation delivery sites.

Operational Cost = (Cost for staff to monitor water and operate the lateral

Note: All laterals must have a staff person on-call.

Lateral Delivery Requirement = (Volume of Water necessary to be diverted at the lateral headgate to reach the recharge pits at the end of laterals).

[(Estimate One-time Canal Prep for all sites/10 years) + (Annual cost for canal prep for all sites) + (Cost of Operation)] / [(Lateral Delivery Requirement)] + (Phelps Canal Recharge Rate) = Cost for lateral diversion for pit delivery (per AF)

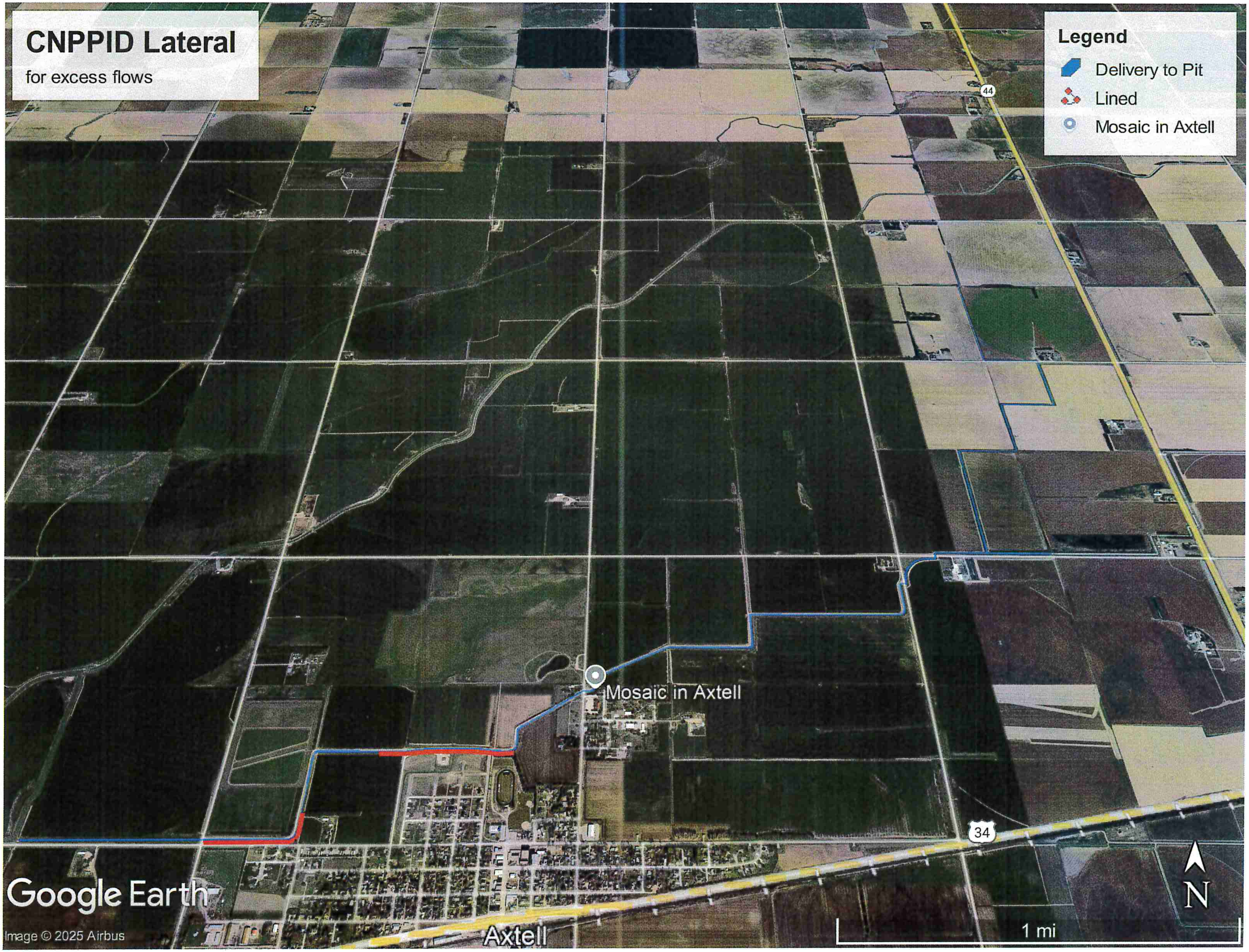
Example Cost Determination for Central excess flow delivery into Phelps County canal lateral 38.6-0.6.4-1

Cost Evaluation Assumptions and Estimation:

- ✓ We have no automation after patrol headgates (ie…. water conditions can only be observed physically by a person patrolling it while running). Therefore, staff will need to be on-call.
- ✓ Approximately twenty-four (24) screened farm delivery sites are identified between the headgate and the proposed recharge pit.
    - All existing delivery sites need to be protected from damage.
        - Site preparation for protection would likely require valve installation, tube extensions, and associated fabrication. This work would only need to be done one time and is considered an initial ***one-time cost*** for all sites.

Annually, all irrigation screens would need to be removed in the fall and then reinstalled prior to irrigation delivery. This effort was determined to be an annual cost, and all 24 sites would need addressed. This work was determined to be an ***annual cost****. Thus,* ***48 site visits*** *would be required for screen removal and installation. It will take approximately 45 minutes to remove and 45 minutes to install each screen.*

Cost input: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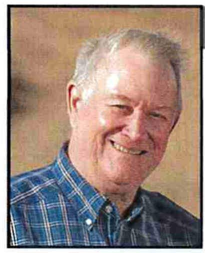
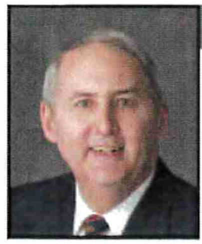


District 1 471-2733

Bob Hallstrom, Syracuse

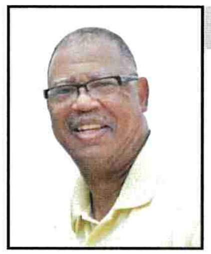
Hallstrom is an attorney and serves as general counsel for the Nebraska Bankers Association. He also represents independent businesses, pharmacists, workers' compensation equity and fairness.



District 2 471-2613

Robert Clements, Elmwood

Clements' family has owned Elmwood's American Exchange Bank for 79 years. He holds a B.S. in mathematics from UNL and is a retired banker and insurance agent. He is the chair of the Appropriations Committee.



District 3 471-2627

Victor Rountree, Bellevue

Rountree is a retired U.S. Air Force Chief Master Sergeant with more than 30 years of service. He served as Budget Officer at Offutt AFB and brings his financial experience to the Legislature.

District 4 471-2621

R. Brad von Gillern, Omaha

von Gillern holds a degree from UNL in construction management engineering. He currently serves as director of business development at Lueder Construction.

District 5 471-2710

Margo Juarez, Omaha

Juarez is a school board member for OPS. She was born and raised in South Omaha. She is retired from the Social Security Administration and IRS. She is currently part-time with Omaha Parks & Recreation.

District 6 471-2714

Machaela Cavanaugh, Omaha

Cavanaugh holds a master's degree in public administration from UNO. She worked at the Buffett Early Childhood Institute at the University of Nebraska.

District 7 471-2721

Dunixi Guereca, Omaha

Guereca is the executive director of Stand for Schools, a nonprofit for public schools. Prior to that he was a union organizer for healthcare workers. He studied political science and is a national officer for Young Democrats.

District 8 471-2722

Megan Hunt, Omaha

Hunt holds a master's degree in political communication from UNO. She is the owner of Hello Holiday, a boutique and e-commerce company.

District 9 471-2723

John Cavanaugh, Omaha

Cavanaugh served as the Assistant Douglas County Public Defender. He holds both a master's degree in environmental policy and a J.D. from Vermont Law School.

District 10 471-2718

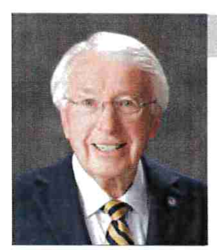
Wendy DeBoer, Omaha

DeBoer graduated from UNL Law School and is working on her Ph.D. in Christian theology at UNO. She teaches philosophy and religious studies.

District 11 471-2612

Terrell McKinney, Omaha

McKinney helped coach wrestling at Omaha North Magnet High School. He is a community organizer and co-hosts a weekly podcast. He is the chair of the Urban Affairs Committee.



District 12 471-2623

Merv Riepe, Omaha

Riepe is a Navy veteran and worked in the field of healthcare management. He was first elected to serve in the Nebraska Legislature in 2018 and was re-elected in 2022. He is the chair of the Business & Labor Committee.

District 13 471-2727

Ashlei Spivey, Omaha

Spivey grew up in North Omaha. She earned a degree in communications and marketing and has a masters in urban social planning. She has a background in nonprofit executive leadership and owns a small business.

District 14 471-2730

John Arch, La Vista

Arch holds an MBA from UNO. He worked in the health care division at Boys Town for 23 years. He is the 2023 Speaker of the Legislature.

District 15 471-2629

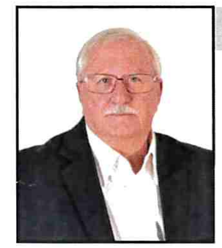
Dave "Woody" Wordekemper, Fremont

Wordekemper is a veteran Fremont firefighter and longtime paramedic. He grew up in West Point, Nebraska.

District 16 471-2728

Ben Hansen, Blair

Hansen is a graduate of Wayne State College. He is the owner of Hansen Chiropractic Wellness Center. He is the chair of the Health and Human Services Committee.



District 17 471-2716

Glen Meyer, Pender

Meyer was born and raised on a Wayne County farm. He attended Pender High School and went on to raise crops and livestock on a farm west of Pender.

District 18 471-2801

Christy Armendariz, Omaha

Armendariz currently works as a Strategic Sourcing Specialist for Nebraska Methodist Health System. She holds a bachelor's degree in Business Administration and has earned an MBA from Nebraska Methodist College.

District 19 471-2929

Robert Dover, Norfolk

Dover was appointed to serve in the legislature after Senator Mike Flood resigned his seat to run for Congress. He has worked as a real estate entrepreneur.

District 20 471-2622

John Fredrickson, Omaha

Fredrickson has a bachelor's degree in social work from New York University and an M.A. in social work from Columbia University. He currently works as a mental health professional.

District 21 471-2673

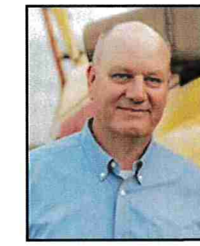
Beau Ballard, Lincoln

Ballard has a bachelor's degree in business from Colorado Christian University and an MBA from UNL. He is a small business owner in Lincoln. He previously served 5 years as a legislative aide. Ballard was appointed to fill Senator Hilgers seat.

District 22 471-2715

Mike Moser, Columbus

Moser served as Mayor of Columbus. He has a degree in speech communications from UNL and is the owner of Columbus Music.



District 23 471-2719

Jared Storm, David City

Storm grew up in rural Kansas and has an education degree. He moved to Wahoo in 1997 to pursue a career in ag aviation. He owns Storm Flying Service performing aerial application. He also does aircraft maintenance.

District 24 471-2756

Jana Hughes, Seward

Hughes holds a degree in industrial engineering from Texas A&M University. She previously worked at Hughes Brothers Manufacturing. Hughes has been on the Seward board of education since 2018.

District 25 471-2731

Carolyn Bosn, Lincoln

Bosn was appointed in April 2023 to fill the seat of Suzanne Geist. Bosn holds a J.D. from Creighton University School of Law and is a former Lancaster County prosecuter. She is currently a stay-at-home parent.

District 26 471-2610

George Dungan, Lincoln

Dungan holds a J.D. from American University and now serves as a public defender. He has served on the Board of Trustees of the Lincoln Bar Association.

District 27 471-2632

Jason Prokop, Lincoln

Prokop serves as director of First Five Nebraska, an early childhood and education nonprofit. He grew up in Crete, and earned degrees in political science and communication from Nebraska Wesleyan.

District 28 471-2633

Jane Raybould, Lincoln

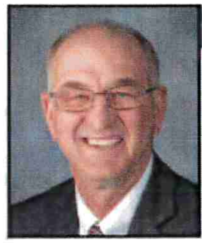
Raybould earned a bachelor's degree in political science, business, and French from Creighton University and a Master's in Russian studies from Georgetown University. She has served on the Lincoln City Council since 2015.

109TH NEBRASKA LEGISLATURE – JANUARY 2025

District 29 471-2734

Eliot Bostar, Lincoln

Bostar served as executive director of the Nebraska Conservation Voters and as a member of the Lincoln Electric System's administrative board of directors.



District 30 471-2620

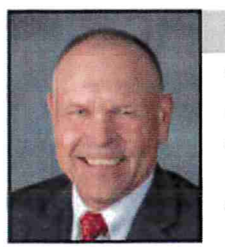
Myron Dorn, Adams

Dorn is a lifelong farmer and graduate of the University of Nebraska-Lincoln. He served as chairman of the Gage County Board of Supervisors.

District 31 471-2327

Kathleen Kauth, Omaha

Kauth was appointed to fill the District 31 legislative seat after the death of Senator Rich Pahls. She and her husband opened a mediation and consulting business where she specializes in Eldercare Mediation.



District 32 471-2711

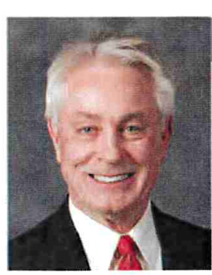
Tom Brandt, Plymouth

Brandt is a farmer and livestock feeder. He holds a degree in agriculture from UNL and served as chairman of the Southeast Nebraska Corn Growers Association.

District 33 471-2712

Dan Lonowski, Hastings

Lonowski is a combat veteran and retired Army colonel. He aso taught 34 years, the last 29 at Adams Central School District where he coached wrestling and junior high football.



District 34 471-2630

Loren Lippincott, Central City

Lippincott holds a degree in broadcast journalism from UNL. He served as a pilot in the U.S. Air Force, retiring with the rank of captain. He went on to work as a commercial airline pilot at Delta Air Lines.

District 35 471-2617

Dan Quick, Grand Island

Quick previously served in the Legislature from 2017-2021. He worked 28 years in the Utilities Department at the Platte Generating Station. He has served as president of the IBEW Union and other labor organizations.

District 36 471-2642

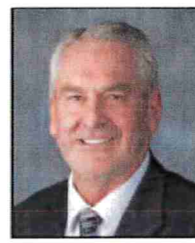
Rick Holdcroft, Bellevue

Holdcroft holds a degree in electrical engineering from UNL where he graduated through the ROTC program. He is a veteran who spent 28 years in the U.S. Navy.

District 37 471-2726

Stanley Clouse, Kearney

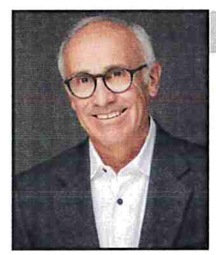
Clouse served as Mayor of Kearney since 2006 and is a 40+ year employe of Nebraska Public Power District.



District 38 471-2732

Dave Murman, Glenvil

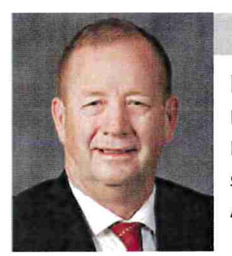
Murman is a dairy farmer and former president of the Nebraska State Dairy Association. He is a former member of the Sandy Creek School Board. He is chair of the Education Committee.



District 39 471-2885

Tony Sorrentino, Omaha

Born and raised in Omaha, Sorrentino earned accounting and law degrees from Creighton. He spent 45 years in the business community providing professional services in accounting, law and employee benefits.



District 40 471-2801

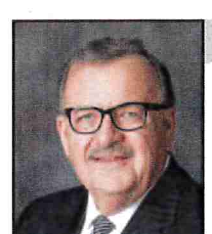
Barry DeKay, Niobrara

DeKay is a rancher. He served on the Nebraska Public Power District board of directors. He also served as President of the Nebraska Rural Electric Association board of directors.

District 41 471-2631

Daniel McKeon, Amherst

McKeon is an agronomist. He grew up on a farm near Ravenna and earned a degree in ag education. He also spent time in the Army National Guard, is an Eagle Scout and FFA alumnus. He's been a high school wrestling official for more than 30 years.



District 42 471-2729

Mike Jacobson, North Platte

Jacobson was appointed to fill the seat vacated by Senator Mike Groene. He is the founder and CEO of NebraskaLand Bank.

District 43 471-2628

Tanya Storer, Whitman

Storer is a rancher, educator and former Cherry County commissioner. She holds a degree in consumer science and education. She served on the Farm Bureau state board from 2010-2016.

District 44 471-2805

Teresa Ibach, Sumner

Ibach holds a B.S. from the College of Human Resources and Family Science at UNL. She was a property manager for 28 years, and she and her husband live on the family farm.

District 45 471-2615

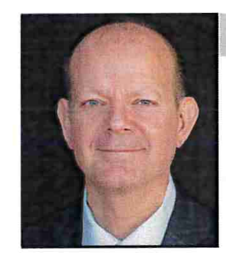
Rita Sanders, Bellevue

Sanders is the former mayor of Bellevue. She is a commercial real-estate developer and owns Richmont Senior Living Retirement Campus in Bellevue.

District 46 471-2720

Danielle Conrad, Lincoln

Conrad served in the Nebraska Legislature from 2007-2015. She worked as the executive director of ACLU Nebraska.



District 47 471-2616

Paul Strommen, Sidney

Strommen is a Sidney city council member, deputy mayor and member of Nebraska and Gas Conservation Commission. He is an executive with an ethanol plant in Perkins County.

District 48 471-2802

Brian Hardin, Gering

Hardin holds an M.A. from Denver Seminary. He is an entrepreneur with an emphasis on consulting for foreign businesses looking to enter the U.S. market.

District 49 471-2725

Bob Anderson, La Vista

Anderson was raised near Detroit before joining the U.S. Air Force. He retired from the USAF in 2003 and still consults with defense contractors. In 2008, he and his wife purchased a childcare facility in La Vista.

LEGISLATIVE COMMITTEES

AGRICULTURE (Meets Tuesday)
DeKay (C), Hansen, Holdcroft, Ibach, Kauth McKeon, Raybould, Storm.

APPROPRIATIONS (Meets Monday-Friday)
Clements (C), Armendariz, Cavanaugh, M., Dorn, Dover, Lippincott, Prokop, Spivey, Strommen.

BANKING, COMMERCE & INSURANCE (Meets Monday & Tuesday)
Jacobson (C), Bostar, Dungan, Hallstrom, Hardin, Riepe, von Gillern, Wordekemper.

BUSINESS & LABOR (Meets Monday)
Kauth (C), Hansen, Ibach, McKeon, McKinney, Raybould, Sorrentino.

EDUCATION (Meets Monday & Tuesday)
Murman (C), Conrad, Hughes, Hunt, Juarez, Lonowski, Meyer, Sanders.

GENERAL AFFAIRS (Meets Monday)
Holdcroft (C), Andersen, Cavanaugh, J., Clouse, DeKay, Quick, Rountree, Storm.

GOVERNMENT, MILITARY & VETERANS AFFAIRS (Meets Wednesday, Thursday, Friday)
Sanders (C), Andersen, Cavanaugh, J., Guereca, Hunt, Lonowski, McKeon, Wordekemper.

HEALTH AND HUMAN SERVICES (Meets Wednesday, Thursday, Friday)
Hardin (C), Ballard, Frederickson, Hansen, Meyer, Quick, Riepe.

JUDICIARY (Meets Wednesday, Thursday, Friday)
Bosn (C), DeBoer, Hallstrom, Holdcroft, McKinney, Rountree, Storer, Storm.

NATURAL RESOURCES (Meets Wednesday, Thursday, Friday)
Brandt (C), Clouse, Conrad, DeKay, Hughes, Juarez, Moser, Raybould.

NEBRASKA RETIREMENT SYSTEMS (Meets at call of Chair)
Ballard (C), Clements, Conrad, Hardin, Jaurez, Sorrentino.

REVENUE (Meets Wednesday, Thursday, Friday)
von Gillern (C), Bostar, Dungan, Ibach, Jacobson, Kauth, Murman, Sorrentino.

TRANSPORTATION & TELECOMMUNICATIONS (Meets Monday & Tuesday)
Moser (C), Ballard, Bosn, Brandt, DeBoer, Fredrickson, Guereca, Storer.

URBAN AFFAIRS (Meets Tuesday)
McKinney (C), Andersen, Cavanaugh, J., Clouse, Quick, Rountree, Sorrentino.

NEWS RELEASE

LOWERLOUP
NATURAL RESOURCES DISTRICT
2620 Airport Drive
Ord, Nebraska 68862

Contact: Alan Bartels
Information and Education Coordinator
abartels@llnrd.org
Phone (308) 728-3221

FOR IMMEDIATE RELEASE ORD, NEB. Feb. 4, 2025

Eastern Cottonwood at LLNRD Recreation Area Declared Nebraska Champion Tree

Century-old Giant Towering Over Pibel Lake is also the new National Champion

It is official: the Cornhusker State has a new national champion.

In the summer of 2024, a surveyor working at Pibel Lake in Wheeler County noticed a very large eastern cottonwood tree. He measured the distance around the trunk and sent that information to the Nebraska Forest Service for official consideration for the Nebraska Champion Tree Program. Experts from the Nebraska Forest Service visited Pibel Lake Recreation Area to record official measurements in September 2024.

Pibel Lake Recreation Area is a 72-acre property in southern Wheeler County that is owned and operated by the Lower Loup Natural Resources District. The recreation area includes 24-acre Pibel Lake.

Based on the official measurements of the tree – 85 feet tall, a 120-foot canopy spread, and a trunk circumference of 37.2 feet – the Pibel Lake tree was indeed larger than the reigning Nebraska Champion eastern cottonwood near Beatrice. But before that tree could be dethroned and the Pibel Lake tree crowned, the Beatrice tree would need to be remeasured. In early February 2025, Lower Loup NRD Information & Education Coordinator Alan Bartels received two emails from the Nebraska Forest Service: The first one confirmed that the eastern cottonwood at Pibel Lake Recreation Area was the new Nebraska Champion Tree for that species.

The second email confirmed that the Pibel Lake tree is also the new National Champion eastern cottonwood.

"I was pretty excited to receive the news," Bartels said. "I spent a lot of time at Pibel Lake when I was growing up. It's been a special place for me for a long time. The fact that the Lower Loup NRD is home to the largest known eastern cottonwood in Nebraska and the entire United States means even more since that species is our cherished Nebraska State Tree."

Trees nominated to the Nebraska Champion Tree and National Champion Tree programs are ranked by point value based on a series of measurements. National Champion Trees are determined using a formula developed in 1925: Circumference (in) + Height (ft) + 0.25 * Average Crown Spread Diameter (ft) = Total Champion Tree Points. The canopy measurement of the Pibel Lake tree exceeds that of the previous champion by about 12 feet. National Champion trees must be remeasured every 10 years.

"Nebraska is home to many majestic cottonwoods. In fact, our database of big trees includes well over a dozen trees across the state with trunks at least 25' in circumference," said Justin Evertson, the Green Infrastructure Coordinator for the Nebraska Forest Service & Nebraska Statewide Arboretum. "But none of these trees is as majestic as the Pibel Lake cottonwood which has a trunk circumference of over 37 feet." Evertson nominated the Pibel Lake tree for the National Champion Tree Program. Of the 546 title holders in that program, the eastern cottonwood tree at Pibel Lake is the only National Champion tree, of any species, from Nebraska.

"It would take at least 6 adults linked together to give that tree a complete hug," Evertson added. "The tree is also 85' tall and has a canopy spread of 120', meaning it could shade an entire home or two with plenty of room to spare. But perhaps more importantly, this tree has helped sustain a wide variety of birds, important insects and other wildlife on it, within it and under it for many decades. We hope it continues to do that for many years to come." Eastern cottonwood trees are a fast-growing species. Evertson estimates that the new Nebraska and National

Champion eastern cottonwood tree at Pibel Lake is 100 to 120 years old. It stands toward the northeast side of the Pibel Lake.

“Pibel Lake is a quiet recreational gem,” said Russell Callan, General Manager of the Lower Loup NRD. “Providing habitat for fish and wildlife, and recreational facilities for people, are among the NRD’s statutory authorities. The fact that the state and national champion eastern cottonwood tree is growing on our Pibel Lake Recreation Area only increases the area’s natural significance and importance to residents and visitors. Champion trees are the largest known specimen of their species, and to have this monarch of an eastern cottonwood growing at Pibel Lake, well, I think that’s pretty cool.”

FFA ag issues event prepares students for future

By Wendy Sweeter 1/31/2025

Whether it's learning about eminent domain or water rights, FFA members from around the region gain public speaking and reasoning skills through the ag issues forum leadership development event.

FFA members do a tremendous amount of research and interviews when preparing their topic for the ag issues event. For South Dakota's Beresford FFA Chapter, that means interviewing people from the local ethanol plant, the Public Utilities Commission and a state legislator on eminent domain and specifically about a proposed CO2 pipeline that would go through many counties in the state and Veterans Parkway that runs along the south side of Sioux Falls.

"I believe it affects so many people form so many different aspects form your farmer to city people because we have to have our goods and services to us and the availability of getting that to and from" Twedt said.

Beresford senior Kalya Jensen has participated in ag issues for three years. While learning about eminent domain and other topics has also honed her public speaking skills.

"I like that you get to do acting and you get to come up with a problem or research a problem that's happening right now in the world of agriculture and then get to show everybody that we present to about out topic because some people may not know about the issues that are going on and it helps give a better view of what's going on in agriculture," Jensen said.

This was Twedt's first ag issues team to compete at the National FFA Convention held in October. Their team presented like a town hall meeting where students played the part of farmers, a highway department worker and ethanol plant employee to tell both sides of the issue.

For Montana's Baker FFA Chapter, they presented their ag issues of American Prairie Reserve located in central Montana and how that has been impacting local ranchers in central Montana and across the state and how that could have impacts on the ag industry in Montana. They framed their presentation as a county commission meeting with two members posing as neutral county commissioners. The pro side was a student acting as representative from American Prairie and a student who is Native American who represented indigenous people and acted as a wildlife biologist. The con side had students representing Montana Stockgrowers and a ranch.

Baker senior Halle Brown competed for the first time in the ag issues contest last year. She thinks it is important for FFA members to participate in this contes to learn about ag topics in Montana.

"I think it's really important to learn about what is going on in your state so you can really see what's going on and not have a closed view." Brown said.

Baker FFA adviser Abbey Wolenetz's strategy in forming an ag issues team was finding a group of kids who were dedicated and passionate about the issues they were presenting on.

"Once those kids were committed and they started to become very passionate about it. I think that was what make us as successful as we ere because the kids were really interested in the topic and they were exposed to leaders across the state of Montana and the nation that are insighting change on that issue which was really cool to see," Wolenetz said.

When presenting in the state, they presented to American Prairie, the Montana Stockgrowers and representatives from Sen. Steve Daines' office. To prep for their presentation, they spoke directly with organizations and read legal documents.

Nebraska's Elwood FFA Chapter advisor Maggie Louthan said her students chose a ran three miles past their high school. Chapter members tackled the issue of if water should be diverted from the Platte River to the Republican River and is that is a beneficial use of the water. She said currently Tri-Basin Natural Resources District has a water right application into the Nebraska Department of Natural Sources to divert 80 cubic feet per second to the Republican River to help offset the depletion of the river so that Kansas can get water/

In order to prepare, they talked to Tri-Basin representatives, the school board, farmers, the Department of Roads, and Sen/ Tersa Ibach.

For their skit, they designed it so they were picketing outside the county courthouse and students played the roles of some of the Audubon Society, a farmer and the county sheriff.

Elwood junior Brody Diefenbaugh learned more about the issue by participating in the ag issues contest.

"The ag issues event is important because it teaches you about things that are locally around you. I had no idea what the Platte Republican diversion was and that it runs tight through my hometown in Turkey Creek," Diefenbaugh said. "It teaches you about current events that are around you."

FFA members form Chyene High Plains FFA presented their ag issues topic of if livestock grazing should be limited based on climate change. Volunteer coach Karn Budd-Falen, and attorney, has coached ag issues teams in Cheyene, Wyo. Since 2011 when her daughter got involved.

Budd-Falen strategy in preparing students for the contest spend a lot more time looking at issues. She'll send students different newspaper articles and different ag issues from the National Ag Law Center.

"I work with them to pick something with a local message – how is this going to affect farmers and ranchers in my county or state but also needs a national focus," Budd-Falen said.

Besides learning about their particular ag issues topic, FFA members learn about public speaking and decision-making.

Brown noted the ag issues contest prepares members to speak in front of people.

"It prepares you to into a full room of people," Brown said. "It helps you figure out how to do research and dig into a topic and understand the research."

Twedt feels the ag issues contest is important because there are a lot of topics that people are not aware of or informed on.

"For these kids to dive into ag issues and dive into a topic is great because

a member of community if something is going on in their community they can go in and look at the facts and truly know what's going on and talk to people about that," Twedt said. "I don't think there's enough people out there who do that."

Jensen, Twedt's student, agrees that she feels a lot more knowledgeable after participating in ag issues. She feels that it will help her in the future to make decisions by researching the topic.

Wyoming's Budd-Falen likes the fact that the ag issues contes teaches students to listen to opposing opinions, She likes to model polit listening and asking polite questions when they are doing their research.

"You don't have to agree with an opposing opinion but this whole county has gotten to where we can't listen to someone with an opposing opinion without getting mad and calling people names," Budd-Falen said. "I really like teaching the kids that there's a lot of things I disagree with but that doesn't mean I hate the person ; it means I don't agree with their ideas."

Nebraska's Louthan tells here kids that no matter what they believe or what they go do, the most Important thing is to be able to understand other and form their own opinions.

"You don't have to agree with everyone and you shouldn't. I think the ag issues contest really helps kids form their own opinions and be able to successful find research and find ways to create those opinions rather than just doing their first instinct," Louthan said.

Montana's Wolenetz likes that her kids do the ag issues event to learn public speaking and communication skills, but on a deeper level, it teaches our kids critical thinking skills.

Not only does it give our kids some of the things that are obvious like public speaking and communication skills. But on a deeper level, it teaches our kids critical thinking skills and to dive deeper into issues rather than just believing everything they hear on the news or at the dinner table," Wolenetz said.

Central board hears reports on water conservations efforts

Holdrege Citizen 2/4/2025

The Central Nebraska Public Power and Irrigation District's board of directors hear reports on water conservation efforts and education from an irrigation water management specialist at Monday's meeting.

Curtis Sheele, irrigation water management specialist with the Natural Resource Conservation Service presented his annual conservation report, summarizing activity related to the federal 'environmental Quality Incentives Program (EQIP). He also reported on the Conservation Stewardship Program (CSTwP).

Mr. Sheele also provide the board on overview of the local UNL Testing Ag Performance Solution (UNL Taps) team's yield from this past season. He presented the directors with results from a nitrogen testing program that was conducted across the state by UNL.

Also at Monday's meeting:

- A bid was approved for $191,615 to Van Diest for purchase of chemicals for the 3025 irrigation season.
- The board approved a bid of $372,800 for a 2025 CAT 330 Excavator from MNC of Doniphan, Neb.
- Directors gave approval for the purchase of four 1 ton pickups, and five short bed pickups and one dually pickup from Pony Express Chevrolet Buick Gothenburg NE.
- Hydraulic Project Operations Manager Cory Steinke updated the board on the project taking place at Johnson Lake. He reported the dike work should be completed on Monday and crews will be covering the entire new dike with rock the rest of this week. He anticipates the water level of the lake to begin coming up this week, depending on power production scheduling at the hydroplants.
- Civil Engineer Tyler Thulin reported that Lake McConaughy's elevation was 3236.4 feet on Monday (57.9%). Inflows are around 1,200 cubic feet per second (cfs) and outflows are about 675 cfs. Snowpack in the upper North Platte basin is currently 94% of median average, the lower North Plate is at 87% and 104% in the South Platte basin.

Seeds are priceless gold mind by migratory birds

Steve Mosley, RBJV, Kearney Hub 2/3/2025

Near FUNK, Nebraska - Tiny. almost microscopic seeds to be consumed by migrating birds in the millions are a treasure stitched into the fabric of Rainwater Basin wetlands habitats. Seeds that remain provide the seedbank necessary to replenish the next year's plant community perpetuating bye cycle of renewal.

More than 240 species of plants grow in Rainwater Basin wetlands; many are good, some are undesired and others area invasive.

Not so easy, this business of restoring Nebraska's wetlands, then preserving, protecting, expanding and nurturing them in perpetuity.

The wetlands in question lie within the sprawling footprint of the Rainwater Basin Joint Venture… the operating word being "venture" as in a diverse coalition of public and private partners who bring to the task their unique assets, be they land, infrastructure, scientific expertise, boots on the ground or vital financial support.

Nebraska's Sandhills, the largest grassland in the world, stand in contrast to the Rainwater Basin's play (clay-based) wetlands of south-central Nebraska.

The Rainwater Basin is a patch-work quilt of private and public wetlands across 6,100 square miles covering all or parts of 21 counties and five Natural Resources Districts. Prior to settlement where 11,000 playa wetlands covering 204,000 acres. Over time, fertile soils, abundant groundwater and the need for crop production supported the expansion of croplands across this landscape; as a result, 90% were drained for crop production.

Despite the great loss, today an estimated 10 million migrating waterfowl, 500,000 shorebirds and federally endangered whooping cranes still depend on these wetlands during spring migration.

The grass buffers associated with the wetlands are paradise for pheasants, deer and myriad ground-dwelling animals.

Studies prove quality and availability of habitat in spring migration staging acres like the Rainwater Basin directly impact migratory bird populations across North America.

For those and endless other reasons, growing, restoring and lending the health of this one-of-a-kind habitat is the year-round mission of the Rainwater Basis Joint Venture partnership.

One example among decades of projects was happening in the fall at Funk Waterfowl Production Area (WPA) , located south and west of Kearney of the village of the same name.

Like most Phelps County wetland, Funk WPA was substantially diminished by wetland drainage, land leveling and sedimentation that supported cropping prior to US Fish and Wildlife Service ownership.

Much of the developed farmland in Phelps County benefited from irrigation water provided by the Central Nebraska Public Power and Irrigation District canal system.

In the 1980s and 1990s, wetlands like those at Funk WPA ponded water because of excess runoff from flood irrigation systems that surrounded this large wetland. That changed, however, With the arrival of pivot irrigation. As a result. Runoff that filled wetlands spiked sharply downward.

In the fall at Funk WPA, work focused on removing fill material and sediment that had accumulated atop the clay (playa) pan, because that material – a foot-thick tangled mat in places-must become fully saturated before water can pond at the surface. Ater this much material is removed, the much less-permeable clay soils saturate quickly, causing the wetlands quickly pond water.

Wetland management is important in maintaining high quality habitat. Tools include everything from prescribed fire to grazing, herbicide applications, disking, roto tilling, excavation, haying, shredding, mowing and water level manipulation.

One equal concern to scientists is how nutrient-rich soil above the clay encourages invasive species. The species thrive and spread by root growth.

Unmanaged, invasive species do not produce the volume of seeds and reduce access to available ponded habitat needed during migration.

Migrating clouds of waterflow must have seeds to complete their arduous, annual journey , and therein lies the problem.

An October tour of the Funk project with USFWS biologist Jeff Drahota was eye-opening: the work on this single project runs the gamut from heavy equipment scraping away sediment to precise elevation and angle. The excavation restores the basin floor to resettlement conditions. Infrastructure of water control structures and pipelines are the final elements of a project that took years of the planning and hard work needed to allow runoff and supplemental water to reach the wetland .

What happens to all those tons of unwanted soil?

Its value is “bis for cropland and cattle feeders,” was Drahota’s answer. “Five adjacent landowners help dispose of the spoil piles.”

The Funk WPA is just one among hundreds in the Rainwater Basin covering 2,000 acres. That’s good because larger wetlands are key habitats for whooping cranes and migrating waterfowls. These expanses provide resting and feeding areas for all types of waterbirds.

Drahota explains, “bigger ponded frequency, and can support thousands of waterfowl during stopover periods. Large expanses provide resting and feeding areas for all types of waterfowl.

The same work discourages undesirable plants, too.

Taking out the soil not only changes the elevation(fostering surface ponding), but also removes accumulated nutrient content, Drahota added.

That sounds counterintuitive to gardeners in town who pile all the fertilizer and compost they can find under their tomatoes and cucumbers. Not so here, where seed-rich native plants thrive with just a thin skin of soil atop the clay/

“It’s not about making it deeper,” said Drahota, “it’s about increasing ponding frequency and therefore increasing emergent annual plat growth, ultimately increasing energy available to waterflows. Seed are duck feed.”

It also looms large that annual plants favor conditions at allows unlight penetration to expose the ponded water.

The point is made obvious in the accompanying photo of Drahota buried to his waist in reed canary grass. Even if there was a foot of ponded water at his feet, birds could not possible use the chocked mess.

High-nutrient soil like this, he said is “where invasives take over. They very water thirsty and thick,” he added. As a result, no ponding.

Of the long list of partners standing shoulder-to shoulder in the Rainwater Basin Joint Venture, Drahota said, “Interests, might not be identical, but we’re all working for the same outcomes that provide high quality wetlands.”

Partners supporting this project through financial or technical assistance included: CNPPID, Ducks Unlimited, Natural Resources Conservation Service, Nebraska Department of Natural Resources, Nebraska Environmental Trust, Tri-Basin Natural Resources District and the USFSWS.

Shepherd of NP will lead Central board in 2025-'26

Kearney Hub 1-1-2025

The Central Nebraska Public Power & Irrigation District board of Directors elected new officers and seated four new board members on Thursday during their first monthly meeting of 2025.

Kely Shepherd of North Platte was elected to his first two-year term as board president. Shephard has represented Lincoln County on Central's board since 2021 and served as vice president for the past two years. Other directors elected as officers by their fellow board members were Brent Soneson of Holdrege, vice president; Tim Boyle of Elwood, Secretary; and Dudley Nelson of Axtell, treasurer.

Four new board members elected in November are Tom Jasnoch of Ogallala, representing Keith County; Bryant Knoerzer of Elwood, representing Gosper County; Gary Robison of Bertrand, representing Phelps County; and Matt Wells of Axtell, representing Kearney County.

Also at Thursday's board meeting:

- The board approved a real estate agreement to purchase about 60 acres in Gosper County near Jeffery Island. They also approved an agricultural lease for 137.29 acres of irrigated crop land in Gosper County.
- Hydraulic Project Operations Manager Cory Steinke told the board that work being done near Medo's at Johson Lake is projected to be completed by the end of January
- Steinke reported on changes to the district's hydropower generations scheduling to maximize revenue as part of the requirements of Central's new wholesale energy contracts.

  This will result in additional of different water level fluctuations at Jeffery Reservoir and Johnson Lake as Central works to best meet the power demands of its wholesale customers. As a result, lake elevation changes could be more exaggerated and frequent during the day.