

Water Committee Meeting  
Thursday, July 31, 2025 9:30 AM  
Lower Platte North NRD Office  
P.O. Box 126  
Wahoo, NE 68066

1. UNFINISHED BUSINESS

2. REGULATORY

2.A. GROUND WATER MANAGEMENT AREA

2.A.1. Variance Request in the Hydrologically Connected Area (Limited Development Area)

The deadline for applications is September 15.

2.A.2. Variance Requests in the Non-Hydrologically Connected Area (Normal Development Area)

The deadline for applications is August 15.

2.A.3. Variance Requests in the Restricted Development Areas

These will be reviewed at the August Committee Meeting.

2.A.4. Well Permit Program

2.A.4.a. Lindsay Manufacturing

Lindsay Manufacturing is requesting a well permit for pivot testing in NE1/4 SW1/4 S17-20-3W, Platte County. It is located north of the plant and is in Lindsay Wellhead Protection Area. They are getting permission from the Village of Lindsay at their next board meeting.

2.A.4.b. Public Water Supply Well Permit

Attached is a public water supply well permit for Camp Moses - Merrill. This is a transient, non-community public water system and is located in the NE SE S30-17-5E, Saunders County.

2.A.5. UNL Demonstration Fields Update

Bruno Patia Lena - Platte County Extension gave an update on the projects he is conducting in the LPN district. The main takeaway is that conducting soil sampling in the spring showed a higher amount of nitrogen in the soil compared to fall sampling. Mineralization from soil temperature and water could make the difference. The committee asked Bruno to consider soil sampling in April and then May to see if there is a difference.

Joe discussed his project and nitrogen applications utilizing Sentinel Ag. He has decreased his nitrogen application amounts and commented that the corn does not look distressed at this time.

2.A.6. Groundwater Management Plan Update

The committee and staff review the changes to the items shown below. The committee directed staff to proceed with the draft GWMP by putting it on the website and contacting the stakeholders for review. The plan is to start the

hearing process in September for a hearing conducted prior to the October 13th Board Meeting,

Attached is an updated plan.

Here is the list of suggestions that were requested at the last committee meeting when reviewing the plan. Staff have reviewed and changes were made.

- Be consistent with your map legends.
  - Make each map city the same color and maybe change the symbol (They recommend blue or hot pink).
  - Add Swedeburg to the maps.
- Take out 3.1.1 page 34 along with Figure 25 out of the plan.
- Figure 29: They do like the color of the certified acres and make more contrast between city and acres.
- Figure 35 Middle Shell Creek, Platte Center and Lower Shell Creek all look similar in color. Make Platte Center a different color other than green.
- Figure 35 North Bend and Todd Valley are both blue. I would like a different color.
- Figure 35 Weston and Swedeburg to close of similar color.
- Figure 35 Is it possible to have a black boundary around each subarea?
- Objective 1.4 take out "with at least one" and "each year". Page 50
- Objective 1.6 takes out "at least five" and "per year". Page 50
- Objective 4.1 Reword to "Conduct stakeholder review field at least every 5 years", Page 51
- Consistency with NDEE and NeDNR throughout the plan.
- Add Coop, Agronomist etc. as partners

2.A.7. Special Quantity Subareas

Staff have been in contact with LRE to start re-evaluating these areas.

2.A.8. Cost Share Programs

We have received two invoices for our Domestic Well Water Treatment System Cost-Share Program from Allen Svatora and Dan Stevenson. We are offering to pay 75% of the total cost up to \$800.

Allen Svatora one RO Unit cost share of \$505.45.

Dan Stevenson; one RO Unit Cost share of \$375.00.

2.A.8.a. Irrigation Well Sample Kits

Sample kits are being requested. Staff sent out kits initially, but now in a holding pattern as we move forward. Some producers might not be irrigating this year because of the rainfall. Staff have not begun water sampling for the same reason.

The committee suggested calling people to determine when they might be water sampling. They commented that irrigation season is still not over.

2.B. CHEMIGATION

For 2025, we have 660 renewals and 41 new permit applications for a current total of 701. Inspections for 143 renewal permits have been completed and 41 new permits.

2.C. GROUND WATER QUALITY SAMPLING

-Potential for no irrigation sampling this year. Possibility to test our monitoring wells for other contaminants besides nitrates?

3. GROUND WATER PROGRAMS

3.A. DECOMMISSIONED WELL PROGRAM

3.A.1. Well Estimates

no new wells have been reviewed and approved for decommissioning since the last Committee meeting.

Well Owner	Type of Well	Cost Share Estimate	County
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3.A.2. Plugged Wells

no wells have been plugged, reviewed, and ready for cost share payment approval this month.

Well Owner	Type of Well	Cost Share Estimate	County
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3.B. LOWER PLATTE NORTH NRD GROUND WATER STUDIES

3.B.1. Phase Area Update

We have 6 meter cost share invoices for the Richland Schuyler area.

William Klug	4	\$	4,000.00
Hilland Valley farms	1	\$	1,000.00
Benjamin Klug	1	\$	1,000.00
Keith Kallweit	1	\$	1,000.00

3.C. NEW MONITORING WELLS

The data loggers and HydroVu equipment that was damaged have been fixed and are being shipped.

3.D. SOURCE WATER PROTECTION

The Public Hearing for the Newman Grove Wellhead Protection Plan is on August 14th at 7:00 pm.

The Public Hearing for the Platte Center Wellhead Protection Plan was rescheduled for September 15th at 7:00 pm.

3.E. GMDA conference

The conference was held in Idaho Falls. Topics included reports from all participating states and Idaho water challenges. The main challenges are population growth and the overuse of the aquifer. Toured Idahoan Potatoes Factory, Barley Hops elevator, injection wells and National/Idaho Laboratory. Attached are some pictures.

**Key Takeaways**

- The Eastern Snake River Plain Aquifer moves much faster than the Ogallala.
- Idaho has similar concerns with the management of new domestic wells.
- Injection well could pump 10,000 GPM back into the aquifer. Must test for contaminants before. E.coli doesn't survive in some anoxic conditions. Potential for recharge in Prague area?
- Idaho wants to convert groundwater irrigation to surface water irrigation.
- Geologist at ISU discussed how nitrates mobilize uranium in groundwater.
- Four-year crop rotation for potatoes.
- Idahoan potatoes & Anheuser-Busch have taken steps to reduce water usage. Potential to partner with industries for similar initiatives?

4. SURFACE WATER PROGRAMS

Attached is a quarterly invoice from USGS for operation of streamgages at Shell Creek near Columbus and Wahoo Creek at Ashland.

4.A. STATE LAKES, FOR THE WEEK OF JULY 23

This week's beach Bacteria and Harmful Algal Bloom results are now posted on the DWEE web page ([Current Health Alerts and Sampling Results For This Week](#)).

There are no lakes on Health Alert!!!

Kirkman's Cove Lake tested at 3.86 ppb and will be removed from Health Alert.

Branched Oak at Liebers Point Beach, Lewis and Clark at Weigand Beach, Maple Creek Recreation Area, and Summit Lakes all tested above 235 colonies/100 mL.

There are **0** beaches on Health Alert this week.

<b>Current Lakes on Health Alert</b>			
<b>Lake</b>	<b>County</b>	<b>Microcystin (ppb)</b>	<b>Sample Date</b>
<b>None! ??</b>			

When a lake exceeds 8 ppb of microcystin it will be placed on Health Alert. If a lake is under a Health Alert, signs will be posted recommending people avoid full body contact activities such as swimming, wading, skiing, jet skiing, etc.

There are 4 beaches with *E.coli* testing above 235 colonies/100 mL.

<b>Lakes with High <i>E.coli</i> Bacteria</b>			
<b>Lake</b>	<b>County</b>	<b><i>E.coli</i> (MPN)</b>	<b>Sample Date</b>
<b>Branched Oak Lake at Liebers Point Beach</b>	<b>Lancaster</b>	<b>249</b>	<b>7/21/2025</b>
<b>Lewis and Clark Reservoir at Weigand Beach</b>	<b>Knox</b>	<b>397</b>	<b>7/21/2025</b>
<b>Maple Creek Recreation Area Lake</b>	<b>Colfax</b>	<b>1,986</b>	<b>7/21/2025</b>
<b>Summit Lake</b>	<b>Burt</b>	<b>387</b>	<b>7/21/2025</b>

When *E. coli* bacteria levels test above 235 colonies/100 mL a Health Alert is not issued. However, conditions are at a higher risk to human health when swimming. Considering the more rapid changes in bacteria conditions, signs are not posted with these higher levels. Although, we want people to be aware of beach conditions and use their own judgment as to whether they use a listed water body.

Stay cool!

Justin Haas

**State Lakes Coordinator**

**Department of Water, Energy and Environment**

**245 Fallbrook Blvd., Suite 100**

**Lincoln, NE 68509-8922**

**Direct: 402-471-4224 | Main Office: 402-471-2186**

5. IRRIGATION DEMONSTRATION

Attached are some pictures which staff were asked to view in the field. This site is south of Leigh.

6. OTHER

6.A. FY '26 Water Committee Draft Budget Review

The water portion of the budget was reviewed.

6.B. COMMENTS FROM THE PUBLIC

**APPLICATION FOR A PERMIT TO CONSTRUCT A WATER WELL  
IN THE LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT**

DNR & NRD USE ONLY			
Permit No. _____	Date Approved/Denied _____	NRD Representative _____	
Permit Type: New, Replacement or Late	Date Received _____	Paid: Cash or Check	
Date Post-inspected _____	Registration No. _____	Updated Form: June 2022	

**ALL APPLICANTS SEEKING A WATER WELL PERMIT MUST COMPLETE PAGES 1 AND 2, AND THE APPROPRIATE SECTION BASED ON THE PURPOSE OF THE WELL. (CLASS 1 – 4 WELL PERMIT)**

**WATER WELL PERMITS FOR IRRIGATED ACRES GREATER THAN 160 ACRES IN SIZE OR TOTAL ANNUAL WATER USE BETWEEN 150 AND 300 ACRE FEET PER YEAR MUST COMPLETE PAGES 1, 2, AND 3, AND THE APPROPRIATE SECTION BASED ON THE PURPOSE OF THE WELL. (CLASS 3 WELL PERMIT)**

**WATER WELL PERMITS FOR TOTAL ANNUAL WATER USE EQUAL TO OR GREATER THAN 300 ACRE FEET PER YEAR, REGARDLESS OF NUMBER OF IRRIGATION ACRES, MUST COMPLETE PAGES 1, 2, AND 4, AND THE APPROPRIATE SECTION BASED ON THE PURPOSE OF THE WELL. (CLASS 4 WELL PERMIT)**

<b>1. NAME AND ADDRESS OF <u>LAND OWNER</u>:</b> Lindsay Manufacturing 214 E 2nd Street Lindsay, NE 68644 Phone: _____	<b>NAME AND ADDRESS OF <u>CONTACT</u>:</b> Gary Stokes - Plant Manager _____ _____ Phone: (402) 920-1829
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**2. PURPOSE OF NEW WATER WELL (indicate one):**

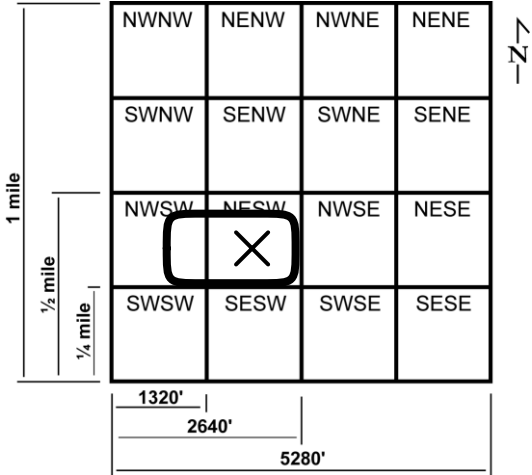
<input type="checkbox"/> Irrigation (Complete section A)	<input type="checkbox"/> Dewatering (Over 30 days, Complete section B)
<input type="checkbox"/> Livestock (Complete section C)	<input type="checkbox"/> Domestic (Irr. on one acre or larger, Complete section D)
<input type="checkbox"/> Industrial (Complete section E)	<input type="checkbox"/> Public Water Supply (Complete section F)
<input type="checkbox"/> Recovery or Remediation (Complete section G)	
<input checked="" type="checkbox"/> Other (specify) <u>Pivot Testing</u> (Complete section H)	

**3. IDENTIFY LOCATION OF PROPOSED WELL:**

A. Platte \_\_\_\_\_ County, NE ¼ of the SW ¼ of Section 17, Township 20 North, Range 3 East West (circle one)

B. The box at the right represents one square mile, (section). Indicate with an "X", the proposed location of the well. Outline the proposed water use area. If the water is to be used outside the above written legal description, give legal description of water use area, \_\_\_\_\_ ¼ of the \_\_\_\_\_ ¼ of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West.

C. The well will be located 1700 feet from the North South section line, and will be 1600 feet from the East West section line. Or enter Lat. / Long.  
 Latitude Degree \_\_\_\_\_ Minute \_\_\_\_\_ Second \_\_\_\_\_  
 Longitude Degree \_\_\_\_\_ Minute \_\_\_\_\_ Second \_\_\_\_\_



**4. REPLACEMENT AND ABANDONED WELL INFORMATION:**

A. Is this a replacement well?  Yes,  No. If yes, fill out the rest of this section.

B. Registration number of well to be replaced: \_\_\_\_\_

C. Well to be replaced was last operated (month/year): \_\_\_\_\_

D. Replacement well is \_\_\_\_\_ feet from original well.

E. Decommissioning of Original well on (month/day/year): \_\_\_\_\_

F. If water use is for irrigation, list the number of acres watered by the original well: \_\_\_\_\_

G. If water use is for irrigation, will replacement well, water the same tract of land as the decommissioned well?  
 Yes,  No: If No, list the number of additional acres \_\_\_\_\_ and legal description \_\_\_\_\_ ¼ of the \_\_\_\_\_ ¼ of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West. (circle one)

- A replacement water well must deliver water to the same tract of land as the original water well, pump from a comparable aquifer, and yield approximately the same gallons per minute and total annual water use as the original water well.

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**5. SPECIFICATIONS OF INTENDED WELL AND PUMP:**

- A. Approximate date when construction will begin (month/day/year): 10/1/2025
- B. Expected total well depth: 120 feet.
- C. Well Casing Diameter: 16 inches.
- D. Pump Column Diameter: 8 inches.
- E. Estimated pumping capacity: 600 GPM.
- F. Expected total annual water use in Acre Inches / Year \_\_\_\_\_ or Total Gallons / Year 750,000
- G. The system is to be powered by  Electric  Fuel
- H. Will the well be used in a system with other wells?  Yes,  No. If Yes, How many \_\_\_\_\_  
List well registration number and legal description of each well in Section 6 below.
- I. Name of Well Driller: Grosch Irrigation Co., Inc. (Please attach test hole log, if available.)

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**6. List additional information requested in this Section or attached additional sheet.**

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**7. Addition information and requirements for Lower Platte North NRD review.**

- Attach current tax assessor records including map, parcel number, and current land use such as irrigated acres.
- Attach aerial photo showing location of water source(s) and area water or reuse water is to be used.
- All new and replacement water wells must install a District approved flow meter and report water pumped annually to the LPNNRD by January 31<sup>st</sup> of the following year. See approved list in this packet.
- Water well permit conditions maybe required for approval by the Lower Platte North NRD for each individual well.

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**8. I certify that I am familiar with the information contained in this application, and it's restrictions, rules and regulations and that to the best of my knowledge and belief such information is true, complete and accurate.**

Date \_\_\_\_\_ Signature of Applicant \_\_\_\_\_  
Signature of Well System Operator, if different than Applicant \_\_\_\_\_  
NRD Certification Number of Landowner or Operator \_\_\_\_\_ (Required for irrigation, livestock, domestic (with irrigation on one acre or more of land), industrial, and public water supply wells.)

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**9. Lower Platte North NRD Use Only. Comments by District Representative.**

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**APPLICATION FOR A PERMIT TO CONSTRUCT A WATER WELL  
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**WATER WELL PERMIT FOR IRRGATED ACRES GREATER THAN 160 ACRES IN SIZE OR TOTAL  
ANNUAL WATER USE BETWEEN 150 AND 300 ACRE FEET PER YEAR, PROVIDE INFORMATION  
REQUESTED ON PAGES 1, 2, AND 3. (CLASS 3 WELL PERMIT)**

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**10. WATER SOURCE INFORMATION:**

In a TWO-mile radius around the water source location, provide the following information to the LPNNRD in both paper copy and electronically in Excel Spreadsheet (Microsoft) or Access Database (Microsoft) format.

- A. List of all registered wells in this area giving registration number, well identification number, legal description, latitude / longitude or UTM coordinates in NAD 83, elevation in feet above mean sea level, and well log for each well.
  - B. List of all test holes in the area that have been published by Conservation and Survey Division of the University of Nebraska.
  - C. List of all surface water rights in this area giving appropriation number, priority date, legal description, use, status, current total acres (if applicable), and grant amount.
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**11. WATER USE LOCATION INFORMATION:**

In the location where the water will be used, provide the following information to the LPNNRD in both paper copy and electronically in Word (Microsoft) format.

- A. Description of expanded water use including: latitude / longitude or UTM coordinates in NAD 83 of water use location and timeframe or schedule when water will be used.
  - B. Amount of water that will be reused or recycled at this new location.
  - C. Description of how water will be used at this new location, i.e. process water vs. cooling water, etc. and estimated total annual water use for each purpose.
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**APPLICATION FOR A PERMIT TO CONSTRUCT A WATER WELL  
IN THE LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT**

**WATER WELL PERMIT FOR TOTAL ANNUAL WATER USE EQUAL TO OR GREATER THAN 300 ACRE FEET PER YEAR, REGARDLESS OF NUMBER OF IRRIGATED ACRES, PROVIDE INFORMATION REQUESTED ON PAGES 1, 2, AND 4. (CLASS 4 WELL PERMIT)**

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**12. WATER SOURCE INFORMATION:**

In a FIVE-mile radius around the water source location, provide the following information to the LPNNRD in both paper copy and electronically in Excel Spreadsheet (Microsoft) or Access Database (Microsoft) format.

- A. List of all registered wells in this area giving registration number, well identification number, legal description, elevation in feet above mean sea level, latitude / longitude or UTM coordinates in NAD 83, and well log for each well.
  - B. List of all test holes in the area that have been published by Conservation and Survey Division of the University of Nebraska.
  - C. List of all surface water rights in this area giving appropriation number, priority date, legal description, use, status, current total acres (if applicable), and grant amount.
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**13. WATER USE LOCATION INFORMATION:**

In the location where the water will be used, provide the following information to the LPNNRD in both paper copy and electronically in Word (Microsoft) format.

- A. Description of expanded water use including: latitude / longitude or UTM coordinates in NAD 83 of water use location and timeframe or schedule when water will be used.
  - B. Amount of water that will be reused or recycled at this new location.
  - C. Description of how water will be used at this new location, i.e. process water vs. cooling water, etc. and estimated total annual water use for each purpose.
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**14. AQUIFER PUMP TEST:**

In the location of the proposed water source a District approved aquifer pump test is to be performed to obtain geologic data that will be used in the ensuing ground water modeling effort. Data from the pump test is to be reported to the LPNNRD in both paper copy and electronically in Excel Spreadsheet (Microsoft) or Access Database (Microsoft) format.

- A. Description of pumping well should include legal description of well, latitude / longitude or UTM coordinates in NAD 83, elevation of well in feet above mean sea level, total amount of water pumped, gallons per minute during pump test, duration of pump test, well construction, well log, water discharge location and method.
  - B. Description of each monitoring well should include legal description of well, latitude / longitude or UTM coordinates in NAD 83, spacing in feet and direction from pumping well, elevation of well in feet above mean sea level, well log, and well construction.
  - C. Depth to bedrock, bedrock material, and name of geologic formation.
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**15. GROUNDWATER MODEL:**

In a FIVE-mile radius of the location of the proposed water source a ground water model using MODFLOW software, or similar software approved by LPNNRD, is to be done. Data from the ground water model is to be reported to the LPNNRD in both paper copy and electronically using the appropriate software.

- A. Model should list boundary conditions used, grid size, include all high capacity wells in modeled area, streams and rivers in the modeled area, expected recharge rates, location and flow amounts, hydrologic conductivity and transmissivity values used.
  - B. At least one iteration, reviewed and approved by LPNNRD, should model steady state conditions over a five-year period with a no flow boundary, and little or no recharge to simulate drought conditions.
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**APPLICATION FOR A PERMIT TO CONSTRUCT A WATER WELL  
IN THE LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT**

**PURPOSE OF WELL**

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**IRRIGATION WELLS (SECTION A)**

- A. How many acres will be irrigated? \_\_\_\_\_ acres
- B. Crops to be planted: \_\_\_\_\_ Crop rotation schedule \_\_\_\_\_
- C. Type of irrigation system.  Center Pivot,  Gravity,  Other (specify) \_\_\_\_\_
- D. The irrigation system is to be powered by  Electric  Fuel
- E. Expected total annual consumptive water use in Acre Inches / Year \_\_\_\_\_ or  
Total Gallons / Year \_\_\_\_\_
- F. Will Fertilizer, Chemicals or Animal waste be applied through the system?  Yes,  No

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**DEWATERING WELLS OVER 30 DAYS (SECTION B)**

- A. Purpose of dewatering well, such as installation of building foundation, etc. \_\_\_\_\_
- B. Expected total number of days the dewatering well will be in use \_\_\_\_\_
- C. Approximate dates (month/day/year) in operation: Start \_\_\_\_\_ End \_\_\_\_\_
- D. Legal description of water discharge location: \_\_\_\_\_ ¼ of the \_\_\_\_\_ ¼ of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West and name of river, stream or water body \_\_\_\_\_
- E. Will discharge water be used for another purpose, such as livestock, irrigation, etc.?  Yes,  No  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.  
\_\_\_\_\_  
\_\_\_\_\_

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**LIVESTOCK WELLS (SECTION C)**

- A. Name of facility \_\_\_\_\_
- B. Type of Livestock:  Feeder Cattle,  Dairy Cattle,  Swine over 55 lbs.,  Swine under 55 lbs.,  
 Sheep,  Poultry,  Horses
- C. Average number of livestock per year \_\_\_\_\_ and average weight per animal \_\_\_\_\_ lbs.
- D. Peak number of livestock \_\_\_\_\_ and time of year \_\_\_\_\_
- E. Is facility approved by Nebraska Department of Environmental Quality?  Yes,  No. If Yes, list NDEQ certification IIS number \_\_\_\_\_ If No, complete the rest of this section.
- F. Type of facility:  Open lot,  Covered Building
- G. If facility is Open lot, list soil type \_\_\_\_\_
- H. Estimated depth to ground water under feedlot \_\_\_\_\_ ft.
- I. Describe manure collection system of feedlot \_\_\_\_\_  
\_\_\_\_\_
- J. Name and distance of nearest surface watercourse from feedlot \_\_\_\_\_
- K. For each manure land application site, list legal description and size in acres, method of application, and distance from feedlot operation. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**DOMESTIC WELLS WITH IRRIGATION ON ONE ACRE OR MORE (SECTION D)**

- A. Check all that apply:
  - a. Water use:  Lawn and number of acres to be irrigated \_\_\_\_\_ acres.
  - b. Water use:  Commercial garden and number of acres to be irrigated \_\_\_\_\_ acres.
  - c. Water use:  Tree Farm and number of acres to be irrigated \_\_\_\_\_ acres.
  - d. Water use:  Type of livestock \_\_\_\_\_ and number \_\_\_\_\_
- B. Type of irrigation system.  Sprinkler,  Drip Tape,  Other (specify) \_\_\_\_\_
- C. If applicable, give Street address and town \_\_\_\_\_

\* One acre equals 43,560 square feet.

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**INDUSTRIAL AND COMMERCIAL WELLS****(SECTION E)**

- A. Name of facility \_\_\_\_\_
- B. Products produced by facility \_\_\_\_\_
- C. In Section 6 or on a separate sheet of paper, list well registration number and legal description of current wells supplying water to this facility.
- D. In Section 6 or on a separate sheet of paper, provide a short description how water is used within the facility and the expected annual amount of water for each use. For example: "The manufacturing plant will use 45% of total annual water use, or 1.45 million gallons per year, for electroplating of galvanized pipe and the remaining 55% of total annual water use, or 1.77 million gallons per year, will be used for non-contact cooling water throughout the plant".
- E. Will any of the used water or waste water from this facility be re-used for another purpose?  Yes,  No.  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.  
\_\_\_\_\_  
\_\_\_\_\_

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**PUBLIC WATER SUPPLY WELLS****(SECTION F)**

- A. On a separate sheet of paper, list the well registration numbers and legal description of current wells supplying water to this community.
- B. Attach a list of the five largest industrial water users that your community supplies water to, and the total annual amount of water supplied to each of these industries for the last five years.
- C. For these same industries list the total annual amount of water returned to the community as waste water for each of the last five years.
- D. Will waste water be used for another purpose, such as livestock, irrigation, etc.?  Yes,  No  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.  
\_\_\_\_\_  
\_\_\_\_\_
- E. Attach a list of the golf courses that the community supplies water to and list the location and number of acres for each one.

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**RECOVERY OR REMEDIATION WELLS****(SECTION G)**

- A. Reason for recovery or remediation well, i.e. leaking underground storage tank. \_\_\_\_\_  
\_\_\_\_\_
- B. Contaminates of concern \_\_\_\_\_
- C. Treatment method of contaminants \_\_\_\_\_
- D. Approximate dates (month/day/year) in operation: Start \_\_\_\_\_ End \_\_\_\_\_
- E. Legal description of water discharge location: \_\_\_\_ ¼ of the \_\_\_\_ ¼ of Section \_\_\_\_, Township \_\_\_\_ North, Range \_\_\_\_ East/West and name of river, stream or water body \_\_\_\_\_
- F. Will cleanup water be used for another purpose, such as livestock, irrigation, etc.?  Yes,  No  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.  
\_\_\_\_\_  
\_\_\_\_\_

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**OTHER WELLS**

- A. Purpose of water use  Research and Development (Testing Pivots) \_\_\_\_\_
- B. Will the well be used for one calendar year or less?  Yes,  No
  - a. If Yes, list approximate dates (month/day/year) the well will be in operation: Start \_\_\_\_\_  
End \_\_\_\_\_
  - b. If No, list the approximate dates (months) or seasons of the calendar year that well is expected to be in peak or highest use. Summer (Growing Season)
- C. Legal description of water discharge location: NW ¼ of the SW ¼ of Section 17, Township 20 North, Range 3 East West and name of river, stream or water body Unnamed Tributary to Shell Creek

**This form must be completed in full and accompanied by a non-refundable \$50.00 filing fee** (payable to the Lower Platte North Natural Resources District). In addition, for Class 3 well permits an added fee of \$250.00 is required for District review. For Class 4 well permits an added fee of \$500.00 is required for District review. Forward this application and filing fees to:

**Lower Platte North Natural Resources District  
P.O. Box 126  
Wahoo, NE 68066  
Phone: (402) 443-4675**

Please take the time and fill out the information correctly. The District will return an incomplete or defective application, with 60 days being allowed for resubmission. The District shall issue all permits with conditions attached, or denied not later than 30 days after receipt of a complete and properly prepared application.

### **WATER WELL PERMIT RESTRICTIONS**

1. A well permit is required prior to the construction of a water well. If construction of a water well is commenced prior to obtaining a permit, a late permit must be completed and accompanied by a \$250.00 application fee. Construction or operation of a new water well without an approved water well permit shall result in the District issuing a 'cease and desist order' against further construction or use of that water well.
2. An irrigation well shall not be constructed within 1000 feet of any registered industrial or public water supply well or within 600 feet of a registered irrigation well; A public water supply well shall not be constructed within 1000 feet of any registered irrigation, industrial or other public water supplier's well; An industrial well shall not be constructed within 1000 feet of any registered irrigation, industrial or public water supply well pursuant to §46-609 and §46-651. These spacing restrictions shall not apply to water wells owned by the same person. Any person may apply to the Nebraska Department of Natural Resources for a special permit to drill a water well without regard to the spacing requirements pursuant to §46-653. The District may adopt stricter well spacing requirements based on different aquifer subareas. Check with the District office if you have any questions.
3. This permit does not register the well with the Department of Natural Resources. All wells are required to be registered by the well driller with the Nebraska Department of Natural Resources within 60 days after the well is completed.
4. A replacement water well is one, which replaces an abandoned water well that has been operated within the last three years, and is constructed to water the same tract of land as the abandoned water well that is being replaced. A replacement water well must be pumping from a comparable aquifer and yield approximately the same gallons per minute and total annual water uses as the original water well it is replacing. As of January 1, 1997, both new and replacement wells need a permit from the Lower Platte North Natural Resources District.
5. Consumptive water use in acre-inches is determined from the Department of Natural Resources (DNR) Net Corn Crop Irrigation Requirement map or a similar map produced by the University of Nebraska.
6. If the well is being replaced it must be properly abandoned according to state guidelines. A copy of these guidelines is available from the Lower Platte North NRD.
7. If the water well is not constructed within a one-year period from the date of approval, a new permit is needed.
8. Water wells may not be drilled within 50 feet of a stream bank without first obtaining a surface water right for that water withdrawal from the Department of Natural Resources pursuant to §46-637.
9. Any person who, on or after January 1, 1997, commences or causes construction of such a well for which the required permit has not been obtained, or who knowingly furnishes false information regarding such a permit, shall be guilty of a Class IV misdemeanor pursuant to §46-602.01 and §46-613.02.
10. Permits are not required for test holes or temporary dewatering wells (30 days or less). Permits are needed for water wells designed to pump 50 gallons per minute or less in Level 3 and Stay management areas.
11. Tax assessor records submitted with water well permit must include map, parcel number and an accurate account of current land use, such as irrigated acres.
12. With the well permit application, submit an aerial photograph with markings to show the location of the water source(s) and the location of where the water is to be used.
13. Any person, who knowingly furnishes false information regarding a water well permit, shall be subject to the imposition of penalties imposed through the controls adopted by the District pursuant to §46-746.
14. All new or replacement water wells must install a District approved flow meter and report water pumped annually in acre-inches per year or total gallons per year on LPNNRD approved forms by January 31<sup>st</sup> of each following year.
15. If multiple water sources are used, landowner must supply flow records from each water source in acre-inches per year or total gallons per year on LPNNRD approved forms by January 31<sup>st</sup> of each following year.
16. Water well permit applications require that the applicant or operator of irrigation, livestock, domestic (with irrigation on one acre or more of land), industrial, and public water supply wells by NRD certified.

**\*\* Landowners must list new irrigated acres with the County Assessor, update the DNR well registration, and comply with any additional conditions within 90 days of LPNDRD approval of this water well permit. LPNDRD staff may perform a site visit to verify information provided in the well permit application. \*\***

**Approved List of Propeller Flow Meters  
Lower Platte North Natural Resources District (LPNNRD)  
Effective: April 11, 2022**



**Approved List of Propeller Flow Meters and Required Conditions**

**LPNNRD requirements for all propeller flow meters:**

- Anti-reverse flow feature to prevent backflow.
- Follow manufactures installation recommendations taking into account in-pipe jetting or non-jetting flow conditions. (Correct installation of the flow meter is critical to getting an accurate reading. Most meters require a straight pipe before and after the flow meter that is at least equivalent to five times the pipe diameter in order to obtain an accurate flow measurement. Doing the installation correctly the first time saves money in the long run).
- Straightening vanes are required according to manufacturer’s installation recommendations for in-pipe jetting or non-jetting flow conditions.
- Meter must be positioned to ensure water totally fills the pipe, such as a level pipe or positioned on a riser.
- Meter must be configured: to inside and outside diameter of the pipe, material of the pipe, meter used that will operate within minimum and maximum output flow rates of the well, horizontal or vertical installations, and unobstructed straight run distance upstream and downstream of meter and in most cases straightening vanes (or other flow straightener) will be necessary.
- Meter totalizes flow in acre inches and flow meter dial is in gallons per minute.
- A flow meter must be dedicated to each individual well. (Exceptions will be made if several wells are used to provide enough water to operate a single irrigation system such as a pivot or gated pipe. In these situations a flow meter placed at the central location where all water can be metered is acceptable).

<b>Manufacturer</b>	<b>Model</b>	<b>Notes</b>
McCrometer	McPropeller	All propeller models
Sparling	Propeller saddle meter	Model 312 propeller meter
Geyser	Saddle meter	All propeller models for Farmland Irrigation

**LPNNRD prefers the following added features for all propeller flow meters:**

- Over-run bearing (or extra bearing) for smother operation and to extend life of the meter
- Canopy cover to protect meter

LPNNRD will inspect systems for proper installation of flow meters

**APPLICATION FOR A PERMIT TO CONSTRUCT A WATER WELL  
IN THE LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT**

DNR & NRD USE ONLY			
Permit No. _____	Date Approved/Denied _____	NRD Representative _____	
Permit Type: New, Replacement or Late	Date Received _____	Paid: Cash or Check	
Date Post-inspected _____	Registration No. _____	Updated Form: June 2022	

ALL APPLICANTS SEEKING A WATER WELL PERMIT MUST COMPLETE PAGES 1 AND 2, AND THE APPROPRIATE SECTION BASED ON THE PURPOSE OF THE WELL. (CLASS 1 - 4 WELL PERMIT)  
 WATER WELL PERMITS FOR IRRIGATED ACRES GREATER THAN 160 ACRES IN SIZE OR TOTAL ANNUAL WATER USE BETWEEN 150 AND 300 ACRE FEET PER YEAR MUST COMPLETE PAGES 1, 2, AND 3, AND THE APPROPRIATE SECTION BASED ON THE PURPOSE OF THE WELL. (CLASS 3 WELL PERMIT)  
 WATER WELL PERMITS FOR TOTAL ANNUAL WATER USE EQUAL TO OR GREATER THAN 300 ACRE FEET PER YEAR, REGARDLESS OF NUMBER OF IRRIGATION ACRES, MUST COMPLETE PAGES 1, 2, AND 4, AND THE APPROPRIATE SECTION BASED ON THE PURPOSE OF THE WELL. (CLASS 4 WELL PERMIT)

<b>1. NAME AND ADDRESS OF LAND OWNER:</b> <u>Camp Moses - Merrill</u> <u>2849 Co Rd. 31, Bldg. 3</u> <u>Linwood, NE 68036</u> Phone: _____	<b>NAME AND ADDRESS OF CONTACT:</b> <u>Andrew Rieschick</u> <u>70656 649 Ave.</u> <u>Falls City, NE 68355</u> Phone: <u>402-801-1452</u>
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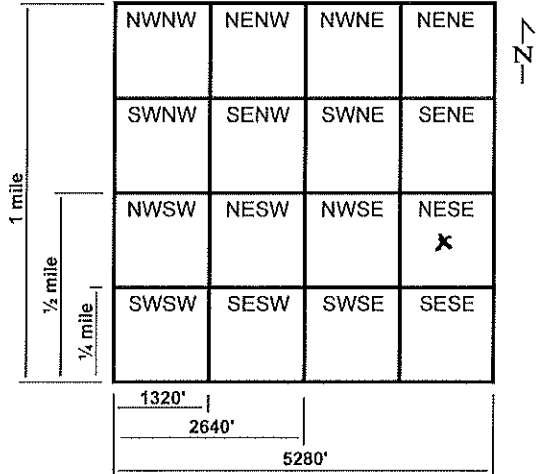
**2. PURPOSE OF NEW WATER WELL (indicate one):**

<input type="checkbox"/> Irrigation (Complete section A)	<input type="checkbox"/> Dewatering (Over 30 days, Complete section B)
<input type="checkbox"/> Livestock (Complete section C)	<input type="checkbox"/> Domestic (Irr. on one acre or larger, Complete section D)
<input type="checkbox"/> Industrial (Complete section E)	<input checked="" type="checkbox"/> Public Water Supply (Complete section F)
<input type="checkbox"/> Recovery or Remediation (Complete section G)	
<input type="checkbox"/> Other (specify) _____ (Complete section H)	

**3. IDENTIFY LOCATION OF PROPOSED WELL:**

A. Saunders County, NE ¼ of the SE ¼ of Section 30, Township 17 North, Range 5 East/West. (circle one)

B. The box at the right represents one square mile, (section). Indicate with an "X", the proposed location of the well. Outline the proposed water use area. If the water is to be used outside the above written legal description, give legal description of water use area, \_\_\_\_\_ ¼ of the \_\_\_\_\_ ¼ of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West.



C. The well will be located 1831 feet from the North/South section line, and will be 587 feet from the East/West section line. Or enter Lat. / Long. Latitude Degree 41 Minute 24 Second 49 Longitude Degree 96 Minute 53 Second 19

**4. REPLACEMENT AND ABANDONED WELL INFORMATION:**

- A. Is this a replacement well?  Yes,  No If yes, fill out the rest of this section.
- B. Registration number of well to be replaced: \_\_\_\_\_
- C. Well to be replaced was last operated (month/year): \_\_\_\_\_
- D. Replacement well is \_\_\_\_\_ feet from original well.
- E. Decommissioning of Original well on (month/day/year): \_\_\_\_\_
- F. If water use is for irrigation, list the number of acres watered by the original well: \_\_\_\_\_
- G. If water use is for irrigation, will replacement well, water the same tract of land as the decommissioned well?  Yes,  No: If No, list the number of additional acres \_\_\_\_\_ and legal description \_\_\_\_\_ ¼ of the \_\_\_\_\_ ¼ of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West. (circle one)

• A replacement water well must deliver water to the same tract of land as the original water well, pump from a comparable aquifer, and yield approximately the same gallons per minute and total annual water use as the original water well.

**5. SPECIFICATIONS OF INTENDED WELL AND PUMP:**

- A. Approximate date when construction will begin (month/day/year): 08/2025
- B. Expected total well depth: 348 feet.
- C. Well Casing Diameter: 5 inches.
- D. Pump Column Diameter: 3 inches.
- E. Estimated pumping capacity: 80 GPM.
- F. Expected total annual water use in Acre Inches / Year \_\_\_\_\_ or Total Gallons / Year \_\_\_\_\_
- G. The system is to be powered by  Electric  Fuel
- H. Will the well be used in a system with other wells?  Yes,  No. If Yes, How many \_\_\_\_\_  
List well registration number and legal description of each well in Section 6 below.
- I. Name of Well Driller: Ryan Riechick (Please attach test hole log, if available.)

**6. List additional information requested in this Section or attached additional sheet.**

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**7. Addition information and requirements for Lower Platte North NRD review.**

- Attach current tax assessor records including map, parcel number, and current land use such as irrigated acres.
- Attach aerial photo showing location of water source(s) and area water or reuse water is to be used.
- All new and replacement water wells must install a District approved flow meter and report water pumped annually to the LPNNRD by January 31<sup>st</sup> of the following year. See approved list in this packet.
- Water well permit conditions maybe required for approval by the Lower Platte North NRD for each individual well.

**8. I certify that I am familiar with the information contained in this application, and it's restrictions, rules and regulations and that to the best of my knowledge and belief such information is true, complete and accurate.**

Date \_\_\_\_\_ Signature of Applicant \_\_\_\_\_  
Signature of Well System Operator, if different than Applicant \_\_\_\_\_  
NRD Certification Number of Landowner or Operator \_\_\_\_\_ (Required for irrigation, livestock, domestic (with irrigation on one acre or more of land), industrial, and public water supply wells.)

**9. Lower Platte North NRD Use Only. Comments by District Representative.**

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**APPLICATION FOR A PERMIT TO CONSTRUCT A WATER WELL  
IN THE LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT**

**PURPOSE OF WELL**

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**IRRIGATION WELLS (SECTION A)**

- A. How many acres will be irrigated? \_\_\_\_\_ acres
- B. Crops to be planted: \_\_\_\_\_ Crop rotation schedule \_\_\_\_\_
- C. Type of irrigation system.  Center Pivot,  Gravity,  Other (specify) \_\_\_\_\_
- D. The irrigation system is to be powered by  Electric  Fuel
- E. Expected total annual consumptive water use in Acre Inches / Year \_\_\_\_\_ or  
Total Gallons / Year \_\_\_\_\_
- F. Will Fertilizer, Chemicals or Animal waste be applied through the system?  Yes,  No

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**DEWATERING WELLS OVER 30 DAYS (SECTION B)**

- A. Purpose of dewatering well, such as installation of building foundation, etc. \_\_\_\_\_
- B. Expected total number of days the dewatering well will be in use \_\_\_\_\_
- C. Approximate dates (month/day/year) in operation: Start \_\_\_\_\_ End \_\_\_\_\_
- D. Legal description of water discharge location: \_\_\_\_\_ ¼ of the \_\_\_\_\_ ¼ of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West and name of river, stream or water body \_\_\_\_\_
- E. Will discharge water be used for another purpose, such as livestock, irrigation, etc.?  Yes,  No  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.  
\_\_\_\_\_  
\_\_\_\_\_

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**LIVESTOCK WELLS (SECTION C)**

- A. Name of facility \_\_\_\_\_
- B. Type of Livestock:  Feeder Cattle,  Dairy Cattle,  Swine over 55 lbs.,  Swine under 55 lbs.,  
 Sheep,  Poultry,  Horses
- C. Average number of livestock per year \_\_\_\_\_ and average weight per animal \_\_\_\_\_ lbs.
- D. Peak number of livestock \_\_\_\_\_ and time of year \_\_\_\_\_
- E. Is facility approved by Nebraska Department of Environmental Quality?  Yes,  No. If Yes, list NDEQ certification IIS number \_\_\_\_\_ If No, complete the rest of this section.
- F. Type of facility:  Open lot,  Covered Building
- G. If facility is Open lot, list soil type \_\_\_\_\_
- H. Estimated depth to ground water under feedlot \_\_\_\_\_ ft.
- I. Describe manure collection system of feedlot \_\_\_\_\_
- J. Name and distance of nearest surface watercourse from feedlot \_\_\_\_\_
- K. For each manure land application site, list legal description and size in acres, method of application, and distance from feedlot operation. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**DOMESTIC WELLS WITH IRRIGATION ON ONE ACRE OR MORE (SECTION D)**

- A. Check all that apply:
  - a. Water use:  Lawn and number of acres to be irrigated \_\_\_\_\_ acres.
  - b. Water use:  Commercial garden and number of acres to be irrigated \_\_\_\_\_ acres.
  - c. Water use:  Tree Farm and number of acres to be irrigated \_\_\_\_\_ acres.
  - d. Water use:  Type of livestock \_\_\_\_\_ and number \_\_\_\_\_
- B. Type of irrigation system.  Sprinkler,  Drip Tape,  Other (specify) \_\_\_\_\_
- C. If applicable, give Street address and town \_\_\_\_\_

\* One acre equals 43,560 square feet.

**INDUSTRIAL AND COMMERCIAL WELLS (SECTION E)**

- A. Name of facility \_\_\_\_\_
- B. Products produced by facility \_\_\_\_\_
- C. In Section 6 or on a separate sheet of paper, list well registration number and legal description of current wells supplying water to this facility.
- D. In Section 6 or on a separate sheet of paper, provide a short description how water is used within the facility and the expected annual amount of water for each use. For example: "The manufacturing plant will use 45% of total annual water use, or 1.45 million gallons per year, for electroplating of galvanized pipe and the remaining 55% of total annual water use, or 1.77 million gallons per year, will be used for non-contact cooling water throughout the plant".
- E. Will any of the used water or waste water from this facility be re-used for another purpose?  Yes,  No.  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.

**PUBLIC WATER SUPPLY WELLS (SECTION F)**

- A. On a separate sheet of paper, list the well registration numbers and legal description of current wells supplying water to this community. *G-053964, SE 1/4 sec 30, T7N, SE*
- B. Attach a list of the five largest industrial water users that your community supplies water to, and the total annual amount of water supplied to each of these industries for the last five years. *none*
- C. For these same industries list the total annual amount of water returned to the community as waste water for each of the last five years.
- D. Will waste water be used for another purpose, such as livestock, irrigation, etc.?  Yes,  No  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.

- E. Attach a list of the golf courses that the community supplies water to and list the location and number of acres for each one. *none*

**RECOVERY OR REMEDIATION WELLS (SECTION G)**

- A. Reason for recovery or remediation well, i.e. leaking underground storage tank. \_\_\_\_\_
- B. Contaminates of concern \_\_\_\_\_
- C. Treatment method of contaminants \_\_\_\_\_
- D. Approximate dates (month/day/year) in operation: Start \_\_\_\_\_ End \_\_\_\_\_
- E. Legal description of water discharge location: \_\_\_\_\_ 1/4 of the \_\_\_\_\_ 1/4 of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West and name of river, stream or water body \_\_\_\_\_
- F. Will cleanup water be used for another purpose, such as livestock, irrigation, etc.?  Yes,  No  
If Yes, list purpose, location and expected total amount of water use in acre-inches / year or total gallons / year.

**OTHER WELLS (SECTION H)**

- A. Purpose of water use \_\_\_\_\_
- B. Will the well be used for one calendar year or less?  Yes,  No
  - a. If Yes, list approximate dates (month/day/year) the well will be in operation: Start \_\_\_\_\_ End \_\_\_\_\_
  - b. If No, list the approximate dates (months) or seasons of the calendar year that well is expected to be in peak or highest use. \_\_\_\_\_
- C. Legal description of water discharge location: \_\_\_\_\_ 1/4 of the \_\_\_\_\_ 1/4 of Section \_\_\_\_\_, Township \_\_\_\_\_ North, Range \_\_\_\_\_ East/West and name of river, stream or water body \_\_\_\_\_





# Camp Moses Merrill P&S approval

PDF - 576 KB



## NEBRASKA

Good Life. Great Resources.

DEPT. OF ENVIRONMENT AND ENERGY



Jim Pillen, Governor

November 25, 2024

NDEE PERMIT No. W-147-2024  
FACILITY ID 3963

Bev Pacas, Director  
2849 Co Rd 31, BLDG 3  
Linwood NE 68036

Re: **Drinking Water – Camp Moses-Merrill – W-147-2024 – Plans and Specifications – Water Main – Linwood NE (Rieschick Engineering & Consulting, LLC)**

Dear Ms. Pacas:

Documents describing the above-referenced project have been reviewed and are hereby approved with respect to features of sanitary significance. This approval does not supersede any other NRD, local, state, or federal requirements. In accordance with Title 179 NAC 7-003, a construction permit is hereby granted. This permit is valid for a period of two years from the date of issuance.

This approval is subject to any stipulations listed below. Written approval must be obtained from this Department before proceeding with any major changes from the project documents as approved. One set of the submitted documents is being made a part of this Department's records.

No project that is considered major construction shall be placed into service prior to a final inspection and approval by the Department. The only exception to this requirement is interior tank coating and water distribution main projects. The Department may allow these projects to be placed into service when requested by the owner and/or the engineer. The request to place into service must be accompanied with a certification of project completion by the engineer and copies of satisfactory bacteriological testing results for the project. The Department may be issuing administrative penalties, as authorized in Neb. Rev. Stat. § 71-5304.01, to any system that violates this regulation.

Sincerely,

Cyril Martinmaas, P.E., Engineering Section Supervisor  
Permitting & Engineering Division  
Nebraska Department of Environment and Energy

CJM:BW:CNW

xc: Andrew Rieschick, P.E., Rieschick Engineering & Consulting, LLC (ec)  
Joel R. Pacas, Camp Moses-Merrill (ec)  
Andy Kahle, NDEE (ec)

**XXXX** In accordance with Title 179 NAC 7-005.01, documentation of the contract or actual cost of the project shall be provided to this Department for the purpose of determining the final fee amount. Payment of the final fee amount shall be made to this Department.

**XXXX** In accordance with Title 179 NAC 7-003.02, record drawings must be submitted to the Department. PDF (Portable Document Format) copies are preferred.

**XXXX** Discharge of chlorinated water from disinfection procedure must follow Best Management Practices (BMPs) for meeting surface water quality standards under the National Pollutant Discharge Elimination System (NPDES). For assistance, contact the NPDES Compliance Section at 402/471-1367.

Department of Environment and Energy  
P.O. Box 98922  
Lincoln, Nebraska 68509-8922

OFFICE 402-471-2186 FAX 402-471-2909  
ndee.merrill@nebraska.gov



# NEBRASKA

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DEPT. OF ENVIRONMENT AND ENERGY



Jim Pillen, Governor

March 15, 2024

FACILITY ID: 3963

Joel Pacas  
Moses Merrill Camp & Conference Center  
2849 Co Rd 31 Bldg 3  
Linwood NE 68036

Re: PWS – Camp Moses Merrill – Saunders County – **Construction of Well Meeting the Requirements of Title 178 NAC 12**

Dear Mr. Pacas:

We have reviewed the correspondence received on March 14, 2024, from Andrew Rieschick of Rieschick Engineering & Consulting, LLC. Based on the information submitted, it is our understanding that the owner wishes to construct a Title 178 NAC 12 well at the above referenced location in Saunders County, NE. The information submitted indicates that the proposed well will have a capacity of less than 100 gpm and a combined wellfield capacity of less than 200 gpm for the water system. Also, it was indicated that the well screen will have a depth of more than 50 feet from the original ground surface and will be located more than 200 feet from any surface water sources.

As such, you may construct the Title 178 NAC 12 well under the above stated conditions. Please notify the Department should any of the above conditions change prior to completion of the well. Be advised that this approval is only for the Title 178 NAC 12 well. **Plans and specifications** prepared by a NE registered professional engineer must be submitted for review and approval prior to beginning construction for **any other portion of the public water system not covered by Title 178 NAC 12 – such as distribution piping.**

Please contact Logan Morgaridge at 402-471-1010 or [logan.morgaridge@nebraska.gov](mailto:logan.morgaridge@nebraska.gov) for any information concerning the water quality testing and monitoring for this well.

If you have any questions concerning this letter, please feel free to contact me at 402-471-0522 or [cyril.martinmaas@nebraska.gov](mailto:cyril.martinmaas@nebraska.gov).

Sincerely,

Cyril Martinmaas, P.E., Engineering Section Supervisor  
Permitting & Engineering Division  
Nebraska Department of Environment and Energy

CJM:VDK

xc: Andrew Rieschick, PE, Rieschick Engineering & Consulting (ec)  
Andy Kahle & Logan Morgaridge, NDEE (ec)  
David Miesbach, NDEE (ec)

Department of Environment and Energy

P.O. Box 98922  
Lincoln, Nebraska 68509-8922

Jim Macy, Director

OFFICE 402-471-2186 FAX 402-471-2909  
[ndee.moreinfo@nebraska.gov](mailto:ndee.moreinfo@nebraska.gov)

3/14/2024

Andrew Rieschick, P.E.  
Rieschick Engineering & Consulting, LLC  
70656 649<sup>th</sup> Ave.  
Falls City, NE 68355

Nebraska Department of Environment & Energy  
Attn: Vince Kuppig  
PO Box 98922  
Lincoln, NE 68509

**Mr. Vince Kuppig,**

I am writing this letter on behalf of Camp Moses Merrill seeking approval to construct a well on their property to Title 178 NAC 12 Standards. I understand there are several criteria that must be met in order to obtain approval to do so.


The system is a transient, non-community public water system. Addressing the items you mentioned in the previously mentioned email:

1. **The total capacity of the system will be less than 100 gpm.** The proposed well will be the only supply to the system, and will likely be pumped at rate near 50 gpm.
2. **The top the proposed screen will be at a depth greater than 50 feet from the ground surface.** The top of the screen will be at approximately 280 feet below grade and terminate approximately 300 feet below grade.
3. **The well be greater than 200 feet from a surface water source.** The siting of the well is near the top of a hill which makes it greater than 1000' from the nearest surface water.

Since all criteria have been met to construct the proposed well to Title 178 NAC 12 Standards, we are seeking written approval from you so that we may proceed with design.

If you have any questions, please do not hesitate to contact me.

Sincerely,



Andrew Rieschick, P.E.  
Owner  
Rieschick Engineering & Consulting, LLC



# Groundwater Management Plan

**Public Review Version 10.0**

*Approval Date: XX/XX/XXX*

*Prepared for:*



**LOWER PLATTE NORTH**  
Natural Resources District

*Prepared by:*



### **Board of Directors - 2024**

<b>Name</b>	<b>Sub-District</b>
Lon Olson	1
Anthony Hanson	1
John Goldsberry	2
Bill Saeger	2
Dave Saalfeld	3
Andrew Tonnies	3
Chris Yosten	4
Matt Bailey	4
Mark Seier	5
David Lawrence	5
Joe Birkel	6
Robert Hilger	6
Ryan Sabatka, Chairman	7
Ryan Engel	7
Jerry Johnson	8
Roger Harder	8
Duane Johnson	9
Robert Meduna Jr	9
Thomas McKnight	At-Large

*This third update of the Lower Platte North Natural Resources Groundwater Management Plan (GWMP) has been prepared per Nebraska Revised Statute 46-709. The GWMP was created based upon the best available scientific information.*

# TABLE OF CONTENTS

<b>List of Tables</b> .....	<b>ii</b>
<b>Table of Figures</b> .....	<b>ii</b>
<b>List of Abbreviations and Acronyms</b> .....	<b>iii</b>
<b>1 Introduction</b> .....	<b>1</b>
1.1 LPNNRD Background .....	1
1.2 Legal Authority and Obligations.....	2
1.3 Agency Roles and Functions .....	3
1.4 Joint-Planning Efforts .....	5
1.5 Current Rules and Regulations.....	6
<b>2 Description of the NRD</b> .....	<b>11</b>
2.1 Groundwater Regions and Principal Aquifer .....	11
2.2 Hydrogeologic Datasets .....	12
2.3 Topography .....	15
2.4 Soils .....	15
2.5 Geology and Hydrological Characteristics .....	17
2.6 Total Saturated Sand.....	18
2.7 Confined vs. Unconfined Aquifers .....	19
2.8 Transmissivity.....	22
2.9 Climate and Precipitation .....	22
2.10 Land Cover.....	23
2.11 Population – Economic Base .....	25
2.12 Surface Water.....	26
2.13 Wells and Test Holes .....	28
2.14 Partners and Programs.....	29
2.15 Environmental Education and Information.....	31
<b>3 Groundwater Quantity</b> .....	<b>32</b>
3.1 Groundwater Levels and Existing Wells.....	32
3.2 Groundwater Recharge.....	35
3.3 Water Use and Demand.....	37
3.4 Certified Irrigated Acres.....	39
<b>4 Groundwater Quality</b> .....	<b>41</b>
4.1 Aquifer Vulnerability .....	41
4.2 Wellhead Protection Areas .....	46
<b>5 Goals and Objectives</b> .....	<b>49</b>
5.1 Groundwater Management Goals and Objectives .....	49
<b>6 Stakeholder Involvement</b> .....	<b>52</b>
6.1 Outreach Methods.....	52
6.2 Stakeholder Group.....	52
6.3 Open House Meetings .....	52
6.4 Board Retreat.....	52
<b>7 Recommendations</b> .....	<b>53</b>
7.1 Adoption of Groundwater Management Subareas .....	53
7.2 Expansion of the Observation Network.....	54
7.3 Alteration to the Well Variance Scoring Protocol.....	56

7.4	Quantity Trigger Adjustments.....	57
7.5	Clarification of Terminology.....	58
7.6	Re-evaluation of Special Quantity Subareas.....	58
7.7	Efforts to Enhance Data Transparency and Communication.....	58
7.8	Reassessment of Water Quality Triggers.....	59
<b>8</b>	<b>References .....</b>	<b>60</b>

## LIST OF TABLES

Table 1:	Confined and Unconfined Aquifer Triggers.....	9
Table 2:	Geologic Sequence of Major Formations in LPNNRD .....	17
Table 3:	LPNNRD Land Cover Change (2009 – 2023).....	24
Table 4:	Population of Incorporated Places (1990 – 2025) .....	25
Table 5:	LPNNRD Steam Gage Information.....	27
Table 6:	Annual Municipal Water Usage All Communities .....	37
Table 7:	Annual Municipal Water Usage Without LWS and MUD .....	38
Table 8:	Active Registered Well Distribution .....	39
Table 9:	LPNNRD PWS State-Approved WHP Plans .....	46
Table 10:	Observation Wells and Proposed Sites by Subarea .....	55

## TABLE OF FIGURES

Figure 1:	LPNNRD Location .....	1
Figure 2:	Board of Director Sub-districts (2025).....	4
Figure 3:	Lower Platte River Basin Coalition NRDs .....	5
Figure 4:	Quality and Special Quantity Sub-areas.....	8
Figure 5:	Groundwater Limited Development Areas.....	10
Figure 6:	Groundwater Regions of the LPNNRD .....	12
Figure 7:	AEM Flights within and near the LPNNRD .....	13
Figure 8:	3D Leapfrog output in cross section .....	14
Figure 9:	Well and Test Holes with Geologic Logs (LRE Water, 2023).....	14
Figure 10:	Topography of the LPNNRD .....	15
Figure 11:	Soil Types .....	16
Figure 12:	Bedrock Formations.....	17
Figure 13:	Total Saturated Sand, Well and Test Holes.....	19
Figure 14:	Confined vs. Unconfined Aquifers .....	21
Figure 15:	Hydrograph of Transitional Aquifer Type .....	21
Figure 16:	Aquifer Transmissivity.....	22
Figure 17:	Average Annual Precipitation (1981-2010).....	23
Figure 18:	2023 Land Cover .....	24
Figure 19:	Major River Systems, Stream Gages and Diversion Points.....	27
Figure 20:	Registered Active Wells in the LPNNRD.....	28
Figure 21:	Test Holes within 5-miles of LPNNRD .....	29
Figure 22:	Groundwater-Level Changes in LPNNRD, Predevelopment to Spring 2023.....	32
Figure 23:	Observation Well Network .....	33

Figure 24: Depth to Groundwater ..... 34

Figure 25: Potential Areas for Sub-irrigation ..... 35

Figure 26: Artificial Recharge Potential ..... 36

Figure 27: Percent of NeDNR Active Registered Wells ..... 39

Figure 28: Certified Irrigated Acres in the LPNNRD (2024) ..... 40

Figure 29: Aquifer Vulnerability ..... 42

Figure 30: LPNNRD Nitrate Concentrations 2019-2023 ..... 43

Figure 31: LPNNRD Statewide Water Quality Monitoring Network Wells ..... 45

Figure 32: Wellhead Protection Areas ..... 47

Figure 33: Five Steps of the WHP Program ..... 47

Figure 34: Proposed Groundwater Management Subareas ..... 54

Figure 35: Existing Observation Wells and Potential Expansion Sites ..... 56

## LIST OF ABBREVIATIONS AND ACRONYMS

ACT	Nebraska Groundwater Management Act
AF	Acre Feet
AEM	Airborne Electromagnetic
Assessment	LPNNRD Hydrogeologic Assessment (2023)
Coalition	Lower Platte River Basin Coalition
CSD	Conservation and Survey Division
District	Lower Platte North NRD
DCP	Drought Contingency Plan
DEM	Digital Elevation Model
DWEE	Nebraska Department of Water, Energy, and Environment
ENWRA	Eastern Nebraska Water Resources Assessment
EQIP	Environmental Quality Incentive Program
GIS	Geographic Information System
GWMA	Groundwater Management Area
GWMP	Groundwater Management Plan
HCA	Hydrologically Connected Areas
IMP	Integrated Management Plan
LENRD	Lower Elkhorn Natural Resources District
LPMT	Lower Platte Missouri Tributary Groundwater Model
LPNNRD	Lower Platte North Natural Resources District
LPSNRD	Lower Platte South Natural Resources District
LPRCA	Lower Platte River Corridor Alliance
LWS	Lincoln Water System
Mg/L	Milligrams per Liter
MUD	Metropolitan Utilities District
NARD	Nebraska Association of Resources Districts
NASS	National Agricultural Statistics Service
NDEE	Nebraska Department of Environment and Energy

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NeDNR	Nebraska Department of Natural Resources
NeDWEE	Nebraska Department of Water, Energy, and Environment
NHCAs	Non Hydrologically Connected Areas
NPDES	National Pollutant Discharge Elimination System
NRC	Natural Resources Commission
NRD	Natural Resources District
LWS	Lincoln Water System
PMRNRD	Papio-Missouri River Natural Resources District
PPM	Parts Per Million
PPB	Parts per Billion
RWS	Rural Water System
SQS	Special Quantity Subareas
UNL	University of Nebraska-Lincoln
USGS	United States Geological Survey
WHP	Wellhead Protection

# 1 INTRODUCTION

## 1.1 LPNNRD BACKGROUND

The Lower Platte North Natural Resources District (LPNNRD or District) spans 1,587 square miles, or just over 1 million acres, over seven counties in eastern Nebraska and is shown in Figure 1. The total estimated population is nearly 66,000 (NARD, 2024). The primary watersheds used to delineate the LPNNRD includes Shell Creek, starting at the northwest boundary past Newman Grove and to the southeast to the Lower Platte River at Fremont, and the Wahoo Creek watershed to the southeast near Ashland. The LPNNRD economy is predominantly focused on agricultural and industrial activities.

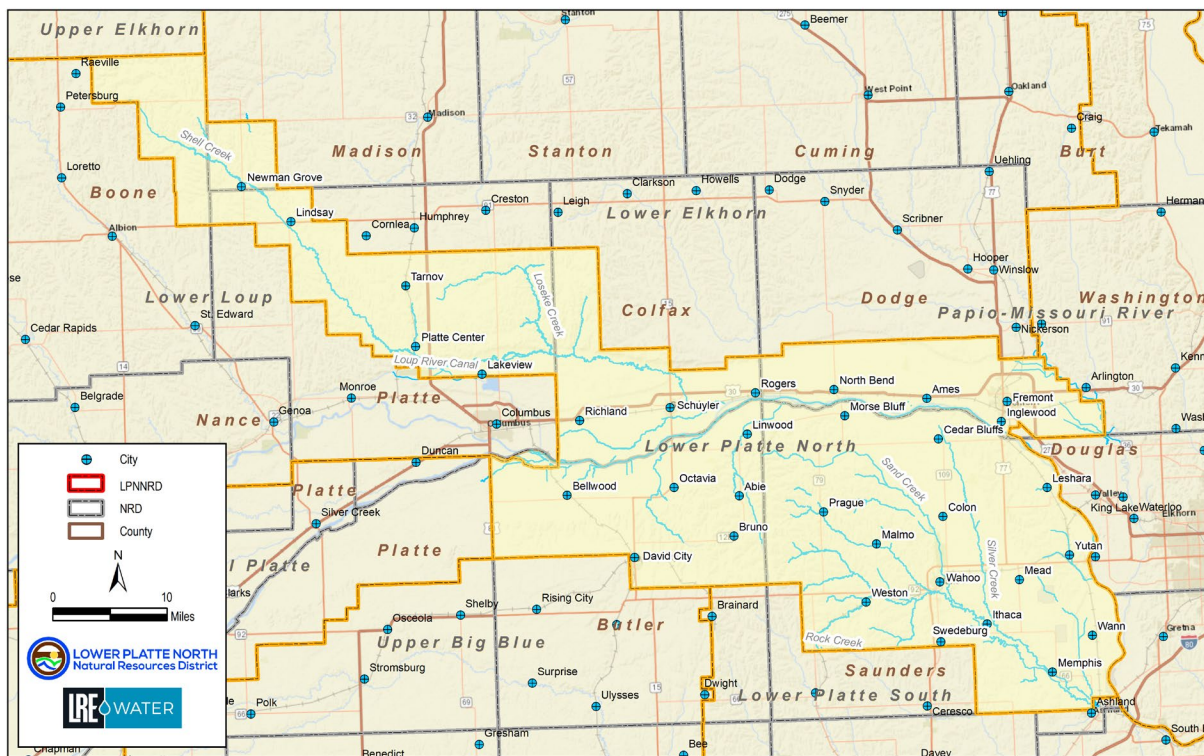


Figure 1: LPNNRD Location

## 1.2 LEGAL AUTHORITY AND OBLIGATIONS

Groundwater is widely recognized as one of the state's most valuable natural resources, and the management is a key responsibility granted to the Nebraska Natural Resources Districts (NRDs), which were established in 1972. The declaration, intent, and purpose of NRDs groundwater management responsibilities were established by the Nebraska Groundwater Management and Protection Act (Act) as outlined in Nebraska Revised Statute Chapter 46, Article 7, passed in 1975.

In 1984, the Nebraska Legislature mandated that NRDs prepare a Groundwater Management Plan (GWMP) by January 1986. The original LPNNRD GWMP was prepared in 1985 and with the adoption of the 1985 plan, the LPNNRD embarked upon a new era of groundwater resource management marked by an intensive program of data collection designed to characterize the resource and establish the relationship with other water resources. In addition, the District developed education and demonstration programs designed to increase awareness of groundwater supplies, use, and protection.

Legislative Bill 51 (LB51) was passed in 1991 and amended the Act by providing clarification, therefore the GWMP was updated in 1995, as an amendment to the 1985 version and the amendment meets the intent of LB51 and fulfills the District's need for continued understanding of the supply and quality of its groundwater resource, and sets forth a plan of protection for the future. The Board of Directors recognizes, along with the Nebraska legislature, that groundwater is a valuable resource and planned management is essential and in the public interest.

This version of the GWMP is intended to meet requirements of Section 46-709 of the Act (NeDNR, 2021), which states, The plan shall include, but not be limited to, the identification to the extent possible of the following:

- 1) Groundwater supply information within the District including transmissivity, saturated thickness maps, and other groundwater reservoir information, if available;
- 2) Local recharge characteristics and rates from any sources, if available;
- 3) Average annual precipitation and the variations within the District;
- 4) Crop water needs within the District;
- 5) Current groundwater data-collection programs;
- 6) Past, present, and potential groundwater use within the District;
- 7) Groundwater quality concerns within the District;
- 8) Proposed water conservation and supply augmentation programs for the District;
- 9) The availability of supplemental water supplies, including the opportunity for groundwater recharge;
- 10) The opportunity to integrate and coordinate the use of water from different sources of supply;
- 11) Groundwater management objectives, including a proposed groundwater reservoir life goal for the District. For management plans adopted or revised after July 19, 1996, the groundwater management objectives may include any proposed integrated management objectives for hydrologically connected groundwater and surface water supplies but a management plan does not have to be revised prior to the adoption or implementation of an integrated management plan pursuant to section 46-718 or 46-719;
- 12) Existing subirrigation uses within the District;
- 13) The relative economic value of different uses of groundwater proposed or existing within the District; and

- 14) The geographic and stratigraphic boundaries of any proposed management area.

This version was prepared by the staff, the Board of Directors, with technical and planning assistance provided by LRE Water.

### **1.3 AGENCY ROLES AND FUNCTIONS**

The LPNNRD is governed by a locally elected Board consisting of 19 Directors. The LPNNRD is divided into sub-districts (Figure 2), with two Directors per sub-district and one at-large member. Based upon state statute, each NRD shares a common set of responsibilities, listed below, but each also establishes its own additional priorities based upon need.

- Erosion prevention and control
- Soil conservation
- Flood prevention and control
- Prevention of damages from flood water and sediment
- Water supply for any beneficial uses
- Development, management, utilization and conservation of groundwater and surface water
- Pollution control
- Solid waste disposal and sanitary discharge
- Drainage improvement and channel rectification
- Development and management of recreational and park facilities
- Forestry and range management
- Outdoor recreation
- Education

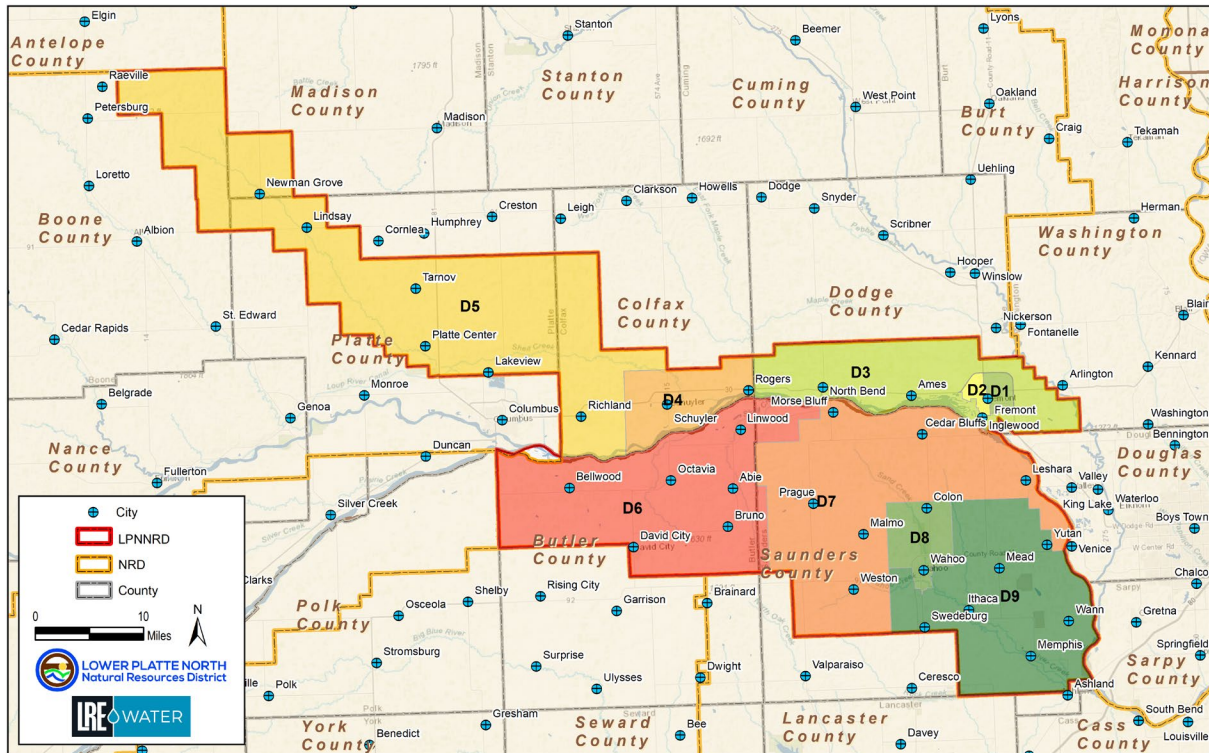


Figure 2: Board of Director Sub-districts (2025)

The LPNNRD is responsible for a variety of programs and projects and has identified five primary services with a focus on the following:

- Water Management
  - Groundwater management phase areas, monitoring programs, chemigation, nitrogen certification, nitrate management, wellhead protection (WHP) program, non-point source pollution management, and well decommissioning.
  - Groundwater restricted and limited control areas, well permits and registration, variances, irrigated acre certification, water use management, and conservation.
- Rural Water Systems (RWS)
  - Management of the Bruno-David City RWS and Colon-Wahoo RWS.
- Forestry and Wildlife
  - Implementing a tree planting program
- Watershed and Flood Damage Reduction
  - Management of seven watershed-wide flood reduction projects that include nearly 60 flood reduction structures, including three high-hazard dams.
- Conservation Programs
  - Cost-share for soil and water conservation, small dams, cost-share for priority watersheds, rock and jetty program, and weed management.
- Education
  - Includes newsletters, environmental education program, events, grants and scholarships, and workshops

## 1.4 JOINT-PLANNING EFFORTS

### Lower Platte River Basin Coalition

In 2017, seven NRDs came together with NeDNR to form the Lower Platte River Basin (Basin) Coalition (Coalition). This Coalition is operating under the guidance of the Basin Water Management Plan, published in October 2017. The Basin is one of Nebraska's most valuable resources, playing a crucial role in the state's agricultural, social, industrial, and municipal development and sustainability (Coalition, 2017).

The Coalition includes the LPNDR, along with the NeDNR and six other NRDS, including Upper Loup, Lower Loup, Lower Platte South, Papio-Missouri River, Lower Elkhorn, and Upper Elkhorn. These NRDs collaborate with the Nebraska Association of Resource Districts (NARD) to maintain a sustainable balance between water supplies and uses in the Basin (Figure 3). Key groundwater elements of the Basin Water Management Plan have been integrated in this GWMP update.

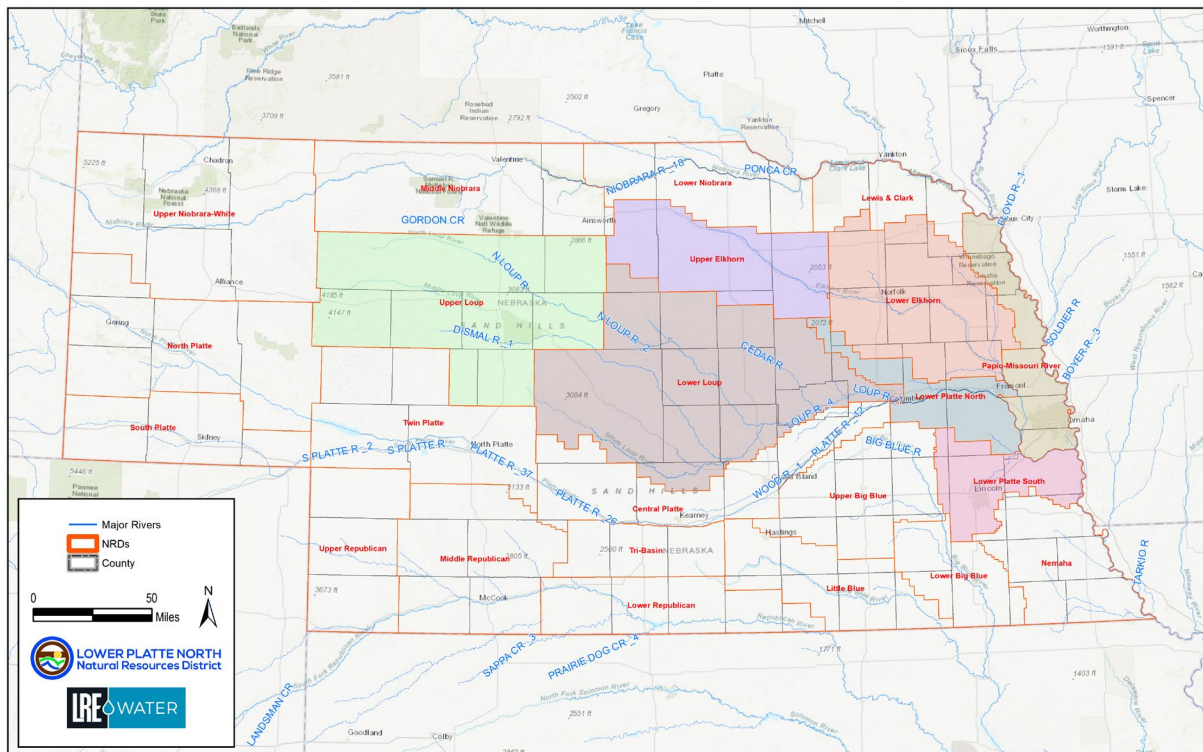


Figure 3: Lower Platte River Basin Coalition NRDs

### Lower Platte River Drought Contingency Plan

The Lower Platte River Basin, including its tributaries and aquifers, serves approximately 80 percent of Nebraska's population, thousands of businesses, and industries, includes more than two million irrigated acres, and provides streamflow for threatened and endangered species. The drought-driven risks are diverse and a potential drought in the region would pose serious risk to public health, the economy, and fish/wildlife. Projects and programs designed to increase water supply and decrease water demands would benefit a variety of interests, including irrigation, power, environmental, and recreational

activities (Consortium, 2019). As a result, the LPNNRD, LPSNRD, PMRNRD, Metropolitan Utilities District (MUD), Lincoln Water System (LWS), and NeDNR established the Lower Platte River Drought Contingency Plan in 2019.

### Integrated Management Plan

The LPNNRD's first voluntary Integrated Management Plan (IMP) was adopted by the District on June 11, 2018, and by the NeDNR on June 13, 2018, with an effective date of July 15, 2018. The IMP was developed in accordance with the Nebraska Ground Water Management and Protection Act (Act). The Act assigns the NeDNR and the District responsibilities and authority for management of groundwater, surface water, and their hydrologically connected areas in accordance with the Act, N.R.S. Chapter 46, Article 7. The voluntary IMP provides the framework for joint management of groundwater and surface water, recognizing that the two water sources are hydrologically connected. This framework enables the District and the NeDNR to coordinate management actions and monitoring of groundwater and surface water, to better protect water resources for future generations (LPN, 2018a). The IMP recognized five goals:

- 1) Develop and maintain a District-wide water supply inventory
- 2) Develop and maintain a District-wide water demand inventory
- 3) Develop and implement water use policies and practices with the purpose of achieving and sustaining a balance between water uses and supplies
- 4) Communicate to the public that Nebraska has a great supply of water, and a need to continue to manage it well
- 5) Coordinate with the Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Coalition that maintains a balance between current and future water supplies and demands

### LPNNRD Drought Contingency Plan

The LPNNRD was developing a district-wide Drought Management Plan in 2025. The Drought Management Plan will help to reduce district-wide impacts during drought events and aid the LPNNRD in water resource management. This project will include establishing drought monitoring and forecasting protocol, identifying potential best management practices, creating educational and awareness materials, and identifying future actions to reduce drought impacts. The GWMP will be a key resource integrated into the Drought Plan.

A significant part of the planning process will focus on local communities and their public water systems to evaluate their drought vulnerabilities and understand available community drought ordinances. The plan will include the development of drought mitigation strategies and other recommendations based on the outcomes of the drought risk analysis and meetings with communities. Also included with the plan will be a community engagement materials kit and sample drought ordinances for communities to utilize and update to fit their needs. The outcome will be a more sustainable and stable water supply for all uses across the district.

## **1.5 CURRENT RULES AND REGULATIONS**

The Groundwater Management Area Rules and Regulations were first implemented on January 1, 1997, and last amended on June 15, 2018. Under Neb. Rev. Statutes 46-701 to 46-754 of the Act. The LPNNRD

has designated the entirety of the District as a Phase I Management Area for groundwater quality and quantity.

### 1.5.1 Groundwater Quality Management Areas

Groundwater quality management areas can have one of four designated phases (i.e., Phase I through Phase IV) based on nitrate contamination concentrations. If concentrations increase in an area enough to meet specified trigger levels, that area is moved to a higher Phase area with increased corresponding management regulations. Areas are triggered by 50 percent of the wells sampled being over the trigger for a minimum of two sampling events, a minimum of ten registered wells must be sampled, and the area must be a minimum 9-square miles unless the area is a Wellhead Protection Area. Based on the June 15, 2018, amended Rules and Regulations, the phases and corresponding groundwater nitrate concentration trigger levels are as follows:

1. **Phase I:** 0 to 8.01 parts per million (ppm)
2. **Phase II:** > 8.01 to 10.01 ppm
3. **Phase III:** > 10.01 to 15 ppm
4. **Phase IV:** > 15 ppm

For all other contaminants, a Phase 2 is triggered at 81% of the MCL, Phase 3 = >100% of the MCL. Currently, the LPNNRD has two Quality Groundwater Management Areas shown in Figure 4 triggered by nitrate concentrations. One is near the Village of Bellwood and is currently in a Phase II level of management. The second is near the cities of Richland/Schuyler area, where Phase III and Phase IV levels of management are in place. Additional nitrogen management, reporting, and educational requirements are required for operators within these areas. In 2024, a Phase IV area was added for exceedance of the Maximum Contaminant Level (MCL) of nitrates and uranium west of Schuyler.

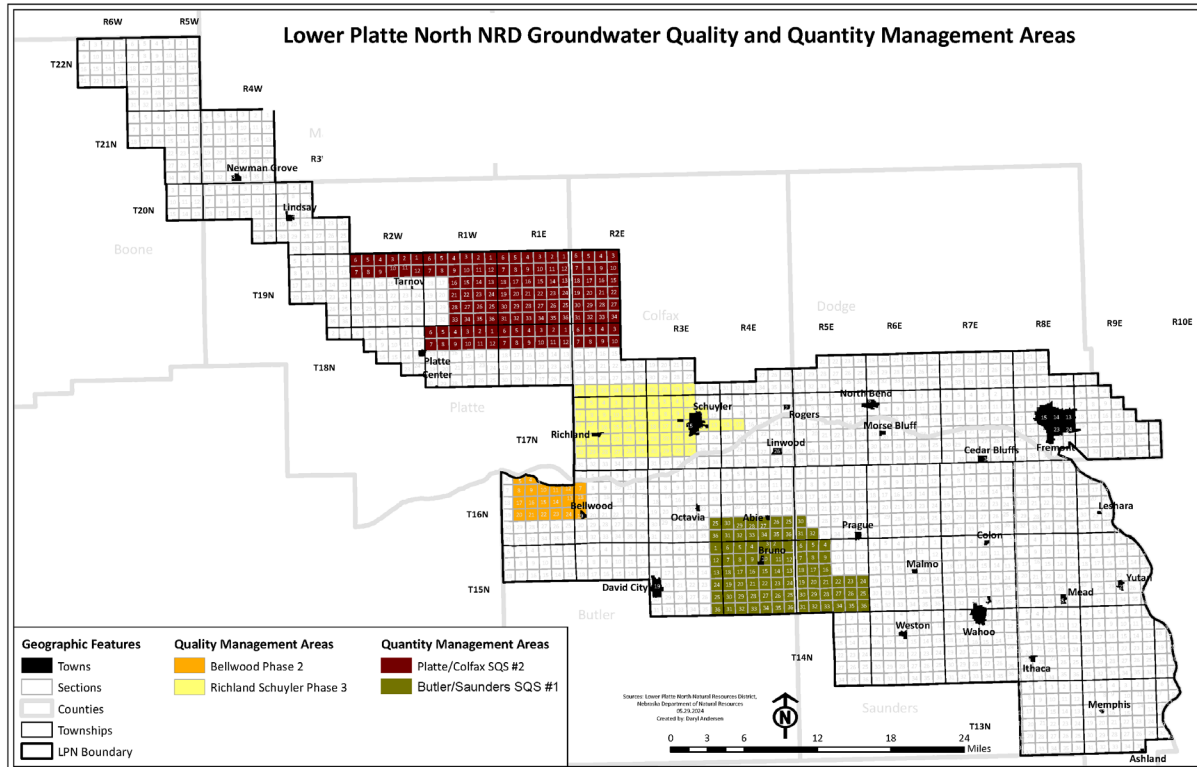


Figure 4: Quality and Special Quantity Sub-areas

### 1.5.2 Special Quantity Sub-Areas

Starting on January 1, 1997, the LPNNRD established two Special Quantity Sub-Areas (SQS) as a result of excessive seasonal declines in water levels that caused well interference. Due to the declines occurring during the summer, they did not qualify under the criteria for Groundwater Quantity Management Areas described below. These are referred to as Butler/Saunders SQS #1 and Platte/Colfax SQS #2. There are no new wells and expansion of irrigated acres are limited to the original allocation in these areas, and several other restrictions apply. The SQS areas are shown on Figure 4 above along with the Quality Management Areas.

### 1.5.3 Groundwater Quantity Management Areas

The Rules and Regulations also allow for the development of Groundwater Quantity Management Areas based on the percentage of water level decline for an unconfined aquifer and the percentage of hydraulic head decline for a confined aquifer. Assessment of the percentage drop is calculated using spring readings of the District’s spring/fall static observation wells over a 3-year period. Over 50 percent of the wells must reach or exceed a predetermined water level percent trigger. A general summary of the quantity triggers is shown below. Currently, the LPNNRD does not have a designated Groundwater Quantity Management Area.

Table 1: Confined and Unconfined Aquifer Triggers

AQUIFER TYPE	TRIGGER %	LEVEL CONTROL
Unconfined	10	I
	15	II
Confined	7	IA
	10	IIA

#### 1.5.4 Groundwater Development Areas

In March 2018, the LPNNRD established Groundwater Limited Development Areas (Figure 5), where restrictions are in place on the development of high-capacity wells and the expansion of irrigated acres. These areas were delineated by the results of NeDNR's Lower Platte Missouri Tributaries Groundwater Model (LPMT)'s Hydrologically Connected Areas (HCAs). These areas have been determined to have a physical hydrologic connection between groundwater and surface water, and the goal is to ensure no further impact to surface water flow occurs as a result of excessive groundwater pumping. These areas are shown in Figure 5, along with the Special Quantity Subareas, which are unrelated to the HCAs.

- **Outside Groundwater Control Area (white):** Up to 75 new acre-feet (AF) per year are allowed through a variance process due annually on August 15.
- **Inside Groundwater Control Area (blue):** Up to 200 new AF per year with a variance deadline of September 15.
- **Restricted Development Area (red):** Was established through a separate study, and there are no new irrigated acres or water uses allowed, but consideration is given to areas within 1 mile of the red area.

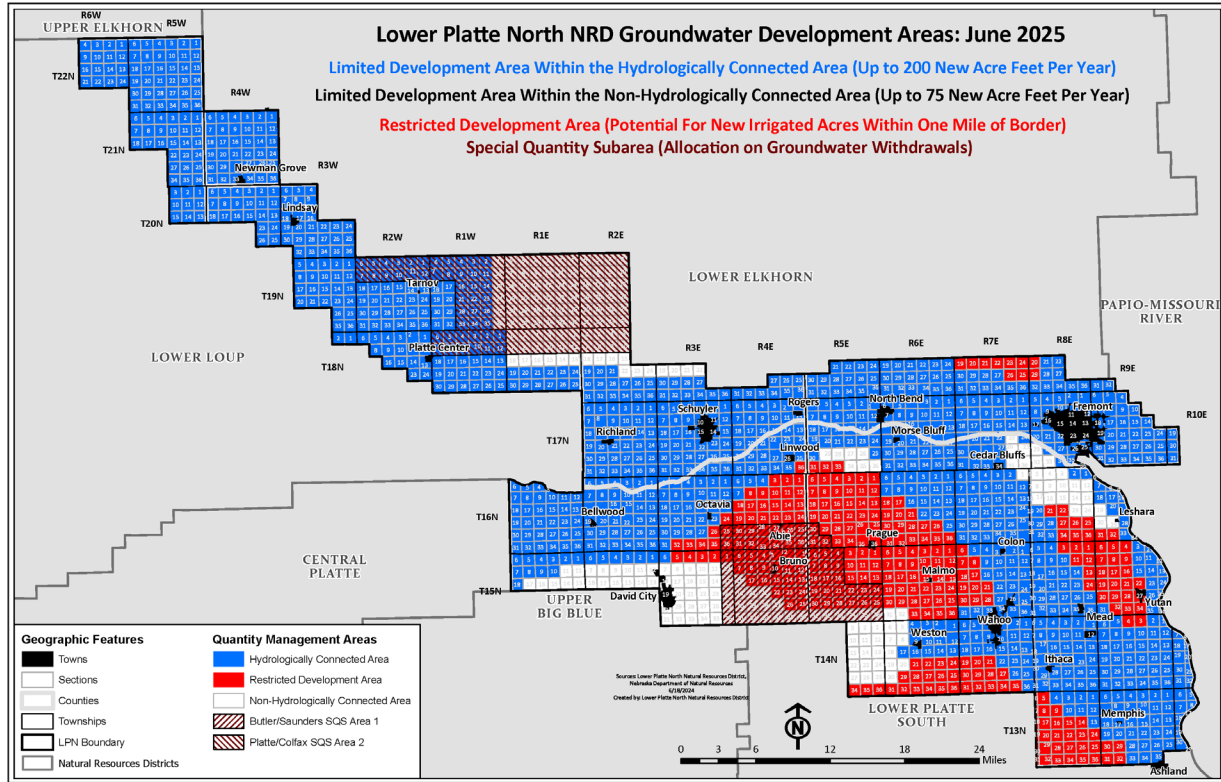


Figure 5: Groundwater Limited Development Areas

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## 2 DESCRIPTION OF THE NRD

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### 2.1 GROUNDWATER REGIONS AND PRINCIPAL AQUIFER

The 1995 GWMP subdivides the District into four distinct regions based on hydrogeologic and physiographic characteristics. The regions are described in the LPNNRD Hydrogeologic Evaluation and Subarea Delineation Study (Olsson, 2009) and are shown in Figure 6.

- **Platte River** This area is characterized by fluvial sand and gravel deposits of varying thickness, which are overlain by alluvial silt and clay, and younger loess deposits. Coarser and thicker sands and gravels appear to be present in paleovalley deposits, which sometimes extend into the Uplands Region described below.
- **Shell Creek:** Located in the northwest portion of the District, this region extends from the Platte River to the Sandhills and dissects glacial terrain similar to that of the Uplands Region. The upper reaches include the Ogallala Group.
- **Todd Valley:** This region was formed by the ancestral Platte River, which carved a fluvial valley. This region consists of fluvial sand and gravel deposits capped by loess and overlies the Cretaceous-age Dakota Group bedrock formations. The fluvial deposits typically grade from fine to a progressively coarser-grained sands and gravels with depth. The Todd Valley aquifer is connected to the Platte River alluvial sand and gravel aquifer.
- **Uplands:** This region is characterized by dissected clay-rich glacial till and younger loess deposits with interbedded, discontinuous sand and gravel outwash deposits. In places, the glacial deposits overlie deeper paleovalleys that contain thicker and coarser sands and gravels or are in contact with the underlying Dakota Group. The sandstone units of the Dakota Formation contain brackish to saline water.

Principal Aquifer is the major groundwater reservoir in the District. It refers to the saturated unconsolidated sand and gravel aquifers, including the Ogallala Group, where present.

The following sections provide more insight into the hydrogeologic data and recent assessments, and background of the LPNNRD.

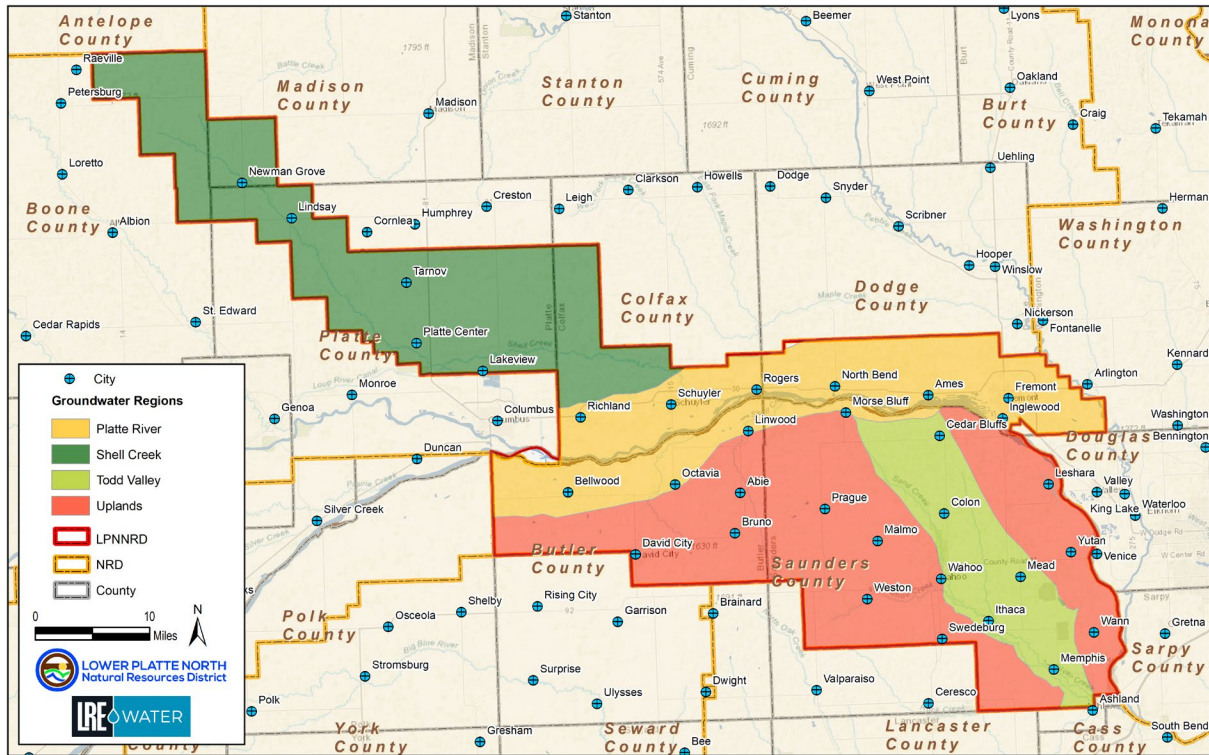


Figure 6: Groundwater Regions of the LPNNRD

## 2.2 HYDROGEOLOGIC DATASETS

Since 2006, the Eastern Nebraska Water Resources Assessment's (ENWRA) work has resulted in vast geologic datasets and creation of hydrogeologic frameworks for six NRDs in eastern Nebraska, including the LPNNRD. The major datasets include airborne electromagnetic (AEM) data, and geologic logs from the NeDNR and University of Nebraska-Lincoln, Conservation Survey Division (UNL-CSD) well and test holes database. These data sets and detailed desktop hydrogeologic assessments completed recently for the District are available to aid in well siting and similar groundwater management actions.

### 2.2.1 Airborne Electromagnetic Survey

AEM is an airborne geophysical survey method that can provide characterization of electrical properties of earth materials from 3 to 10 feet to depths over 1,000 feet. These surveys provide geophysical data quickly and efficiently and when analyzed, can help define aquifer and non-aquifer materials. The AEM surveys have been crucial in the LPNNRD's efforts to help address water quality and quantity challenges.

The LPNNRD's AEM survey datasets and reports from 2009, 2012, 2015, 2016 and 2018 are available on EWRA's projects website (<https://enwra.org/projects>). The AEM flight line locations within the District and adjacent NRDs are shown in Figure 7.

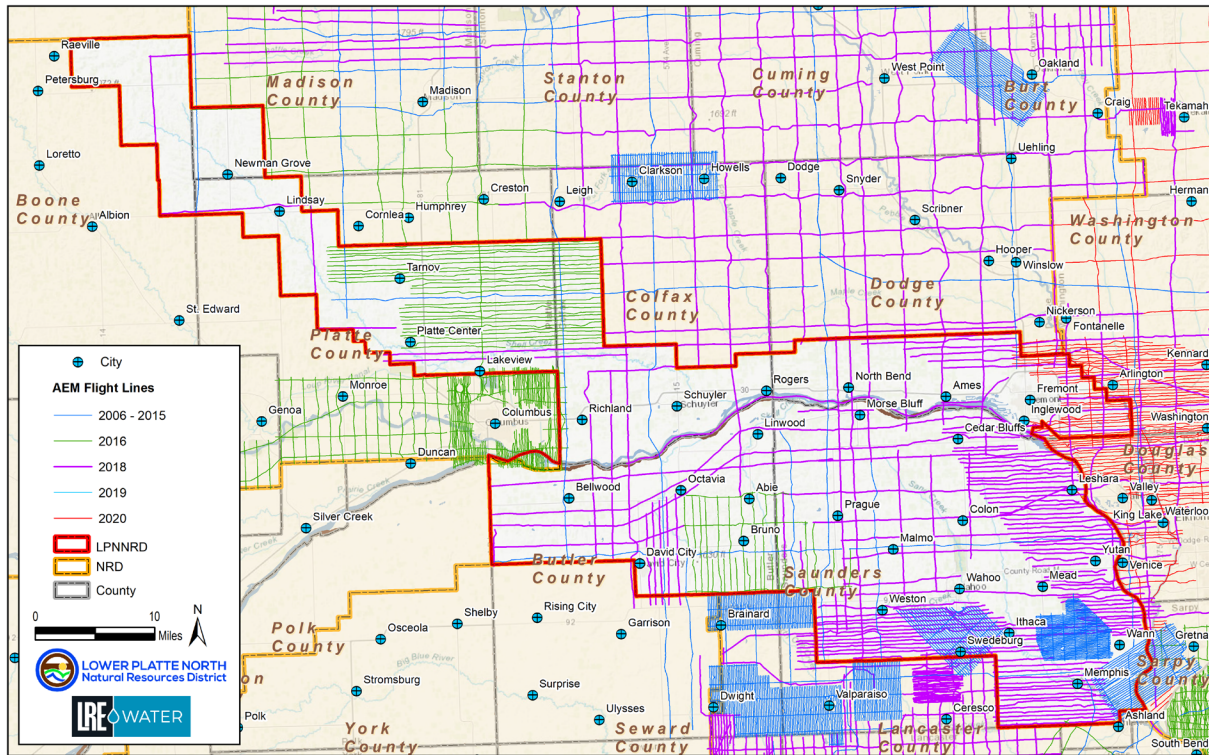


Figure 7: AEM Flights within and near the LPNNRD

### 2.2.2 3D AEM Framework and Hydrogeologic Assessment

In 2022, the LPNNRD utilized the AEM datasets to create a 3D AEM Framework (LRE Water, 2022), in addition to constructing detailed hydrogeologic cross sections from geologic logs. The framework was created using Leapfrog, a 3D geological modeling software program. The program delineated the hydrostratigraphy and hydraulic conductivity zones from the processed AEM data. The framework offers several benefits:

- Provides hydrogeologic information to assist staff in reviewing well permits.
- Enhances understanding of aquifer characteristics, such as recharge areas and water-bearing layers.
- Facilitates vulnerability assessments and identifies areas needing best management practices.
- Better defines hydrologically connected surface and groundwater.
- Improves collaboration with neighboring NRDs and NeDNR.
- Creates a MODFLOW grid, including layers, cells, and hydraulic conductivity zones for numerical groundwater flow modeling.

An example of a Leapfrog Works model output is shown in Figure 8 where higher resistivities are shown as brighter colors and are representative of sand and gravel. The darker colors represent low resistivity and represent clay, till, and losses. The bedrock surface is shown as a black line.

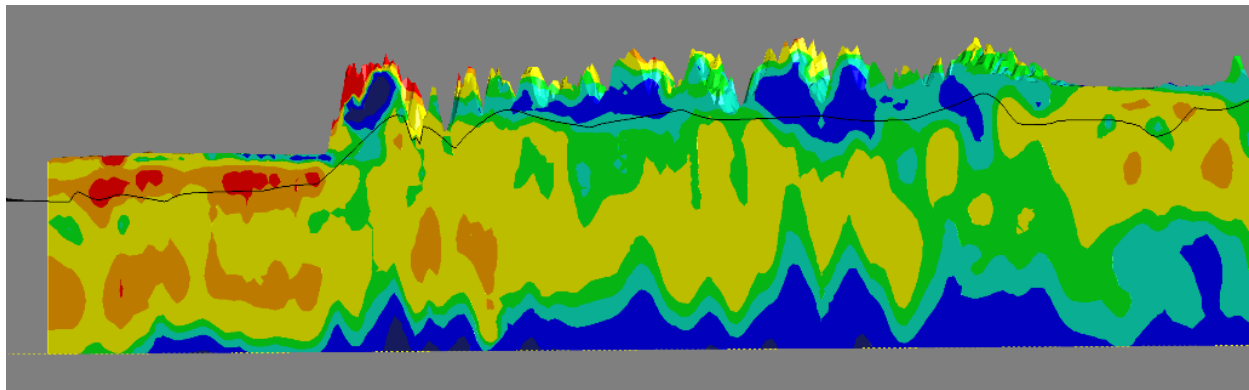


Figure 8: 3D Leapfrog output in cross section

In 2023, a Hydrogeologic Assessment (Assessment) was completed for the LPNNRD utilizing all available NeDNR well logs UNL-CSD test holes (LRE Water, 2023). In total, 22,500 well logs and 290 test holes were incorporated into the Assessment, which included a 5-mile buffer around the LPNNRD boundary. There were a total of 11,893 wells within the LPNNRD with geologic logs as seen in Figure 79. The Assessment also utilized existing geologic information from the 2022 3D AEM Framework.

In addition to a bedrock surface, the geospatial and hydrogeologic analyses completed on the geologic log data were used to develop 28 hydrogeologic cross sections, and to generate the other hydrogeologic raster surfaces, many of which were utilized to create the maps illustrated below within this plan.

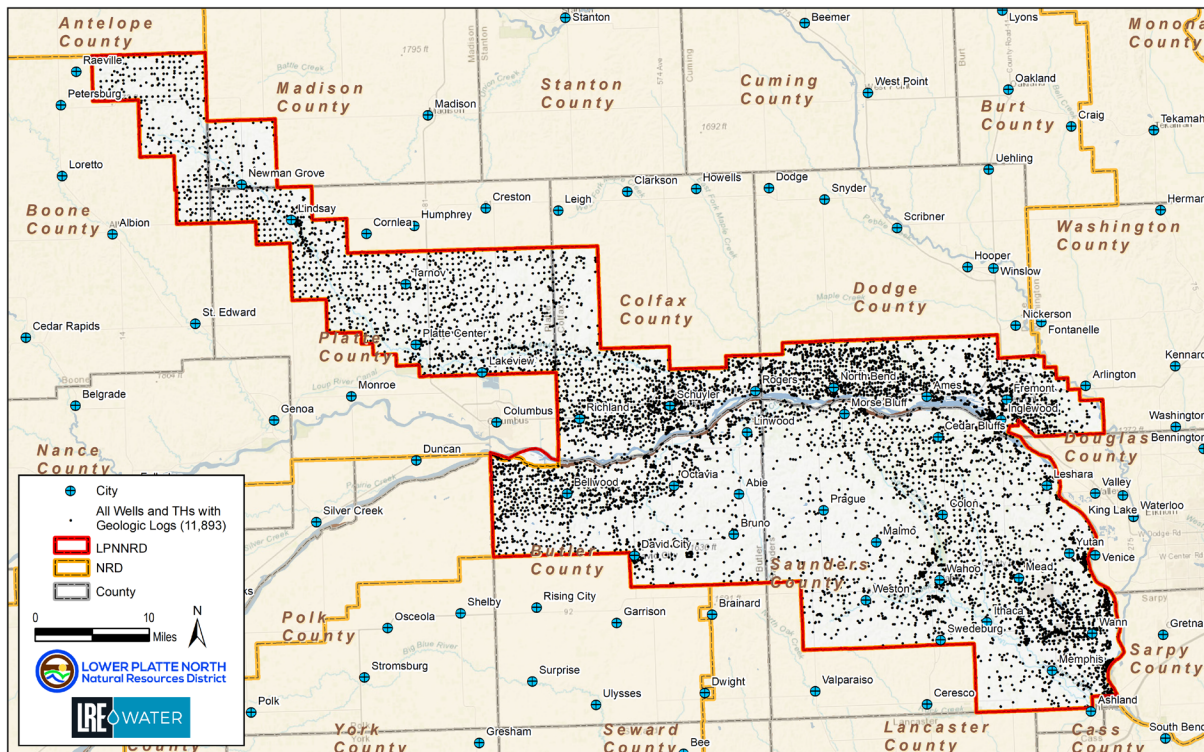


Figure 9: Well and Test Holes with Geologic Logs (LRE Water, 2023)

## 2.3 TOPOGRAPHY

The northwest arm of the District is dominated by upland dissected plains topography and includes portions of Boone and Madison counties, and about two-thirds of Platte County. To the southeast, the central portion of the LPNND includes approximately 125 miles of the Platte River Valley, extending from the cities of Columbus to the west and Ashland to the east. Through the east-central portion of Saunders County, from the cities of North Bend to Ashland, is a broad fertile area 5 to 8 miles wide, referred to as the Todd Valley. West and southwest Saunders County and eastern Butler County, known locally as the 'hill area', is comprised of bluffs along the north edge and rolling hills, ridges, and steep valley slopes south of the Platte River Valley. A map of the topography, derived from a Digital Elevation Model (LRE Water, 2023), is shown in Figure 10.

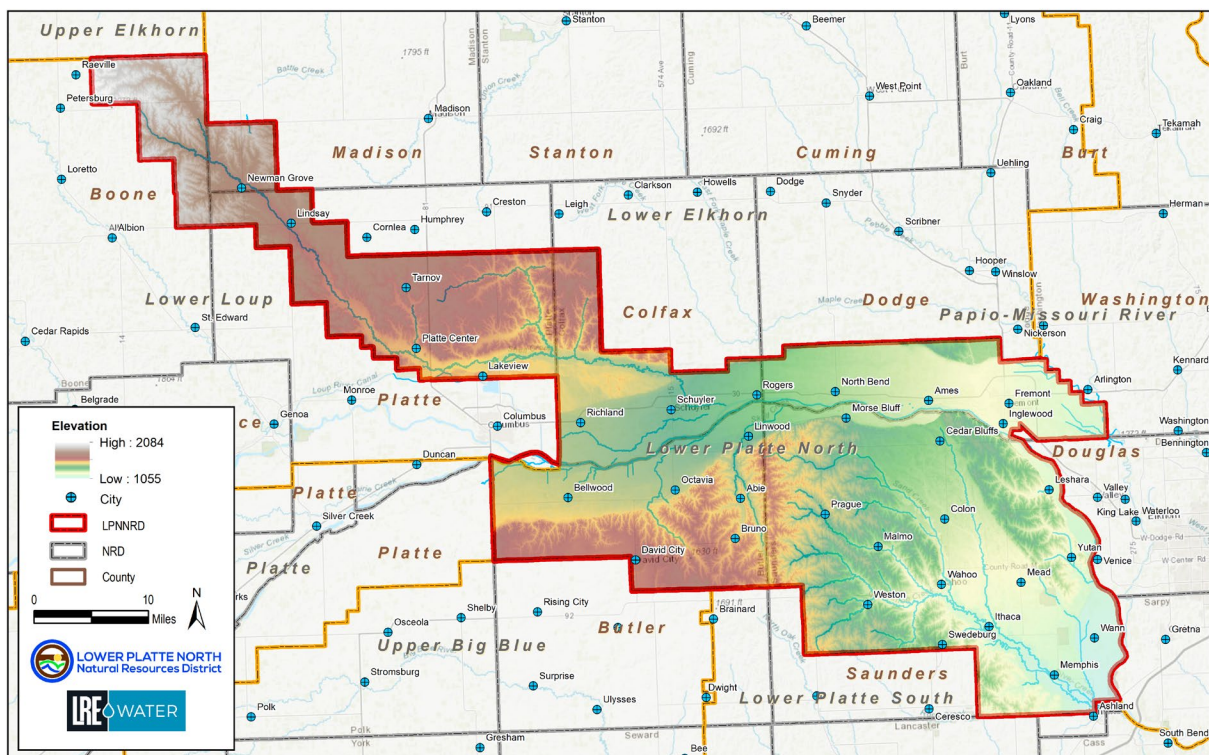


Figure 10: Topography of the LPNND

## 2.4 SOILS

Soils in the uplands of Butler and Saunders counties consist primarily of clays and silty clays to silty clay loams somewhat similar to the Sharpsburg and Sharpsburg-Pawnee association. Primary soils in the upland areas are eroded to a point where they no longer exist, and landowners are now farming in the "B" horizon. This has implications for surface and groundwater quality. The permeability of these soils is less than 1.0 inch per hour on slopes that range from gentle to 20 percent. Recharge rates are quite low and recharge is principally limited to perched aquifers. These soils are loess type soils with some intermixed glacial till areas. The drainage pattern and flood plain configuration of Wahoo Creek is primarily composed of Kennebec soils of silty clay loam ranging from moderate to poorly drained (HWS, 1995).

The western portion of the Platte River corridor is comprised of Acadia-Platte alluvial fine sands underlain by sands and gravels. The eastern portion of the corridor is practically the same, however, depth to water in the eastern area is greater. This primary water line, where groundwater is most significantly present within the Platte River corridor, is bounded on the north by poorly drained Gibbon-Luton silty and clayey soils. Areas to the south and a few areas along the western end of the Platte River corridor contain silty soils that are well drained and of loess origin (HWS, 1995).

The northwest corner of the District is composed of moderately to well drained silty type soils with permeabilities ranging from 1 to 2 inches per hour above the areas adjacent to Shell Creek. Areas in northeast Platte County have permeability ranges of 1.5 to 5 inches per hour (HWS, 1995).

The general pattern of soil distribution shows that soils of loess origin are found on the uplands with alluvial soils predominant on the bottom lands, as seen in Figure 11. Permeabilities range from practically zero to greater than 10 inches per hour (near Columbus and southeast of Bellwood). The pattern shows that, generally, soils south of the Platte River are less permeable than those of the north side. Soil textures range from fine sands to silty clays.

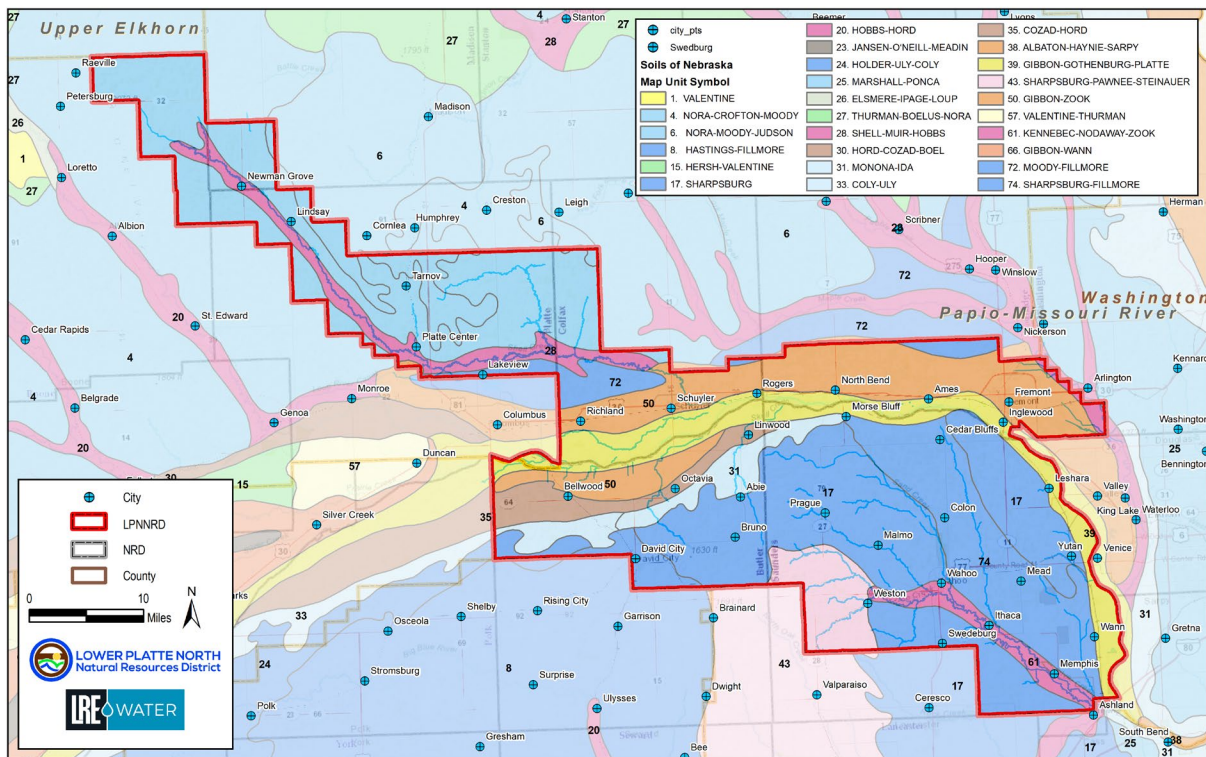


Figure 11: Soil Types

## 2.5 GEOLOGY AND HYDROLOGICAL CHARACTERISTICS

The geology of the District generally consists of Quaternary-age unconsolidated loess, glacial till and outwash, and older buried fluvial deposits overlying bedrock. The five primary bedrock formations are shown in Figure 12. A description of the major unconsolidated and bedrock formations and their potential to transmit water to wells, as described in the previous plan, are listed in Table 2.

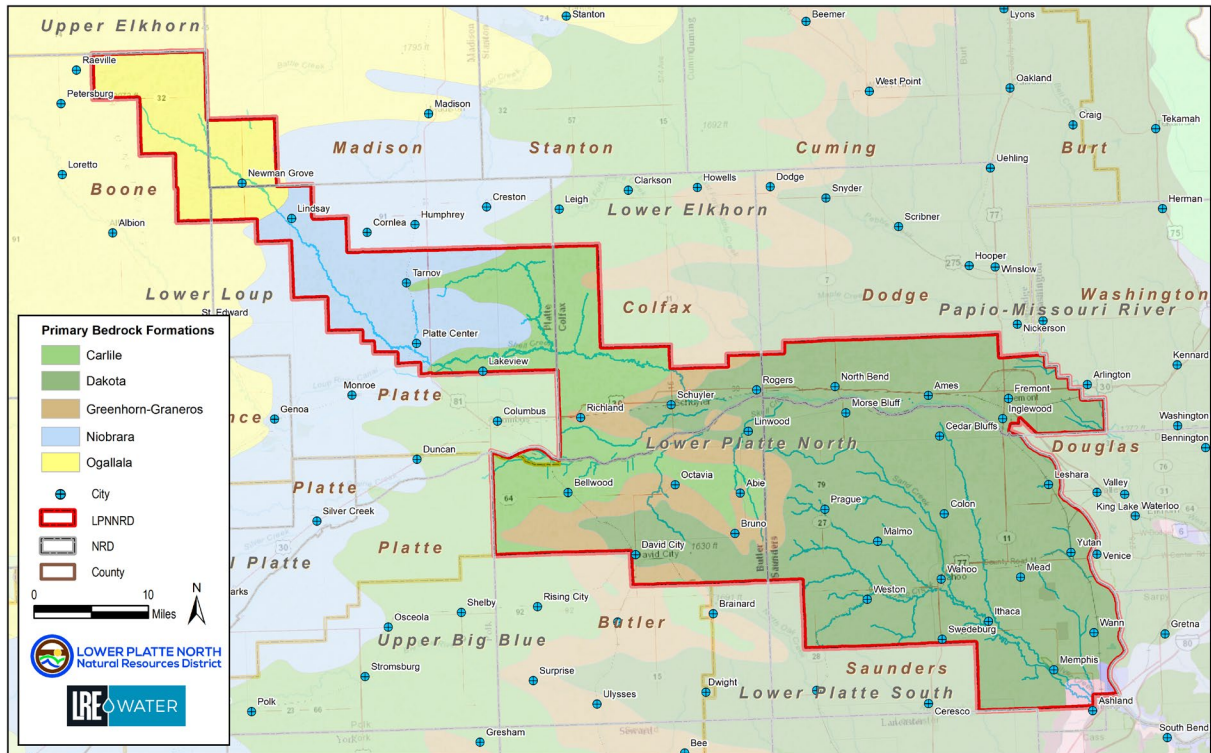


Figure 12: Bedrock Formations

Table 2: Geologic Sequence of Major Formations in LPNDR

SYSTEM	SERIES	MAJOR STRATIGRAPHIC UNITS	PHYSICAL CHARACTER	WATER SUPPLY
Quaternary	Holocene	Modern Soils	Locally silty, clayey, or sandy.	Transmits locally variable amounts of recharge to the groundwater reservoir.
		Recent valley-fill deposits	Alluvial deposits of gravel, sand, silt, and clay associated with the most recent cycle of erosion	May contribute significant amounts of water to wells.

SYSTEM	SERIES	MAJOR STRATIGRAPHIC UNITS	PHYSICAL CHARACTER	WATER SUPPLY
	Pleistocene	Loess	Wind-blown silt with lesser amounts of very fine sand and clay.	Transmits recharge to the underlying aquifers. May provide small quantities of water to shallow wells.
		Till	Ice-deposited silty, sandy clay with gravel and larger pebbles and boulders.	Relatively impermeable. Transmits water slowly to buried aquifers. Groundwater may be perched above the till. Sand deposits within the till provide water to low-capacity wells.
		Glacial outwash and other ancient valley-fill deposits	Alluvial deposits of gravel, sand, silt, and clay associated with ancient erosional and depositional cycles.	Contributes water to wells in generally large amounts, stream-deposited sand and gravel constitute the major aquifers and yields to high-capacity wells.
Tertiary	Pliocene(?)	Ancient valley-fill deposits	Mostly unconsolidated silt. May blanket Cretaceous bedrock at base and on side slopes of paleo-valleys.	Generally, too fine textured to yield water to wells.
	Miocene	Ogallala	Poorly sorted clay, silt, sand, and gravel generally uncemented to slightly cemented.	The Ogallala constitutes a major aquifer in western portion of LPNRD. Yields to large-capacity wells.
Cretaceous	Upper Cretaceous	Niobrara	Chalk	May supply water to wells where fractures exist or are saturated.
		Carlile	Shale	Not known to supply water to wells
		Greenhorn	Limestone	
		Graneros	Shale	
	Lower Cretaceous	Dakota	Sandstone and shale	Constitutes a significant aquifer in the eastern part, potentially yields and water quality are locally variable.

Source: HWS, 1995

## 2.6 TOTAL SATURATED SAND

The total thickness of saturated sand is an indicator that can be used to qualitatively evaluate the relative potential yield from an aquifer or aquifers. The total saturated sand in the District, shown in Figure 13 (LRE, 2023), was created using water level and geologic data from NeDNR well logs and UNL-CSD test holes logs. Figure 13 was created by reviewing only the available geologic logs that

encountered bedrock from the NeDNR and UNL CSD datasets. The thicker aquifers are present in the northwest and Todd Valley portions of the District, and generally become thinner in the central portion and beyond Todd Valley.

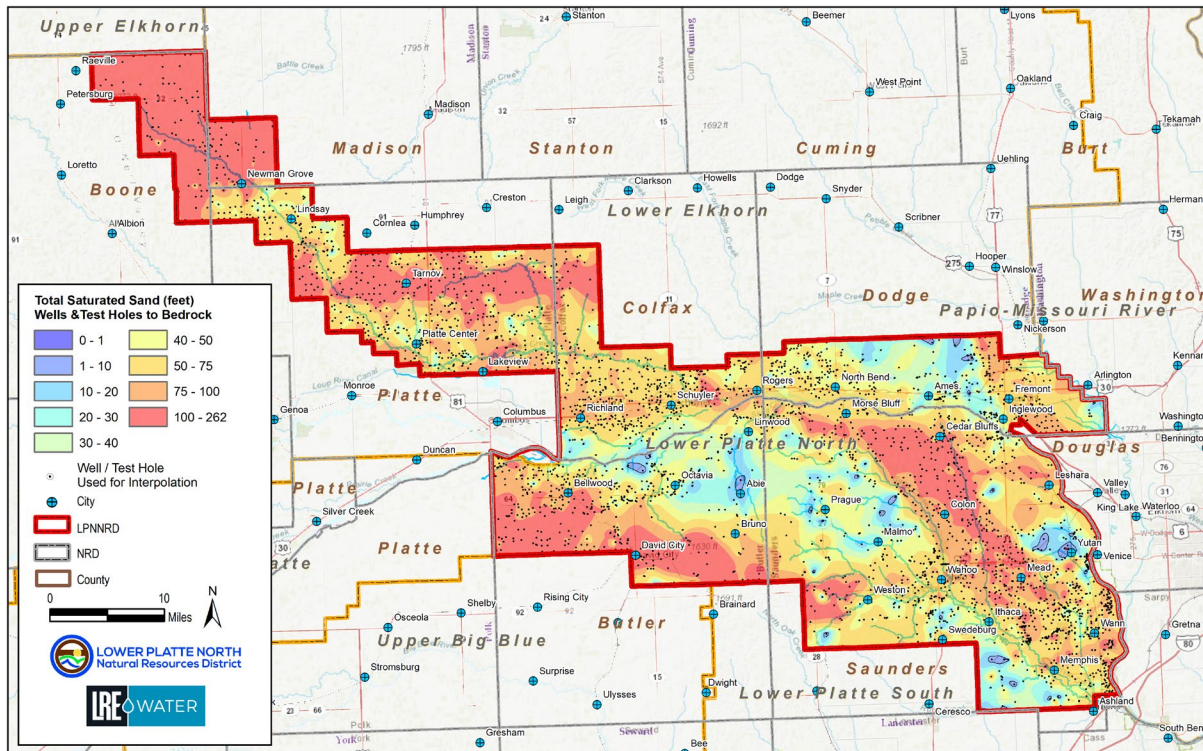


Figure 13: Total Saturated Sand, Well and Test Holes

## 2.7 CONFINED VS. UNCONFINED AQUIFERS

A confined aquifer is a formation below the land surface that is saturated with water and has impermeable layers above and below it causing it to be under pressure. As a result, when a confined aquifer is penetrated by a well, the water will rise above the top of the aquifer in the well. Artesian wells are a result of confined aquifers. In a confined aquifer, water level declines represent a reduction of artesian head, not saturated thickness.

A management strategy for a confined aquifer is to avoid pumping a confined aquifer to levels where it unnaturally transitions to unconfined conditions. The primary risk of this is decreasing the aquifer's pore pressure, which can potentially reduce well yields and quality due to changes in water pressure and oxidation. Over pumping can also lead to well interference by reducing the available head in the aquifer, declining water levels, and reduced well yields.

Unconfined aquifers, also referred to as water table aquifers, are present where the upper water surface (water table) is equal to atmospheric pressure. In an unconfined aquifer, water level rises and declines changes affect the saturated thickness.

Management strategies for an unconfined aquifer are to avoid over pumping if the rate of withdrawal exceeds the rate of recharge. In addition, dewatering activities can draw in pollutants, potentially

contaminating the water source, and excessive pumping can lead to reduced saturated thickness and well yields, reduced water levels in nearby surface waters if hydraulically connected, and the potential for well interference with other users.

Differences in static (i.e., non-pumping) groundwater levels measured in adjacent wells could be caused by wells being screened at different depths and/or in different aquifers.

Knowing whether an aquifer is confined or unconfined is important for effective groundwater management in Nebraska for several reasons:

1. **Water Availability:** Unconfined aquifers, also known as water table aquifers, are more influenced by surface conditions and can be more susceptible to droughts. Confined aquifers, under pressure, provide a more stable water supply.
2. **Recharge Rates:** Unconfined aquifers recharge more quickly due to their proximity to the surface and direct receipt of precipitation. Confined aquifers recharge more slowly due to impermeable layers above them.
3. **Water Quality:** Unconfined aquifers are more vulnerable to surface contamination from activities like agriculture and industry, while confined aquifers are generally better protected. Well construction issues will increase the vulnerability.
4. **Management Strategies:** Different practices are required for managing confined and unconfined aquifers. Unconfined aquifer management focuses on protecting recharge areas and controlling surface contamination, while confined aquifer management involves monitoring pressure levels and ensuring sustainable withdrawal rates. Pressure levels can be monitored using a piezometer to measure water level, known as the piezometric head. The pressure is calculated at a specific depth using a formula that includes the density of water, acceleration due to gravity, and height of the water column above the point of measurement.
5. **Hydraulic Properties:** The hydraulic properties, such as transmissivity and storativity, differ between confined and unconfined aquifers, affecting water movement and extraction.

By understanding the differences in aquifer types, the staff and Board can develop more effective strategies to promote sustainable water use and protect water quality by allocating resources based on specific needs. Figure 14 (LRE, 2023) illustrates the distribution of confined and unconfined aquifers. In certain areas, aquifers may transition from unconfined to confined due to fluctuations in water levels, with transitional zones defined as areas experiencing water level changes of approximately  $\pm 10$  feet. For the purposes of the GWMP, all transitional zones are classified as unconfined. Figure 15 provides an example of a transitional zone where over pumping has resulted in a shift from confined to unconfined conditions.

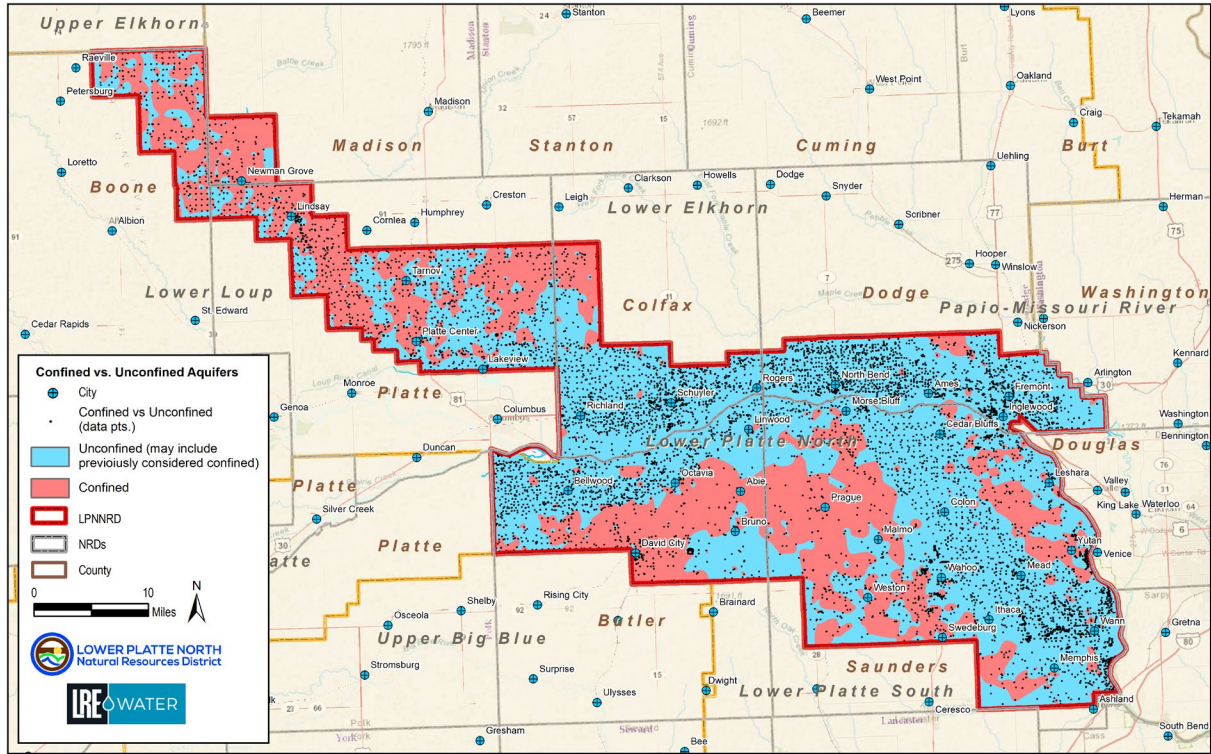


Figure 14: Confined vs. Unconfined Aquifers

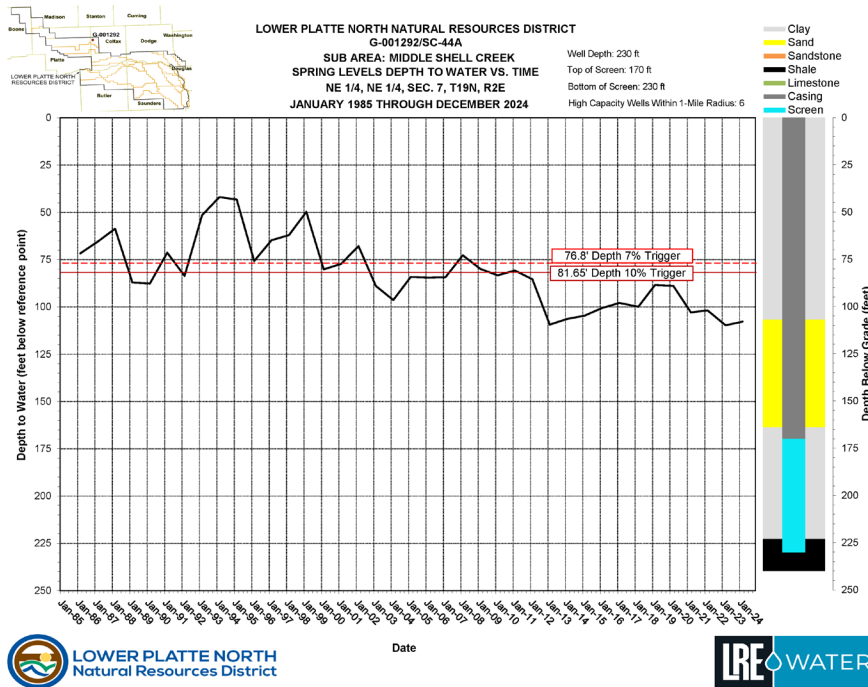


Figure 15: Hydrograph of Transitional Aquifer Type

## 2.8 TRANSMISSIVITY

Transmissivity is perhaps the one hydrologic parameter which best describes the aquifer and its potential for use and withdrawal. Transmissivity is the rate which quantifies the ability of an aquifer to transmit water and is dependent on saturated thickness and permeability.

Figure 16 shows the transmissivity of the Principal Aquifer for the LPNNRD based upon the Assessment (LRE Water, 2023). Areas with transmissivity less than 10,000 gallons per day per foot are not considered optimal areas for high-capacity wells, which are hatched.

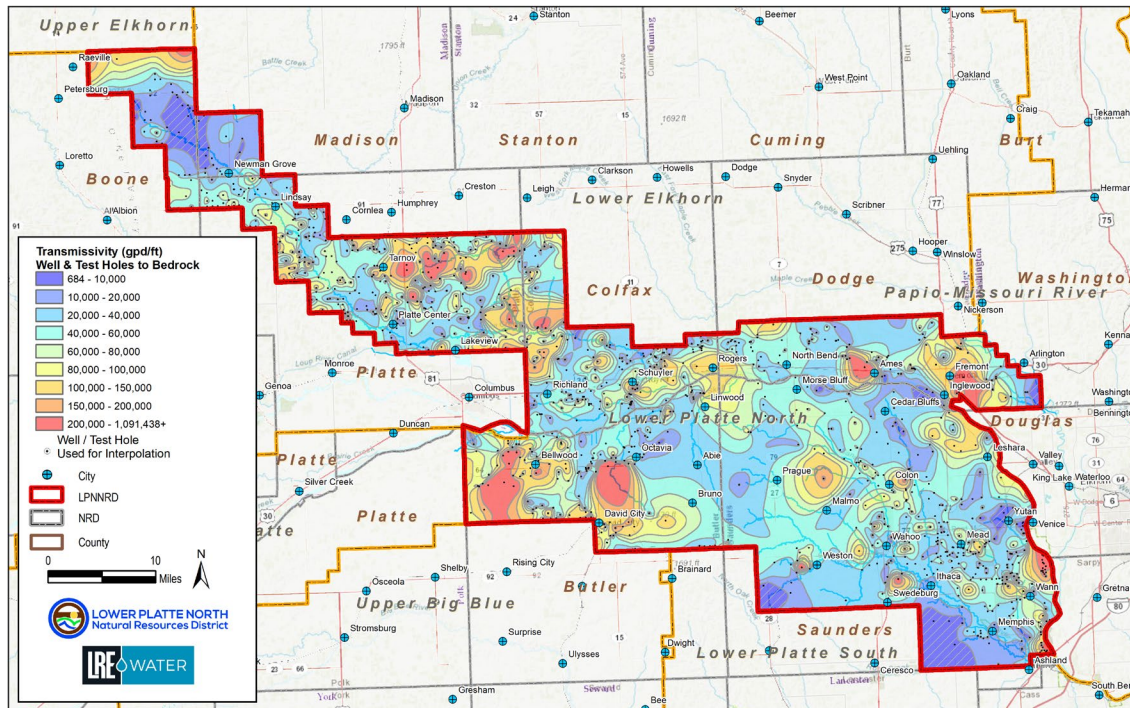


Figure 16: Aquifer Transmissivity

## 2.9 CLIMATE AND PRECIPITATION

Precipitation in the LPNNRD serves as the principal source of water for recharge, except in the Platte River Valley and areas adjacent to the Platte River, where river water contributes to aquifer recharge. Pumping in these areas can further induce additional recharge from the river. Figure 17 demonstrates the mean annual precipitation for the state and the LPNNRD between 1981 and 2020, provided by the National Oceanic and Atmospheric Administration. The average annual water requirement for maximum yield by crops varies from 25 inches for corn to 22 inches for grain sorghum and soybeans (HWS, 1995). The overall average water use for irrigation to supplement precipitation is 5.56 inches district-wide, with the exception of Butler/Saunders SQS#1 (4.65) and Platte/Colfax SQS#2 (4.59) where allocations restrict pumping (LPN, 2024). Moisture needs are more critical at certain times in the crop growing cycle and if moisture is not available, crop production can and does suffer. Detailed evaluations of precipitation versus soil moisture and crop water needs are necessary components in providing a comprehensive management system.

This area of the state receives maximum precipitation in April, May, and June, at which time the highest rate of leaching of contaminants is occurring. The maximum water use period by crops stretches from April through September (crop dependent), with July, August, and September water requirements exceeding available average precipitation. It is apparent that at certain times there is a need for irrigation water to consistently produce high yields.

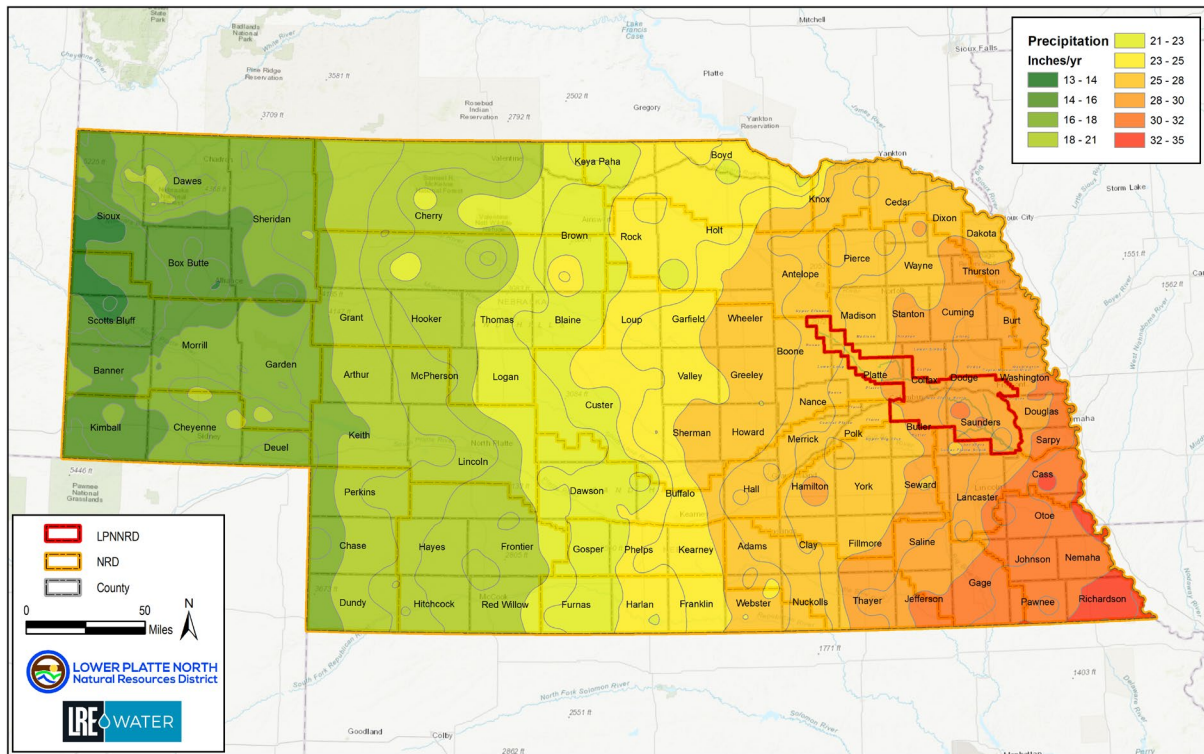


Figure 17: Average Annual Precipitation (1981-2010)

## 2.10 LAND COVER

The vast majority of the District’s 1,030,468 acres (approximately 75 percent) of LPNNRD is classified as row crop by the CropScape – Cropland Data Layer, derived from the U.S. Department of Agriculture’s National Agricultural Statistics Service (NASS). The NASS dataset was used to look at land cover changes since 2009 and categories were combined into seven sub-categories, out of the 37 that are available. As shown in Table 3, over 84,500 acres of grass or pasture has been converted since 2009. The increase in wetlands was not determined but could be a result of the 2019 flood event or potentially a difference in interpretations of data collected in each respective year. A spatial representation of land cover is shown in Figure 18.

Table 3: LPNNRD Land Cover Change (2009 – 2023)

Land Cover	2009	2023	Ac Change	% Change	2009 Coverage	2023 Coverage
Row Crop	716,285.3	769,604.6	53,319.3	7.4%	69.5%	74.7%
Alfalfa/Hay	19,640.1	34,722.4	15,082.3	76.8%	1.9%	3.4%
Developed	55,475.7	58,863.9	3,388.2	6.1%	5.4%	5.7%
Grass/pasture	179,834.1	95,315.4	-84,518.7	-47.0%	17.5%	9.2%
Forest	33,010.9	35,942.7	2,931.8	8.9%	3.2%	3.5%
Open Water	17,666.4	19,698.6	2,032.2	11.5%	1.7%	1.9%
Wetlands	8,556.2	16,320.7	7,764.5	90.7%	0.8%	1.6%

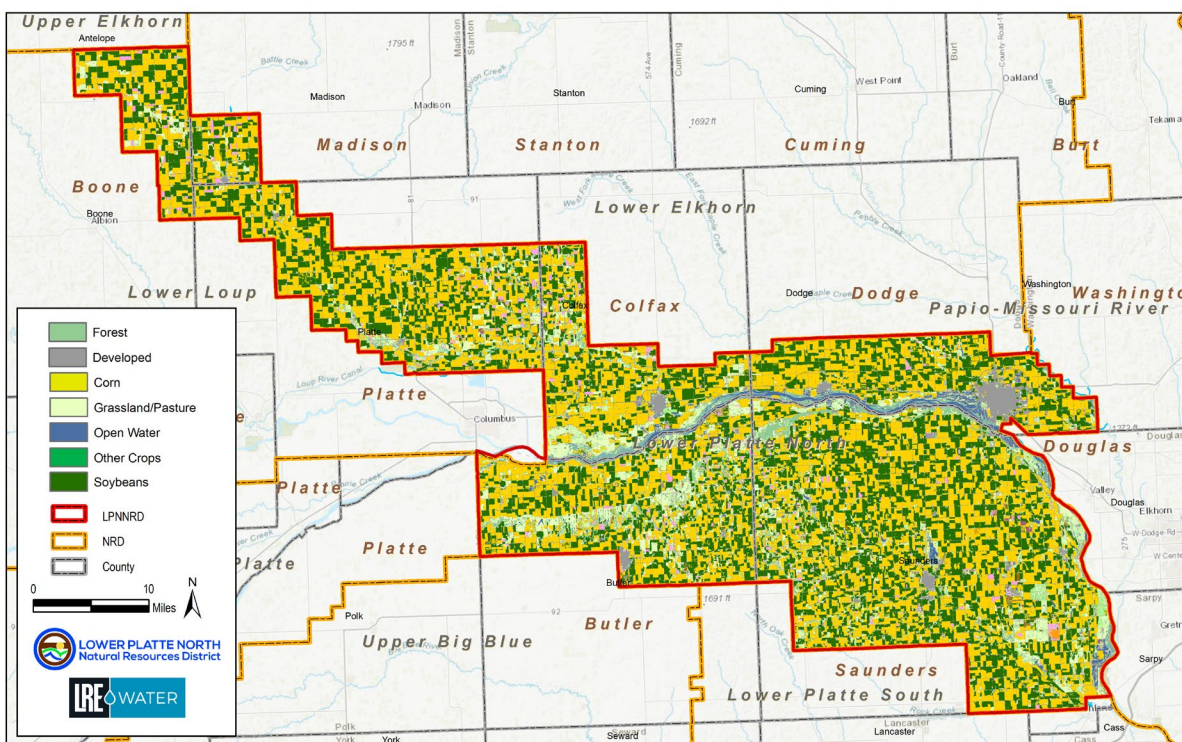


Figure 18: 2023 Land Cover

As the total number of acres harvested increases, the following occurs:

1. The number of acres of permanent cover decrease.
2. The number of acres more susceptible to erosion and runoff increases.
3. The usage of fertilizer, herbicides, pesticides, etc. increases.
4. The potential for ground and surface water degradation increases.
5. The use of high-capacity wells for irrigation increases demand on the aquifers and surface water resources.

## 2.11 POPULATION – ECONOMIC BASE

The economic base for LPNNRD communities varies, but generally includes agriculture, manufacturing, and services. Many of the communities rely heavily on agriculture, including crop production (corn, soybeans) and livestock farming. The City of Fremont, the largest community, has a diverse industrial base with food processing, metal fabrication, and other manufacturing sectors. Tourism and recreation are also available, with multiple state and locally operated lakes open to the public, along with use of the Platte River for open water recreation.

The total population of the LPNNRD is estimated at 65,447 (NARD, 2024) with approximately 49,860 within incorporated communities, or approximately 76 percent. Most of these residents in the rural areas are relying on private drinking water wells. A breakdown of population for the 28 LPNNRD communities is shown in Table 4.

Table 4: Population of Incorporated Places (1990 – 2025)

Village/City	1990	2000	2010	2020	Projected Population 2025
Yutan	1,100	1,216	1,174	1,308	1,350
Weston	310	310	324	335	340
Wahoo	3,700	3,942	4,508	4,509	4,600
Prague	340	346	303	285	290
Morse Bluff	130	134	135	135	140
Memphis	110	106	114	114	120
Mead	580	564	569	617	630
Malmo	120	109	120	120	125
Leshara	115	112	112	112	115
Ithaca	150	168	148	148	150
Colon	140	138	110	110	115
Cedar Bluffs	630	615	610	610	620
Schuyler	5,200	5,371	6,211	6,547	6,700
Rogers	95	95	95	95	100
Richland	75	73	73	73	75
North Bend	1,180	1,213	1,177	1,241	1,300
Inglewood	390	382	325	325	330
Fremont	24,500	25,174	26,397	27,141	27,500
Octavia	125	127	127	127	130
Linwood	88	88	88	88	90
David City	2,550	2,597	2,906	2,995	3,050
Bruno	110	112	99	99	100
Bellwood	440	446	435	435	440
Abie	110	108	69	69	70
Newman Grove	790	797	721	721	730
Tarnov	65	63	46	46	50

Village/City	1990	2000	2010	2020	Projected Population 2025
Platte Center	340	336	336	336	340
Lindsay	320	321	255	255	260
<b>TOTALS</b>	43,803	45,063	47,587	48,996	49,860

Source: Statistical Atlas of the U.S.

Information on industrial activity demonstrates a variety of industrial types present in the District that includes grain processing, alfalfa products, concrete products, equipment manufacturing, fiberglass manufacturing, irrigation equipment manufacturing, sand and gravel mining, steel fabrication, confined animal feeding operations (swine, beef, and chickens), packing plants, among many others. This industrial array also yields a diversity of water needs and waste treatment problems. These needs and problems may have a degrading effect on both ground and surface water quality and quantity if not properly addressed.

## 2.12 SURFACE WATER

The LPNNRD is recognized by its northwest boundary consisting of the Shell Creek watershed extending from the cities of Newman Grove to Schuyler, where it meets the Platte River. Other significant streams include Elm Creek, Loseke Creek, Lost Creek, Skull Creek, and Wahoo Creek and its tributaries including Sand Creek, Silver Creek, and Cottonwood Creek (Figure 19).

Outside of the Platte River, most of the other perennial streams do not support floating or active recreational uses. Flow through this region of the Platte River is a combination of the Upper Platte, the Loup, and the Elkhorn Rivers. Flow in the Platte River can range from no flow to overbank flows. The data (for 51 years up to 1995 as listed in the 1995 GWMP), at the City of Ashland shows the contributions of flow are: Elkhorn River (22 percent), Loup River (48 percent), upper Platte River (28 percent) and tributaries and valley groundwater inflow (2 percent). The annual and seasonal percentages of contribution vary extensively and are dependent upon the level of precipitation or runoff from snowmelt within the areas of influence. As precipitation influences streamflow, dry periods likewise influence streamflow and the manner of loss and gain to groundwater areas is often linked with streamflow volume.

Most of the streams receive baseflow from groundwater seepage to help maintain stream levels during dry periods. However, during heavy rain events, streams become 'flashy' and experience rapid increases in flow and water levels due to surface water runoff.

Surface water rights are managed by NeDNR. As of 2025, there are a total of 154 active surface water diversion points across the LPNNRD with a record of 10,163 acres of irrigated crops utilizing surface water (NeDNR, 2025a).

The Platte River's role in recharging groundwater by induced pumping and during periods of overbank flow within portions the LPNNRD is vital. Wellfields along the Platte River are crucial for supplying water to a significant portion of Nebraska's population, including water supplies for the City of Lincoln Water System (296,000 customers) (City of Lincoln, 2024) and Metropolitan Utilities District (600,000 customers) (MUD, 2024). The importance of this water source, managing the balance between groundwater recharge and surface water flow is essential. This involves monitoring water quality,

managing water withdraws, water rights, and ensuring sustainable practices to maintain the health of the aquifer and the river system.

There are a total of seven stream gages, managed USGS, within the LPNDR, including one in progress. The location and station name for each of the gage stations is shown in Table 6 with locations in Figure 19. Historical stream flow hydrographs can be found in Attachment A. Statistics from the USGS gage stations provide an idea of the volume of water, and variation in flow events, within Shell Creek, Wahoo Creek, and Platte River.

Table 5: LPNDR Steam Gage Information

Station Number	Station Name	General Location
06795500	Shell Creek near Columbus	122nd Ave - 4 miles NE of Lake Babcock
06796000	Platte River at North Bend	State HWY 79 - 0.5 miles S of North Bend
06796500	Platte River near Leshara	State HWY 64 west of Valley
06804000	Wahoo Creek at Ithaca	CRG - 1 mile S of Ithaca
06804700	Wahoo Creek at Ashland	State HWY 63 - 0.5 miles N of Ashland
06801000	Platte River near Ashland	At HWY 6
06795050	Shell Creek near Platte Center	In Progress

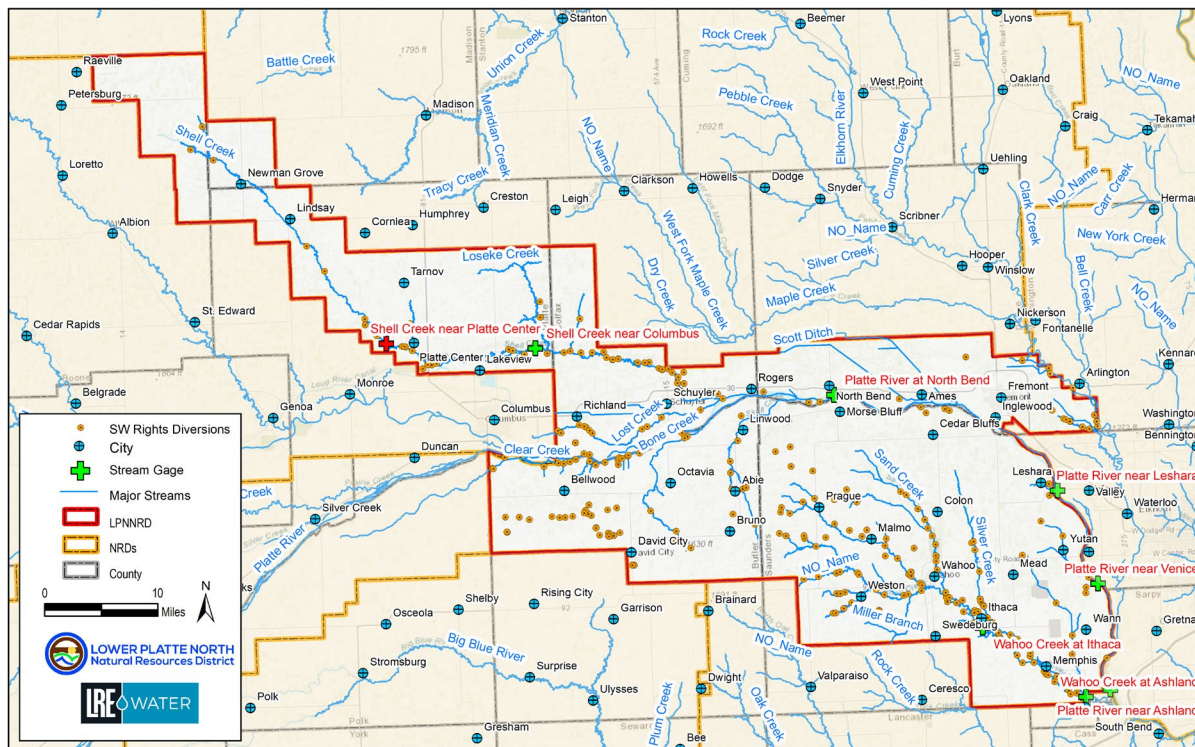


Figure 19: Major River Systems, Stream Gages and Diversion Points

## 2.13 WELLS AND TEST HOLES

The primary volumetric uses of groundwater in the District are for irrigation and municipal water needs, as shown in Figure 19. Groundwater is the principal source of supply for public drinking water systems, with all public water supplies deriving their supply from these sources. The cities of Lincoln, Omaha, and Fremont have extensive wellfields along the Platte River. Although the City of Lincoln is not located in the LPNNRD, a significant portion of its wellfield for public water supply is situated along the Platte River north of the City of Ashland.

The current use rate for the City of Lincoln’s wellfield averages 39.4 million gallons per day (mgd) but can reach up to 64 mgd during the summer months (LWS, 2020). This volume, combined with the demand from irrigation and other public and private users within the District, underscores the importance of both the quantity and quality of groundwater for continued and sustained development. While community water use is reported annually as part of the IMP implementation, the development of irrigation wells serves as an indicator of the majority of the aquifer use, as shown in Figure 20.

The UNL-CSD’s drilling program and has drilled 6,000 test holes throughout the state since 1930. Geologic material from these sites is preserved at the CSD Geological Sample Repository. This data is maintained by UNL-CSD and made available to the public for research, well siting, aquifer mapping, and much more. There are 151 UNL-CSD test holes within the LPNNRD, and another 136 within 5 miles of the LPNNRD boundary, as shown in Figure 21.

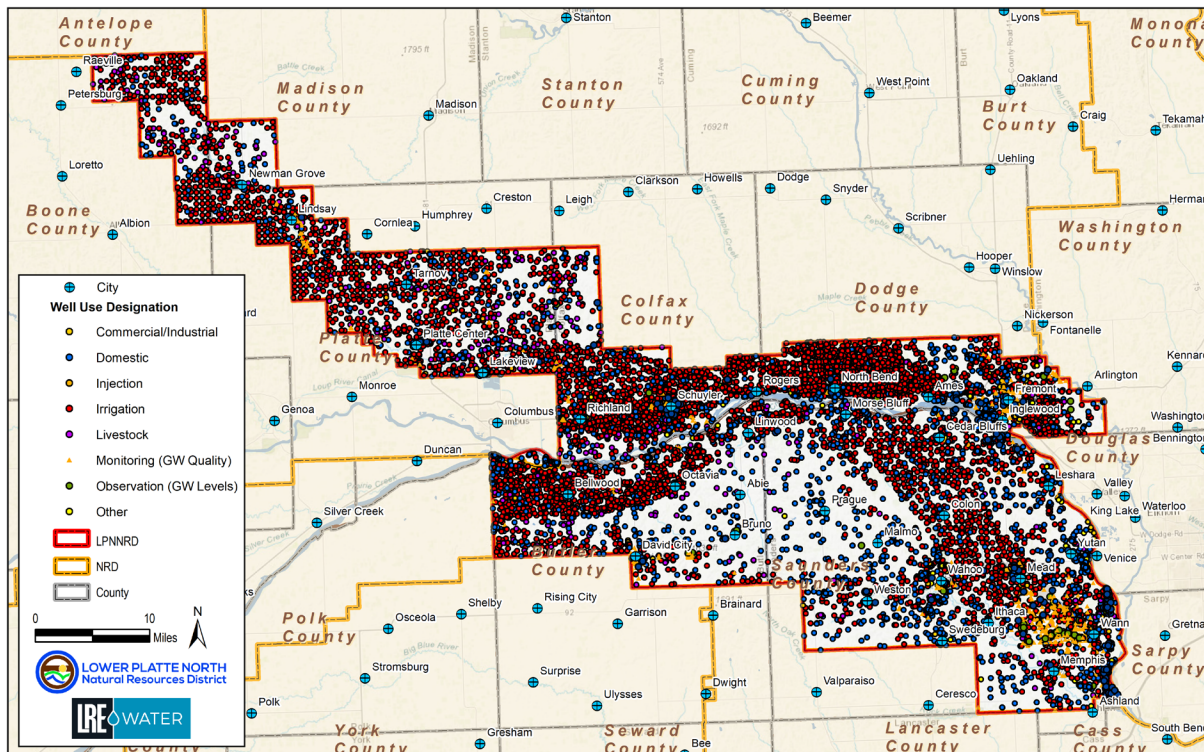


Figure 20: Registered Active Wells in the LPNNRD

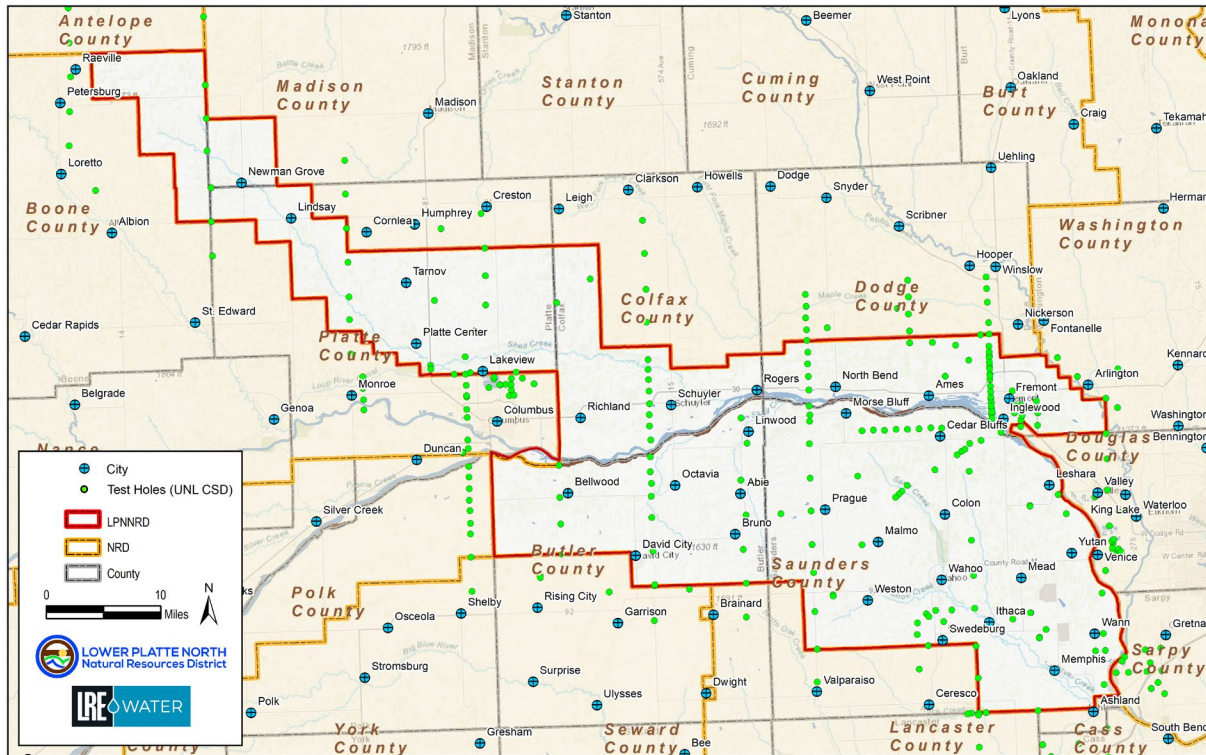


Figure 21: Test Holes within 5-miles of LPNNRD

## 2.14 PARTNERS AND PROGRAMS

The LPNNRD commonly works with a wide-array of partners in managing water resources. A summary of the major partners are listed below:

### U.S. Geologic Survey (USGS)

The Nebraska Water Science Center, a organization of the USGS, commonly partners with NRDs to provide reliable, impartial, and foundational data and scientific analysis to support a wide-variety of groundwater and surface water projects. The USGS is responsible for the maintenance of the five stream gages in the LPNNRD.

### Nebraska Department of Environment and Energy (NDEE)<sup>1</sup>

The NDEE is responsible for protecting and improving human health, the environment, and energy resources. Primary responsibilities include environmental protection of air quality, water quality, land and waste management, emergency response to spills, petroleum remediation, climate change, assistance to agricultural practices, and energy resources.

The NDEE maintains the Nebraska Groundwater Quality Clearinghouse, a one-stop location for a wide-variety of water quality data that is strongly supported by NRDs. The Source Water Protection Program

<sup>1</sup> As of July 1, 2025, NDEE and NeDNR merged and are referred to as the Nebraska Department of Water, Energy, and Environment (NeDWEE)

provides funding and is utilized to support the protection and sustainability of public water systems and the WHP program. Other programs related to groundwater include Underground Injection Control, Onsite Wastewater Compliance, Agricultural Permitting, and the National Pollution Discharge Elimination System. NDEE also provides Section 319 funding including support of projects addressing nitrate leaching to groundwater.

#### Nebraska Department of Natural Resources (NeDNR)<sup>2</sup>

The NeDNR is responsible for surface water, groundwater, floodplain management, dam safety, natural resources planning, water planning and integrated management, storage of natural resources and related data, and administration of State funds (NeDNR, 2025b). The NeDNR is a regular partner with the NRDs and is currently working with the LPNNRD on implementation and updates to the IMP. The NeDNR is responsible for the maintaining the registered well database, registering wells, providing GIS data, and maintaining stream gages. They also administer multiple funding programs.

#### University of Nebraska – Lincoln Extension

The UNL Extension provides education and outreach, and is spearheading a statewide initiative to enhance collaboration among project partners to tackle health concerns related to contamination of water resources.

#### University of Nebraska – Conservation and Survey Division (UNL-CSD)

The UNL-CSD serves as the natural resources component of the School of Natural Resources. Overtime, UNL-CSD has partnered with the LPNNRD on a variety of projects aimed at installing dedicated monitoring wells and analyzing AEM data.

#### Eastern Nebraska Water Resources Assessment (ENWRA)

The ENWRA started in 2006 with six NRDs collaborating on the development of a geologic framework and water budget for the previously glaciated portion of eastern Nebraska (ENWRA, 2024). This group has been responsible for the collection of AEM surveys across a large area of Eastern Nebraska, including most of the LPNNRD.

#### Neighboring NRDs

Through efforts such as the Lower Platte River Basin Coalition, the LPNNRD regularly collaborates with neighboring NRDs on regional and local water management efforts. The LPNNRD is also a partner of the Lower Platte River Drought Contingency Plan and is working with NeDNR, LPSNRD and PMRNRD on development of a subregional groundwater model for the Lower Platte River.

#### Cities and Villages

The LPNNRD regularly collaborates with Nebraska cities and villages to manage and protect natural resources effectively including flood management, water quality programs, stormwater management, education outreach, recreation projects, and grant and funding assistance. The LPNNRD will assist

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<sup>2</sup> As of July 1, 2025, NDEE and NeDNR merged and are referred to as the Nebraska Department of Water, Energy, and Environment (NeDWEE)

communities with development of WHP plans, source water protection projects, and engage with communities to site new public water supply wells.

### Counties

The LPNNRD collaborates with Counties on flood reduction and ice jam management, groundwater management, education programs at county fairs, and engagement of special projects on a county-wide basis (SQS areas).

### NARD

The NARD serves as the trade association for Nebraska's 23 NRDs. Some of the basic functions include coordination and support, governmental representation, education and outreach, resource sharing, and policy development.

### Other Organizations

Local agronomists, cooperatives, and other partners support groundwater protection through nutrient management guidance, promotion of BMPs, and outreach that encourages sustainable farming practices across the LPNNRD.

## **2.15 ENVIRONMENTAL EDUCATION AND INFORMATION**

The LPNNRD offers a variety of hands-on activities, classroom presentations, field trip opportunities, career exploration and more for young and old to learn more about the environment and our natural resources. There are two full time staff available to implement environmental education programs. All activities are of no cost to the public. Activities offered include:

- Coffee Lakeside and Monthly Educational Program
- Local and Regional Land Judging Contests
- Adult Environmental Education Opportunities
- Field trips to recreation areas and prairies
- Envirothon Field Day at Clint Johannes Education Building at Lake Wanahoo
- Local and regional range judging contest in partnership with area NRDs
- Spring Conservation Sensation – a natural resources field day for local 5<sup>th</sup> and 6<sup>th</sup> graders
- Test Your Well events in conjunction with local FFA Chapters
- Scholarships for:
  - Students participating in the Shell Creek Watershed monitoring group
  - Nebraska Association for Conservation and Environmental Education (NACEE) – support for teachers and other educators who are interested in science as it relates to natural resources.
  - Ag in the Classroom – incorporation of program materials into the classroom
  - Natural Resources Grant – to assist local high school students monetarily in a natural resources-based project within their community.

### 3 GROUNDWATER QUANTITY

#### 3.1 GROUNDWATER LEVELS AND EXISTING WELLS

Most of the LPNNRD has not seen significant declines according to the UNL-CSD's annual 'Groundwater-Level Changes in Nebraska – Predevelopment (mid-1950s) to Spring 2023' dataset, shown in Figure 22. It is important to note that 2022 and 2023 were significantly dry years for the region. The primary area of concern is within Colfax County, where groundwater levels have declined 30 to 40 feet near the Village of Leigh where the District borders the LENRD. Other areas around the Village Bruno in Butler County also have documented declines. On the other hand, the far northwest corner of the District in the Shell Creek region has seen increasing level up to 30 feet near the Village of Petersburg and toward the Sandhills.

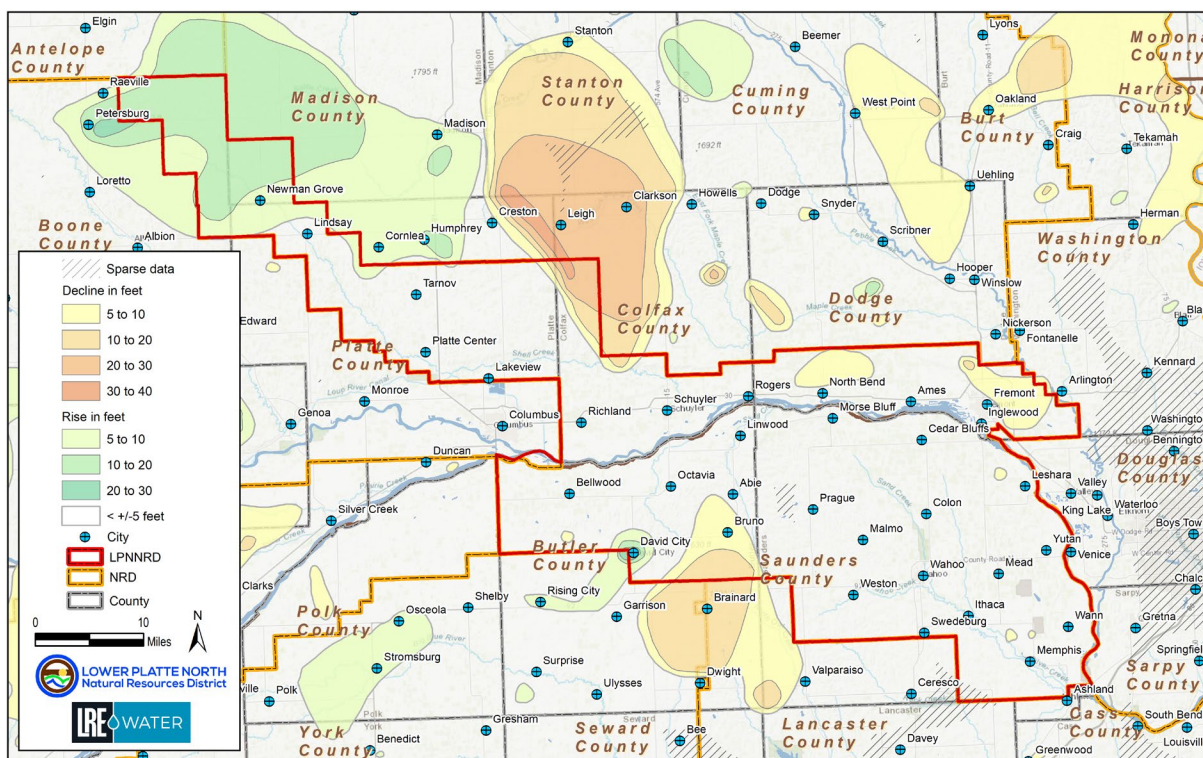


Figure 22: Groundwater-Level Changes in LPNNRD, Predevelopment to Spring 2023

Each spring and fall, LPNNRD staff measure static water levels from approximately 215 wells, most of which are utilized for high-capacity irrigation. The staff also manage a dedicated observation well network with 62 sites, each with a pressure transducer and logger with telemetry, providing real-time data to the staff and public through the District's website. The data from the spring water levels are utilized annually to review changes in water levels and are reviewed against the triggers set for Groundwater Management Phase Areas. Locations of the spring/fall static wells and dedicated network is shown in Figure 23.

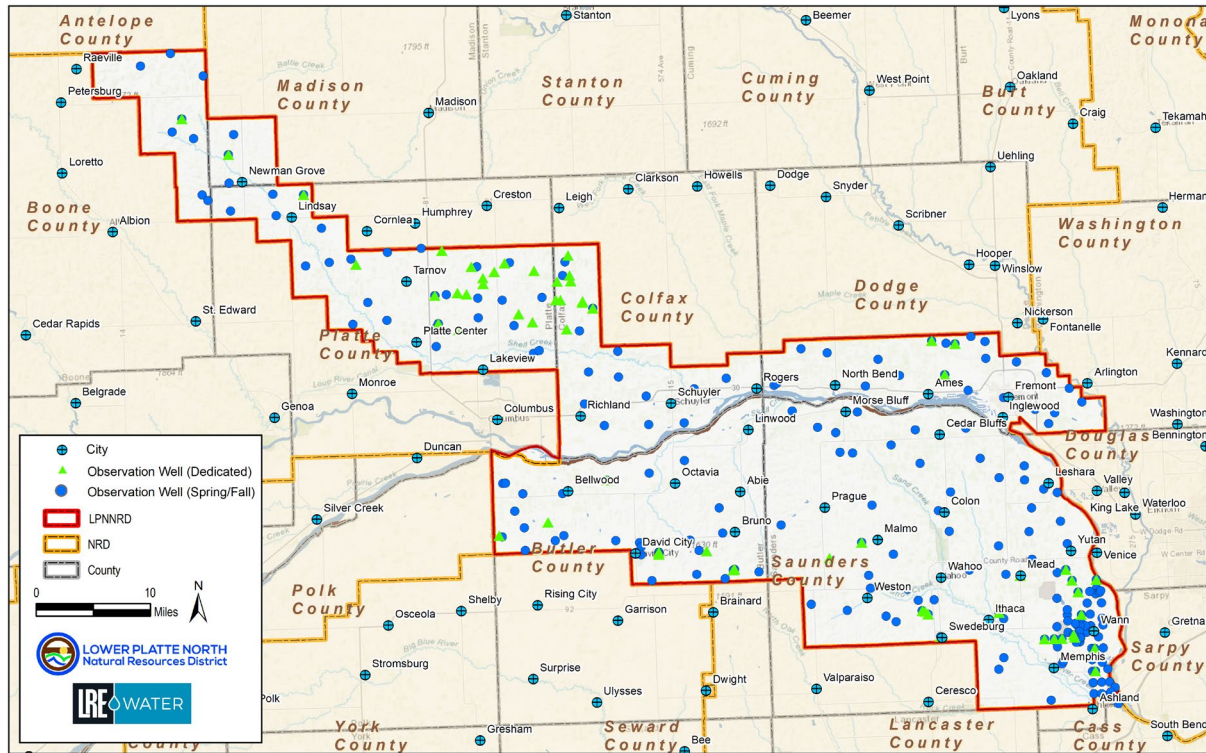


Figure 23: Observation Well Network

The depth to groundwater shown in Figure 24 was produced as part of the Assessment (LRE, 2023) and shows the depth to groundwater, in feet below ground surface. This elevation was determined by subtracting the ground surface elevation shown in Figure 10 from the groundwater surface elevations created during the Assessment. Water elevations were determined by reviewing all available geologic logs and test holes and utilizing static water level data at the time the well was drilled. Depth to water varies from near the surface to 20 feet deep along the Platte River to more than 250 feet below grade in the Shell Creek and Upland regions.

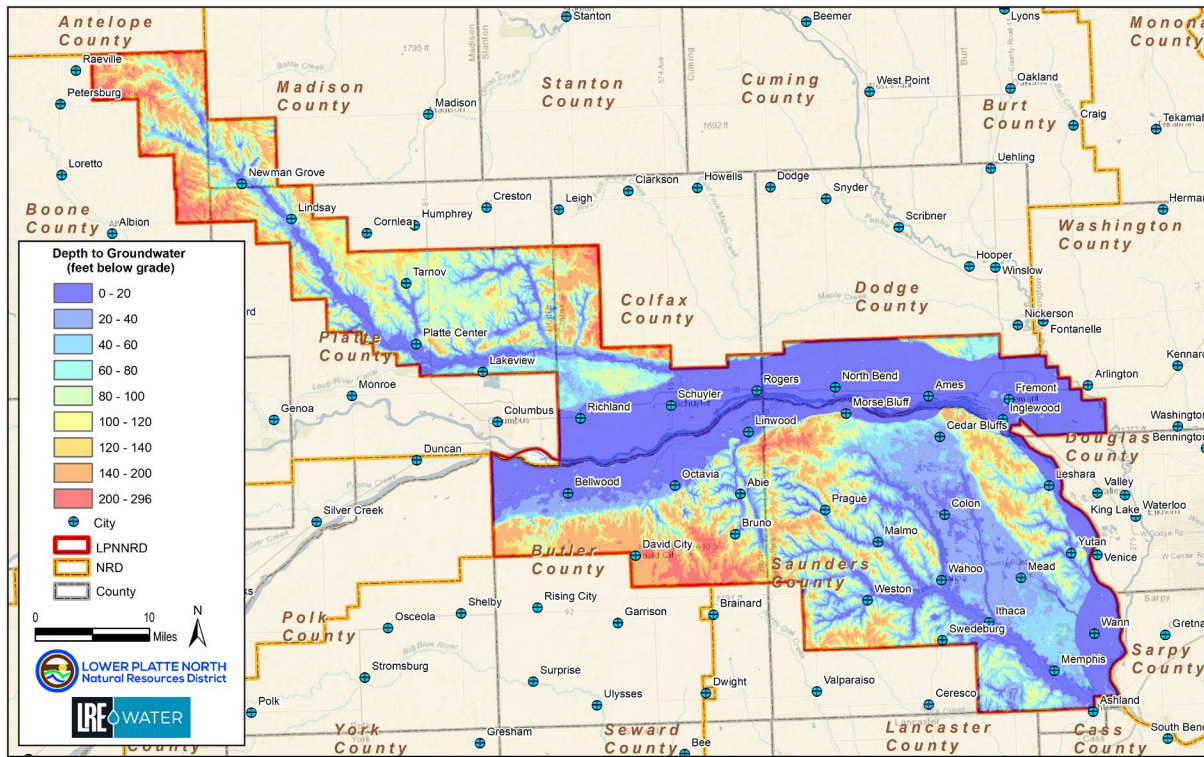


Figure 24: Depth to Groundwater

### 3.1.1 Sub-irrigation Potential

Sub-irrigation occurs naturally when a high groundwater table provides moisture to plant roots. There is significant potential for sub-irrigation within the LPNNRD, primarily due to the Platte River valley. The LPNNRD Rules and Regulations has defined sub-irrigation as, “the natural occurrence of a groundwater table within the root zone of agricultural vegetation, not exceeding ten feet below the surface of the ground”. Currently, the LPNNRD asks producers who plan to introduce new acres utilizing sub-irrigation to contact staff, but the LPNNRD is not currently requiring annual reports from agricultural producers who benefit from sub-irrigation.

The Hydrogeologic Assessment (LRE, 2023) was used to identify areas within the LPNNRD that include all areas that have groundwater within 10 feet or less, which totals over 228,000 acres, or over 22 percent, mostly due to the presence of the Lower Platte River valley. The depth of groundwater was determined by subtracting the groundwater elevation surface from the Digital Elevation Model, as shown in Figure 25.

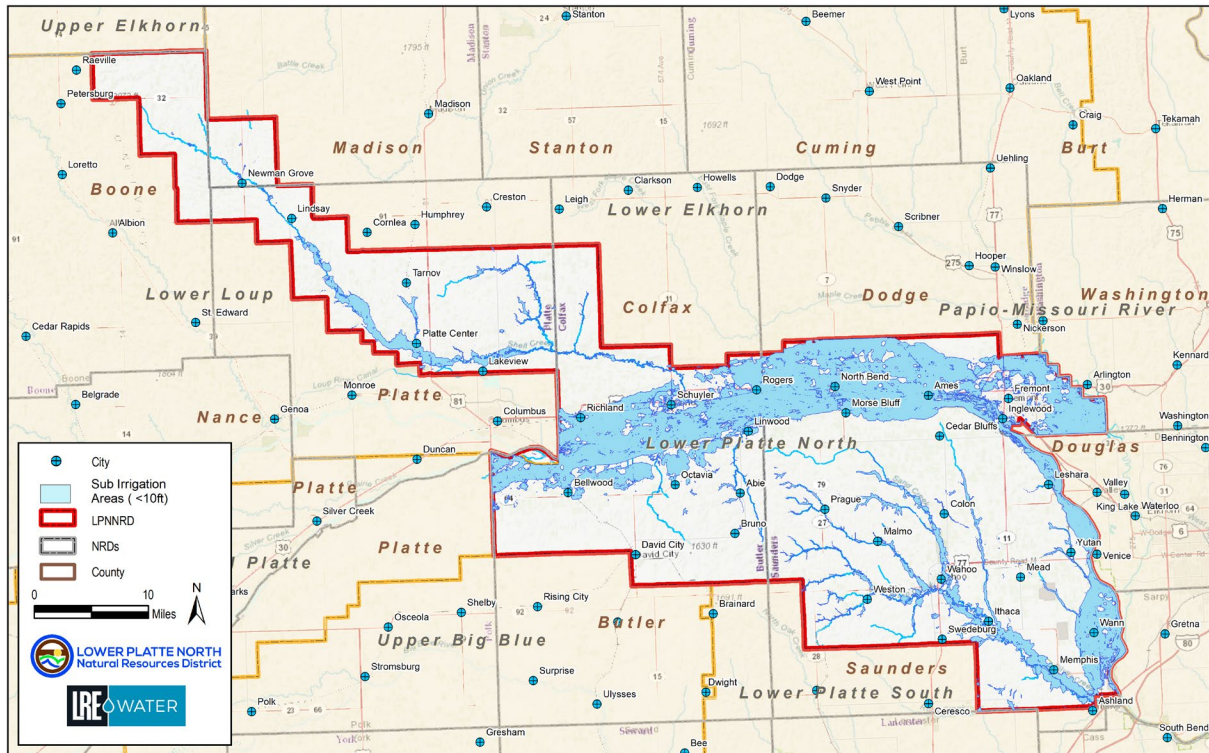


Figure 25: Potential Areas for Sub-irrigation

### 3.2 GROUNDWATER RECHARGE

Local precipitation serves as a major recharge source for aquifers in the LPNDR, complemented by the Platte River. The river receives significant runoff from Rocky Mountain snowmelt and baseflow contributions from major tributaries originating in the Nebraska Sandhills, facilitating natural infiltration. Its sand and gravel substrate enhances percolation into underlying aquifers, helping to sustain groundwater levels in the LPNDR. Additionally, groundwater from western regions, including the Sandhills, migrates eastward through the High Plains Aquifer system, contributing to baseflow in numerous rivers and streams. These hydrologically connected areas—particularly Shell Creek, Platte Valley, and Todd Valley aquifers—have been documented by the NeDNR.

Artificial groundwater recharge potential refers to the capacity of a specific area to effectively increase the amount of water entering an aquifer through human-controlled methods, which would require importing water or retiming water to make a project practical. This map also provides a general representation of areas that are more likely to naturally recharge groundwater. This process, known as artificial recharge, involved techniques such as:

- **Surface spreading:** Using canals, infiltration basins, or ponds to direct water across the land surface.
- **Injection wells:** Directly injecting water into the subsurface.
- **Irrigation methods:** Recharge from agricultural practices involving furrow or sprinkler systems to enhance infiltration.

Using the GIS data resources available from the Assessment (LRE, 2023), a representation of artificial recharge was created using two key inputs, the depth to groundwater and unsaturated clay thickness above the Principle Aquifer. Using GIS, a qualitative model was created on a scale from 1 (Lowest Potential) to 5 (Very High Potential), as shown in Figure 26. As expected, the Platte Valley and Todd Valley regions display a high to very high potential, whereas other areas within the Shell Creek and Upland regions tend to be limited to area along active waterways. This map is not necessarily representative of injection well methods.

Artificial recharge potential is also closely linked to groundwater risk, as these areas are also prone to infiltration of contaminants, such as nitrate, into the aquifer, potentially degrading water quality. This is especially critical in areas where the recharge water might carry pollutants from agricultural runoff, industrial processes, or urban runoff. Treatment wetlands could be a consideration to improve water quality and provide groundwater recharge in the highly vulnerable locations.

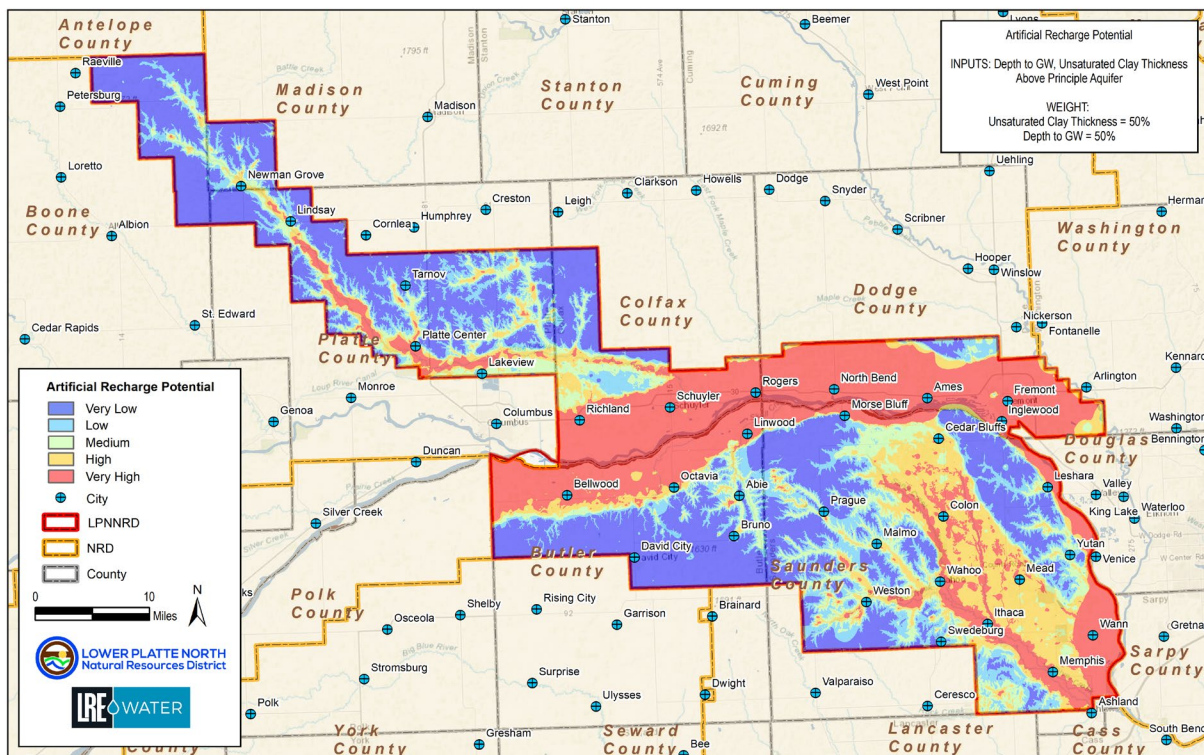


Figure 26: Artificial Recharge Potential

### 3.3 WATER USE AND DEMAND

The LPNNRD reports annually on water demand as part of the LPRCA Basin Water Management Plan Annual Report. This report is available by contacting the LPNNRD office. Highlights of the reporting on water use include the following:

1. Collection of data from over 1,300 flow meters, of which nearly 1,200 are on irrigation systems.
2. Recording of water use within SQS#1 (Bulter/Saunders) and SQS#2 (Platte/Colfax).
3. Continuous updating and tracking of nearly 392,500 certified irrigated acres (as of 2024).
4. Tracking of municipal and industrial groundwater uses.
5. Data collection and monitoring of new groundwater consumptive uses (agricultural, municipal, industrial).
6. Tracking of acres for groundwater consumptive uses (agricultural, municipal, industrial).
7. Creation of the 3-District Model, an ongoing effort with PMRNRD, LPSNRD, and NeDNR to utilize the 3-D AEM Framework created for the participating NRDs.
8. Working with the Coalition to track new stream depletion accounting (depletions and accretions).

The LPNNRD requires public water suppliers to report annual total water use as part of the LPRCA reporting. Table 5 displays the 2023 reported value, outside of Memphis, Bellwood, and Ithaca, which all have 2022 pumping shown. The Village of Bruno is connected to the City of David City and the Village of Colon receive water from the City of Wahoo. Numbers reported by the Lincoln Water System (LWS) and Metropolitan Utilities District (MUD), which serves Omaha and surrounding communities, including only pumping from wellfields located within the LPNNRD, each in eastern Saunders County. Table 6 displays the same information, but without the LWS and MUD wellfields.

*Table 6: Annual Municipal Water Usage All Communities*

Municipality	Gallons Pumped	Percent of Total
Newman Grove	32,205,200	0.15%
North Bend	64,260,000	0.30%
Wahoo*	269,693,307	1.27%
Abie	2,576,600	0.01%
Lindsay	65,992,600	0.31%
Malmo	1,980,000	0.01%
Mead	20,280,316	0.10%
Morse Bluff	2,183,000	0.01%
Platte Center	19,348,203	0.09%
Weston	13,948,027	0.07%
Yutan	49,132,000	0.23%
Fremont	3,654,341,000	17.26%
David City*	163,436,066	0.77%
Schuyler	376,856,000	1.78%
LWS (Lincoln)	5,841,820,110	27.59%
Cedar Bluffs	25,147,232	0.12%

Municipality	Gallons Pumped	Percent of Total
MUD (Omaha)	10,334,804,000	48.80%
Ashland	190,022,000	0.90%
Prague	11,420,000	0.05%
Memphis	9,524,000	0.04%
Bellwood	19,807,000	0.09%
Ithaca	4,000,000	0.02%
Rogers	4,006,000	0.02%
TOTAL	21,176,782,661	100.00%

Table 7: Annual Municipal Water Usage Without LWS and MUD

Municipality	Gallons Pumped	Percent of Total
Newman Grove	32,205,200	0.64%
North Bend	64,260,000	1.29%
Wahoo*	269,693,307	5.39%
Abie	2,576,600	0.05%
Lindsay	5,992,600	1.32%
Malmo	1,980,000	0.04%
Mead	20,280,316	0.41%
Morse Bluff	2,183,000	0.04%
Platte Center	19,348,203	0.39%
Weston	13,948,027	0.28%
Yutan	49,132,000	0.98%
Fremont	3,654,341,000	73.08%
David City*	63,436,066	3.27%
Schuyler	76,856,000	7.54%
Cedar Bluffs	25,147,232	0.50%
Ashland	90,022,000	3.80%
Prague	1,420,000	0.23%
Memphis	9,524,000	0.19%
Bellwood	19,807,000	0.40%
Ithaca	4,000,000	0.08%
Rogers	4,006,000	0.08%
	5,000,158,551	100.00%

### 3.3.1 Registered Wells

One method to generally understand water demand is through an evaluation of registered wells, as shown in Figure 27. In total, there are 13,025 registered wells in the LPNNRD (including PWS wells) in 2024. This total does not account for the likely thousands of unregistered wells constructed before

registration was required for all domestic wells in 1993. Of this total, 9,711 are active, and 47 percent are used for irrigation. Domestic well use is the second most common at 28 percent, as seen in Table 7. The ‘other’ category includes injection, other, and recovery wells. The majority of inactive wells within the database were decommissioned wells.

Table 8: Active Registered Well Distribution

TYPE	ACTIVE	PERCENT
Irrigation	4,611	47%
Domestic	2,716	28%
Livestock	295	3%
Observation	211	2%
Monitoring	1,156	12%
Commercial/Industrial	71	1%
Ground Heat/Heat Pump	170	2%
Public Supply Wells	188	2%
Other	293	3%
TOTAL	9,711	100%

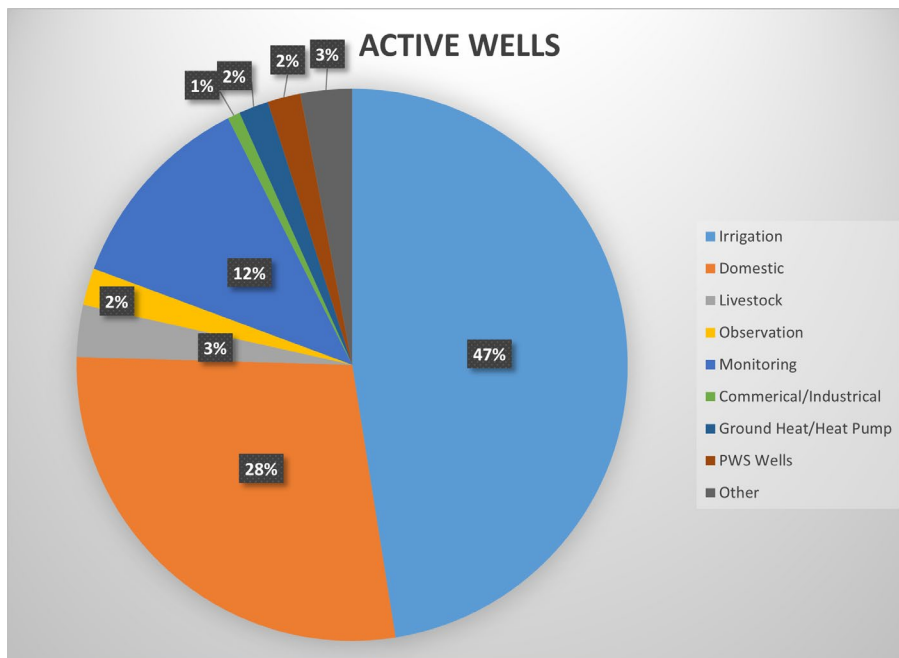


Figure 27: Percent of NeDNR Active Registered Wells

### 3.4 CERTIFIED IRRIGATED ACRES

The LPNNRD began certifying irrigated acres in the spring of 2010 as governed by the Nebraska Groundwater Management and Protection Act, 46-701. This statute provides the legal framework for managing and protection groundwater resources, including the certification of irrigated acres to ensure sustainable water use. The certification process helps catalog all existing irrigated acres and aligns

records from the LPNNRD, County Assessor, and the Farm Service Agency. This process helps ensure that irrigation practices comply with local and state water management regulations and helps manage and allocate water resources more effectively to prevent overuse and ensure sustainability. The certified irrigated acres as of January 2025 are shown in Figure 28.

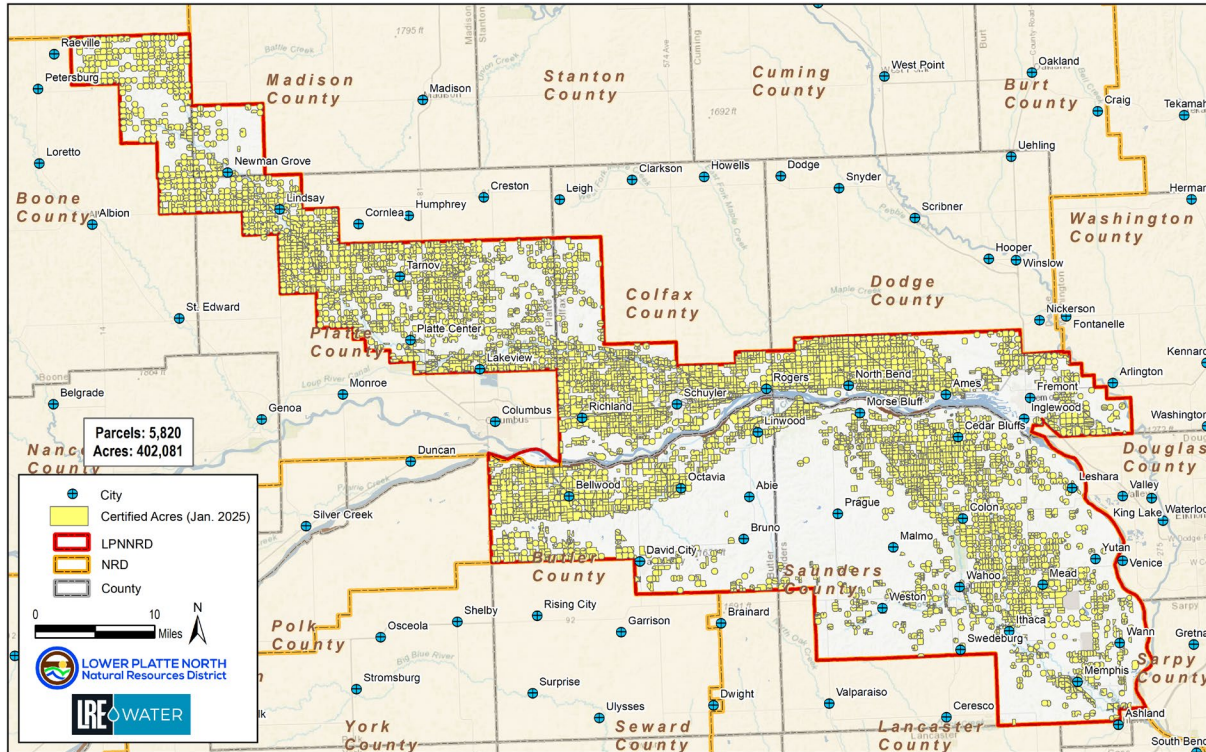


Figure 28: Certified Irrigated Acres in the LPNNRD (2024)

## 4 GROUNDWATER QUALITY

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### 4.1 AQUIFER VULNERABILITY

#### 4.1.1 Nonpoint Source Pollution

Non-point source pollution is generally defined as pollution arising from diffuse sources where no single point of release can be identified. While non-point source pollution can be related to weathering of minerals or soil erosion, human activities are commonly the originator for non-point source groundwater pollution. The diffuse application of fertilizers, pesticides, and herbicides in agricultural operations as well as urban areas account for large areas of land with soils containing these additives. Heavy application of chemicals, coupled with heavy precipitation or irrigation can result in these chemicals leaching to groundwater. Overland flow resulting from runoff can also provide a means of chemical leaching to a groundwater aquifer. In Nebraska, as well as in the LPNNRD, nitrate is the most common non-point source pollutant.

Aquifer vulnerability within the LPNNRD was mapped as part of the Assessment (LRE, 2023) by quantifying the amount of unsaturated clay above the top of the first encountered aquifer at each well or test hole location. The clay thickness values (75% of the model weight) were reclassified into five categories:

- 0 – 5 ft = 5
- 5 – 10 ft = 4
- 10 – 20 ft = 3
- 20 – 40 ft = 2
- > 40 ft = 1

Land use was also considered (25% weight) and reclassified into two categories with a value of either 1 or 5. Irrigated farmland is considered the most vulnerable (a rating of 5), and the remaining land use categories are considered least vulnerable (ratings of 1).

The resulting raster layer contains qualitative values that show where the aquifer has more or less potential vulnerability to the downward migration of potential contaminants from activities on the ground surface. This map shows a qualitatively modeled spatial distribution of groundwater vulnerability, from very low to very high, across the LPNNRD Boundary. A “Very Low” potential vulnerability means the aquifer is not likely to receive contaminants from activities on the ground surface. Conversely, a “Very High” potential vulnerability means the aquifer is potentially very susceptible to surface contaminants. The aquifer vulnerability map is shown in Figure 29.

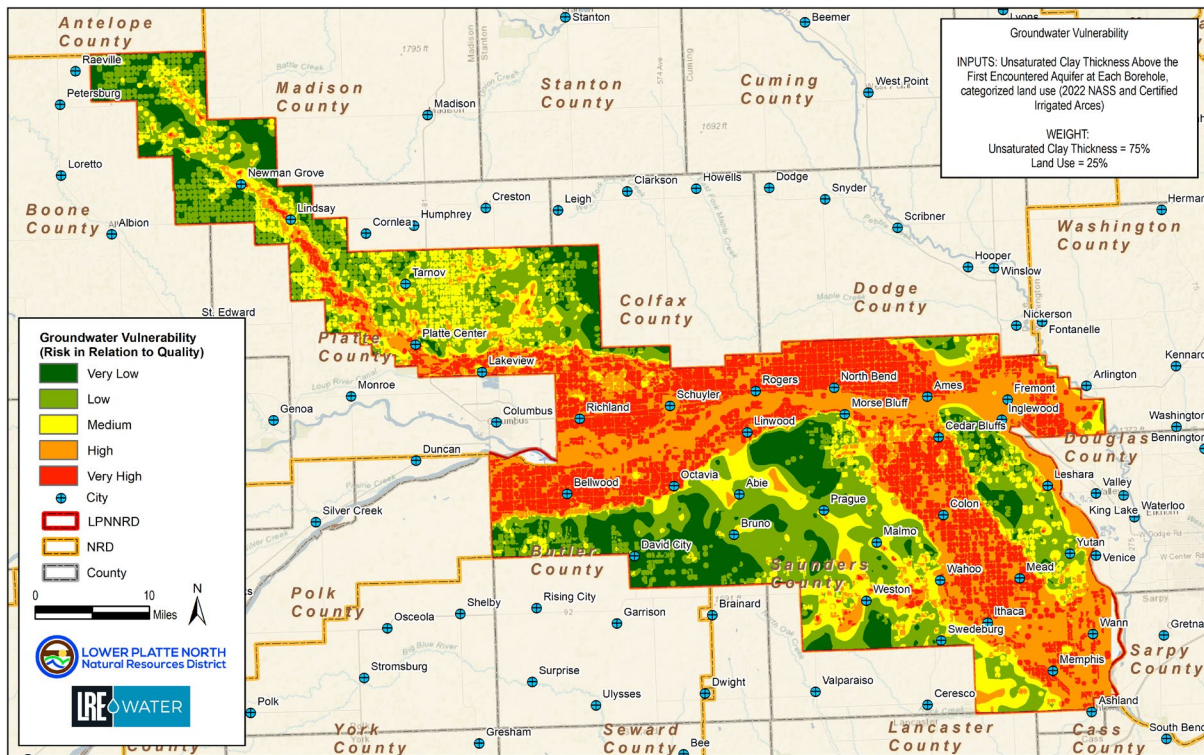


Figure 29: Aquifer Vulnerability

Nitrate can be found in most areas in Nebraska. Sources of nitrate include breakdown of organic material in soils, human or livestock wastes, and chemical fertilizers. When exposed to nitrate levels in excess of the U.S. Environmental Protection Area’s (USEPA) Maximum Contaminant Level (MCL) of 10 mg/L in drinking water, infants younger than about 6 months of age may develop methemoglobinemia or "blue-baby" syndrome. The University of Nebraska Medical Center has also recently begun researching the connection of nitrate in drinking water to various cancers in Nebraska.

To provide an illustration of the most recent nitrate concentrations, data from 2019 through 2023, collected by the LPNNRD staff from 537 wells across the District, is shown in Figure 30. Each year, the LPNNRD staff collected representative data across the entire District and concentrated sampling in Groundwater Management Areas, as seen within the Richland/Schuyler phase three GWMA. Staff have also been obtaining additional samples throughout the Shell Creek region where concentrations of nitrate have been slowly rising.

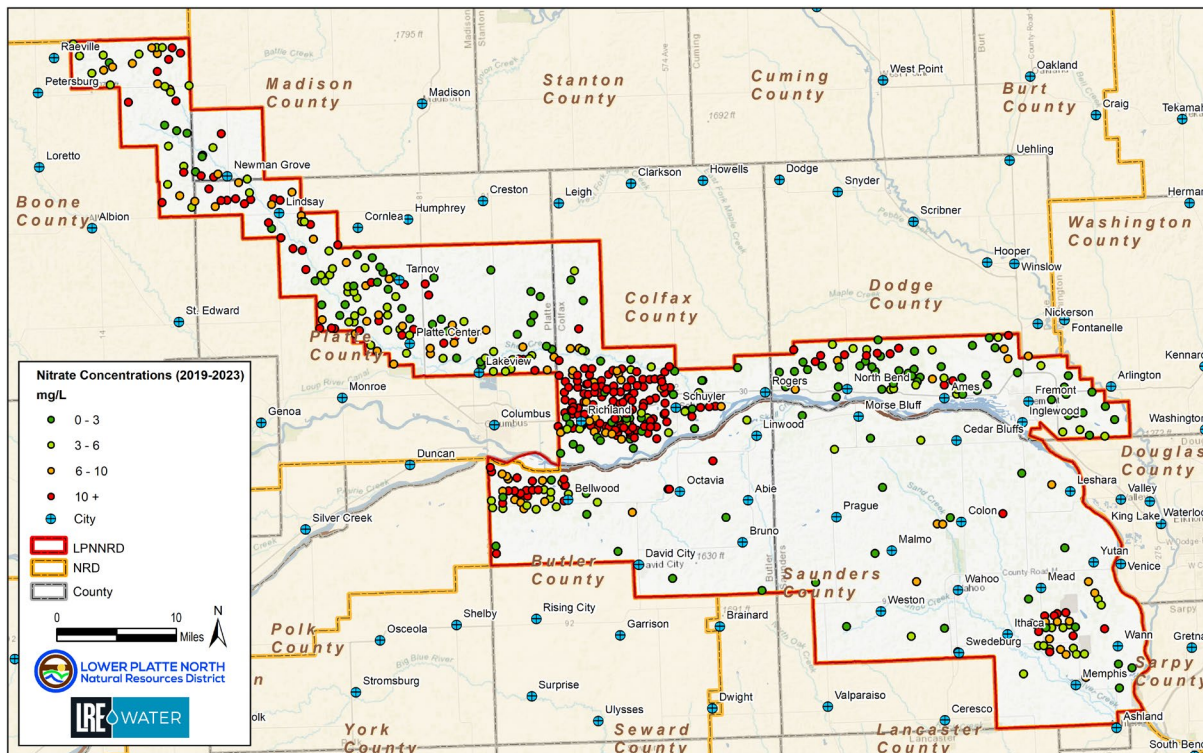


Figure 30: LPNNRD Nitrate Concentrations 2019-2023

#### 4.1.2 Additional Water Quality Monitoring

The LPNNRD conducts a wide variety of additional water quality data, including random sampling of wells for unique circumstances. In the past, sampling included nickel, sodium, selenium, mercury, among others. The LPNNRD can also provide property owners assistance to monitor nitrates and bacteria from private wells.

While nitrate remains the top water quality concern in LPNNRD due to agricultural runoff, other issues like arsenic, iron, uranium, and saltwater intrusion pose growing threats. Arsenic and uranium, both naturally occurring in regional geology, requires focused testing and public outreach—especially in areas like Richland-Schuyler, where uranium levels have exceeded 30 ppb in half of the sampled wells (LPN, 2025). Iron, though often an aesthetic nuisance, can signal redox conditions that mobilize other contaminants. Saltwater intrusion, driven by over-pumping or proximity to saline sources such as the Dakota aquifer, threatens aquifer quality and calls for proactive monitoring and recharge strategies (UNL, 2017). Meanwhile, emerging contaminants like PFAS and pharmaceuticals, though less prevalent, warrant early action through partnerships, education, and hotspot identification. By expanding monitoring, encouraging treatment and management practices, and collaborating with health and research agencies, LPNNRD can address these evolving challenges with foresight and resilience.

Starting in 2001, the Nebraska Legislature passed LB329, which directed the NDEE to report on groundwater quality monitoring in Nebraska (NDEE, 2024). The NRDs are also required (§46-1305) to submit an annual report on water quality to the legislature, which is prepared by NARD annually, and is issued concurrently with NDEE’s annual Nebraska Groundwater Quality Monitoring Report. As a partner, the LPNNRD collects water quality samples from a total of 53 wells district-wide over a four year period,

as shown in Figure 31. This data is part of the Nebraska Groundwater Quality Clearinghouse, which includes an online, interactive database featuring data, maps, well construction details, and statistics (NDEE, 2024). One of the focuses of the statewide network is on pesticides and includes the following:

1. **Metribuzin:** A herbicide used to control broadleaf weeds and grasses.
2. **Methoxychlor:** An insecticide used to control flies, mosquitoes, and other insects.
3. **Hexachlorobenzene:** A fungicide used to treat seeds.
4. **Alachlor:** A herbicide used to control annual grasses and broadleaf weeds.
5. **Butylate:** A herbicide used to control grasses and some broadleaf weeds.
6. **Atrazine:** A herbicide used to prevent pre- and post-emergence broadleaf weeds.
7. **Cyanazine:** A herbicide used to control annual grasses and broadleaf weeds.
8. **Hexachlorocyclopentadiene:** A chemical intermediate used in the production of pesticides.
9. **Propachlor:** A herbicide used to control annual grasses and some broadleaf weeds.
10. **Trifluralin:** A herbicide used to control annual grasses and broadleaf weeds.
11. **Chlorpyrifos:** An insecticide used to control various pests including termites and mosquitoes.
12. **Aldrin:** An insecticide used to control soil pests.
13. **Lindane:** An insecticide used to treat lice and scabies.
14. **Di(2-ethylhexyl)phthalate:** A plasticizer that can be found as a contaminant in the environment.
15. **Dieldrin:** An insecticide used to control soil pests.
16. **Fonofos:** An insecticide used to control soil insects.
17. **Simazine:** A herbicide used to control broadleaf weeds and grasses.
18. **Benzo(a)pyrene:** A polycyclic aromatic hydrocarbon that can be found as a contaminant.
19. **Heptachlor:** An insecticide used to control soil insects.
20. **Heptachlor Epoxide:** A breakdown product of heptachlor.
21. **Total Chlordane:** Refers to the sum of chlordane and its breakdown products.
22. **Endrin:** An insecticide used to control pests on crops.

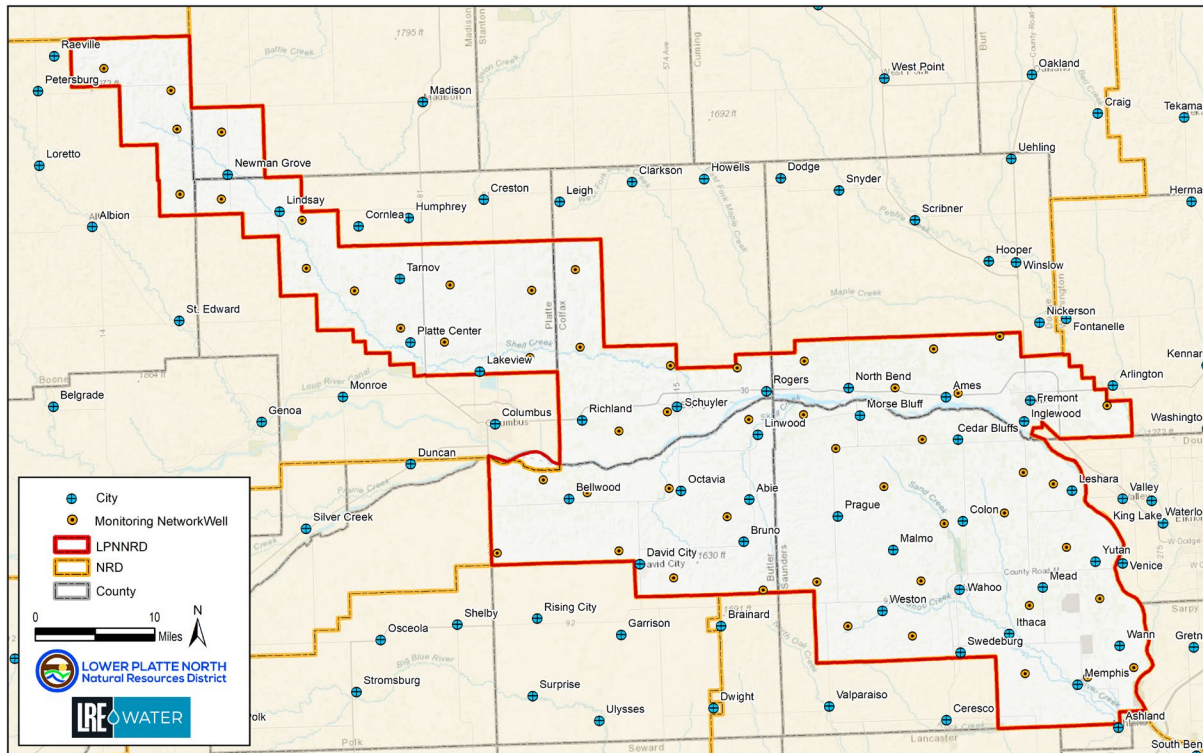


Figure 31: LPNNRD Statewide Water Quality Monitoring Network Wells

#### 4.1.3 Point Source Pollution

Point source pollution generally impacts the quality of the groundwater in localized areas. However, when these sites are located above potential drinking water supplies or are located adjacent to domestic or municipal wells the impact of a spill or leak can affect larger land areas and populations. Even spills that are cleaned up to health-based cleanup goals of a regulatory agency can impact drinking water supplies as human taste thresholds of many chemicals are below the health based "action" levels.

There are numerous manufacturing facilities and petroleum handling facilities, grain bin storage sites, and fertilizer and pesticide storage facilities within the LPNNRD. Although new regulations and generally improved product and waste handling procedures have reduced the chances of a spill or release of contaminants from these type of activities, historically, numerous spills have been documented.

The NDEE holds regulatory authority over substances from point source discharges that can cause or contribute to groundwater contamination. To obtain a permit, they are reviewed by engineering and permitted if they meet minimum design requirements and have no adverse impacts to water quality standards.

The NDEE maintains a permitted facilities database of regulated facilities under their jurisdiction, which are known or suspected to have soil and water contamination. This database includes various categories, such as the National Pollutant Discharge Elimination System (NPDES) program, Integrated Waste Management, Leaking Storage Tanks, Livestock Waste Control, Onsite Wastewater Treatment, Release Assessment, Remedial Action Plan Monitoring, Resource Conservation Recovery, Superfund, SARA Title III, and Underground Injection Control. Some of these facilities could potentially be point

sources of groundwater contamination if they do not maintain full compliance. Additional information on NDEE regulated facilities can be found an interactive mapping application on their website.

## 4.2 WELLHEAD PROTECTION AREAS

The NDEE oversees the WHP program, a voluntary initiative that offers financial and technical support to communities with public water suppliers to safeguard water supplies from contamination. Each community water system with a groundwater supply has a designated WHP area, as shown in Figure 32, but few communities have exercised controls to regulate contamination threats within the WHP Area. The WHP area delineates the time-of-travel and the surficial region drawn around a water well or wellfield that supplies a Public Water System (PWS), indicating where contaminants are likely to travel toward and reach the well. Typically, a 20-year time-of-travel is utilized for the WHP Area, while some communities have opted to use the 50-year time-of-travel. The five minimum steps for the WHP Program are shown in Figure 33.

As of 2025, the LPNNRD was supporting WHP plans, well siting assessments, and delineation efforts in the Village of Platte Center and City of Newman Grove, and had recently supported projects for the cities of Ashland, David City, and Wahoo. A summary of WHP plans in the LPNNRD is shown in Table 8.

*Table 9: LPNNRD PWS State-Approved WHP Plans*

PWS Name	COUNTY	DATA APPROVED
Platte Center	Platte	2025
Newman Grove	Platte/Madison	2025
Wahoo	Saunders	2023 (plan & ordinance)
David City	Butler	2023 (plan & ordinance)
Lindsay	Platte	2015
Fremont	Dodge/Douglas	2010
Woodcliff Water System	Saunders/Dodge	2006
Weston	Saunders	2005
Abie	Butler	2003
North Bend	Dodge	2003
Yutan	Saunders	2003

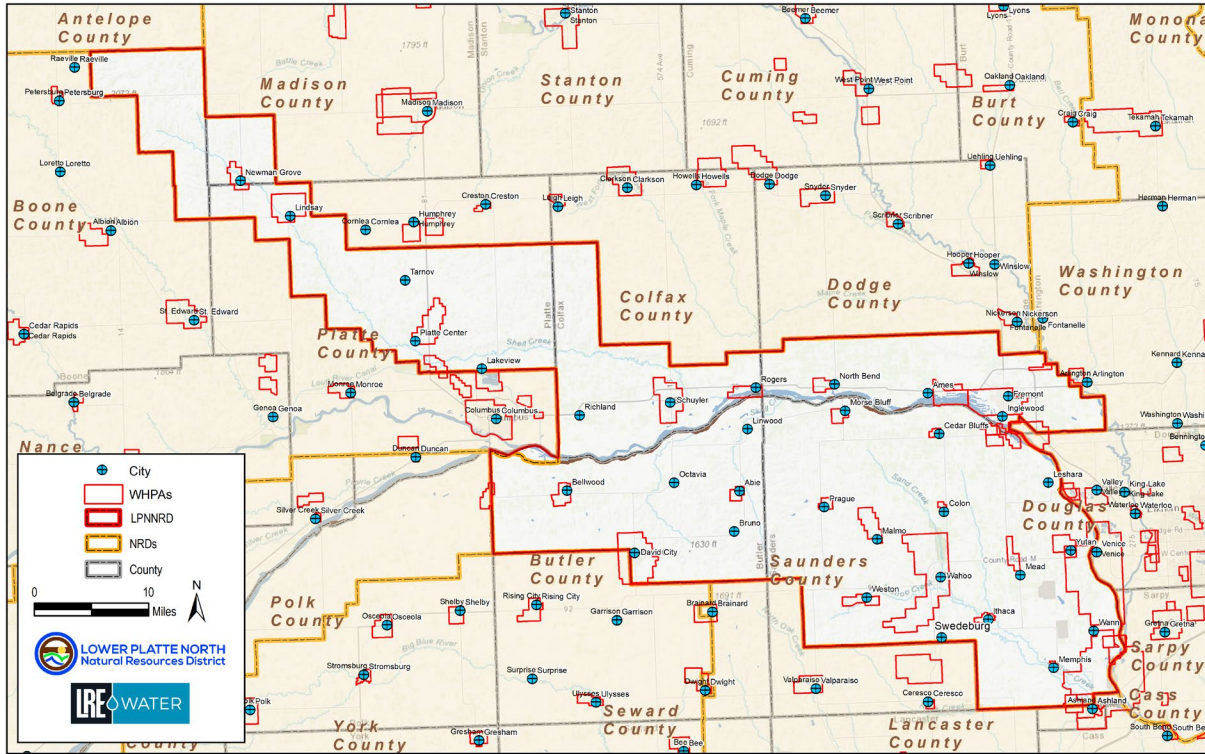


Figure 32: Wellhead Protection Areas



Source: NDEE

Figure 33: Five Steps of the WHP Program

### 4.2.1 Water Quality Activities

A summary of recent water quantity activities for the LPNNRD for 2023 are as follows:

- Completion of 6 nitrogen/irrigation certification meetings with 200 - 300 in attendance.

- Implementation of a program, funded by WSF, to provide cost-share practices in the Schuyler-Richland GWMA for gravity to pivot/SDI conversions, water flow meters, and cover crops.
- USGS is leading an age-dating project, in conjunction with LLNRD, near the Schuyler-Richland GWMA.
- District-wide soil moisture sensor cost-share
- Well decommissioning cost-share
- Shell Creek Watershed Water Quality Project, including agricultural and urban cost-share for best management practices.

## 5 GOALS AND OBJECTIVES

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### 5.1 GROUNDWATER MANAGEMENT GOALS AND OBJECTIVES

The primary management target, defined below in the Vision Statement, is to maintain the ‘groundwater reservoir life goal’ – defined within the Rules and Regulations as the period of time which the District establishes as its goal for maintenance of the supply and quality of water in a groundwater reservoir. This goal can also be described as ensuring a safe yield for aquifers, which is the amount of water that can be sustainably withdrawn without causing long-term depletion or adverse effects on the aquifer and hydrologically connected water resources. The goals and objectives are designed to guide the staff and Board of Directors in making decisions about water resource management.

#### ***LPNNRD Groundwater Management Vision Statement***

*Strive for the continuous management of the groundwater reservoir, in perpetuity, to ensure it meets the standards appropriate for its various uses, including domestic, livestock, public water supply, public health, irrigation, agriculture, wildlife, industrial, and other beneficial uses. Minimizing, as much as possible, the adverse impact of these uses on the quantity and quality of groundwater that supports lakes, wetlands, and streams.*

By implementing the five goals and objectives shown below, the LPNNRD can ensure groundwater remains a reliable resource while protecting the ecosystems that depend on it. Goal categories include monitoring, pollution prevention, conservation, public education, and sustainable management plans and regulations.

#### **5.1.1 Goal 1 – Groundwater Monitoring**

Continuously monitor and assess groundwater levels and quality, ensuring early detection of significant changes for proactive resource management, with clear benchmarks for expansion and data utilization.

- **Objective 1.1** – Expand groundwater monitoring efforts by installing up to four new dedicated observation wells per year over the next 10 years covering more vulnerable areas such as WHP areas.
- **Objective 1.2** – Integrate scientific advances and research into regulatory frameworks, updating policies at least every two years to incorporate the latest hydrogeologic findings.
- **Objective 1.3** – Conduct annual water quality sampling, tracking nonpoint source contamination trends over time and using the data to refine mitigation strategies.
- **Objective 1.4** – Strengthen collaborative efforts by partnering with new organizations or research institution to enhance the water quality monitoring network.
- **Objective 1.5** – Maintain and expand the spring/fall water energy level monitoring network by adding at least five additional wells with construction data annually, ensuring comprehensive coverage.
- **Objective 1.6** – Develop a real-time monitoring initiative by adding telemetry to dedicated observation wells, integrating data into a public-facing online dashboard within two years (2027) to improve transparency.
- **Objective 1.7** – Implement more frequent monitoring programs to track water quantity changes in known problem areas related to groundwater pumping, identifying risks early and adjusting management strategies accordingly.

### 5.1.2 Goal 2 – Water Quality

Reduce the potential for pollution to ensure a sustainable supply of high-quality, consumable, and safe groundwater for all users in the NRD. Implement and support best management practices that achieve a district-wide reduction in nitrate concentrations by an average of 0.5 ppm per year, tracked through annual water quality monitoring reports.

- **Objective 2.1** – Utilize advanced studies and modeling tools (MODFLOW) to conduct at least two groundwater flow and contamination movement analyses per year, ensuring data-driven management decisions.
- **Objective 2.2** – Obtain and assess new groundwater and contamination data using sources such as the Clearinghouse, integrating findings into sustainable development strategies to track improvement trends.
- **Objective 2.3** – Develop and implement at least one new cost-share initiative annually that supports pollution reduction efforts, focusing on precision nutrient management and contaminant mitigation programs.
- **Objective 2.4** – Provide cost-share funding for at least 15 well decommissioning projects per year, prioritizing locations with high contamination risks.
- **Objective 2.5** – Actively manage Phase Areas with vulnerable aquifers or excessive nitrate concentrations by conducting annual mitigation strategy reviews, ensuring targeted interventions effectively reduce nitrogen loading in public water supply sources.

### 5.1.3 Goal 3 – Water Quantity

The LPNNRD will continue to encourage highly efficient water conservation management practices, with the objective of recovering and maintaining sustainable water levels to support beneficial uses.

- **Objective 3.1** – Utilize hydrogeologic and modeling data to assess the impacts of new uses and quantify water level responses to drought or reduced precipitation trends, setting baseline measurements and tracking fluctuations annually.
- **Objective 3.2** – Connect 1,000+ property owners annually to conservation programs that enhance water quality and quantity, tracking participation rates and success metrics.
- **Objective 3.3** – Develop a drought response strategy with phased thresholds, defining trigger points for water conservation measures and emergency response actions within the district.
- **Objective 3.4** – Conduct annual groundwater assessments for Special Quantity Sub-areas and Control Areas with thin or limited aquifers, using the data to refine conjunctive management strategies and improve hydrologic sustainability and reverse declining water level trends.

### 5.1.4 Goal 4 – Outreach and Education

Continue to be a resource for outreach and education for youth and adults, emphasizing the importance of protecting groundwater resources through measurable engagement and awareness strategies.

- **Objective 4.1** – Conduct stakeholder review at least every five years (agriculture, industry, local government, environmental groups, and public health) to gather diverse perspectives and needs.
- **Objective 4.2** – Expand public environmental education programs by hosting four or more outreach events annually focused on nitrate impacts and water conservation, measured by attendance and participant feedback surveys.

- **Objective 4.3** – Utilize hydrogeologic data and studies, including the Nitrate Risk Too, to conduct a minimum of 20 one-on-one educational sessions per year, ensuring direct engagement with landowners, producers, or other stakeholders.
- **Objective 4.4** – Participate in at least 10 natural resources workshops, county fairs, camps, or classroom presentations annually, tracking engagement metrics.
- **Objective 4.5** – Demonstrate cutting-edge water and fertilizer management technologies through three or more field demonstrations annually, documenting adoption rates among participants.
- **Objective 4.6** – Provide information and education through a minimum of six published pieces per year across news articles, social media posts, newsletters, brochures, and website updates.
- **Objective 4.7** – Develop and launch a web-based graphic user interface within two years, ensuring public accessibility to hydrogeologic data and maps, with a tracking system for user engagement.
- **Objective 4.8** – Develop and launch a district-wide notification system to be in place by 2026 with at least 500 members to provide timely updates on water quality, conservation programs, and regulatory changes.

### 5.1.5 Goal 5 – Rules and Regulations

Develop and enforce rules, regulations, and plans that balance water usage with natural replenishment rates while reducing contamination through structured monitoring and compliance efforts.

- **Objective 5.1** – Conduct updates at least every five years to the Groundwater Management Plan and Rules and Regulations to reflect emerging contaminants, policy changes, and evolving water use patterns.
- **Objective 5.2** – Align regulations with 100% compliance to new state and federal policies within six months of adoption, ensuring resources are leveraged for district-wide water management improvements.
- **Objective 5.3** – Implement an adaptive management strategy with annual performance evaluations, adjusting policies and responses based on monitoring data trends.
- **Objective 5.4** – Maintain consistent engagement in Lower Platte River Basin integrated and drought management plans, tracking participation and policy influence through quarterly reports.
- **Objective 5.5** – Increase community participation in NDEE’s Wellhead Protection Program by at least 15% annually, expanding outreach efforts and tracking adoption rates.
- **Objective 5.6** – Utilize hydrogeologic-based subareas for Control Area management, conducting annual data reviews to refine Phase Area designations and mitigation strategies.
- **Objective 5.7** – Conduct biennial reviews of the Integrated Management Plan, ensuring sustainable water use strategies align with conservation goals and include annual instream flow assessments.
- **Objective 5.8** – Support and conduct at least three special studies annually, focusing on research initiatives that enhance groundwater sustainability and contamination mitigation.

## 6 STAKEHOLDER INVOLVEMENT

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### 6.1 OUTREACH METHODS

The LPNNRD utilized the website ([www.lpnrd.org](http://www.lpnrd.org)), district-wide publications, press releases to local newspapers, radio, social media, and announcements through Board meetings to spread the word about the GWMP update. The Summer 2024 edition of the Viaduct included an announcement on the update process, need for Stakeholders, and the locations and times of the first two public open houses.

### 6.2 STAKEHOLDER GROUP

The LPNNRD established two Stakeholder Groups, one meeting in the Village of Platte Center and another meeting in the City of Wahoo. The group included agricultural producers, community representatives, NeDNR, UNL Extension, NRCS, LPNNRD, and LRE Water. The role of the stakeholder group was to work closely with LPNNRD to provide feedback, identify information, discuss concerns, communicate and engage with other stakeholders, and provide feedback on the draft Plan. A summary of the meetings included:

- Platte Center meetings on June 4<sup>th</sup>, 2024, and January 16, 2025
- Wahoo meetings on June 6, 2024, and January 9<sup>th</sup>, 2025

### 6.3 OPEN HOUSE MEETINGS

Two sets of Open House meetings were held to provide an opportunity for the public to learn about the purpose and requirements of the GWMP, discuss water quality and quantity concerns, review the proposed subareas, review the highlights of the draft GWMP, and discuss recommendations. Meetings occurred at:

- Wahoo on August 24, 2024, and January 9, 2025
- Platte Center on August 26, 2024, and January 16, 2025

### 6.4 BOARD RETREAT

On February 7, 2025, the LPNNRD held a Board of Directors retreat with a major focus on the GWMP and key recommendations by LRE Water. The retreat aimed to provide a general education on key hydrogeologic terminology and principles, obtain consensus on actions to enhance groundwater management effectiveness, and discuss the goals and objectives.

## 7 RECOMMENDATIONS

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This section outlines considerations for modifications, additions, or adjustments to the current procedures used for the management of groundwater. These recommendations were established after a review of existing data, reports, studies, water level data, hydrographs, and input from the LPNNRD staff, Board of Directors, the Stakeholder Group, and the public.

### 7.1 ADOPTION OF GROUNDWATER MANAGEMENT SUBAREAS

The original subareas were delineated by Olsson in the March 2009 LPNNRD Hydrogeologic Evaluation and Subarea Delineation Study (Olsson, 2008) based on local hydrogeologic conditions and depositional characteristics; however, these were not officially recognized by the LPNNRD. LRE Water and the LPNNRD staff reviewed the existing sub-areas and made slight adjustments using hydrogeologic information from the Assessment (LRE, 2023). This process included the following key steps:

- 1) LPNNRD staff squared off the subareas to the nearest section boundary.
- 2) Subareas were adjusted by LRE Water by reviewing the saturated sand thickness, hydrogeologic cross sections, AEM, and the DEM. Overall, changes were minimal by merging small areas and adding or subtracting a few sections based upon the new saturated sand thickness.
- 3) LRE Water provided the LPNNRD with GIS data and an updated subarea map to allow for review and edits by District staff and the Board of Directors.

There are several advantages to adopting and utilizing subareas named by local communities or other known features. Some of the benefits include:

- 1) **Localized Management:** Subareas allow for more precise and localized management of groundwater resources. This means that specific issues within a smaller area can be addressed more effectively, rather than applying a one-size-fits-all approach across a larger region.
- 2) **Tailored Solutions:** Different subareas may have unique geological and hydrological characteristics. By focusing on subareas, the LPNNRD can focus studies and develop tailored solutions that are more effective for the specific conditions of each subarea.
- 3) **Efficient Resource Allocation:** Managing groundwater at the subarea level helps in the efficient allocation of resources. It ensures that efforts and funds are directed towards areas with the most pressing needs or the highest potential for improvement.
- 4) **Enhanced Monitoring and Data Collection:** Subareas facilitate more detailed monitoring and data collection. This detailed data can lead to better decision-making and more effective management practices.
- 5) **Community Involvement:** Working with subareas often involves local stakeholders and communities, leading to greater public involvement and support for groundwater management initiatives.

While groundwater quality and quantity studies may occur across an entire subarea, it is important to note that Groundwater Quality and Quantity Management Areas, or phase areas, can be smaller or larger than a subarea and could include may also cross multiple subareas or portions of subareas. A breakdown of the proposed subareas is shown in Figure 34. It is also recommended that the areas be referred to by name, rather than only a number.

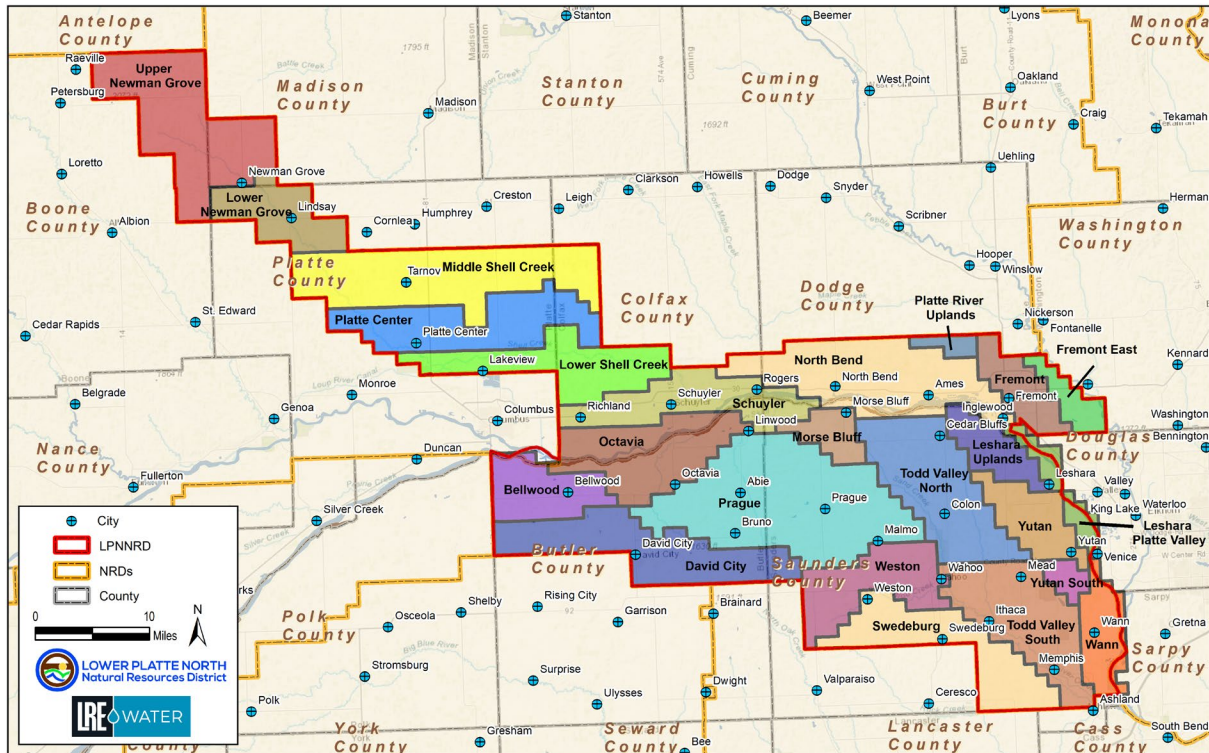


Figure 34: Proposed Groundwater Management Subareas

## 7.2 EXPANSION OF THE OBSERVATION NETWORK

Water levels alone cannot accurately determine the percentage of decline in saturated thickness for an unconfined aquifer or hydraulic head in a confined aquifer unless the screen interval and depth to water are compared to the geologic layers. Variations in water levels in wells may result from data collected from wells of differing depths and screened at various intervals, penetrating both confined and unconfined aquifers. To ensure that the data collected is representative of the area of study or concern, the following recommendations are proposed:

- Utilize the new standard scale hydrograph format to analyze all future observation wells, ensuring consistency and accuracy in data interpretation.
- Categorize and select new observation wells that are consistent and representative of the subarea, considering factors such as well depth, screened interval, and whether the aquifer is confined or unconfined.
- Ensure adequate spacing of observation wells from pumping wells to avoid interference and obtain more accurate readings.
- Partner with public water supplies to strategically place observation wells within wellhead protection areas and/or upgradient from PWS wells, enhancing the monitoring of water levels and water quality.

To assist with understanding the spatial representation of the current observation well network, an evaluation was completed by subarea. Table 9 displays the current spatial representation of spring/fall monitoring wells and the dedicated observation wells by subarea, which is displayed in Figure 35.

Table 10: Observation Wells and Proposed Sites by Subarea

Subarea Name	Spring Fall Well Count	Dedicated Observation Well Count	Potential Area for New Observation Well Count
Bellwood	6	0	1
David City	22	8	0
Fremont	7	0	0
Fremont East	3	0	0
Leshara Platte Valley	0	0	0
Leshara Uplands	5	0	0
Lower Newman Grove	5	1	0
Lower Shell Creek	6	1	3
Middle Shell Creek	19	16	5
Morse Bluff	4	0	0
North Bend	12	2	1
Octavia	5	1	2
Platte Center	11	9	0
Platte River Uplands	4	2	0
Prague	5	2	6
Schuyler	7	0	0
Swedeburg	10	4	2
Todd Valley North	8	0	0
Todd Valley South	12	9	0
Upper Newman Grove	10	2	6
Wann	10	4	0
Weston	11	0	2
Yutan	7	0	0
Yutan South	4	3	0

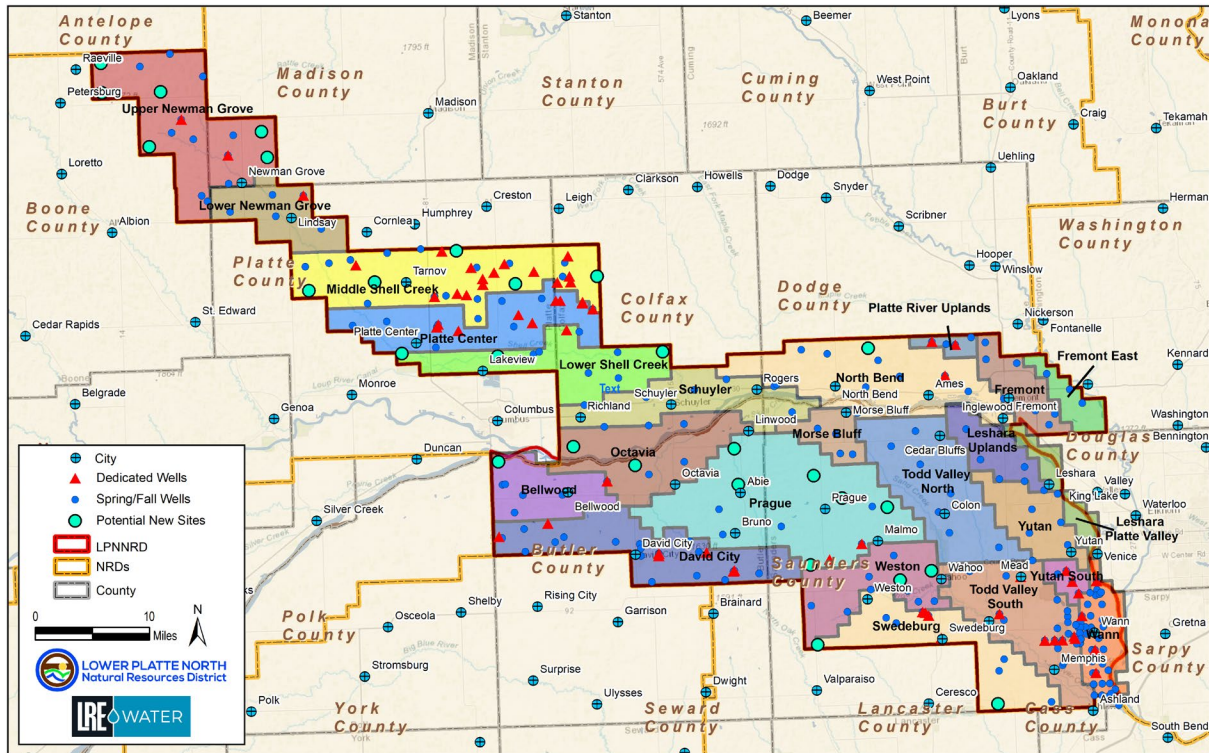


Figure 35: Existing Observation Wells and Potential Expansion Sites

### 7.3 ALTERATION TO THE WELL VARIANCE SCORING PROTOCOL

Many well permit application reviews raise questions about adequate aquifer thickness, target yield capabilities, pumping influence on surface water, well interference, and aquifer protection. To address these questions and uncertainties, alternations to the well variance scoring sheet would improve the accuracy of the decision-making process. The following recommendations are proposed:

#### Point Sheet

1. Include points for the location of the well within the Groundwater Resource Development Risk map.
2. Review ranges for the New Groundwater Consumptive Use category.
3. Create separate sheets for unconfined and confined aquifers, considering specific yield and saturated thickness for an unconfined aquifer, but not confined.
4. Use aquifer thickness, storativity, and available head for a confined aquifer.
5. Include irrigation well density, domestic well density, and other well densities (livestock, municipal) to address potential well interference.
6. Review how transmissivity is calculated (e.g., from aquifer thickness multiplied by estimated hydraulic conductivity, or from hydrogeologic assessment maps).
7. Approximate the extent of the aquifer (e.g., any negative aquifer boundaries).
8. Include a theoretical radius of influence based on the above information.
9. Include a score for water level trends in the area of the proposed well.

10. Include point ranges based on existing nitrate concentrations.
11. Review other NRD scoring systems for additional criteria and methods.

#### Other Review Criteria and Procedures

1. Establish a radius for Class 1 and Class 2 and obtain all well logs within the study area.
2. Review well logs within a radius determined by the scoring sheet or class.
3. Conduct a limited desktop assessment, if necessary, to determine the level of uncertainty qualitatively, based on the class of well and data gaps.
4. Provide the applicant with a summary of the District's review and any additional data required, with technical justification.
5. Complete test hole(s) prior to issuing the permit if a data gap analysis indicates this is necessary.
6. Require an aquifer pumping test or capacity test for Class 2 and Class 3 variances based on points scored and data gaps, if necessary.

## **7.4 QUANTITY TRIGGER ADJUSTMENTS**

Since 1987, quantity management triggers have been in place but have yet to initiate a Groundwater Management Area 'control area' designation. To improve effectiveness, adjustments to the policy may include eliminating triggers for confined aquifers, incorporating qualitative criteria, and refining delineation strategies for quantity control areas. The proposed modifications include:

- Identify and prioritize areas with consistent well interference, incorporating data from annual pumping impact reports to track severity.
- Differentiate management strategies for confined and unconfined aquifers, ensuring policy adjustments align with their distinct hydrologic responses.
- Enhance monitoring practices by utilizing observation wells and hydrograph trends to detect seasonal declines rather than relying solely on spring/fall measurements, allowing for continuous multi-season assessments.
- Incorporate historical drought impact data to evaluate magnitude trends, setting baseline depletion benchmarks for proactive response measures.
- Strengthen unconfined aquifer management through policies aligned with Integrated Management Plan goals, including stream depletion factors and annual recharge trend analyses.
- Refine decline impact assessments, distinguishing significant drops (e.g., a 10% decline in aquifers exceeding 100 feet vs. those under 50 feet) to prioritize intervention efforts accordingly.
- Establish quantified thresholds for confined aquifers, such as triggering management action at 50% of remaining head above the aquifer top, ensuring proactive conservation.
- Implement subarea-based resource allocation, directing management efforts and funding to high-risk zones where depletion issues are most pronounced.
- Utilize numerical groundwater flow models to identify areas of concern, assessing long-term trends and aquifer response to pumping impacts from a variety of scenarios to refine management strategies and improve predictive capabilities.

## 7.5 CLARIFICATION OF TERMINOLOGY

When updating the Rules and Regulations, provide clarity and consistency to key terminology utilized in the GWMP.

- Revise the GWMP and Rules and Regulations to ensure clear and consistent terminology and definitions throughout. This may include, but is not limited to, the clarifying the following terms: “Trigger Level,” “Level Controls,” “Level Criteria,” “Control Areas,” “Quantity Areas,” “Subareas,” “Groundwater Management Areas,” “Limited Development Area,” “Restricted Development Areas,” and “Special Quantity Sub Areas.”
- Recognize the following hierarchy for groundwater management within the Rules and Regulations, GWMP, and other district publications:
  - Groundwater Regions: Platte, Shell Creek, Uplands, and Todd Valley
    - Within the regions, establish Groundwater Subareas
  - Groundwater Management Areas:
    - Quality: Phase I, II, III, IV
    - Quantity: Phase I, II, III
  - Groundwater Control Areas
    - Limited and restricted development areas
- Where relevant, ensure the GWMP and Rules and Regulations refer to “aquifer thickness,” “available head” or “hydraulic head,” and “potentiometric surface” for confined aquifers, and “water table surface” and “saturated thickness” for unconfined aquifers.

## 7.6 RE-EVALUATION OF SPECIAL QUANTITY SUBAREAS

In 2016, the Special Quantity Subareas were established to address significant pressure drops in the aquifer during peak irrigation periods, which can cause shallower wells to run short on water. Overtime, it is valuable to reevaluate these Groundwater Management Areas to monitor improvement or worsening conditions.

- Complete a hydrogeologic study to reassess the sufficiency of the current boundaries of the Butler/Saunders SQS #1 and Platte/Colfax SQS #2. Utilize existing studies and research, including AEM surveys and hydrogeologic assessment data.
- Engage with local farmers and stakeholders to gather input and address concerns regarding the accuracy of the current boundaries.
- Incorporate recent data and technological advancements to ensure the boundaries reflect the most accurate and up-to-date information.
- Provide a detailed report with recommendations for any necessary modifications to improve groundwater management and address stakeholder concerns.

## 7.7 EFFORTS TO ENHANCE DATA TRANSPARENCY AND COMMUNICATION

Nebraska’s NRDs have been making significant efforts to improve transparency and accessibility of data through real-time data collection and online visualization tools. The following recommendations are provided for consideration to enhance communication with constituents:

- Create an online, data visualization tool to allow users to obtain data on recent nitrate concentrations, water level trends, and similar water use information.
- Provide maps and information from the Hydrogeologic Assessment, the GWMP, features of the Rules and Regulations such as locations of Groundwater Management Areas, subareas, and groundwater regions; Wellhead Protection Areas, and similar features.
- Establish a system to communicate with the public by allowing sign-up using a feature on the website to receive push notifications through text messaging and/or email about upcoming events, meetings, and planned changes to policies.

## 7.8 REASSESSMENT OF WATER QUALITY TRIGGERS

The UNMC has conducted extensive research recently on the public health effects of nitrates in groundwater, highlighting several critical concerns (Water for Food, 2024):

- **Health Risks:** High concentrations of nitrates in drinking water have been linked to various adverse health outcomes, including methemoglobinemia (especially in infants), colorectal cancer, thyroid disease, and neural tube defects. Other potential health issues include increased heart rate, nausea, headaches, and abdominal cramps.
- **Cancer and Birth Defects:** Studies have shown a significant association between high nitrate levels and certain cancers, such as pediatric brain cancer, kidney cancer, bladder cancer, and non-Hodgkin lymphoma. Additionally, there is evidence linking nitrate exposure to an increase in birth defects.
- **Economic Impact:** The economic costs associated with health effects from nitrate-contaminated drinking water are substantial. These costs include medical expenses and lost productivity due to illness. Treating drinking water for nitrate has a significant economic impact, especially for small communities, and drilling new wells can be expensive.

Given these findings, the LPNNRD should consider a reassessment of the water quality triggers. By doing so, the LPNNRD can proactively reduce nitrate levels in groundwater, thereby protecting public health and mitigating economic burdens associated with nitrate contamination.

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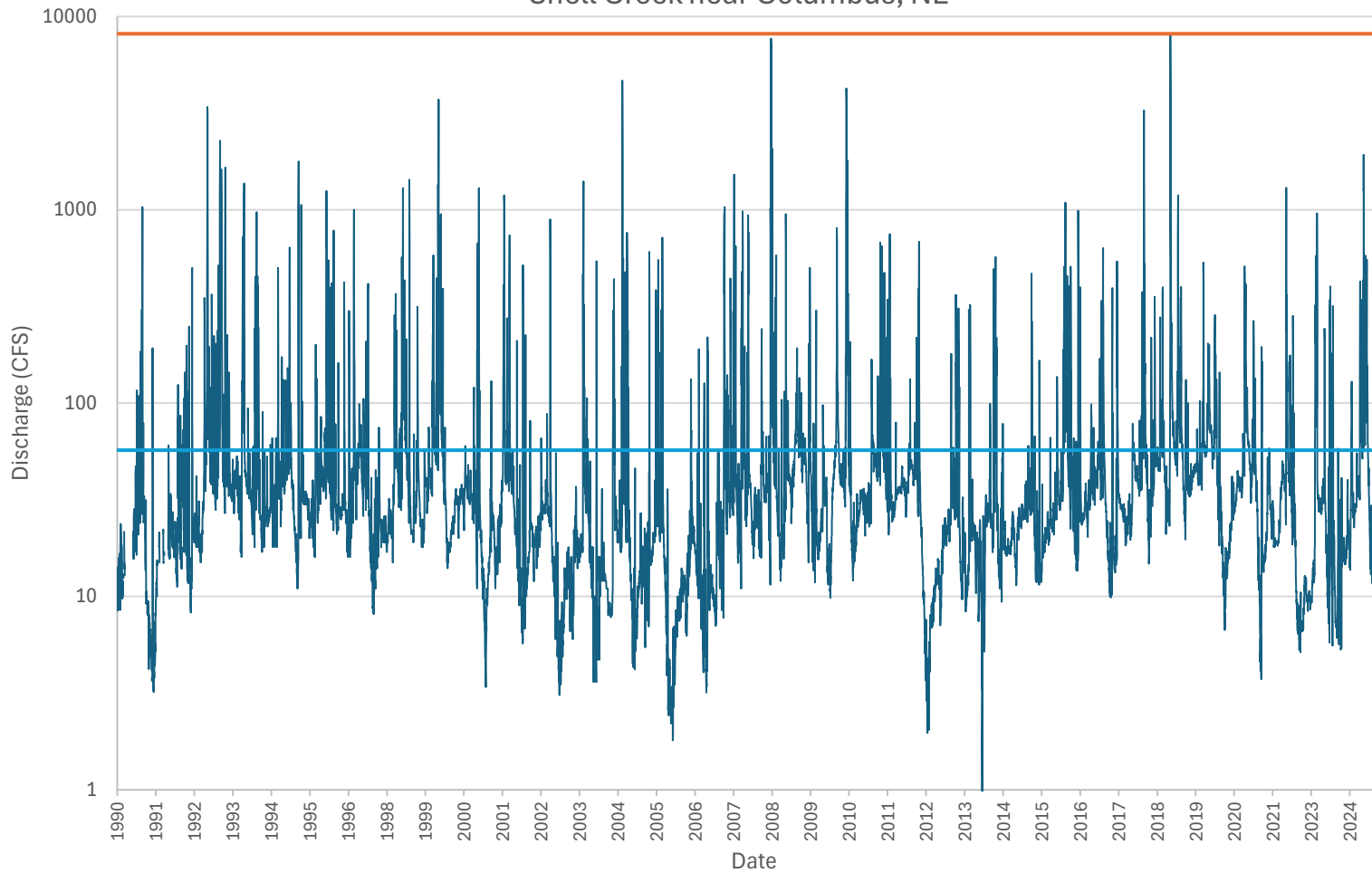
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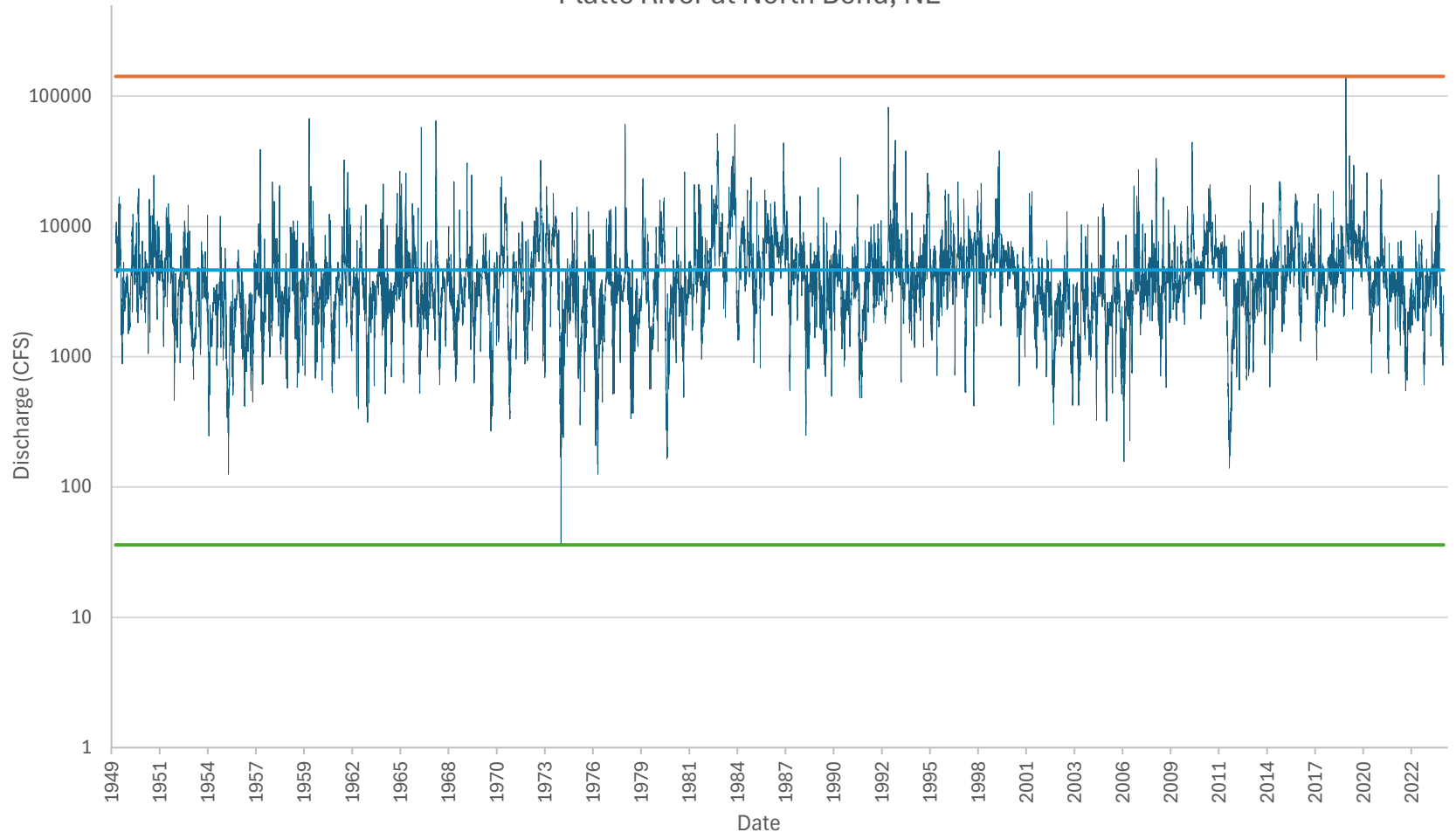
## **ATTACHMENT A – STREAM FLOW HYDROGRAPHS**

USGS Station No. 06795500  
Shell Creek near Columbus, NE



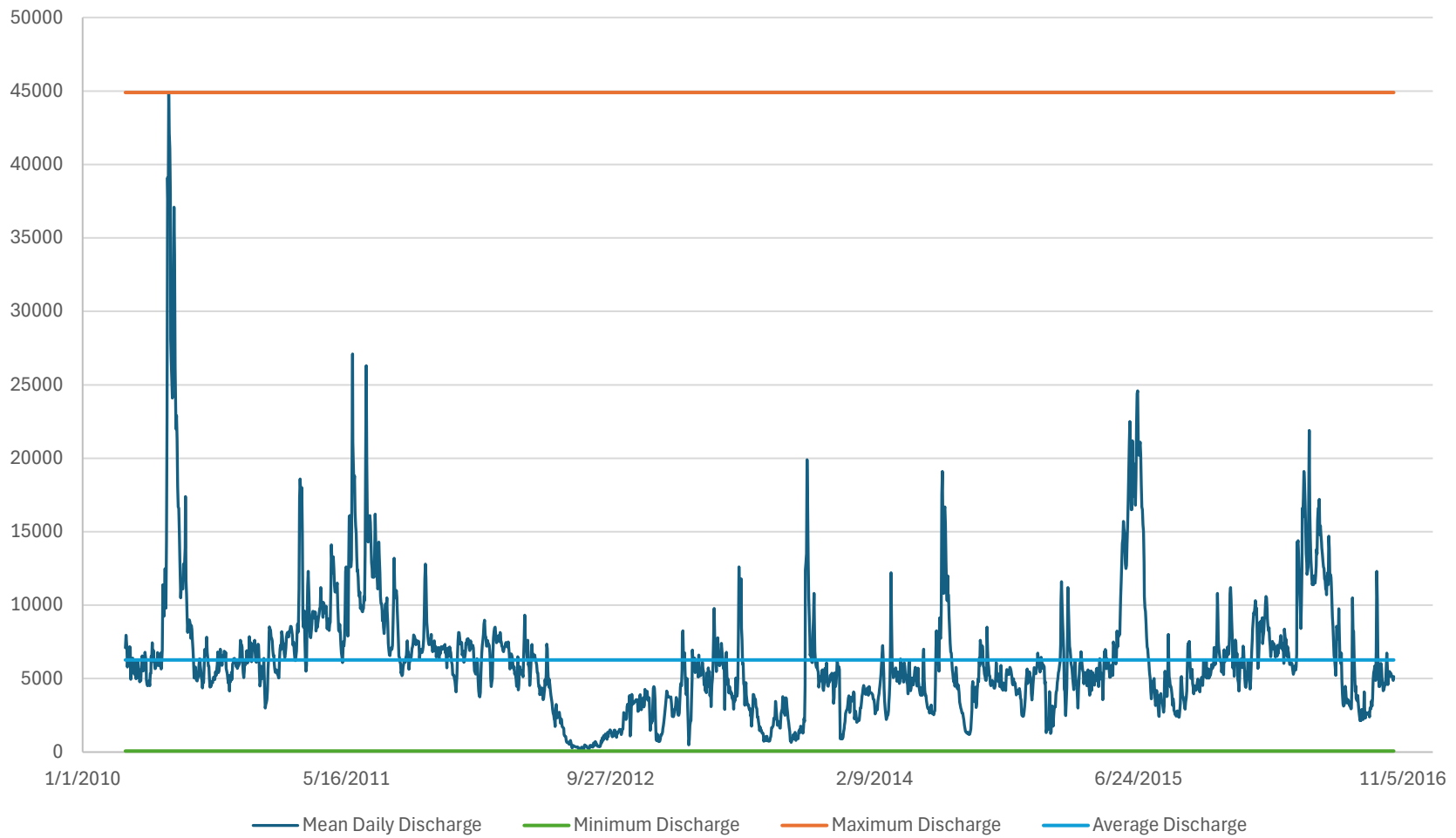
— Mean Daily Discharge    — Minimum Discharge    — Maximum Discharge    — Average Discharge

USGS Station No. 06796000  
Platte River at North Bend, NE

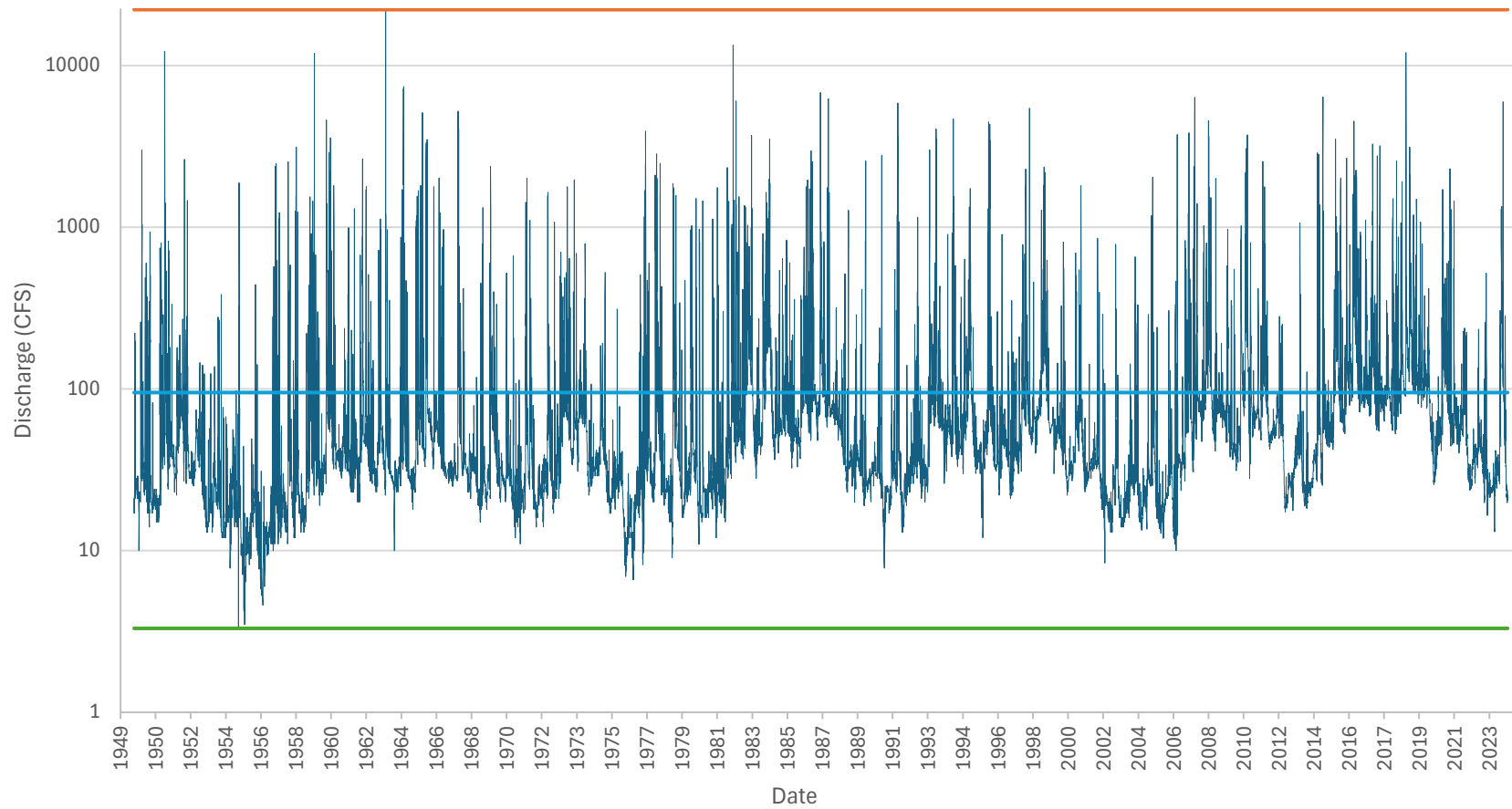


— Mean Daily Discharge    — Minimum Discharge    — Maximum Discharge    — Average Discharge

USGS Station No. 06796550  
Platte River near Leshara, NE

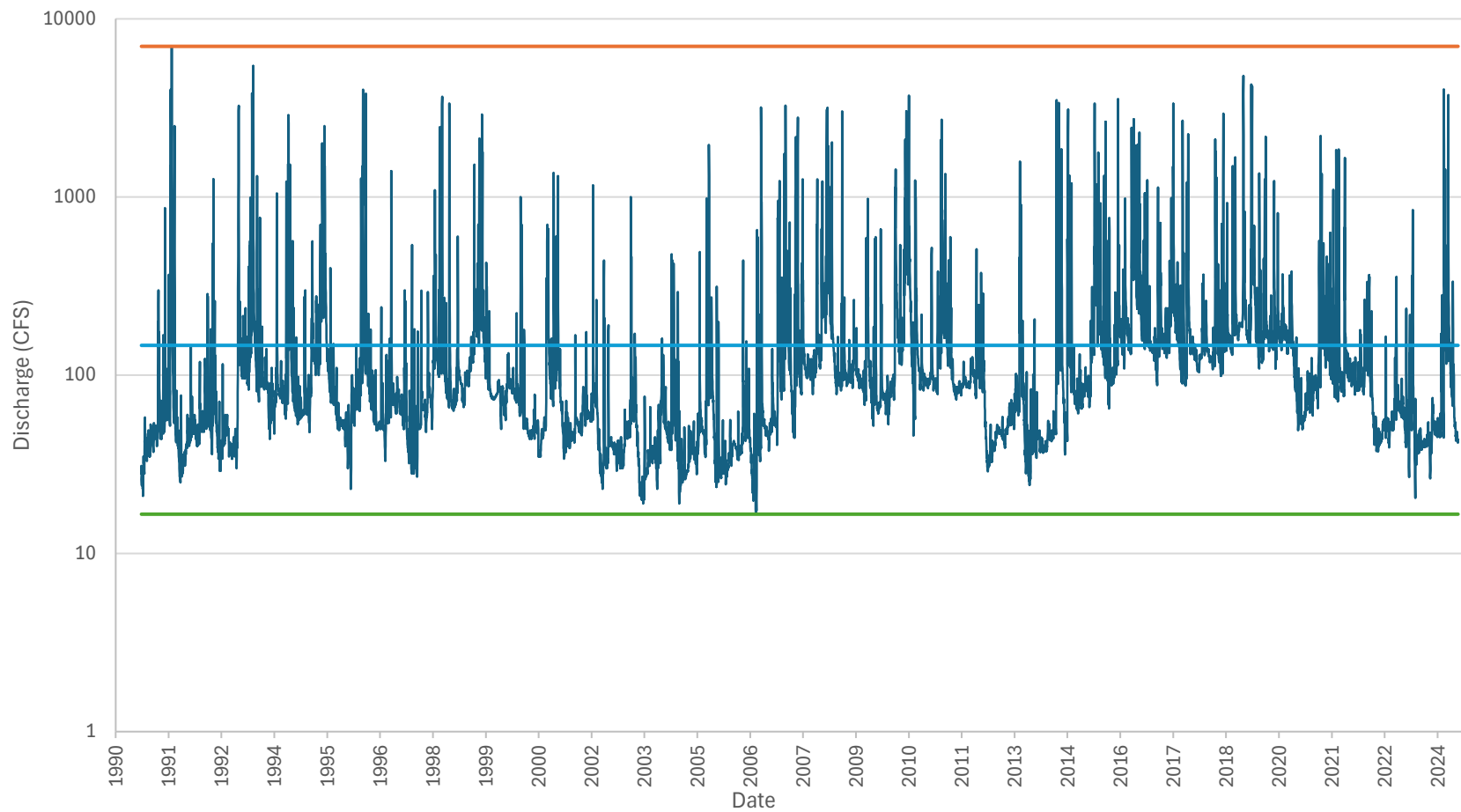


USGS Station No. 06804000  
Wahoo Creek at Ithica, NE



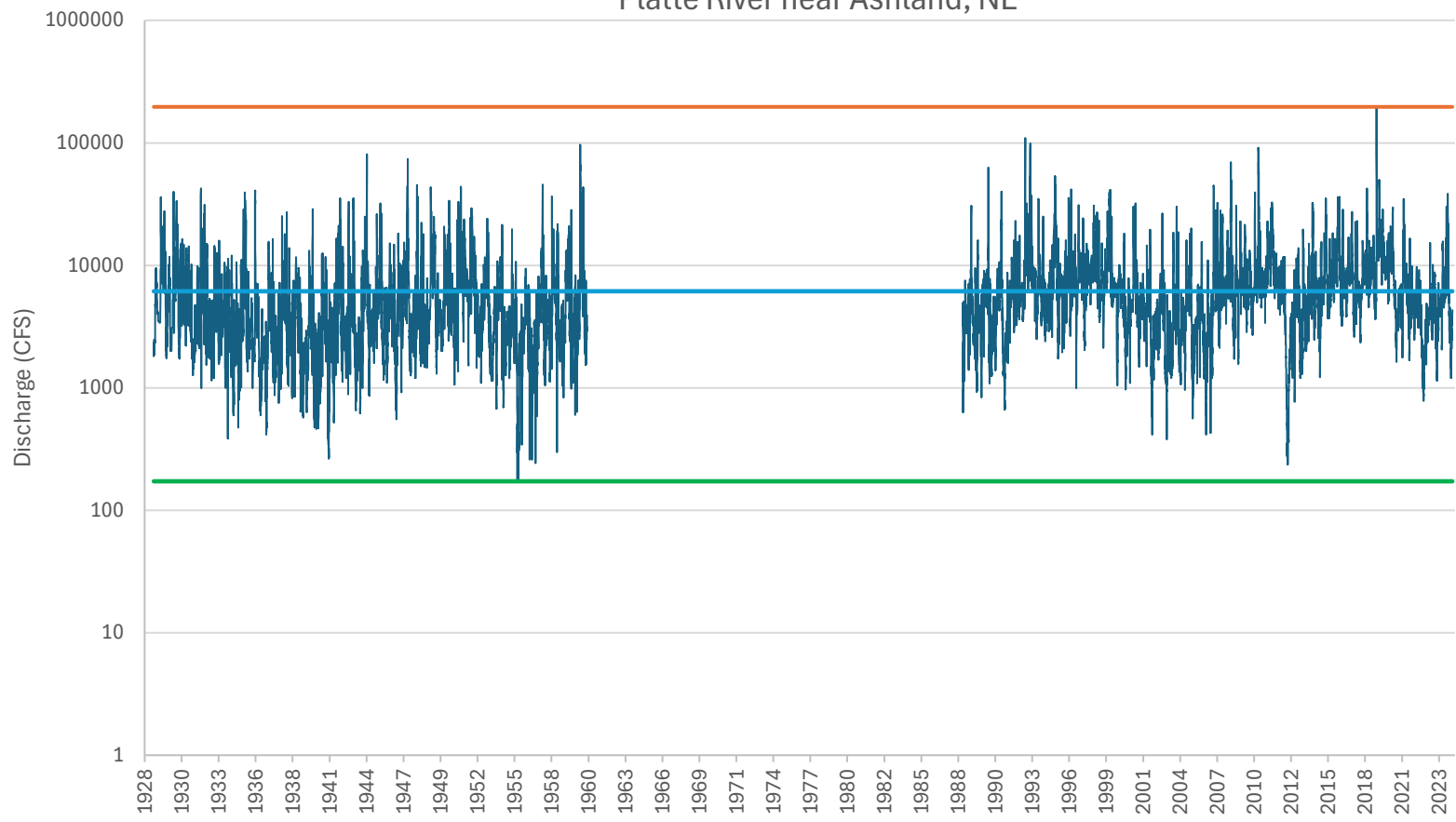
— Mean Daily Average    — Minimum Discharge    — Maximum Discharge    — Average Discharge

USGS Station No. 06804700  
Wahoo Creek at Ashland, NE



— Mean Daily Discharge    — Minimum Discharge    — Maximum Discharge    — Average Discharge

USGS Station No. 06801000  
Platte River near Ashland, NE



— Mean Daily Discharge    — Minimum Discharge    — Maximum Discharge    — Average Discharge

# CHEMIGATION - July 2025

## TOTAL CHEMIGATION APPLICATIONS IN 2024 (714)

### NEW CHEMIGATION APPLICATIONS - 41

(9) Boone (6) Butler (6) Colfax (5) Dodge (2) Madison (9) Platte (4) Saunders

### RENEWALS: 660

BOONE COUNTY - 49  
BUTLER COUNTY - 78  
COLFAX COUNTY - 79  
DODGE COUNTY - 111  
MADISON COUNTY - 7  
PLATTE COUNTY - 108  
SAUNDERS COUNTY - 228

### RENEWAL INSPECTIONS: 143

(6) Boone (21) Butler (16) Colfax (19) Dodge (0) Madison (31) Platte (50) Saunders

### NEW INSPECTIONS: 41

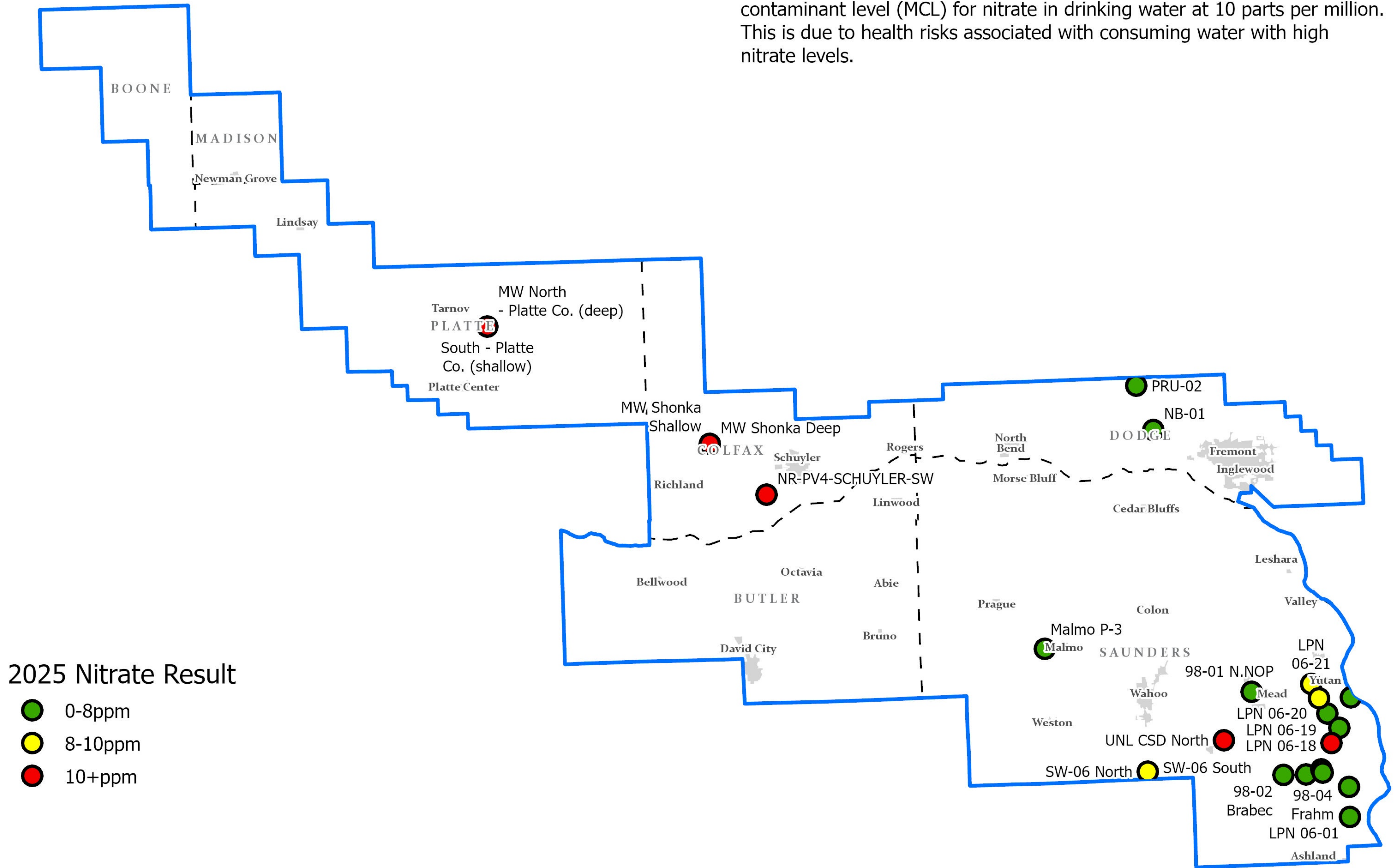
(12) Boone (5) Butler (5) Colfax (4) Dodge (2) Madison (9) Platte (4) Saunders

### NEW CANCELLATIONS: 4

(0) Boone (3) Butler (0) Colfax (1) Dodge (0) Madison (0) Platte (0) Saunders

### EMERGENCY: 0

The Environmental Protection Agency (EPA) has set the maximum contaminant level (MCL) for nitrate in drinking water at 10 parts per million. This is due to health risks associated with consuming water with high nitrate levels.



# 2025 LPNNRD Monitoring Well Nitrate Sampling












02

### Peel & Cook Process


#### Peeling

Potatoes are blasted with high pressure steam to loosen the peel from the potato. The peel is then removed with brushes.




#### Sorting and Slabbing

Foreign material and bad potatoes are removed from the process. The sorter uses IR and high-speed cameras to sort the potatoes.



#### Cooking

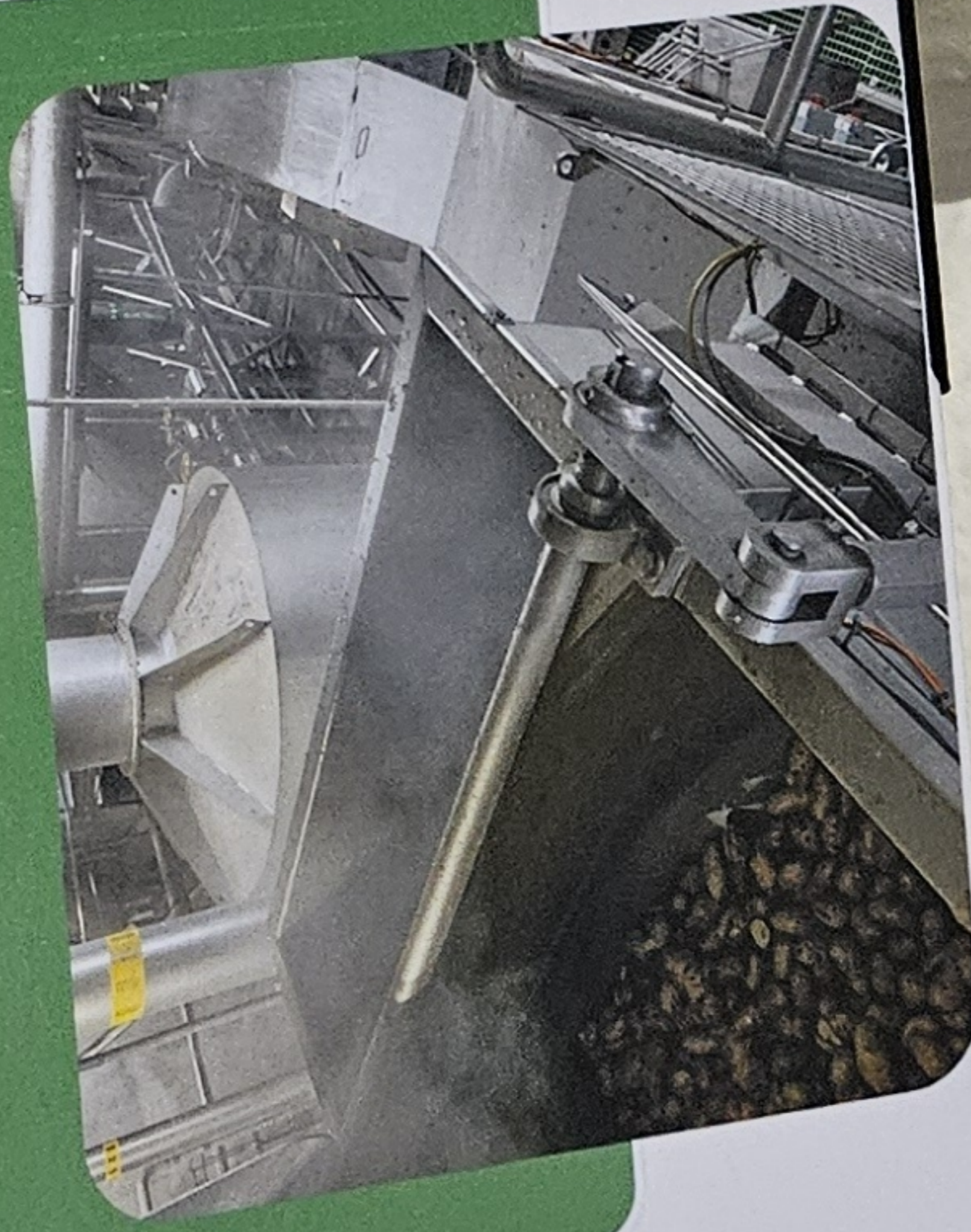
The potatoes are steam cooked and pulsed through a rotating plate turning them into mashed potatoes.



# Peel & Cook Process

## Peeling

Potatoes are blasted with high pressure steam for several seconds. The steam loosens the peel from the potato and is scrubbed off with brushes.



## Sorting and Slabbing

Foreign material and bad potatoes are removed from the process with our state-of-the-art sorter. The sorter uses IR and high-speed cameras to sort the potatoes.



## Cooking

The potatoes are conditioned with steam, cooked, and pushed through a ricing plate turning them into mashed potatoes.



# Dehydration

Mashed potatoes are fed onto the drums. The drum and rollers rotate into each other and apply a layer of potato cells to the drum. As the drum rotates, heat is transferred from the drum to the mash, evaporating the water, and creating a thin sheet of dried potato.





Dehydration



STOPS  
SOUTH



*Budweiser*

IDAHO VALLEY



UNITED STATES DEPARTMENT OF THE INTERIOR  
DOWN PAYMENT (BILL) REQUEST

Make Remittance Payable To: U.S. Geological Survey  
Billing Contact: Amanda Flynn, Budget Analyst Phone: 402-328-4144,  
aflynn@usgs.gov

Bill #: 90117104  
Customer: 6000000136  
Date: 07/17/2025  
Due Date: 09/15/2025

Remit Payment To: United States Geological Survey  
P.O. Box 6200-27  
Portland, OR 97228-6200

Payer: LOWER PLATTE NORTH NRD  
P.O. BOX 126  
WAHOO NE 68066

Additional forms of payment may be accepted. Please email GS-A-HQ\_RMS@USGS.GOV or call 703-648-7683 for additional information.

To pay through Pay.gov go to <https://www.pay.gov>.

Checks must be made payable to U.S. Geological Survey. Please detach the top portion or include bill number on all remittances.

Amount of Payment: \$ \_\_\_\_\_

Date	Description	Qty	Unit Price		Amount
			Cost	Per	
07/17/2025	The streamgages at Shell Creek near Columbus and Wahoo Creek at Ashland, as agreed to in Joint Funding Agreement 25NRJFA00170 between the US Geological Survey and the Lower Platte North NRD  JFA 25NRJFA00170 25NRJFA00170	1	4,213.00	1	4,213.00

Amount Due this Bill: 4,213.00

Accounting Classification:  
Sales Order: 143669  
Sales Office: GENR  
Customer: 6000000136  
Accounting #: 11608154

TIN: \*\*\*\*\*2716



# #1 EAST MACHINE

# 3-0029

12.50 V

0 RPM

0.0 IPS

STOPPED



LIQUID

WATER



▶ RUN

UNITS

IN

## LIQUID SETTINGS

TARGET

0.48

ACTUAL

1.1







0 4 9 2 4 4

McCROMETER  
HEMET, CALIFORNIA



