

Water Committee Meeting
 Tuesday, March 1, 2022 6:00 PM
 Lower Platte North NRD Office
 P.O. Box 126
 Wahoo, NE 68066

1. UNFINISHED BUSINESS

2. Eastern Nebraska Water Resources Assessment (ENWRA)

Katie Cameron, coordinator for ENWRA, made a presentation to the Water Committee. She explained the GeoCloud and GeoScene Viewer utilizing the AEM data. Some of the projects that are planned in the next 5 years are updated water level maps (currently 1995), CSD WalkTem along with test holes planning, recharge stations and maps, and specific focus areas. The complete presentation is attached.

The group would like to continue with a 5-year contract with LPN contribution of \$30,000 per year.

Advantages of continuing with ENWRA

- More leverage for grants
- Individual to help in interpreting geologic conditions
- Develop other projects to help NRD management decisions
- Coordination of NRDs in the Eastern part of the state to collaborate on ideas and projects.

3. REGULATORY

3.A. GROUND WATER MANAGEMENT AREA

3.A.1. Well Permit Program

3.A.1.a. Well Permits Approved

3.A.1.b. Wells Permits Approved: #

3.A.1.c. Lan downer	3.A.1.d. N umber of Wells	3.A.1.e. Nu mber of New Irrigated Acres
3.A.1.i. Zak Farms	3.A.1.j. 1	3.A.1.k. 0
3.A.1.o.	3.A.1.p.	3.A.1.q.
3.A.1.u.	3.A.1.v.	3.A.1.w.
3.A.1.aa.	3.A.1.bb.	3.A.1.cc.

3.A.1.gg.	3.A.1.hh.	3.A.1.ii.	
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3.A.1.mm.

3.A.1.nn.

3.A.1.oo.

3.A.1.pp.

3.A.1.qq.

3.A.1.rr.

3.A.1.ss. The total number of approved permits for 2021 is #

Location of Approved Well Permits for 2021: Correct as of #####

3.A.1.tt. County	Co	3.A.1.uu. Irrigation - New	3.A.1.vv. Irrigation - Replacement	
3.A.1.bbb. Butler	Bu	3.A.1.ccc.	3.A.1.ddd.	
3.A.1.jjj. Jfax	Co	3.A.1.kkk.	3.A.1.lll.	
3.A.1.rrr. Rdge	Do	3.A.1.sss.	3.A.1.ttt.	
3.A.1.zzz. Zone	Bo	3.A.1.aaaa.	3.A.1.bbbb.	
3.A.1.hhhh. Madison	M	3.A.1.iii.	3.A.1.jjjj.	
3.A.1.pppp. Patte	Pl	3.A.1.qqqq.	3.A.1.rrrr.	
3.A.1.xxxx. Sunders	Sa	3.A.1.yyyy.	3.A.1.zzzz.	
3.A.1.ffff. Ftal	To	3.A.1.ggggg.	3.A.1.hhhhh.	

3.A.2. Transfer Policy

Attached is an updated draft version of the transfer policy. If the Committee feels the basic concepts are OK, staff could have Jovan review it.

The committee gave staff suggestions on keeping the wording consistent, like irrigated ground should be irrigated parcel.

3.A.3. Special Quantity Subareas

Staff has received another request for a supplemental well in SQS #2. The legals are the SE and SW quarters of Section 19-19N-1E, which one well, at the present time, irrigates 256.39 acres.

The Committee will review when a request is received.

3.A.4. Cost Share Programs

3.A.4.a. Soil Moisture Sensors

The Water Committee in 2018 gave staff permission to offer cost-share on Advance Soil Moisture Technology. This year, staff received requests from some producers for this equipment. In 2018, the discussion was between 500 -750 dollars up to 50%, with the attached form showing \$750. This would be part of the soil moisture sensor program developed with the Nebraska Ag Network Moisture Sensors. The District has budgeted cost-share for numerous years on soil moisture sensors. The past few years, not many producers have taken advantage of this program.

The Committee will review applications at the next Water Committee Meeting for potential approval.

3.A.4.b. Flow Meters

Attached is the approved flow meter list.

This item will be discussed at the Water Committee retreat and also as an agenda item for the next Water Committee to update the approved meter list.

3.A.5. LPNNRD Operator Certification

3.A.6. Lower Platte River Basin Water Management Plan Coalition (LPRBC)

Attached is the V-IMP report for 2022.

3.B. GROUND WATER QUALITY SAMPLING

Attached is 2021 State Wide Network Wells sampling results.

4. GROUND WATER PROGRAMS

4.A. DECOMMISSIONED WELL PROGRAM

4.A.1. Well Estimates

4.A.2. The current list of applications that have been approved for cost-share within the last 5 months. Waiting for completion and copy of paid invoices before reimbursement can occur.

4.A.3. Well Owner	4.A.4. Type of Well	4.A.5. Cost Share Estimate	4.A.6. c
4.A.7. Jason Lutjens	4.A.8. Irrigation	4.A.9. \$1,000.00	4.A.10.

4.A.11. Gillwell Foundation	4.A.12. Domestic	4.A.13. \$744.75	4.A.14. S
4.A.15. Mark Treptow	4.A.16. Irrigation	4.A.17. \$892.50	4.A.18. S
4.A.19. Walter Bohaty	4.A.20. Irrigation	4.A.21. \$1,000.00	4.A.22.
4.A.23. Nicholas Lee Schmit	4.A.24. Irrigation	4.A.25. \$1,000.00	4.A.26.
4.A.27. Dwaine J. Schmit Trust	4.A.28. Irrigation	4.A.29. \$1,000.00	4.A.30.
4.A.31. Nicholas Lee Schmit	4.A.32. Irrigation	4.A.33. \$1,000.00	4.A.34.
4.A.35. Martin Ernst	4.A.36. Domestic	4.A.37. \$449.90	4.A.38. c

4.A.39. Plugged Wells

4.A.40. 2 wells have been plugged, reviewed, and ready for cost share payment approval this month.

4.A.41. Well Owner	4.A.42. Type of Well	4.A.43. Cost Share Estimate	4.A.44. County
4.A.45. Charles Emanuel & Sons Inc	4.A.46. Irrigation	4.A.47. \$613.87	4.A.48. Dodge
4.A.49. Charles Emanuel & Sons Inc	4.A.50. Irrigation	4.A.51. \$569.96	4.A.52. Dodge
4.A.53.	4.A.54.	4.A.55.	4.A.56.

4.B. LOWER PLATTE NORTH NRD GROUND WATER STUDIES

4.B.1. Phase Area Update

Information from the Phase Areas nitrogen reports.

4.B.2. Water Committee Retreat

The committee will be having a retreat on Tuesday, March 29, starting at 3:30 pm, followed by a Committee meeting at 6.

Agenda Topics

- SQS #2 - Boundaries and future management
 - Jesse Korus - UNL will be at the retreat to explain the study that has been conducted in the area.
- Nitrogen Management Areas
 - Cost-share items and dollar amounts
- Flow Meter Discussion
- Variance Scoring Sheet
- Other suggestions

4.C. NEW MONITORING WELLS

At the October 11, 2021 Board Meeting, a motion was passed to accept the quote from Dvorak Well Inc. Part of the agreement was a deadline of January 15, 2022 for construction of the monitoring well. As the deadline was not met, the agreement should be voided and allow staff to send out new RFPs to potential firms.

Attached is the original bid from Dvorak Well inc. showing the January 15, 2022 deadline.

5. SURFACE WATER PROGRAMS

6. OTHER

The Committee discussed LB806 - Change provisions relating to drainage of land by the landowner. This item is now on General File, which came out of the Natural Resources Committee with 6 AYE and 1 present not voting.

6.A. COMMENTS FROM THE PUBLIC

INTERLOCAL COOPERATIVE AGREEMENT

BETWEEN THE

**LEWIS & CLARK NATURAL RESOURCES DISTRICT
LOWER ELKHORN NATURAL RESOURCES DISTRICT
LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT
LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
NEMAHA NATURAL RESOURCES DISTRICT and
PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT**

AMENDMENT #7

THIS AMENDMENT #7 is made and entered into by and between the above natural resources district this ____ day of _____, 2022. The natural resources districts are hereinafter referred to collectively as the Districts. This Amendment supplements the original agreement effective as of January 18, 2007, and Amendments #1, #2, #3, #4, #5 and #6 effective as of April 28, 2020.

Modification #1: Article III, Section 3.02, as modified in Amendment #1, Modification #1, Amendment #4, Modification #1, Amendment #5, Modification #1, and Amendment #6, Modification #1:

The "Exhibit A" Cooperative Agreement references related to the coordinator position shall refer to the Amended Cooperative Agreement for the July 1, 2022 - June 30, 2027 term, attached hereto.

Modification #2: Article V, Section 5.02-5.03, original agreement, as modified in Amendment #1, Modification #3, Amendment #3, Modification #2 and Amendment #5, Modification #2:

These sections shall be changed to read:

The Districts shall contribute funding for the project for the entire term of the agreement which now terminates on June 30, 2027, unless further extended by mutual agreement of all Districts. The Districts agree that funding for the fiscal year (FY) 2023 through FY 2027 will be as follows:

	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
LCNRD	\$9,150	\$9,150	\$9,150	\$9,150	\$9,150
NNRD	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
PMRNRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
LENRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
LPSNRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
LPNNRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
Total	\$149,150	\$149,150	\$149,150	\$149,150	\$149,150

LEWIS AND CLARK NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER ELKHORN NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: FEB 10, 2022

NEMAHA NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

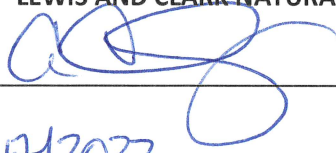
PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LEWIS AND CLARK NATURAL RESOURCES DISTRICT

BY:



DATE:

02/17/2022

LOWER ELKHORN NATURAL RESOURCES DISTRICT

BY:

DATE:

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY:

DATE:

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY:

DATE:

NEMAHA NATURAL RESOURCES DISTRICT

BY:

DATE:

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY:

DATE:

COOPERATIVE AGREEMENT

THIS COOPERATIVE AGREEMENT (the "Agreement") is made and entered into between the LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT ("DISTRICT"), acting as Administrator under an Interlocal Agreement identified in Exhibit "A", and the BOARD OF REGENTS OF THE UNIVERISTY OF NEBRASKA ON BEHALF OF THE UNIVERSITY OF NEBRASKA-LINCOLN CONSERVATION AND SURVEY DIVISION, SCHOOL OF NATURAL RESOURCES ("CSD"), collectively referred to herein as the "Parties."

WITNESSETH:

RECITALS

- A. The Parties have a mutual interest in the study and stewardship of the geologic and groundwater resources in eastern Nebraska.
- B. The Parties desire to maintain a cooperative working arrangement to enhance the study and stewardship of the geologic and groundwater resources in eastern Nebraska.
- C. DISTRICT and CSD programs have the potential to significantly enhance the study and stewardship of the geologic and groundwater resources in eastern Nebraska.

NOW THEREFORE, in consideration of the above recitals and the mutual promises and covenants contained herein, the Parties agree as follows:

1. **Effective Date.** The Parties agree that the Agreement will become effective upon the signature of both Parties.
2. **Term.** The term of the Agreement shall be for five (5) years from the effective date; provided however, that it may be terminated by either party at any time by giving sixty (60) days prior written notice to the other party. In the event that the term of the Agreement needs to be extended, an amendment shall be executed by both parties.
3. **Responsibilities of DISTRICT.** The DISTRICT agrees to the following:
 - (a) Set general accomplishment goals and priorities for the assigned geologist/hydrogeologist, in consultation with the CSD
 - (b) Provide input to CSD on the hiring/assignment of a qualified geologist/hydrogeologist.
 - (c) Participate in the development of annual work plans and program evaluations for the assigned geologist/hydrogeologist.
 - (d) Provide 60% of the salary and benefits plus annual operating expenses of up to

\$6,250 for the assigned geologist/hydrogeologist. DISTRICT policies do not allow payment of indirect costs.

- (e) Provide office space, clerical support, and office supplies/equipment for the assigned geologist/hydrogeologist.
- (f) Submit appropriate reports to CSD.
- (g) Function as the administrative representative of the Eastern Nebraska Water Resources Assessment. (ENWRA)

4. Responsibilities of CSD. CSD agrees to the following:

- (a) Hire and assign a qualified geologist/hydrogeologist to work full-time on geologic and groundwater related activities and/or projects pertaining to eastern Nebraska.
- (b) Invoice the DISTRICT on a semi-annual basis for 60% of the assigned geologist/hydrogeologist salary and benefits plus annual operating expenses of up to \$6,250 (based on the July 1 through June 30 fiscal year). CSD is responsible for 40% of salary and benefits.
- (c) Use the DISTRICT and CSD funding agreed upon within this agreement to provide a vehicle and to cover travel expenses for the assigned geologist/hydrogeologist.
- (d) Acquire additional funding, if necessary, to provide specialized equipment and supplies for the assigned geologist/hydrogeologist.
- (e) Submit an annual budget for the assigned geologist/hydrogeologist to the DISTRICT by May 1 of each year.

5. Duties of the Assigned Geologist/Hydrogeologist. The geologist/hydrogeologist assigned under the Agreement will be required to perform the following tasks:

- (a) Focus on geologic and groundwater resources in eastern Nebraska.
- (b) Provide technical geologic and groundwater resource services to rural and urban cooperators within eastern Nebraska.
- (c) Prepare and provide educational materials and compile, record, and publish information on the geology and groundwater resources of eastern Nebraska.
- (d) Submit appropriate work plans and accomplishment reports to CSD and the DISTRICT.
- (e) Provide technical and coordinator support to the Eastern Nebraska Water Resources Assessment.

- (e) Provide technical and coordinator support to the Eastern Nebraska Water Resources Assessment.
- (f) Obtain supervision from the Director of the Conservation and Survey Division.

6. **Amendments.** The Agreement may only be amended in writing signed by the Parties.

IN WITNESS WHEREOF the Parties have executed the Agreement by their authorized representatives on the date show below.

**LOWER PLATTE SOUTH
NATURAL RESOURCES DISTRICT**, as Administrator, acting on behalf of the participating DISTRICTS under an Interlocal Agreement attached as Exhibit "A" hereto.

By: 
Paul D. Zillig

Title: General Manager

Date: FEB 10, 2022

CONSERVATION AND SURVEY DIVISION

By: _____
Robert M. Joeckel

Title: Director

Date: _____

UNIVERSITY OF NEBRASKA

By: _____

Title: Director of Sponsored Programs

Date: _____

Lower Platte South Natural Resources District Cooperative Agreement – BUDGET

YEAR ONE (July 1, 2022 to June 30, 2023)	TOTAL YEAR ONE
Budget Category	
Salary	43,945
<i>Benefits</i>	13,184
<i>Total Personnel</i>	57,129
Travel	3,125
Supplies	350
Operating	2,775
Total Direct Costs	6,250
Total	63,379

Budget justification: Salary will be used to support a geologist/hydrogeologist. Travel is for field work and for attendance at service/educational activities and meetings. Supplies are for software needed for model development and data analysis and various small laboratory and field supplies needed to complete the project. No equipment will be purchased as part of this project.

ENWRA



EASTERN NEBRASKA WATER
RESOURCES ASSESSMENT

LOWER PLATTE NORTH COMMITTEE MEETING

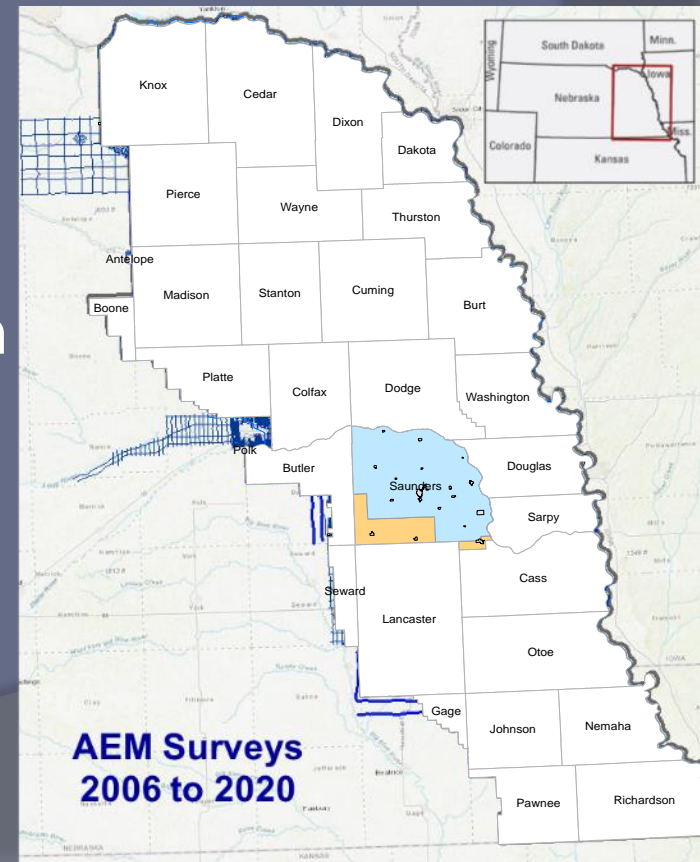
MARCH 1, 2022

ENWRA Presentation

- Introduction/ENWRA Review
- ENWRA Website & Nebraska GeoCloud
- New WSF grant award #5312 & Recharge
- ENWRA Interlocal Renewal
- Recap and Questions

ENWRA Overview

- ENWRA NRDs: LCNRD, LENRD, P-MRNRD, LPNNRD, LPSNRD, and NNRD
 - NRDs pay dues to the ENWRA account annually
 - Annual dues total \$149,150 (LPNNRD's portion is \$30,000)
- NRD Interlocal and Coordinator Agreements - renewal for Fiscal Year 2023 through 2027
- ENWRA Organization:
 - Technical Committee, Managers, and Technical Advisors
- ENWRA Objectives/Long Range Plan
 - Identify location and volume of aquifers
 - Estimate recharge rates
 - Assess gw/sw water interaction
 - Estimate water budgets
 - Characterize water quality concerns



Website: enwra.org

ENWRA

EASTERN NEBRASKA WATER
RESOURCES ASSESSMENT



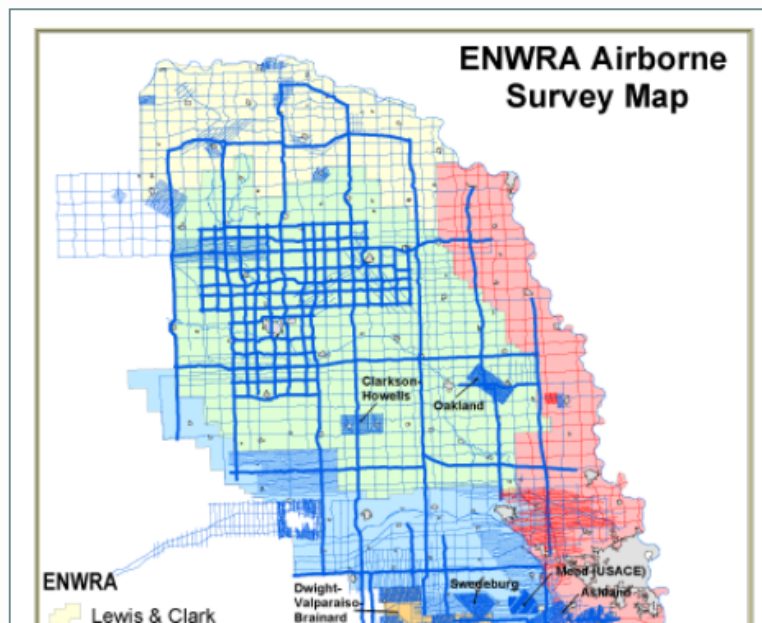
About Projects **Media/Downloads** **2020 AEM** 2018 AEM

2016 AEM 2015 AEM 2014 LENRD AEM AEM Partner Projects

Contact Home

NRDS: [Papio-Missouri River NRD](#) [Nemaha NRD](#)

2020 Airborne Electromagnetic Survey (AEM)



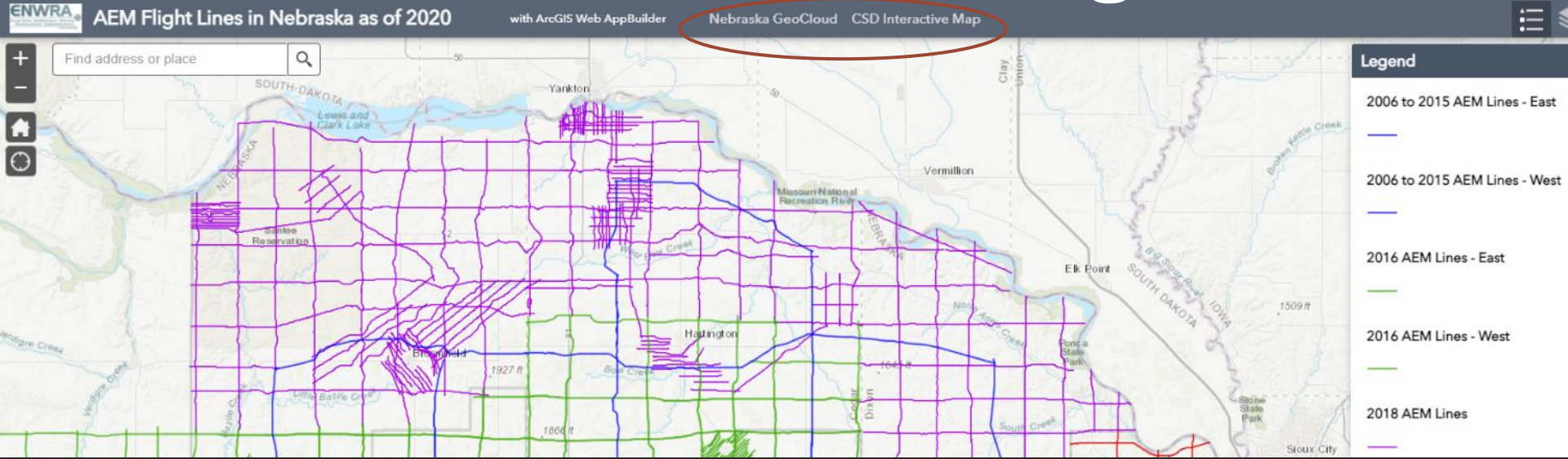
3125 Portia St
PO Box 83581
Lincoln, NE 68501
402.476.2729

kcameron_enwra@lpsnrd.org

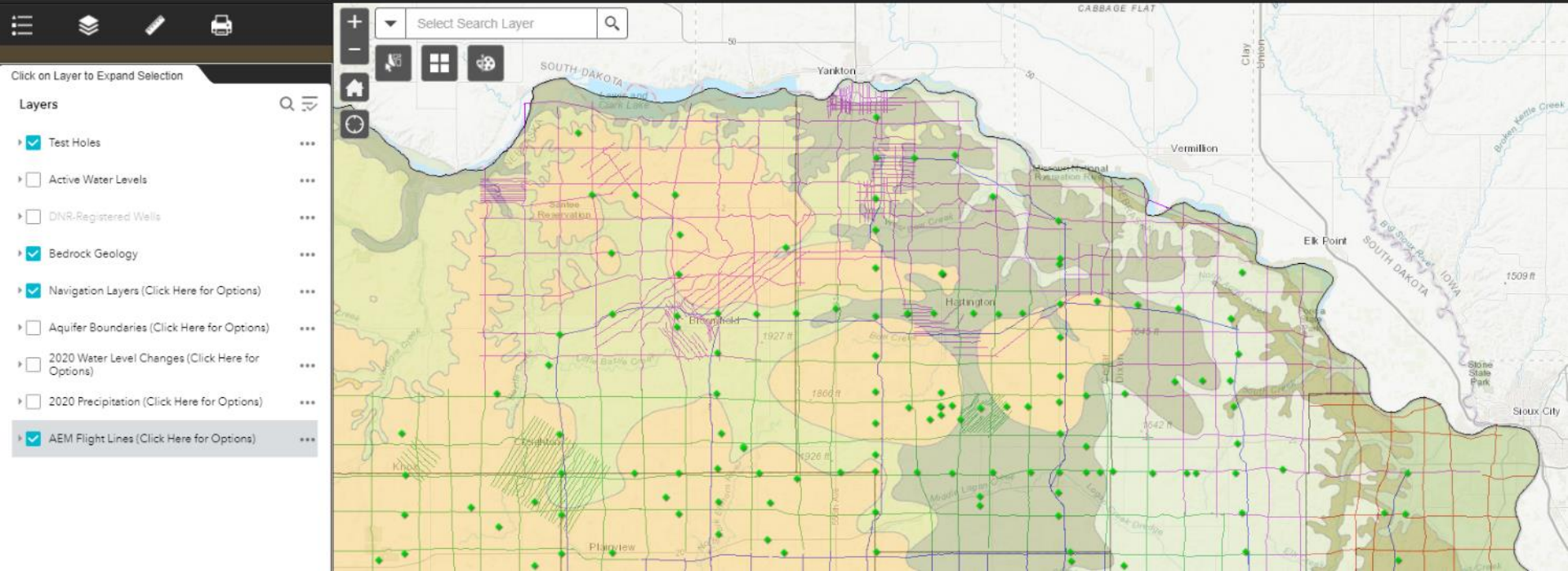
News

The **2020 Airborne Electromagnetic (AEM)** Survey Flight reports for the Nemaha and Papio-Missouri-River NRDs are complete! You can also click [here](#) for an updated location map of the eastern Nebraska 2006 to 2020 flight locations. A statewide interactive map of all flight lines is available [here](#). Digital polyline files are available on the AEM tabs and at the bottom of the AEM **Project Partners Tab**. New tutorial video links demonstrating the download and use of the report deliverables are also available on the **Media/Downloads Tab** as well as other ENWRA project reports. Be sure to visit our **other website tabs** and the **Nebraska GeoCloud website** for more information on statewide AEM data availability, guidelines and standards.

Website: enwra.org



CSD Ground Water and Geology Data Portal



Nebraska GeoCloud Access & Standards

UNIVERSITY of NEBRASKA-LINCOLN

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School of Natural Resources

CONSERVATION AND SURVEY DIVISION



About CSD

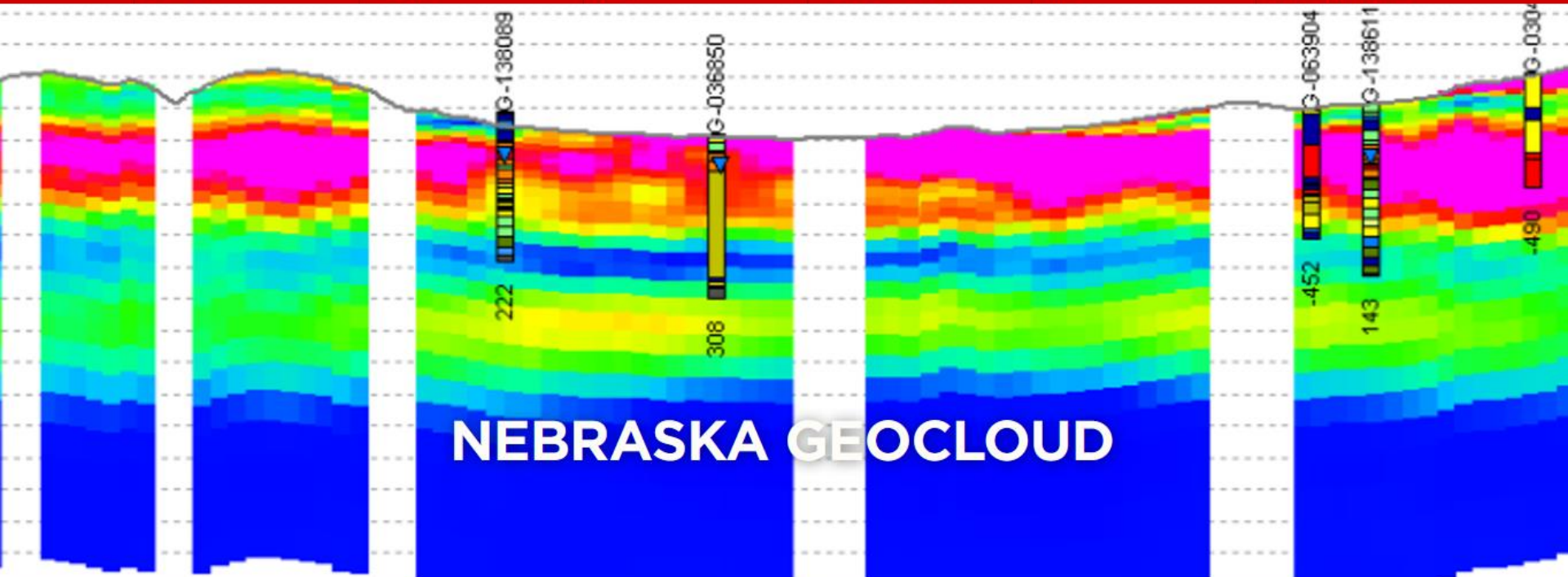
Geology

Water

Soils & Landscapes

GIS

Interactive Data Map



The Nebraska GeoCloud (NGC) is a web-based digital platform for geophysical, geological, and groundwater data and models. The purpose of the NGC is to archive Nebraska's vast volume of data and make it accessible to both model builders and model users. The NGC consists of databases, web servers, and web interfaces designed for data storage, sharing, and distribution. It contains one interface for [Projects](#) and another interface for [Data](#). [Projects](#) may include software files, reports, and other information related to a project. It can be used to store and share project files, or it can be used as the final repository for completed projects. The [Data](#) interface is built upon structured databases that support the upload and download of data and models used in typical hydrogeological studies. Users can access the data contained in this part of the NGC via the GeoScene3D data portal. These data can also be viewed on an interactive web map and they are accessible via a web map service (WMS) in GIS programs (e.g. ArcGIS, QGIS). To request a user account to the NGC, please contact Jesse Korus at jkorus3@unl.edu.

Request User Access

Nebraska Geocloud Projects

Nebraska Geocloud Data

Nebraska GeoCloud Data Map & Upload

<https://youtu.be/Fs4OsWlQhe8>

GeoCloud - Nebraska

Maps Administration Help kcameron_enwra@lpsnrd.org

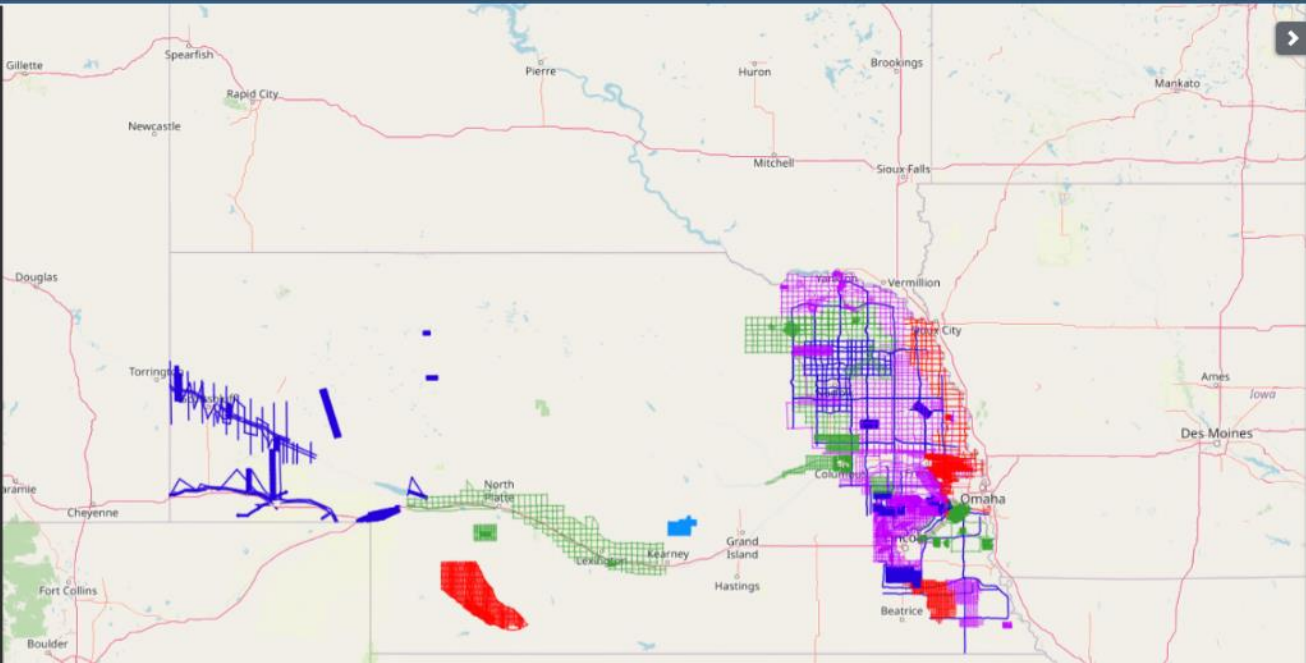
Get WMS For Data

Data Type
1D Models

Service Type
OWS (WMS & WFS)

Note: grids are not available as WFS-T

Copy Link



Toggle All

Only Data in Extent

Groups Data Order

Search

Surveys	37
2D Grids	180
3D Grids	2
Boreholes	33
Points	3
Logs	1
Shapefiles	18
WMS Data	0
WMS Temporary	+

GeoCloud - Nebraska

Maps Administration Help kcameron_enwra@lpsnrd.org

Home

Groups

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File Upload

Materials

Home



Data



File Upload

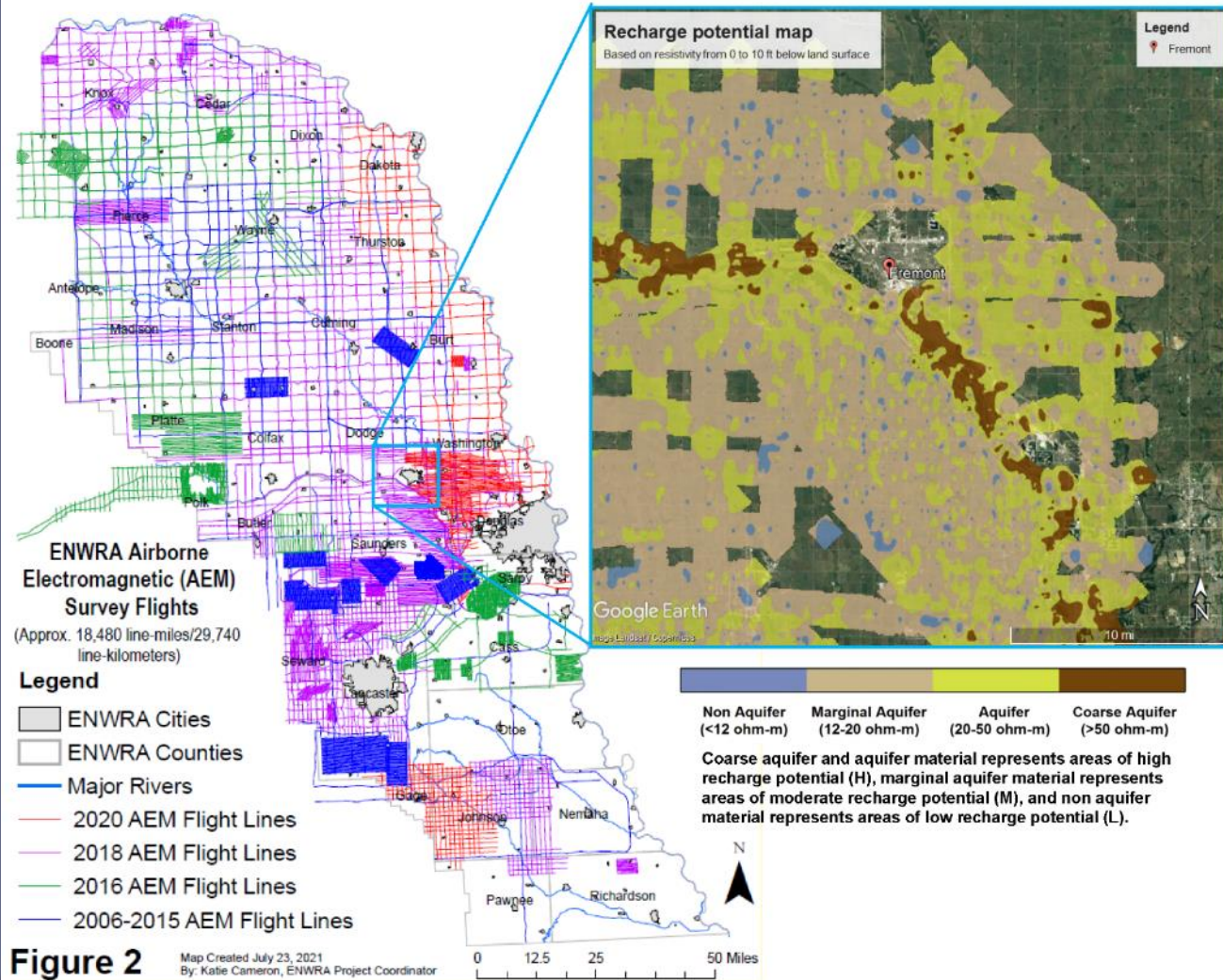


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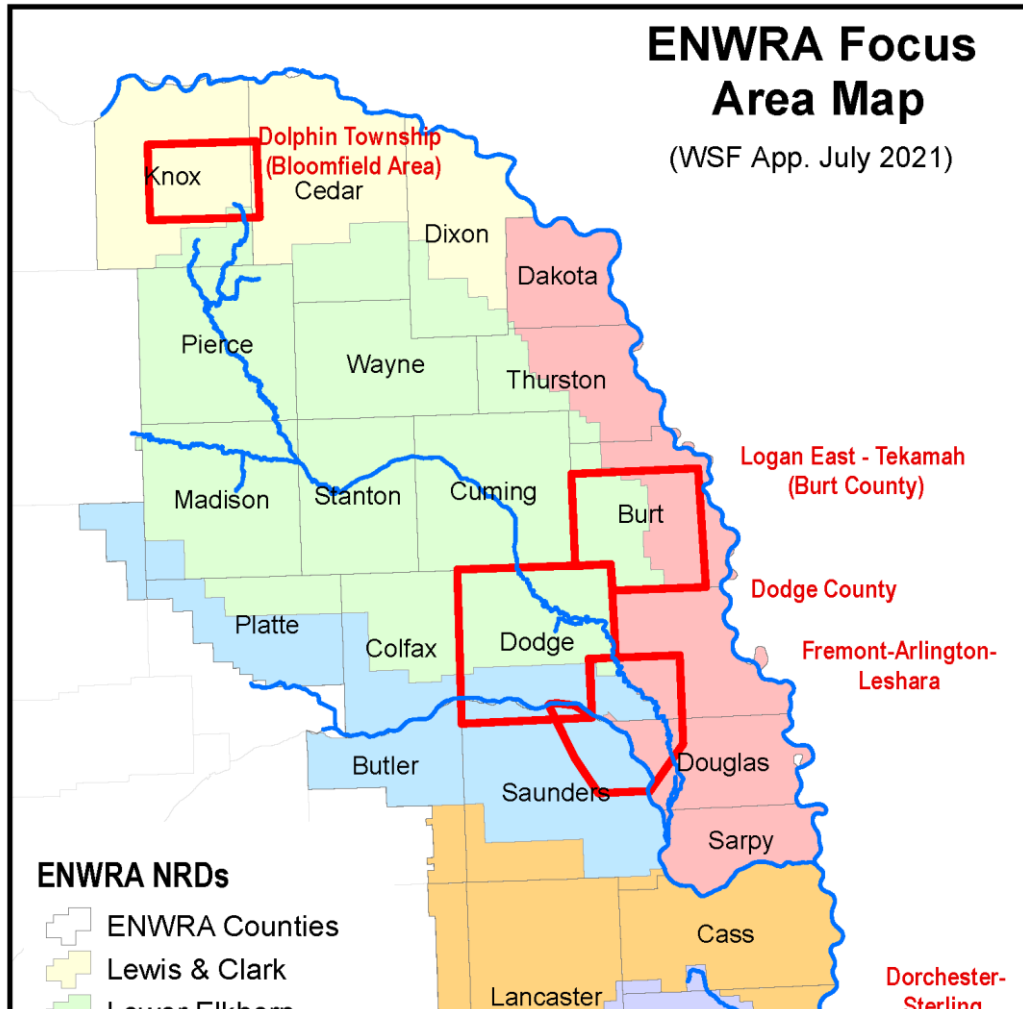
WSF #5312

- ENWRA Recharge and Focus Areas
- 3 Phase collaborative effort with the ENWRA NRDs, UNL-CSD and the U.S. Geological Survey
- Phase 1 will focus on the entire ENWRA region - better than 1995 Contours and AEM with NWIS
- Phase 2 - Focus Area Work
- Phase 3 - Regional Recharge Map Refinements, Report and Recommendations

ENWRA submitted application at the end of July 2021 for \$240,000 project with the USGS and CSD on recharge, \$144k WSF award, \$74k USGS Cooperative Dollars, \$96k ENWRA



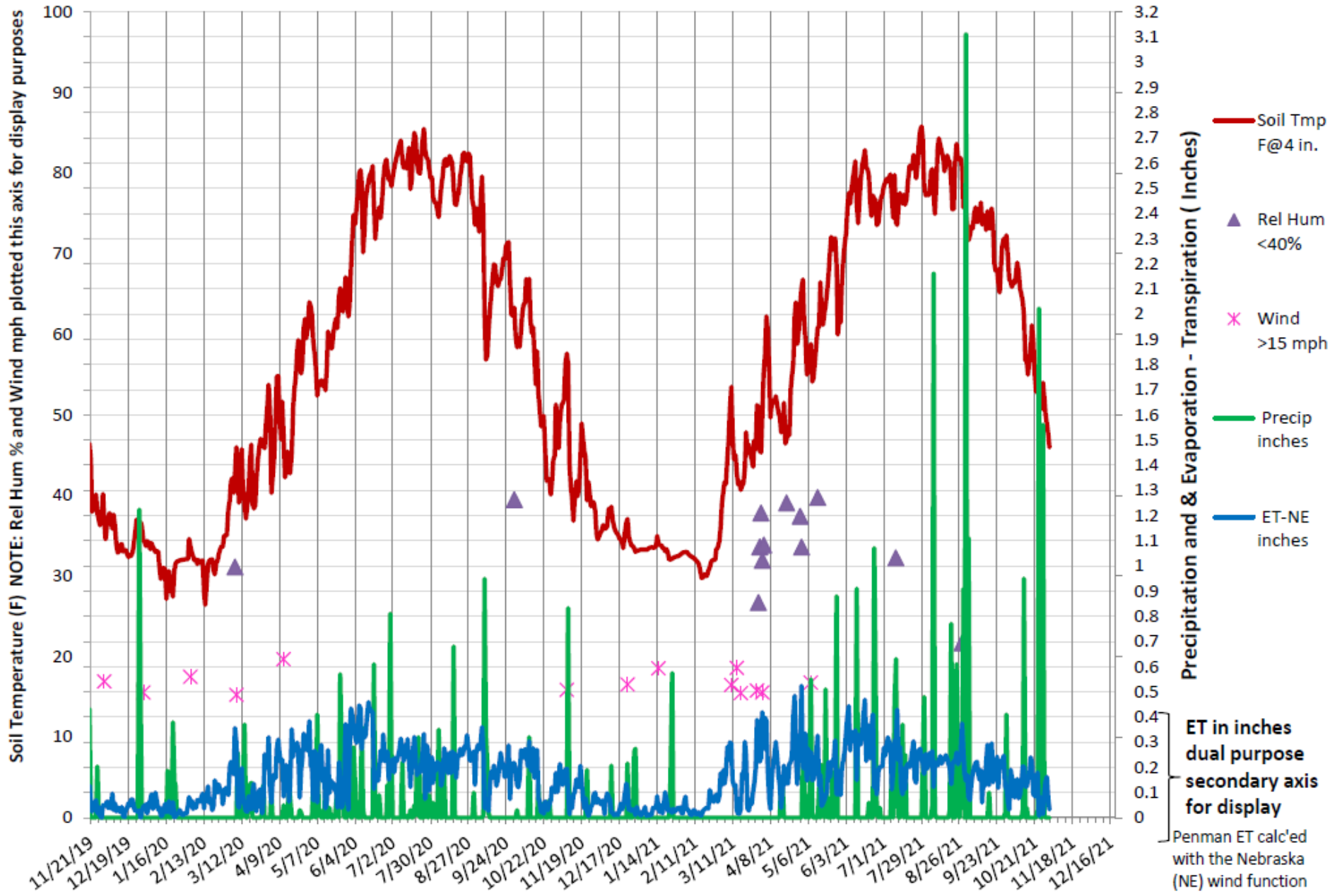
Focus Area name	County
Dorchester-Sterling Paleovalley	Hickman, DeWitt
Dodge County	Dodge
Dolphin Township (Bloomfield Area)	Bloomfield
Logan East-Tekamah (Burt Co.)	Oak



source issue
al and proposed ment has stressed plies. Declines t on edges of aquifer, n issue for some towns
ontamination in Dodge County, effects w groundwater on near Fremont
on of the Cedar-Knox ater District. Possible ource within Dolphin o. Highly variable ater quality and within township
on of Logan-East Rural istrict and nitrate iation of Dakota near

- H M L Recharge map for the district (initial and refined versions) - GIS and Nebraska GeoCloud products
- Updated water-level surfaces from aquifer boundary and potentiometric head evaluations - GeoCloud and GIS products
- Water-level maps from Phase I will be re-evaluated and altered to reflect the degree of confinement, potential perched conditions, and areas of little/no saturated thickness in the Dodge County and Fremont-Arlington-Leshara-Focus Areas
- USGS scientific Investigations Report with a documented plan for the focus areas regarding potential water level, water quality and/or other data gaps and actions still necessary (new recharge stations, aquifer tests etc.)
- Phase 1, 2 and 3 results can be used to compare with districtwide model results or used to update model assumptions (separate LPN WSF w/ P-MRNRD, data planned for use during all phases)

Memphis 5N Station A255367 Precipitation and Soil Temperature and ET - 2020 and 2021



Recharge – 2013 Gates' Report

Table 5. Recharge Rate Estimates (All Sites and Methods)

Site	q (mm yr ⁻¹)	Method
<i>Profile Scale</i>		
OAK-03-UZ	21 (10–36)	Buckingham-Darcy
ASH-02-UZ	0.0001	Buckingham-Darcy
FIR-04-UZ	9 (4–12)	Buckingham-Darcy
FIR-04-UZ	5 (2–8)	Chloride mass balance
FIR-04-UZ	34 (25–43)	Tritium mass balance
<i>Aquifer Scale</i>		
OAK-02-34	58 (30–161)	CFC-12/SF ₆
OAK-02-172	158 (106–161)	SF ₆
OAK-03-15	127 (52–659)	CFC-12/SF ₆
OAK-04-59	20 (14–23)	CFC-12/SF ₆
OAK-04-89	193 (88–200)	SF ₆
ASH-01-50	409 (276–516)	SF ₆
ASH-02-59	73 (61–224)	CFC-12/SF ₆
ASH-03-108	7 (6–7)	SF ₆
ASH-05-15	104 (65–960)	SF ₆
ASH-06-59	13 (12–15)	SF ₆
FIR-04-40	57 (31–67)	CFC-12/SF ₆
FIR-07-35	37 (18–66)	CFC-12/SF ₆
FIR-07-63	89 (73–99)	CFC-12/SF ₆
FIR-08-86	14 (13–17)	CFC-12/SF ₆
<i>Regional Scale</i>		
n/a	56 (14–91)	Water Balance Model

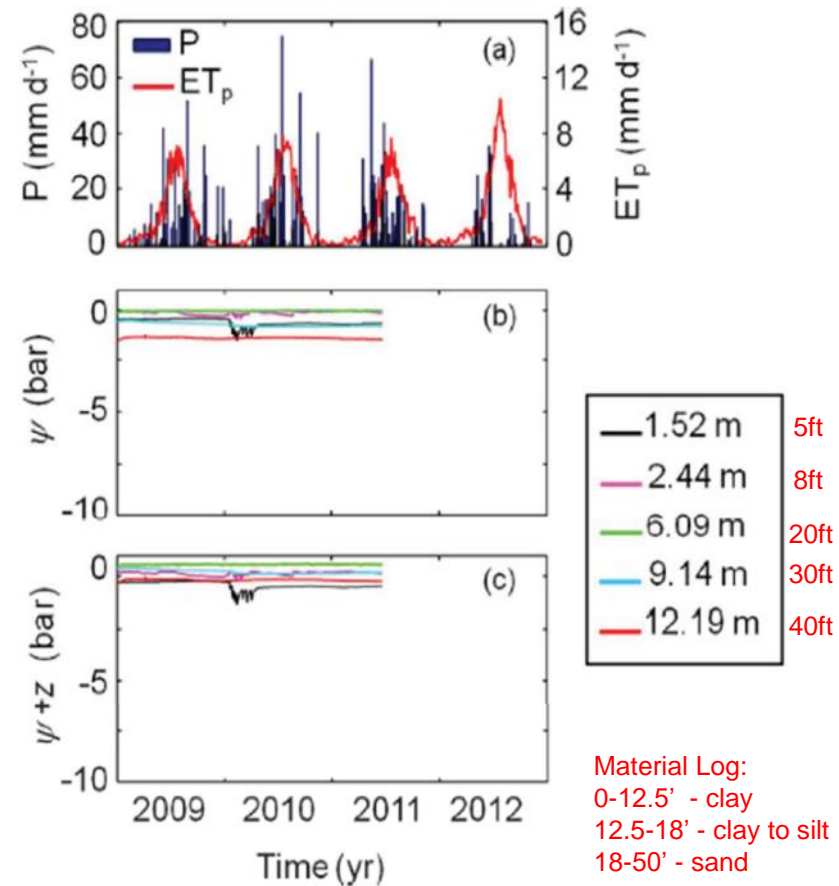
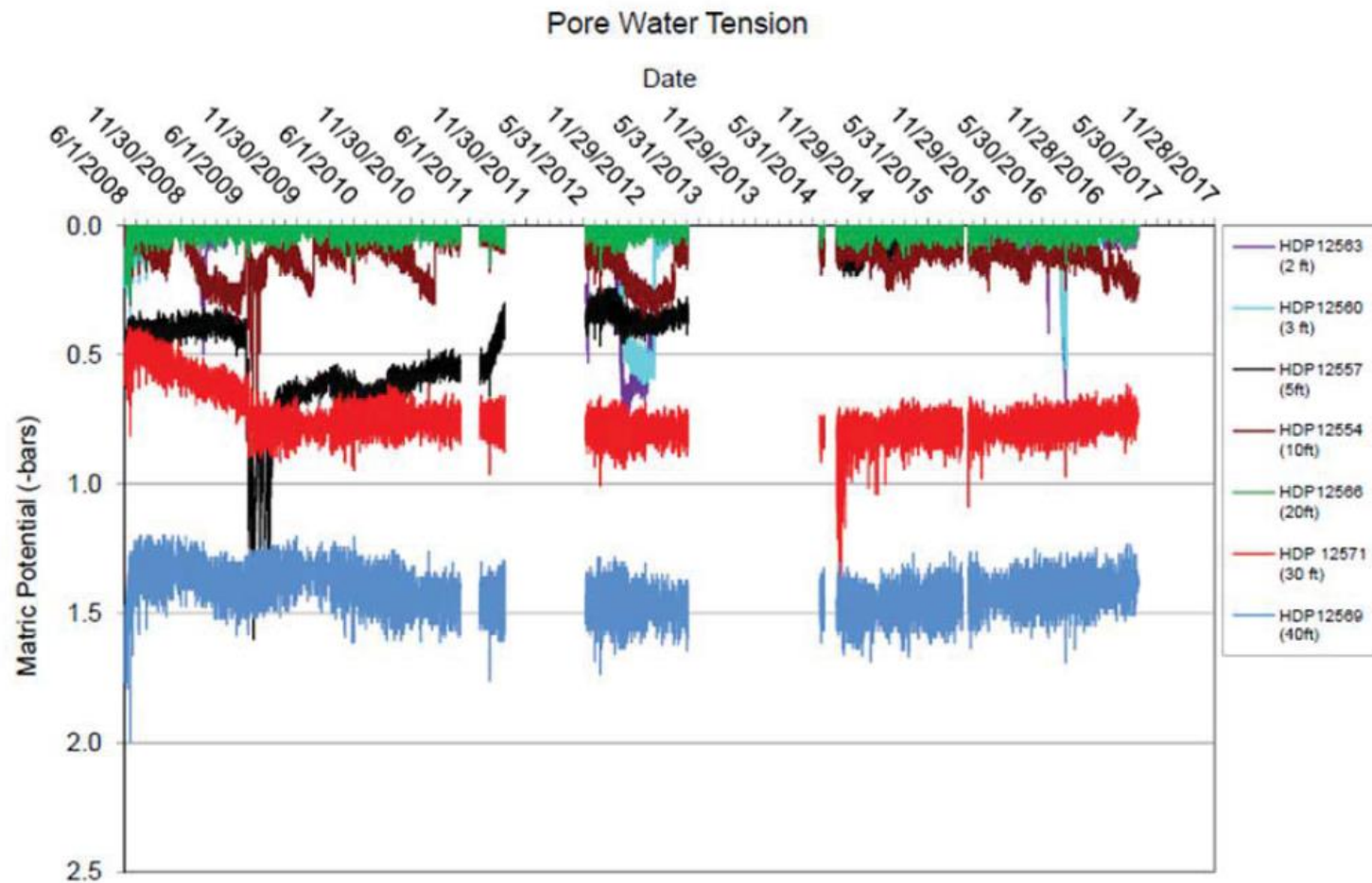


Figure 4. Time series data for ASH-02-UZ including (a) precipitation and potential evapotranspiration, (b) matric potentials, and (c) total potentials.

Recharge – LPNNRD Station



Provisional Data, not subject to release

HDP = Heat dissipation probes

Recharge – 2013 Gates’ Report

region (35%). Under this assumption, the minimum estimate of diffuse recharge as a percentage of total recharge would be 18%. In all cases, estimates of diffuse recharge do not exceed about 60% for any combination of recharge estimates developed in this study, underscoring the likely importance of nondiffuse recharge in this landscape. However, it is emphasized that these estimates are subject to high uncertainty stemming from the limited number of measurements, incongruities in both spatial and temporal time scales between groundwater and unsaturated zone-based estimates, lack of unsaturated zone monitoring sites in locations receiving overland flow or ponding, and potential for unknown biases not taken into account in tracer interpretations. Further investigations are necessary to elucidate the processes leading to nondiffuse recharge in this region.

After the pilot site recharge study, we found we were missing 40% of recharge picture. The AEM data along with the WSF #5312 results will allow us to see where additional investigation (new stations, data collection, aquifer tests) makes the most sense to get at the preferential paths and get more accurate recharge values for specific areas and model assumptions.

Interlocal Recent Activity

- December 15, 2021 WSF #5312 awarded to ENWRA. Initial kick-off meetings with USGS and CSD Jan.
- LPSNRD board January 19, 2022 – 7 ENWRA related agreements (WSF and next 5 year renewals)
- LCNRD board presentation January 20, 2022
- NRD Legislative Conference Tradeshow January 25th 2022 featuring: GeoCloud, USGS Age Dating Report, AEM coverage and Nemaha and Papio-Missouri River NRD 2020 AEM Flight Reports
- P-MRNRD board February 8, 2022
- ENWRA Technical Committee Meeting February 11, 2022

OLD Tables

ENWRA Financial Estimate	
October 6, 2008	
USGS Contracts	
Existing	\$130,000.00
Existing	\$60,000.00
Existing	\$160,000.00
Existing	\$10,000.00
Proposed	\$517,000.00
Total	\$877,000.00
C&SD Contracts	
Existing	\$216,000.00
Existing	\$5,000.00
Existing	\$200,000.00
Existing	\$43,588.00
Total	\$464,588.00
LPSNRD - Project Coord.	
7/30/07 - 8/31/07	\$5,497.64
9/1/07 - 9/30/07	\$5,083.58
10/1/07 - 12/31/07	\$17,334.09
01/01/08 to 03/31/08	\$19,942.36
4/1/08 to 5/27/08	\$5,715.61
5/27/08 to 6/13/08	\$7,831.59
8/1/08 to 9/30/08	\$10,686.69
Total	\$72,091.56
Miscellaneous	
Year One	\$0.00
Year Two	\$206,916.47
Year Three	Unknown
Total	\$206,916.47
Total Projected Cost	\$1,620,596.03
Total Funding of Project	\$1,920,000.00

NRD	ENWRA Dues	% of ENWRA Dues	% of ENWRA Area
PMR	\$ 30,000	20%	14%
LPS	\$ 30,000	20%	13%
LE	\$ 30,000	20%	31%
LPN	\$ 30,000	20%	12%
Nemaha	\$ 20,000	14%	19%
L&C	\$ 7,000	5%	11%
Totals	\$ 147,000	100%	100%

Budget – FY23 Draft

ENWRA FY23 DRAFT (March drafts, July board meeting):		
		Budgeted
Total Bank for start of FY 23:		\$ 344,287.59
Planned Routine (PR) expenses:		
PR	Pilot site wells/equip maint.	\$ 15,000.00
PR	Pilot site water sampling (includes <i>select</i> extra param.)	\$ 13,630.00
PR	Weather stations (will be less, new billing cycle)	\$ 7,800.00
PR	Deep THs or other \$9,150 use (NNRD, LPNNRD, LPSNRD?)	\$ 18,300.00
PR	Website & Conferences	\$ 2,500.00
PR	Coordinator Salary (UNL Coop Agree. Y1 of 5)	\$ 63,379.00
PR	Coor. Office Reimbursement to LPSNRD	\$ 5,000.00
PR	AEM Database/Data Man. efforts (NGC Y1/5)	\$ 23,000.00
	Subtotal	\$ 148,609.00
Committed (C) and/or Suggested (S) expenses for consideration:		
C	Nebraska GeoCloud (Interlocal portion only, ENWRA portion included in data management above)	\$ 8,000.00
C	Grant from Bank (recharge H M L grant with USGS and CSD: \$240,000 is full total , \$144,000 is DNR, \$96,000 is ENWRA)	\$ 38,328.40
S	Consultant proposal OR 3D project with or without grant funds for additional AEM dataset processing, project collaboration services, and products	\$ 50,000.00
	Subtotal	\$ 96,328.40
	TOTAL	\$ 244,937.40
	Plus Incoming FY23 Dues: \$149,150 + \$8,000)	\$ 157,150.00
	Plus interest on banked funds:	\$ 350.00
	Estimated Bank going into FY24:	\$ 256,850.19

ENWRA Interlocal

- Approved through Lower Platte South administrative and Financial Handling Agency for ENWRA Dec. 2021 Mtg.
- ENWRA's 4th 5-year renewal FY23 to FY27
- Group is currently mapping out next 5 year plans and LRP update, LPSNRD, LCNRD and P-MRNRD signed LENRD next March 10th

	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
LCNRD	\$9,150	\$9,150	\$9,150	\$9,150	\$9,150
NNRD	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
PMRNRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
LENRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
LPSNRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
LPNNRD	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
Total	\$149,150	\$149,150	\$149,150	\$149,150	\$149,150

Lower Platte North – Next 5 Years

FY 2023 ENWRA Routine plus:

- Start WSF #5312 and what data gaps could be worked on by ENWRA (or NRDs already have planned to address) on the side during the Phase 2 and 3 WSF work
- Start planning CSD WalkTEM optional along with CSD test hole planning, \$9150 credit due to LPNNRD
- evaluate emerging contaminant lists
- evaluate LPNNRD framework status regarding recharge or working with 3D products and potential funds or grants with ENWRA - LPNNRD board have specific areas in mind? ENWRA meetings/workshop schedule

FY 2024:

- WSF Phase I recharge map online, continue to evaluate recharge assessment plans that tie into WSF work status on Dodge County and Fremont-Arlington- Leshara focus areas (plan new stations where initial results don't agree)
- collaborate with experts, continue search for new recharge and emerging study area experts
- submit ENWRA grant to install equipment or collect recharge assessment data targeted by WSF project Phase 1 and some Phase 2 focus area needs (Toolbox items: test holes, geophysics, transducers, lysimeter or other station probe install types for H M L areas, age dating sample collection at existing or new depths/locations, tracers, aquifer test - longer term planning required but keep components in mind in planning)

FY 2025:

- re-evaluate LPNNRD and other ENWRA specific Recharge Objectives or other objectives [collaborate with experts]
- work on new ENWRA grant if submitted and awarded (start rotation of areas per NRD benefiting from the grant),
- CSD drilling and geophysical program planning

FY 2026:

- SQS#1/DVB study area is in this year or in a new grant submittal using the new NRD model and recharge results (have a project rotation plan for specific NRD areas based on recharge project and other NRD district hydrogeologic efforts underway in after previous WSF grant end).
- CSD drilling and geophysical program planning, LPNNRD gets \$9,150 credit

FY 2027:

- evaluate future of ENWRA and next 5 year plan, continue rotation through NRDs with project focus areas,
- CSD drilling and geophysical program planning

ENWRA

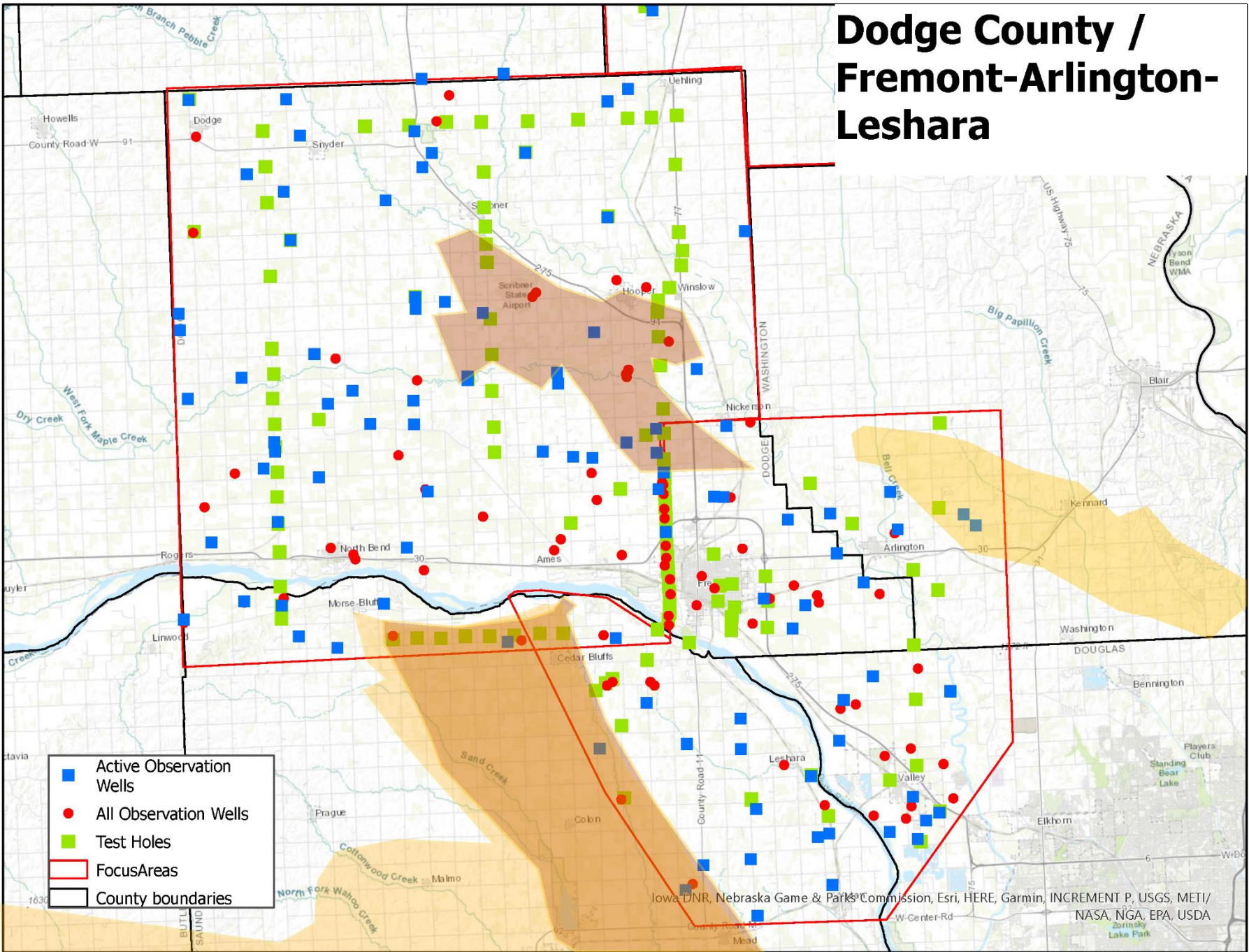


EASTERN NEBRASKA WATER
RESOURCES ASSESSMENT

LOWER PLATTE NORTH COMMITTEE MEETING

MARCH 1, 2022

Dodge County / Fremont-Arlington- Leshara



Iowa DNR, Nebraska Game & Parks Commission, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA

ENWRA Roadmap

IDENTIFY AQUIFER MAPPING TOOLS

Historic CSD boreholes
Registered wells
ENWRA Phase I boreholes
HEM
TDEM
ENWRA Phase II boreholes

Geologic Maps—1st approximation

Firth Oakland Ashland

Seismic refraction ?
Seismic reflection ?
Satellite imagery ?
Gravity ?
Temperature ?
More HEM ?

Geologic Maps—2nd approximation

3D Models ?
Report? Publication? Web site?

IDENTIFY AQUIFER CONNECTIONS

Age dating
Chemistry
Transducers
Aquifer Tests

Report?
Publication?
Web site?

IDENTIFY RECHARGE

Weather stations/ET
Vadose zone/Lysimeters
Age dating
Chemistry
Transducers

Report
Publication?
Web site?

WATER USEAGE MONITORING

Completed and On-going Projects

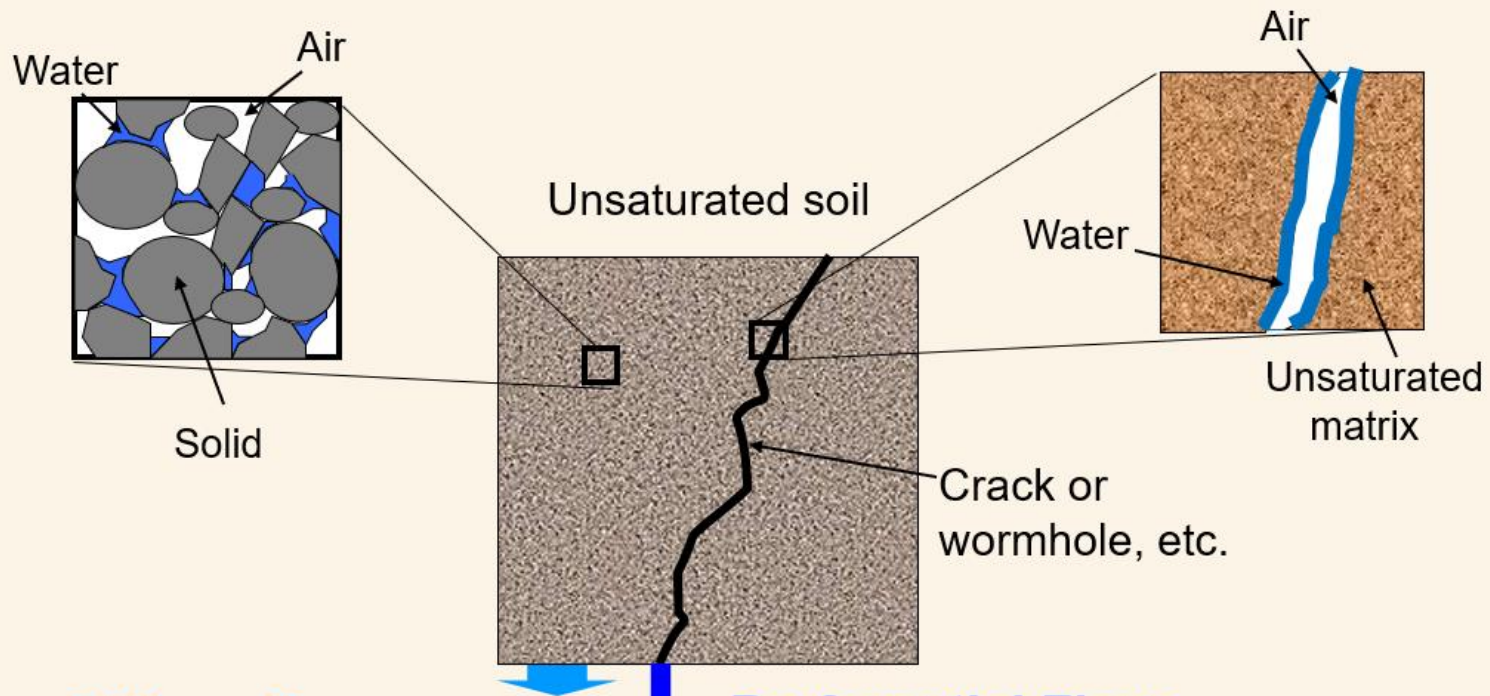
Project	Purpose	Sponsor	Area (mi2)	Funding Sources	Years	Cost	Tasks
Pilot Study Project	assess technical feasibility	all 6 NRDs	110	IWMPP	2006-2010	\$1,920,000	drill test holes; install monitoring wells; install vadose stations; test geophysical methods (HEM, TDEM, CSAMT, microgravity); conduct aquifer tests, collect age dates, conduct bromide tracer test, sample water quality, publish project overview, employ project coordinator
Data Summary/ Analysis	compile and evaluate existing data	all 6 NRDs	13,000*	IWMPP	2009-2011	\$285,300	publish pilot study bulletins, build archived file database, compile and publish cross-sections, sample water quality, monitor vadose equipment, equip monitoring wells, develop long range plan, employ project coordinator
Swedeburg/Sprague HEM	map location and extent of aquifers	LPS, LPN	140	NET	2009-2011	\$440,000	fly HEM, invert data, drill test holes

Annual Coordinator Costs:		OSP Semi-annual Invoice Details:						
	Actual billed:	NRD Budgeted:	Dec semi-annual			June semi-annual		
FY18	\$ 49,132.77	\$ 57,331.00	\$31,727.74			\$ 17,405.03		
			\$ 30,824.38	Annual salary + ben costs		\$ 17,292.03	Annual salary + ben costs	
			\$ 903.36	oper expenses/travel/supply		\$ 113.00	oper expenses/travel/supply	
FY19	\$ 58,670.52	\$ 58,864.00	\$26,655.02			\$ 32,015.50		
			\$ 26,147.90	Annual salary + ben costs		\$ 30,583.93	Annual salary + ben costs	
			\$ 507.12	oper expenses/travel/supply		\$ 1,431.57	oper expenses/travel/supply	
FY20	\$ 53,367.89	\$ 60,441.00	\$22,206.01			\$ 31,161.88		
			\$ 22,173.49	Annual salary + ben costs		\$ 30,783.43	Annual salary + ben costs	
			\$ 32.52	oper expenses/travel/supply		\$ 378.45	oper expenses/travel/supply	
FY21	\$ 54,025.01	\$ 61,705.00	\$27,099.25			\$ 26,925.76		
			\$ 26,824.37	Annual salary + ben costs		\$ 26,925.76	Annual salary + ben costs	
			\$ 274.88	oper expenses/travel/supply		\$ -	oper expenses/travel/supply	
FY22	\$ 56,088.90	\$ 63,368.00	\$27,588.90			\$ 28,500.00		
			\$ 27,147.89	Annual salary + ben costs		\$ 27,000.00	Annual salary + ben costs	<---this last bill will come May 2022
			\$ 441.01	oper exper travel		\$ 1,500.00	oper expenses/travel/supply	
5YR TOTAL:	\$ 271,285.09	\$ 301,709.00						

NOTE: ENWRA pays LPSNRD \$5,000 annually for coordinator office

Recharge – USGS Nimmo 2017

Unsaturated Flow: Two Domains



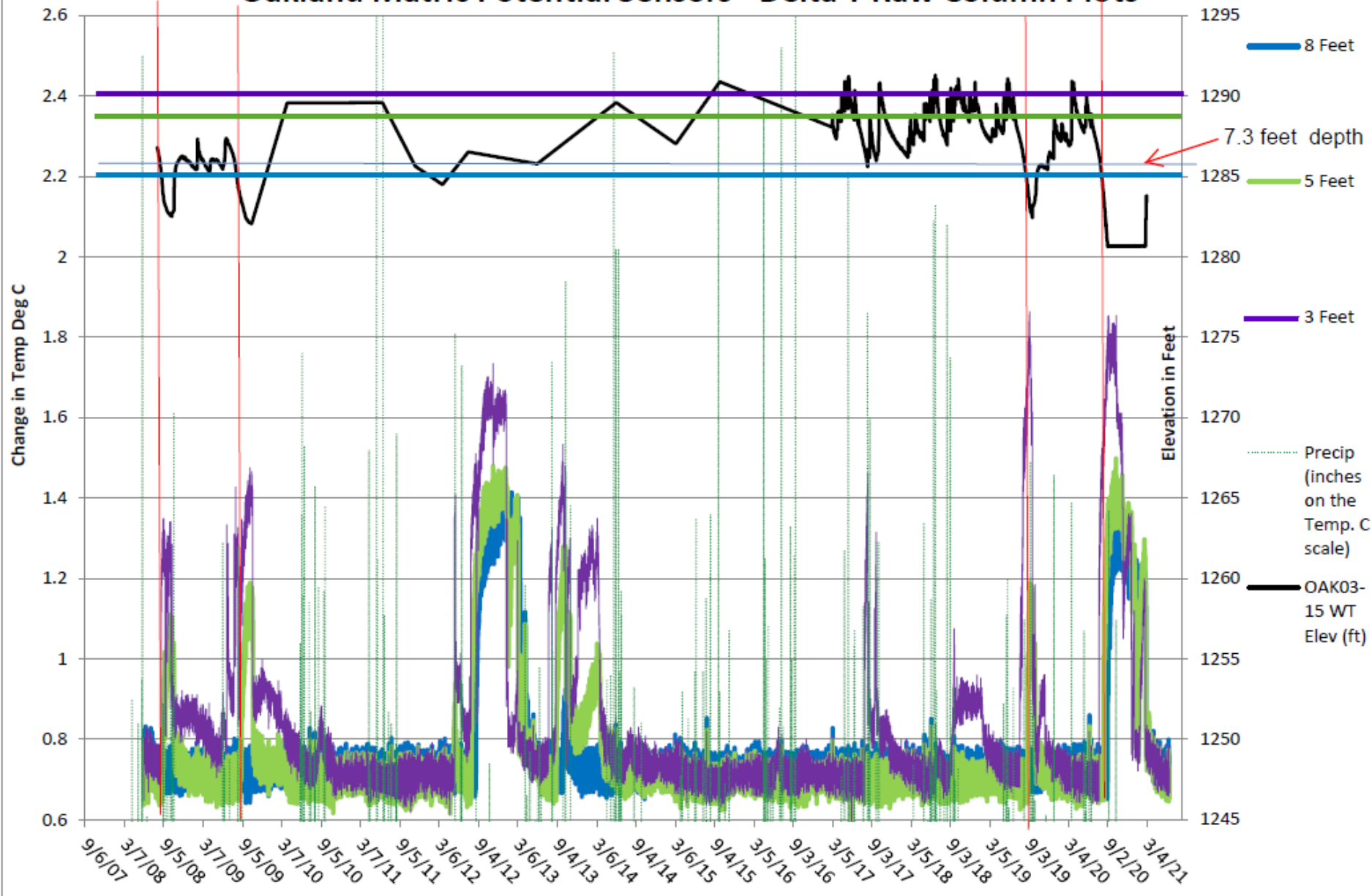
Diffuse flow

- Slow
- Goes on all the time
- Widely-accepted theory
- Affects most soil-water processes

Preferential Flow

- Fast, high-volume
- Happens occasionally for few hours
- No accepted theory
- Critical to recharge, ecohydrology, and contaminant transport

Oakland Matric Potential Sensors - Delta T Raw Column Plots



I. Draft Policy to transfer certified irrigated acres

A. Transfers within the Lower Platte North Natural Resources District (District) must satisfy the following criteria:

1. All transfer applications require a non-refundable application fee of three hundred dollars (\$300.00).
2. Transfers of irrigated acres require a title search. All applicable lien holders of the property from which the acres are being transferred from, must agree to the transfer. Fees associated with these actions will be billed to the landowner(s).
3. Land is currently listed with the District and County Assessor as certified irrigated acres.
4. Relevant landowner, or their tenant, must have current Nitrogen and Water Certification.
5. The originating certified irrigated ground, as well as the gaining ground, must be within LPNNRD.
6. The submission of a completed application is required prior to any consideration of the transfer of irrigated acres. Applications will be provided by the District.
7. Application must include:
 - a. Explanation of the proposed activities;
 - b. Aerial photo with the proposed field(s), well(s), pipeline(s);
 - c. Legal description and parcel IDs of affected properties;
 - d. Landowner(s) signature(s);
 - e. Irrigation plan for gaining property, if pivot model is available, it must be submitted with the application;
 - e. Notarization by notary public.
8. Consideration will not be given to incomplete or incorrect applications until such time as the deficiencies are rectified.
9. Transfers will not be granted in areas with greater restrictions than the land upon which the transfer originates.
10. Transfers will be based on NeDNR Stream Depletion Factors. An increase in Stream Depletion Factor may cause the application to be denied.
11. At District's request applicant(s) will allow access to their property for the purposes of inspection by district personnel.
12. Once transferred, the irrigated acres become the property of the gaining parcel(s). The originating parcel(s) will be certified as dryland acres by the District. After 10 years, the original parcel will be eligible for a variance to allow irrigation except in restricted development areas.

13. Review of the transfer application will be performed by staff and LPN Water Committee. Final approval will be conferred by approved board motion by the LPN Board of Directors.
 14. The gaining ground must meet the minimum threshold of the variance process for the transfer to be approved.
 15. Acres may only be transferred to or from a property once every 5 years.
 16. The gaining parcel may not increase in irrigated acres by more than the transferred amount.
 17. A transfer will not be allowed to increase the number of irrigated acres within a designated wellhead protection area without approval from the wellhead management area designated by the community.
 19. Management Area rules and regulations are subject to change. As per the Groundwater Management Area Rules & Regulations, any new irrigated acres or irrigation well developed after June 15, 2018, may be subject to additional restrictions as the Board of Directors deems reasonable and necessary in light of hydrologic conditions within the District.
 20. Both landowners will be sent transfer paperwork to the Register of Deeds to reflect the transfer.
 21. If the land in question is Highly Erodible Land (HEL) and has to follow an NRCS Conservation Plan in order for this transfer to occur, this will be noted on the form.
 22. Once transferred the new irrigated ground must be Acre Certified by LPNNRD.
- B. The application for a transfer will be denied or conditioned to the extent necessary to:
1. Ensure the consistency of the transfer with the purpose or purposes for which the management area was designated.
 2. Prevent adverse effects on existing groundwater users or on surface water appropriators.
 3. Prevent conflict with any regulations or controls adopted by the District; or
 4. Ensure the proposed transfer to be a reasonable and beneficial use.
- C. An approved transfer will not vest in any person the right to violate a District rule, regulation, or control in effect on the date of issuance, or to violate any rule, regulation, or control properly adopted after such date. It is the responsibility of the applicant to ensure compliance with other rules and regulations. Such violation could result in loss of an approved transfer.
- D. An approved transfer will not vest in any person the right to violate any statute, state agency or other jurisdictional agency's rule, regulation, or control in effect on the date of issuance of the transfer or to violate any rule, regulation, or control properly adopted after such date. It is the responsibility of the applicant to ensure compliance with other rules and regulations. Such violation could result in loss of an approved transfer.
- E. **Approved transfer applications received prior to March 1st**, if approved, will be effective that year. Applications received after March 1st, if approved, will not be effective until the following year.

Application for the Transfer of Irrigated Acres between Parcels

This application is for the transfer of irrigated acres between two parcels belonging to the same landowner in the Lower Platte North Natural Resources District (LPNNRD). For acres to be transferred, the following conditions must be met: The land must be Acre Certified; the relevant landowner must have current Nitrogen and Water Certification or have a tenant with such certification; The originating certified irrigated ground, as well as the gaining ground, must be in LPNNRD. The landowner must provide proof, in the form of legible FSA maps and Form 578s, that the ground to be transferred was irrigated crop prior to the initiation of the request; The land to which the transfer will occur must pass LPNNRD inspection as quality irrigable ground; Once transferred the new irrigated ground must be Acre Certified by LPNNRD; A fee, in the amount of \$300.00 to initiate the transfer request. Any deviations from these conditions are at the discretion of the Lower Platte North NRD’s Board of Directors. Management Area rules and regulations are subject to change. Once these conditions are met, a title search, conducted by a title company selected by LPNNRD and billed to the landowner(s) of record will be performed. When all relevant information relating to this transfer is complete a separate form will be generated authorizing the transfer of acres. Such form will be notarized; and filed, by LPNNRD, with the Register of Deeds of the relevant county.

Originating Parcel:

I, _____ do request the transfer of _____ Certified Irrigated Acres from
Landowner Name as it appears on the title Certified Acres
_____, a parcel I own, located in _____ consisting of _____
Parcel I.D. Legal Description Certified Acres
Certified Irrigated Acres, leaving a balance of _____ Certified Irrigated Acres in this parcel.
Certified Acres

Gaining Parcel:

I, _____ request LPNNRD to apply _____ irrigated acres,
Landowner Name Number of Acres
to _____, a parcel I own, located in _____.
Parcel I.D. Legal Description

I acknowledge, if the transfer is approved, these irrigated acres may only be applied to the gaining field and that I may no longer irrigate the acres transferred from the originating field. I further acknowledge that, if approved, should I not comply with all LPNNRD conditions relating to this transfer, I may suffer the relinquishment of these transferred acres to LPNNRD. Signature authorizes LPNNRD to access any federal records required to satisfy the transfer requirements. Signatory acknowledges that all titleholders of record understand and agree to the terms of the Irrigated Acre Transfer referred to herein.

Landowner Signature Date

Notary Signature and Stamp

TRANSFER APPLICATION INFORMATION

Lower Platte North Natural Resources District
PO Box 126, 511 Commercial Park Road
Wahoo, Nebraska 68066-0126
Phone (402) 443-4675
www.lpnnrd.org

Landowner Receiving Acres from Transfer: *Please list name as it appears on the Title.*

Landowner: _____ Phone#: _____

Address: _____ Email: _____

Contact if other than listed above: _____

Field Information: _____

_____ Section _____ Township _____ Range ____ County _____

Do you intend to drill a well for these acres? Yes No

Landowner Providing Acres for Transfer: *Please list name as it appears on the Title.*

Landowner: _____ Phone#: _____

Address: _____ Email: _____

Contact if other than listed above: _____

Field Information: _____

_____ Section _____ Township _____ Range ____ County _____

Explanation of Transfer Request: Include number of acres. Use additional pages if needed.

Please include

- Aerial photo with the proposed field(s), well(s), pipeline(s).
- Irrigation plan for gaining property, if pivot model is available it must be submitted with the application.

Application for the Transfer of Irrigated Acres between Landowners

This application is for the transfer of irrigated acres between landowners in the Lower Platte North Natural Resources District (LPNNRD). For acres to be transferred, the following conditions must be met: The land must be Acre Certified; the relevant parties must have current Nitrogen and Water Certification or have a tenant with such certification; The originating certified irrigated ground, as well as the gaining ground, must be in LPNNRD. The originating landowner must provide proof, in the form of legible FSA maps and Form 578s, that the ground to be transferred was irrigated crop prior to the initiation of the request; The land to which the transfer will occur must pass LPNNRD inspection as quality irrigable ground; Once transferred the new irrigated ground must be Acre Certified by LPNNRD; A fee, in the amount of \$300.00 to initiate the transfer request. Any deviations from these conditions are at the discretion of the Lower Platte North NRD’s Board of Directors. Management Area rules and regulations are subject to change without notice. Once these conditions are met, a title search, conducted by a title company selected by LPNNRD and billed to the landowner(s) of record will be performed. When all relevant information relating to this transfer is complete, a separate form will be generated authorizing the transfer of acres. Such form will be notarized; and filed, by LPNNRD with the Register of Deeds of the relevant county.

Transferor:

I, _____ do hereby request the transfer of _____ Certified Irrigated Acres from
Landowner Name Certified Acres
_____, a parcel I own, located in _____ consisting of _____
Parcel I.D. Legal Description Certified Acres
Certified Irrigated Acres, leaving a balance of _____ Certified Irrigated Acres in this parcel.
Certified Acres

I acknowledge, that if the transfer is approved, I relinquish all rights to these irrigated acres. I further acknowledge that I am in compliance with all LPNNRD conditions relating to this transfer. Signature authorizes LPNNRD to access any federal records required to satisfy the transfer requirements. Signatory acknowledges that all titleholders of record understand and agree to the terms of the Irrigated Acre Transfer referred to herein.

Signature Transferor Date

Transferee:

I, _____ do hereby request the receipt of _____ irrigated acres, to be granted by
Landowner Name Number of Acres
LPNNRD, applied to _____, a parcel I own, located in _____.
Parcel I.D. Legal Description

I acknowledge, that if approved, these irrigated acres shall become my property and that I must remain in compliance with all LPNNRD conditions relating to this transfer request or I may suffer the relinquishment of these transferred acres to LPNNRD. Signature authorizes LPNNRD to access any federal records required to satisfy the transfer requirements. Signatory acknowledges that all titleholders of record understand and agree to the terms of the Irrigated Acre Transfer referred to herein.

Signature Transferee Date

Notary Signature and Stamp

**Soil Moisture Sensor Incentive Program
Advanced Sensor Technology**

Lower Platte North Natural Resources District
PO Box 126, 511 Commercial Park Road
Wahoo, Nebraska 68066-0126
Phone (402) 443-4675
www.lpnrd.org

Landowner/Tenant: _____ Date _____

Address: _____ City _____ Zip _____

Phone#: _____ Email: _____

Field Information:

Quarter _____ Section _____ Township _____ Range ____ County _____

Equipment Brand _____

Allow LPNNRD access to information on soil moisture sensor data? Yes No

LPNNRD Staff Approval _____ **Date** _____

Cost Share Assistance for Advanced Sensor Technology

The Lower Platte North NRD has limited funding available to assist growers in the purchase of soil moisture sensor technology. The assistance is limited to lands operated within the boundaries of the Lower Platte North NRD. The Lower Platte North NRD has funding to offer 50% reimbursement up to \$750 of the actual cost of the purchase of soil moisture sensors and dataloggers. There are a variety of technologies available and the Lower Platte North NRD can provide guidance in helping the grower determine which product is right for his operation.

Criteria

Application deadline will be March 15, 2022

One application per producer or entity to spread out the cost share.

- Priority Selection
 1. 1st - Special Quantity Sub-Areas
 2. 2nd - Phase Areas
 3. 3rd - District wide
- One-time cost-share
- Invoice required for cost-share money will be dispersed.

As limited funds are committed for the year, a new application if not approved is required for the following year.

**Approved List of Propeller Flow Meters
Lower Platte North Natural Resources District (LPNNRD)
Effective: October 5, 2017**



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).

Manufacturer	Model	Notes
McCrometer	McPropeller	All propeller models
Sparling	Propeller saddle meter	Model 312 propeller meter
ARAD Group	Saddle Water meter	Meter for irrigation applications
Geyser	Saddle meter	All propeller models for Farmland Irrigation
Senninger	Ag Rotor meter	Propeller model

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.



Approved List of Magnetic Flow Meters
Lower Platte North Natural Resources District (LPNNRD)
Effective: October 5, 2017

Approved List of Magnetic Flow Meters and Required Conditions

LPNNRD requirements for all magnetic flow meters:

- Anti-reverse flow feature to prevent backflow measurements.
- Only can be located where water discoloration is not an issue.
- 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. Magnetic meters are sensitive to air bubbles and sediment so many of these should be installed at a 45 degree angle on the pipe to avoid air bubbles or sediment from directly hitting the sensors. Follow recommendations of the manufacturer.
- 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 many cases straightening vanes (or other flow straightener) may be necessary.
- Meter totalizes flow in acre inches.
- 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).
- Chemigation also affects proper location of magnetic flow meters. These flow meters should be installed upstream of the chemigation injection point or far enough downstream that complete mixing occurs before the chemigation solution reaches the meter. In some cases this maybe at least 10 pipe diameters downstream of the injection point. Again follow manufacture’s recommendations.
- Magnetic meters have minimum fluid conductivity restrictions so make sure the meter is within the conductivity tolerances of the water being measured (fresh water vs brackish water).
- Battery life should be at least 3 years with a backup that will store the latest information if the main battery should fail.

Manufacturer	Model	Notes
McCrometer	Mc Mag 3000	
McCrometer	Dura Mag	
Lindsay	Growsmart IM3000	All IM3000 models
Senninger	Magmeter 2551	
Seametrics	Magmeter AG2000	
Sparling	Bluewater FM676	
Valley	Valley 3000	

LPNNRD will inspect systems for proper installation of flow meters.

2022

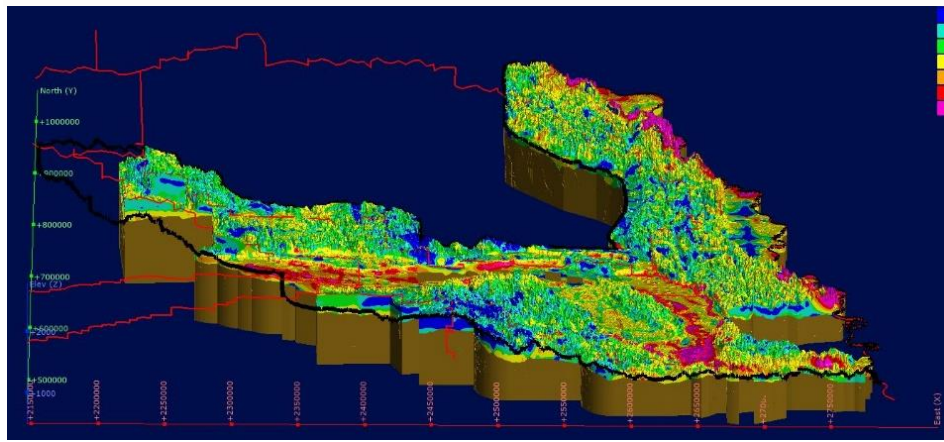
Lower Platte North Natural Resources District

Lower Platte Basin River Plan Report

Introduction

Report period is from January 1, 2021 to December 31, 2021.

Water Quantity Activities



Lower Platte North and Pappio-Missouri River NRDs worked on a joint project with LRE developing a geologic framework model utilizing AEM (Airborne

Electromagnetic Survey) information, well logs and boreholes. The picture above shows a resistivity map with red showing the greatest and blue the lowest.

The Drought Consortium conducted a workshop, which went through a couple of scenarios on what management activities would occur with each agency during a drought. More discussion will continue in 2022 on identifying projects and procedures.

Well Permits Issued Approved, Cancelled or Denied

The Lower Platte North issued 33 new wells permits in 2021. There were 31 irrigation wells, which 19 were replacement: 1 municipal well and 1 domestic.

Water Use Information for Irrigation Wells

Total Number of Reports from Flow Meters – 1075 in 2021 compared to 1040 in 2020. Water Use from the Water Quantity Management Areas; SQS#1 – 2.14 in/ac; SQS#2 – 4.71 in/ac. Other Meters within the District – 4.57 in/ac in 2021 compared to 5.88 in/ac in 2020.

Water Quality Activities

Lower Platte North worked with Dan Snow – UNL Water Center on a vadose and groundwater analysis project within LPN nitrogen management areas. The final report was completed in 2021 with conclusion from the study shown.

Conclusions:

Based on the trends of groundwater and vadose zone nitrate levels in this area of the LPNNRD, there is clearly continued loading of nitrate to the water table. The Bellwood Phase 2, Richland and Schuyler Phase 2 and 3 Groundwater Management Areas have some of the highest groundwater nitrate concentrations of the district. Analysis of six deep vadose zone samples shows pore water nitrate concentrations with location averages ranging 8.82 from 42.55 mg/L, similar to local groundwater concentrations. Vadose zone nitrate was highest beneath cropland with continuous corn and soybeans, while alfalfa, grass, and cover crops had much lower nitrate levels. Except for 2 wells, arsenic and uranium concentrations in groundwater samples were generally below the maximum contaminant level for drinking water. Stable isotope analysis of nitrate in the groundwater and vadose zone samples indicates over half of nitrate nitrogen is likely from the overapplication of commercial fertilizer. Several samples show evidence of enrichment by denitrification, especially grab samples taken near the water table, and several have nitrogen isotope composition characteristic of a mixture of organic (manure) nitrogen and commercial fertilizer. Comparison of sites with enriched nitrogen to manure application can help confirm the importance of this source. The majority of samples, however, have nitrogen isotope composition similar to commercial (inorganic) nitrogen, and thus efforts to limit the application of fertilizer is 5 recommended. Future vadose zone and groundwater sampling in these areas will provide information on the effectiveness of any changes in nutrient management practices.

Water Demand Inventory

The District is in the sixth year for obtaining required water use reports for municipalities. Industrial and other high-capacity wells report voluntarily, unless drilled after 2012. Shown on the next couple of pages are water consumption from Municipal, Industrial, Livestock and Dewatering wells.

Municipal Water Uses

City	Total Gallons (2020)	Total Gallons (2021)
Ashland	166,488,000	120,253,000 (within LPN)
Bellwood	17,608,000	17,879,000
Newman Grove	32,796,900	36,634,547
Lindsay	79,117,800	72,164,700
Platte Center	15,949,100	16,089,370
David City	212,853,406	198,080,911
Wahoo	236,719,180	232,551,090
Yutan	46,538,000	47,582,000
Mead	23,250,000	19,098,187
Fremont	4,185,726,000	3,927,356,000 (within LPN)
North Bend	85,427,000	93,723,000
Schuyler	396,926,000	396,327,340
Cedar Bluffs	31,820,553	21,445,017
Prague	9,906,000	11,367,000
Weston	15,046,500	16,270,960
Malmo	4,056,880	3,889,950
Ithaca	7,378,000	4,480,000
Abie	2,397,700	3,325,550
Memphis	8,100,000	9,242,000
Bruno	David City total	David City total
Colon	Wahoo total	Wahoo total
Lincoln	5,174,138,440	4,380,468,900 (within LPN)
MUD West	9,417,157,000	9,629,850,000 (within LPN)
Morse Bluffs	6,127,000	3,797,000

Lower Platte North Rural Water Systems supplies drinking water to Bruno and Colon with David City and Wahoo supplying the water. The total water use is already shown under the respective communities for 2021.

Industrial Water Uses

Well Reg	2020 Total Water Use	2021 Total Water Use		
G-153440	366,400	Not received	Butler County Landfill Inc	
G-171846	33,984,814.78	30,989,230	Western Sand and Gravel	
G-177445	146,088.52	Reading didn't change	Western Sand and Gravel	

Livestock Uses

The NRD is obtaining numbers from the Poultry Operations. A couple of sites have dataloggers with remote reads.

Well Reg	2021 Total Water Use/Gallons	Size	Specific Use
G-152182	22,357,000	??	Cattle
G-189229	372,470	4 barns	Chickens
G-189230	275,341	8 barns	Chickens
G-185409	1,089,400.50	16 barns	Chickens
G-189228	372,090	4 barns	Chickens
G-189231	808,646	8 barns	Chickens

Couple example of water uses for livestock:

-Chicken Barn usage: 28.47-acre feet; 12 barns; 45,000 chickens to a barn; 6 flocks; 3,240,000 birds raised/ 9,276,892.56 gallons pumped; / 2.86 gallons per bird raised

-Swine: Total pumped in 2021: 28,183,700 = 86.49-acre feet

Dewatering Wells within City of Fremont

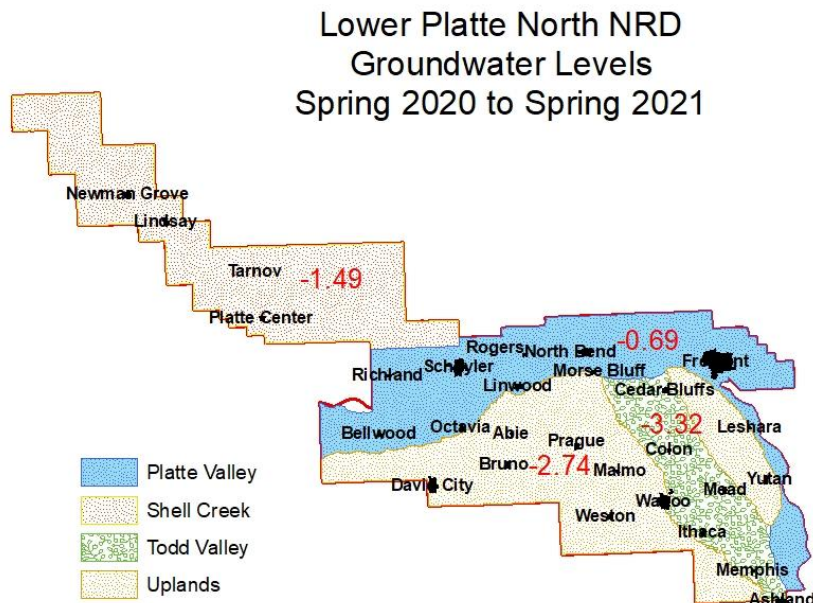
Well Reg	2020 Total Water Use/Gallons	2021 Reading Total Water Use/Gallons
G-181255	29,830,358	34,568,762
G-181192	74,748,630	16,213,509
G-0	10,201,225	Have not received
G-181257	5,153,317	9,827,796

Public Outreach

The District conducted ten “coffee shop” meetings with producers in the nitrogen management areas. These meetings allowed staff to visit with producers on concerns and ideas to assist in curbing the rising nitrates in these areas. Staff assisted producers in entering their data online along with an informal survey on what best management practices they would consider if money was not an obstacle. These meetings had around 60% attendance with great conversation in a one-on-one setting.

Water Supply Inventory and Groundwater Elevation Data

Water samples continue to be taken from the state network wells. All this information has been developed in a cloud base database for remote implementation.



Groundwater Levels 2020-2021 – As shown by the map, groundwater levels have declined from spring 2020, with 87% of the wells declined from the 2020 spring levels. Fall levels in 2021 did show a decline from Fall 2020.

Certified Acres

ALL IRR	All Irrigation Ground	All Irrigation Surface	All Irrigation Commingled
County			
Boone	28622.40	0.00	0.00
Butler	57041.37	671.15	373.05
Colfax	53823.79	240.34	1003.89
Dodge	51034.25	84.52	599.09
Madison	5797.75	0.00	0.00
Platte	90084.90	692.15	1091.70
Saunders	105279.68	2617.39	2055.22
Total	391684.14	4305.55	5122.95
HCA IRR			
HCA Ground			
HCA Surface			
HCA Commingled			
County			
Boone	28622.40	0.00	0.00
Butler	45231.78	602.82	83.02
Colfax	46908.34	205.64	1003.89
Dodge	51034.25	84.52	599.09
Madison	5797.75	0.00	0.00
Platte	76867.58	692.15	1091.70
Saunders	80440.32	2545.50	1823.73
Total	334902.42	4130.63	4601.43
NON HCA IRR			
Non_HCA Ground			
Non_HCA_Surface			
Non_HCA_Commingle			
County			
Boone	0.00	0.00	0.00
Butler	11809.59	68.33	290.03
Colfax	6915.45	34.70	0.00
Dodge	0.00	0.00	0.00
Madison	0.00	0.00	0.00
Platte	13217.31	0.00	0.00
Saunders	24839.35	71.89	125.59
Total	56781.70	174.92	415.62

New Depletions and Groundwater Consumptive Uses 2021 Granted, Cancelled, or Denied

Change ID	County	Township	Range	Direction	Section	Change Type	Change Date	Area	Wells	Use of irrigated acres	SDF	NIR Feet	Acre Feet Depletion
LPN-V-021-0528	Saunders	17		7 E	28	new well	10/12/2021	80		Crop Production		0.79 HCA	14.21
LPN-V-021-0529	Platte	19		2 W	27	new well	10/12/2021	40		Crop Production		0.64 HCA	5.72
LPN-V-021-0530	Saunders	15		8 E	5	new well	10/12/2021	135		Crop Production		0.9 HCA	27.24
LPN-V-021-0531	Saunders	16		7 E	16	new expansion	10/12/2021	20	G-110991	Crop Production		0.57 HCA	2.57
LPN-V-021-0533	Platte	20		4 W	26	new expansion	10/12/2021	10.17	G-030447	Crop Production		0.67 HCA	1.53
LPN-V-021-0534	Platte	19		2 W	22	new well	10/12/2021	137		Crop Production		0.57 HCA	17.64
LPN-V-021-0535	Colfax	17		2 E	16	new expansion	10/12/2021	15	G-000194	Crop Production		0.82 HCA	2.75
LPN-V-021-0536	Saunders	14		9 E	19	new well	10/12/2021	25		Crop Production		0.59 HCA	3.29
LPN-V-021-0538	Saunders	16		8 E	20	new expansion	10/12/2021	226	G-132900	Crop Production		0.79 HCA	39.56
LPN-V-021-0548	Boone	22		5 W	17	new well	10/12/2021	135		Crop Production		0.395 HCA	12.01
LPN-V-021-0549	Colfax	18		3 E	33	new expansion	10/12/2021	65	G-002292	Crop Production		0.89 HCA	13.06
LPN-V-021-0550	Saunders	15		8 E	23	new expansion	10/12/2021	25	G-015507	Crop Production		0.53 HCA	3.01
LPN-V-021-0551	Saunders	16		7 E	33	new expansion	10/12/2021	15	G-044294	Crop Production		0.84 HCA	2.85
LPN-V-021-0552	Saunders	15		7 E	23	new well	10/12/2021	80		Crop Production		0.76 HCA	13.759
LPN-V-021-0554	Saunders	17		6 E	27	new well	10/12/2021	63.44		Crop Production		0.87 HCA	12.47
LPN-V-021-0556	Saunders	16		6 E	6	new expansion	10/12/2021	6	G-159759	Crop Production		0.66 HCA	0.89
LPN-V-021-0557	Dodge	18		6 E	32	new well	10/12/2021	91		Crop Production		0.61 HCA	12.539
LPN-V-021-0559	Platte	19		2 W	15	new well	10/12/2021	34		Crop Production		0.54 HCA	4.139
LPN-V-021-0560	Platte	19		3 W	9	new expansion	10/12/2021	12.38	G-031110	Crop Production		0.78 HCA	2.181
LPN-V-021-0561	Saunders	16		7 E	23	new expansion	10/12/2021	25		Crop Production		0.83 HCA	4.681
LPN-V-021-0568	Platte	18		3 W	2	new expansion	10/12/2021	22	G-074608	Crop Production		0.74 HCA	3.67
G-144086	Boone	21		5 W	15	new expansion	4/15/2021	65.5	G-144086	Crop Production		0.59 HCA	8.68
Total Acres								1327.49				Total Acre Feet Depletion	208.449

Water Transfer Permit granted, Cancelled, or Denied: None for 2021

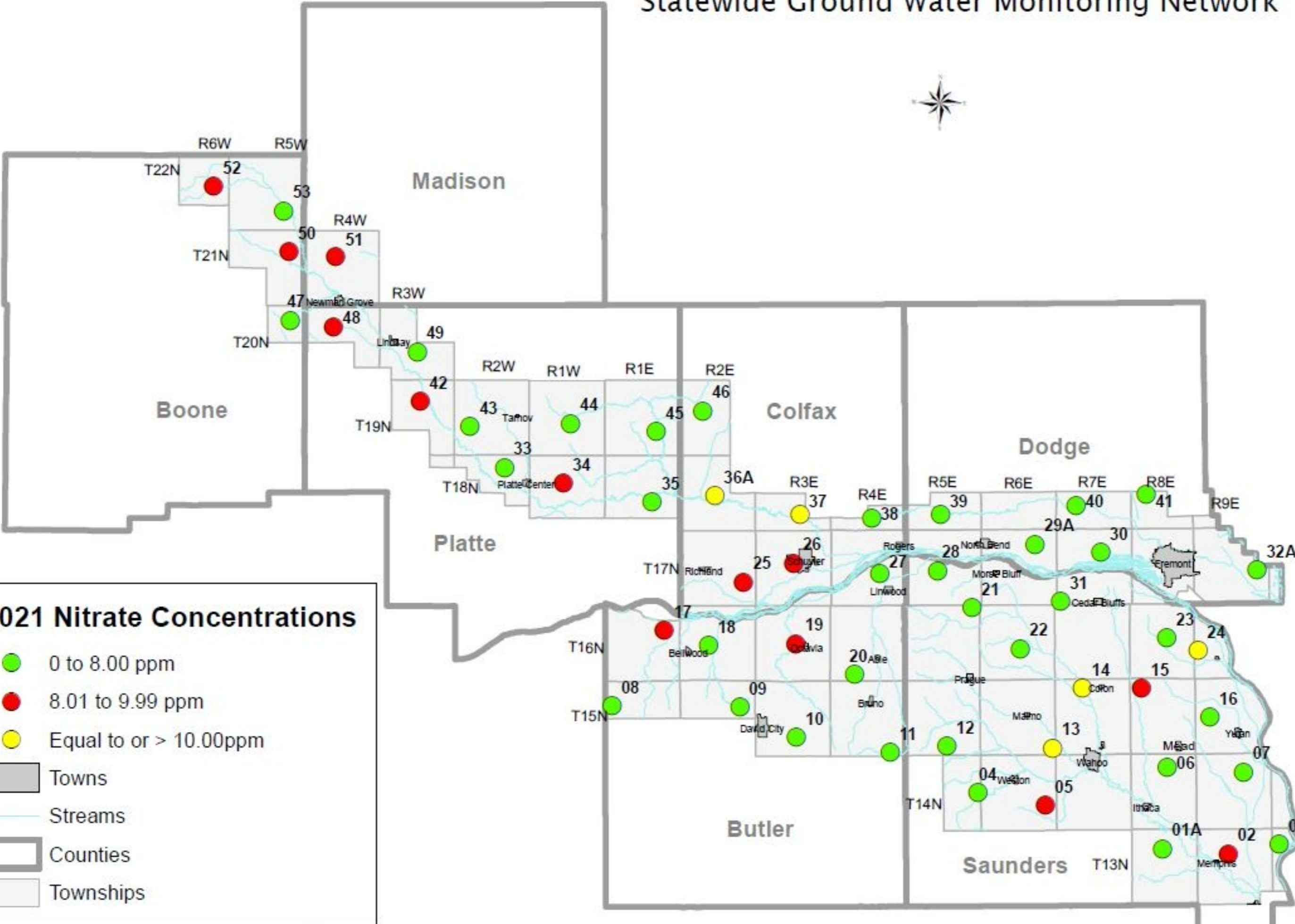
Stream gage measurements on District Maintained Gages:

Lower Platte North gages are joint projects with USGS or NeDNR

Water Banking Activities: None for 2021

Streamflow Accretion Activities (new projects, conjunctive management projects, etc.): None for 2021

Lower Platte North NRD Statewide Ground Water Monitoring Network



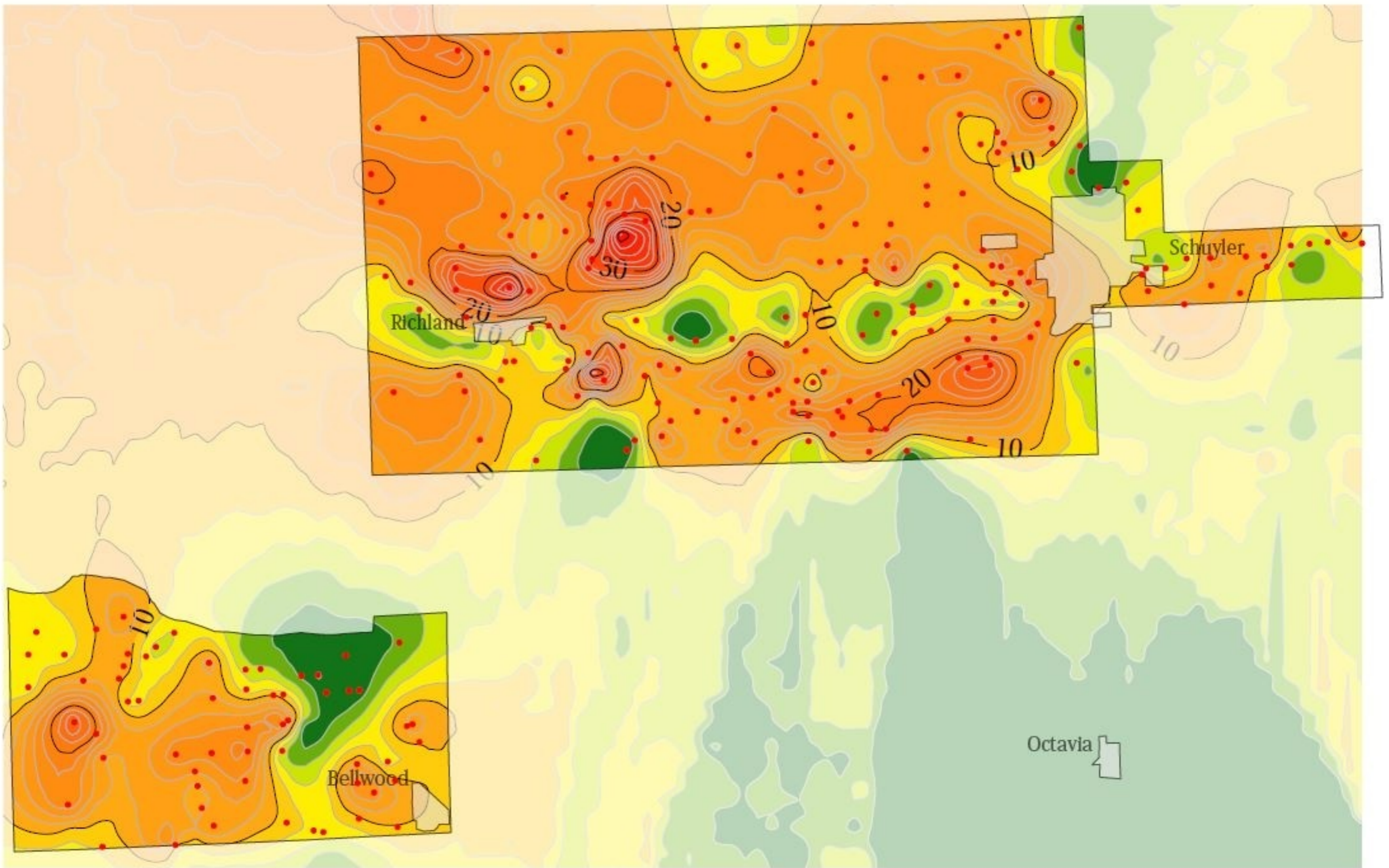
2021 Nitrate Concentrations

- 0 to 8.00 ppm
- 8.01 to 9.99 ppm
- Equal to or > 10.00ppm

- Towns
- Streams
- Counties
- Townships



LPNNRD Phase Area Nitrates - 2021

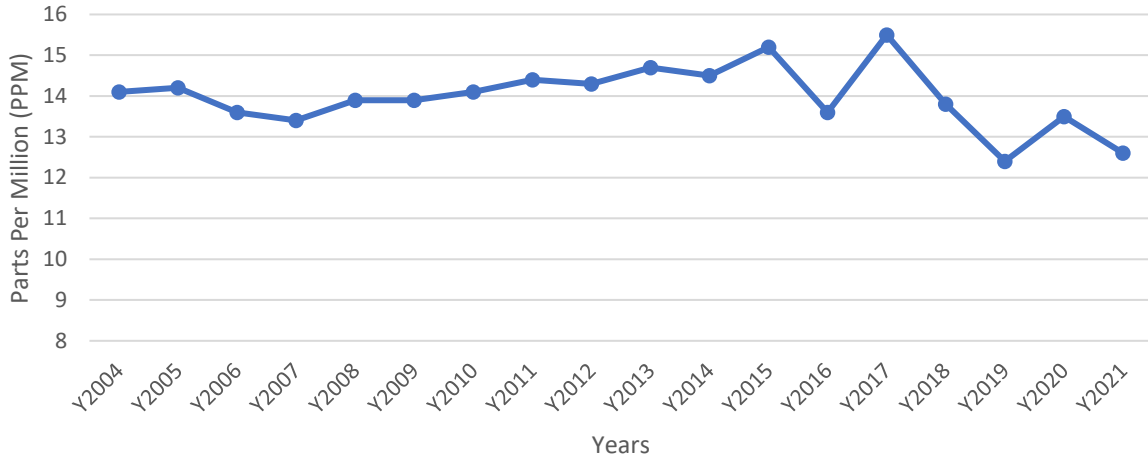


- Wells
- Contours
- Towns

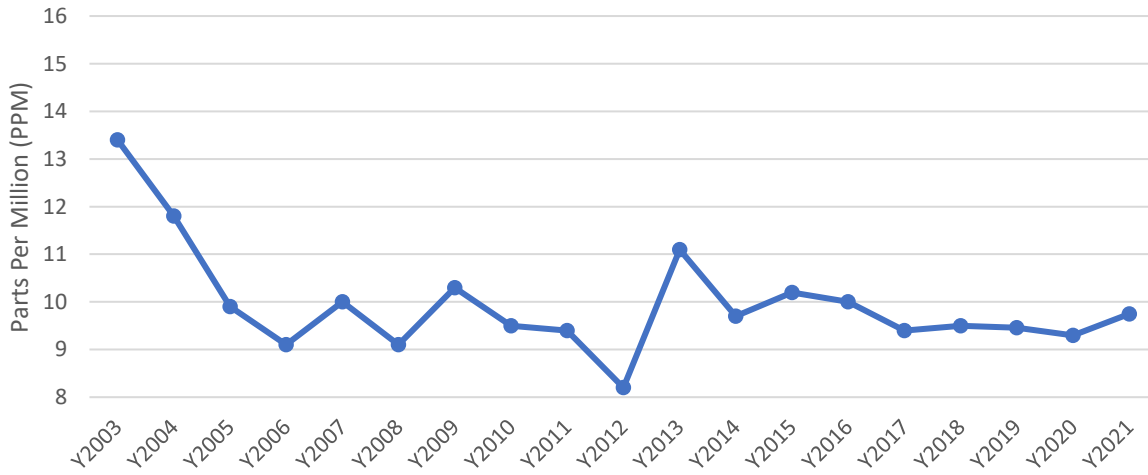
Contour Values 2021



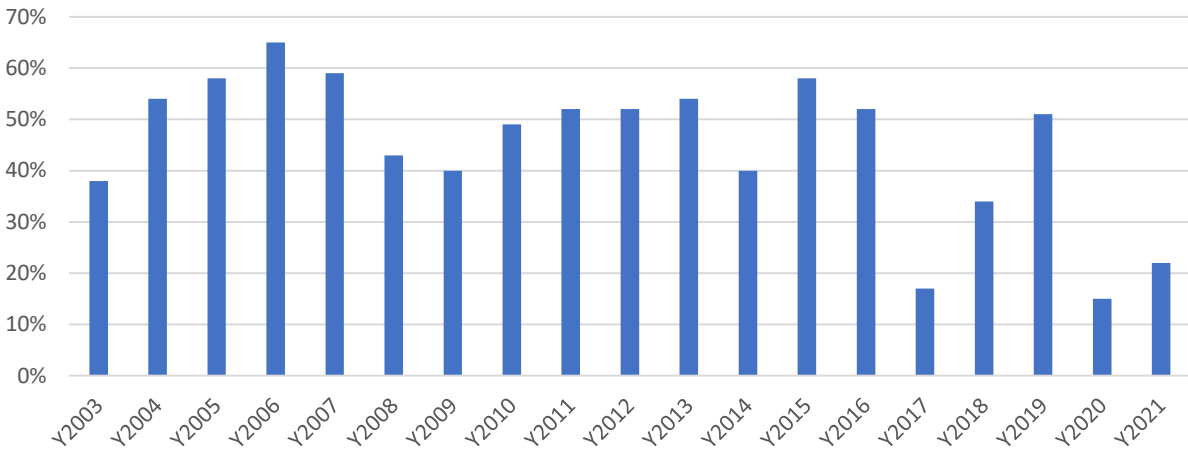
Average Water Nitrate Levels Richland-Schuyler



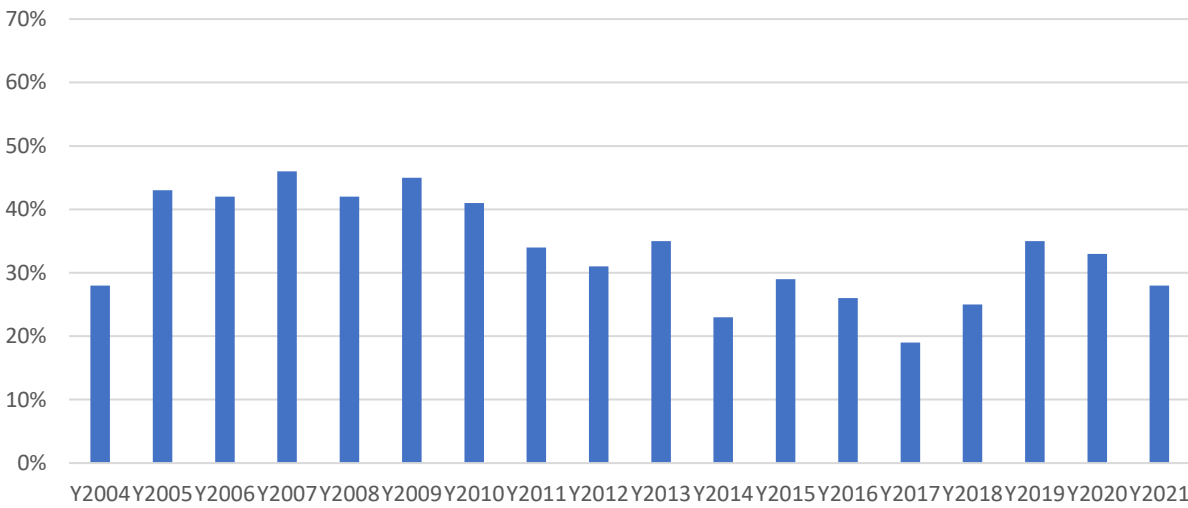
Average Water Nitrate Levels - Bellwood



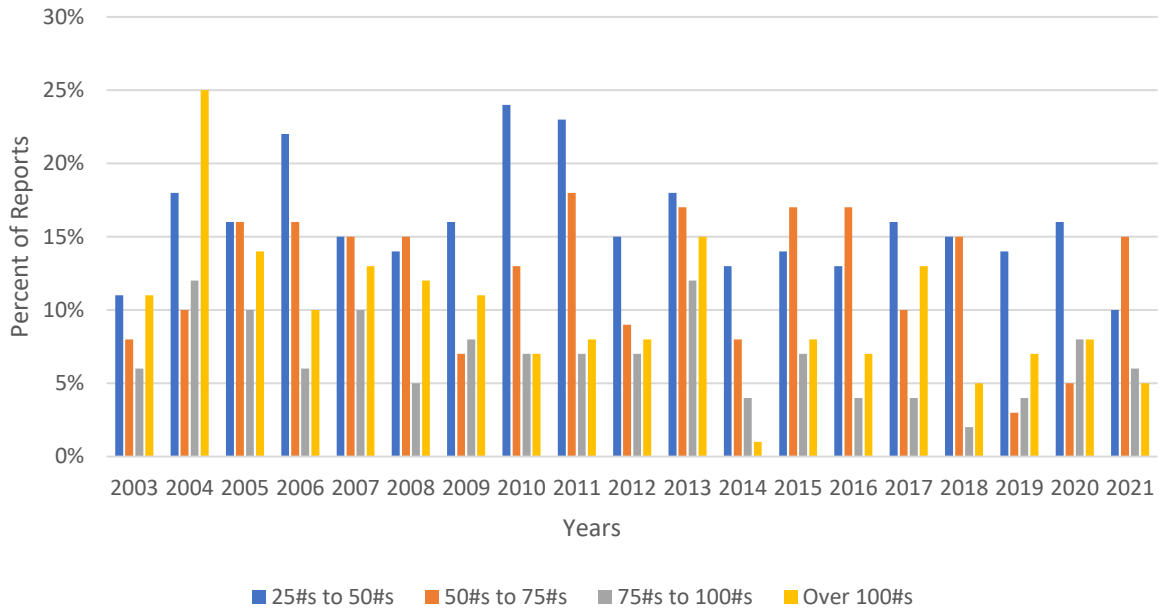
Percent of Fields Over 40 lbs Residual N Bellwood



Percent of Fields Over 40 lbs Residual N Richland-Schuyler



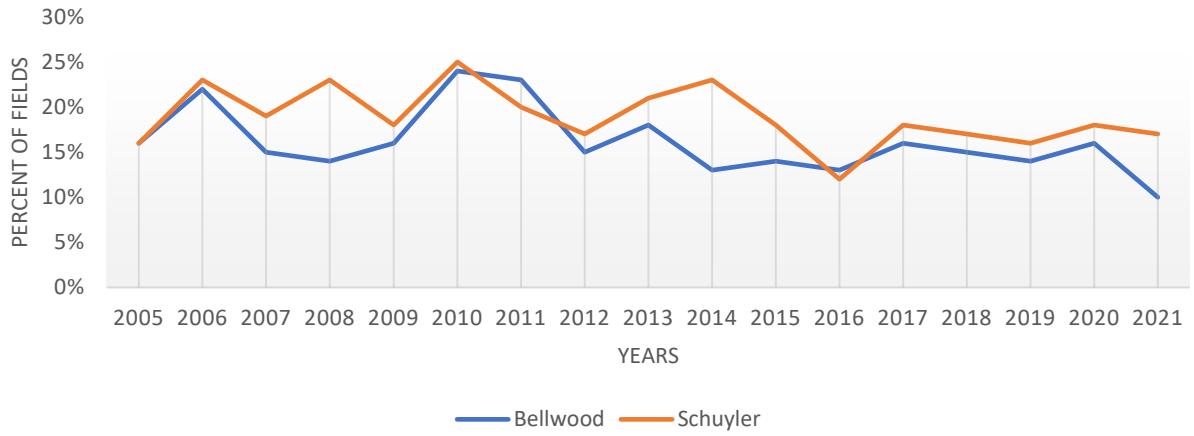
Bellwood Nitrogen Over Recommendation



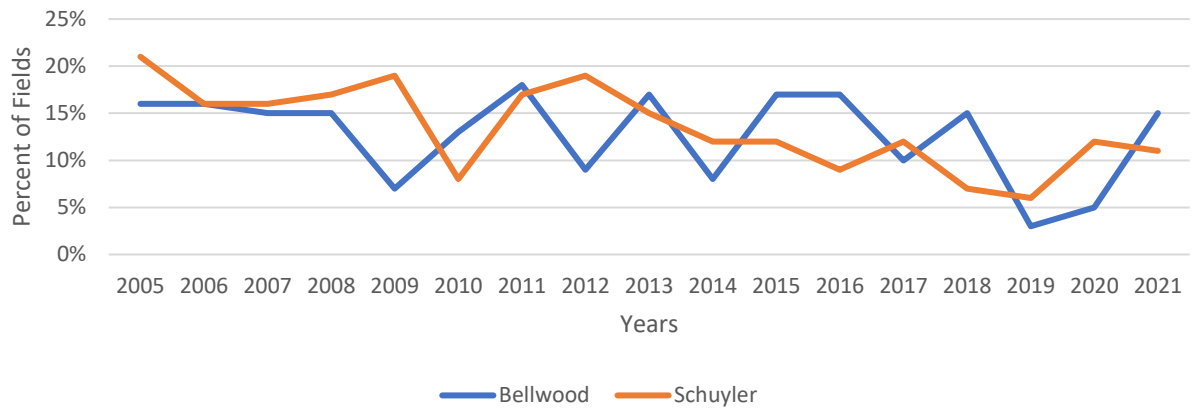
Richland-Schuyler Nitrogen Over Recommendation



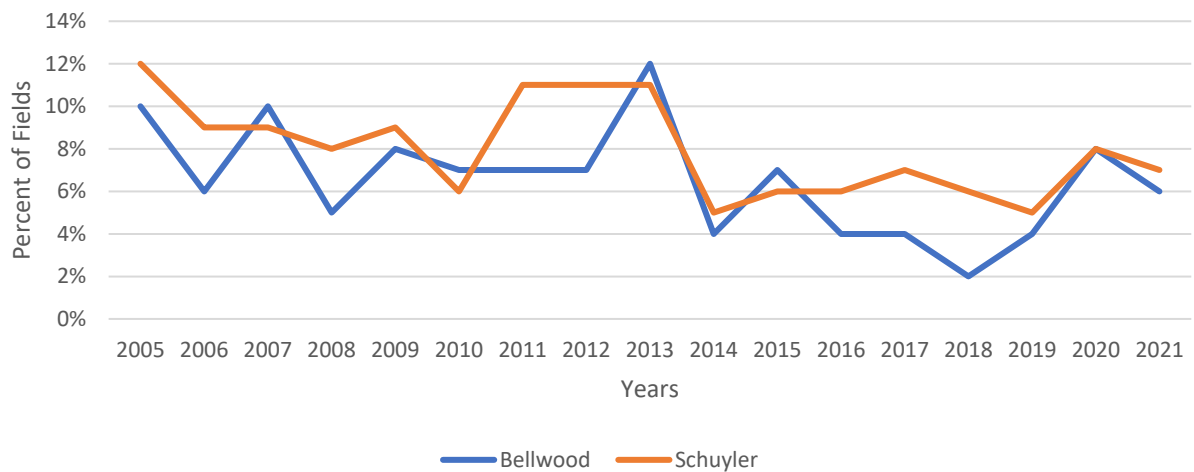
Phase Areas Over Application 25#s to 50#s



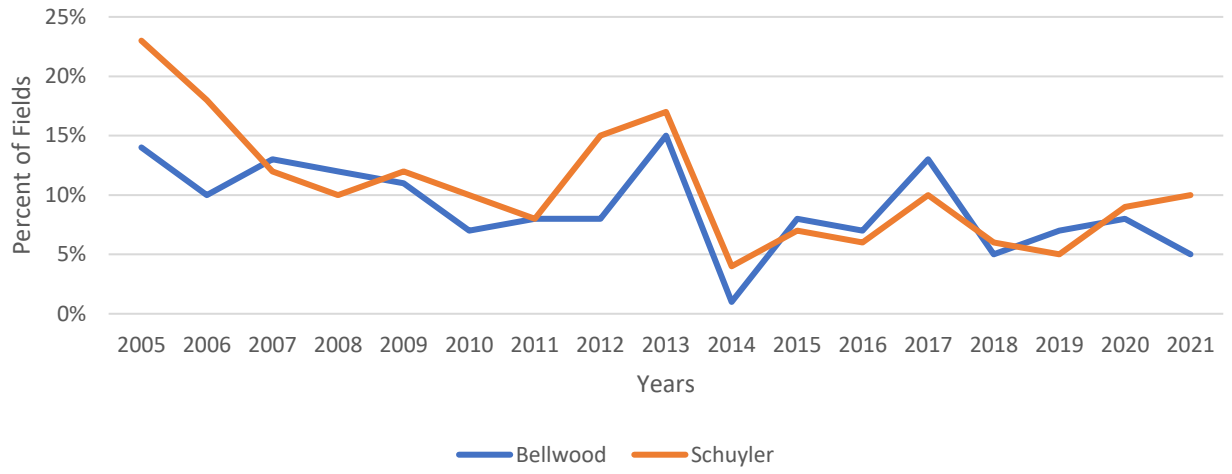
Phase Areas Over Application 50#s to 75#s



Phase Area Over Application 75#s to 100#s



Phase Area Over Applications by 100+ Pounds



**September 9, 2021 MONITORING WELL CONSTRUCTION
INVITATION # LPNNRD – PRU 2010 (2) PAGE 1**

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT
511 COMMERCIAL PARK ROAD, P. O. BOX 126
WAHOO, NEBRASKA 68066-0126

INVITATION TO BIDDERS

FOR

**MONITORING WELL CONSTRUCTION
LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT**

The Lower Platte North Natural Resources District (hereafter LPNNRD) is requesting proposals from qualified parties for monitoring well construction project for **Lower Platte North Natural Resources District, 511 Commercial Park Road, P. O. Box 126, Wahoo, NE 68066-0126** (hereinafter referred to as "LPNNRD"). It is our intent to receive sealed proposals from qualified Bidders, demonstrating the capability to provide the quality of product and /or service required to meet the needs and objectives of LPNNRD.

Vendors are requested to submit their proposal to LPNNRD. Proposals are due no later than the end of the business day, 4:30 pm, September 24, 2021. Proposals received after this date will not be considered for award. Please send your proposal to LPNNRD, Attention Daryl Andersen. Vendors are required to submit Proposal Pages 3 and 10.

Information contained in all proposals will be open for public inspection, after a review team has had the opportunity to evaluate all proposals.

Bidders are requested to submit a proposal, which is directly responsive to the items, conditions, specifications and other documents referred to in this Invitation to Bid.

Bidders are to respond to all requests for information and questions as listed in this Invitation to Bid. Bidders failing to provide requested information will be deemed non-responsive and their proposals will not be considered for award. All forms are to be completed and returned. Failure to complete the forms may disqualify your bid. These forms will be a primary source of information for the proposal evaluation process along with any additional response pages, exceptions pages, and other Bidder provided material LPNNRD may deem as informational to the selection and decision process.

All proposals must be valid for a period of at least ninety (90) days from the above date of bid opening.

LPNNRD reserves the right to reject any or all proposals, wholly or in part; to waive any technicalities, informalities, or irregularities in any proposal which does not materially affect the integrity or effectiveness of competitive bid process; and unless otherwise specified by the Bidder on their proposal, to accept any item or group of items in the proposal.

LPNNRD reserves the right to evaluate bids in detail, as provided in this invitation to Bidders, and to award a contract for purchase which, in the exercise of reasonable discretion, LPNNRD determines to be in its best interest.

PROPOSAL PAGE

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>UNIT/PRICE</u>
A.	Monitoring Well Drilling and Construction	Price Per Linear Foot	\$ <u>32.00</u>
B.	Threaded and Flush Joint PVC		
	1. Plain Casing 4" ID	Price Per	
	Linear Foot		\$ <u>10.00</u>
	2. Slotted Screen 4" ID	Price Per	
	(0.010 SLOT or 0.25)	Linear Foot	\$ <u>12.00</u>
C.	Well Development	Price Per Well	\$ <u>1,200.00</u>
D.	Protective Casing Installation and Pad	Price Per Well	\$ <u>4,600.00</u>

Payment Terms: 100 % 60 Days. Amendments Received No. Through Acknowledged.

Are You Incorporated? yes . 61-1502241
Federal Identification Number

Dvorak Well Inc. Steven J Dvorak
Firm Name By (Please Type Your Name)

1260 Foothill rd Steven J Dvorak
Address Signature

North Bend Ne 68649 Owner
City and State Zip Title

9-24-21 402-652-8342 402-652-8342
Date Area Code/ Phone # Area Code/Fax #

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SPECIFICATIONS FOR DRILLING AND
INSTALLATION OF MONITORING WELLS..... Pages 5 - 9

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ATTACHMENT #1
TEST HOLE AND WELL DEPTH ESTIMATES..... Page 11

ATTACHMENT #2
AERIAL PHOTO, Section 2, Page 11

ATTACHMENT #2
TEST HOLE INFORMATION..... Page 12

ATTACHMENT #3
MONITORING WELL SCHMETIC..... Page 13

If no responsive bids are received, LPNNRD reserves the right to negotiate on the best terms and conditions at the best possible price. Cost of project/service, along with completion date will be prime consideration for award.

LPNNRD reserves the right to conduct discussions with any or all respondents to this request for the purpose of clarification and modification. Discussion and negotiations may include, but is not limited to scope of work, schedule, and price.

Lower Platte North NRD

Dvorak well
the Plat

*would like to use .020 silt
& 16/30 sand
if possible*

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT
511 COMMERCIAL PARK ROAD, P. O. BOX 126
WAHOO, NEBRASKA 68066-0126

**FOR
MONITORING WELL CONSTRUCTION
LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT**

I/We, the undersigned, having carefully examined all the specifications and special conditions of this proposal, and fully understanding the types and qualities required, hereby propose to supply the following item(s) and/or services, certifying that each of these meets all the specifications and conditions requested, except as noted and that all prices stated include all cost such as, but not limited to equipment, supplies, services, labor, manufacturing, packing, crating, insurance, transportation, delivery, installation, training, service under warranty, etc. **FOB Lower Platte North Natural Resources District, 511 Commercial Park Road, P. O. Box 126, Wahoo, NE 68066-0126** (hereinafter referred to as "LPNNRD"). It is further understood and agreed that project start and completion dates are critical in this contract. The successful Bidder agrees to start this project between October 15 and December 15, 2021 and will continue as scheduled until the well is drilled, constructed, developed and the site restored according to the terms of this contract or as determined by LPNNRD.

The period of performance will not exceed 90 working days or January 15, 2022. LPNNRD may assess a penalty of \$100 per day after February 1, 2022 for failure to complete installation of the monitoring well and the site restored to near pre-construction conditions unless a good cause can be shown.

SEE ALL ATTACHED PROPOSAL SPECIFICATION PAGES

All questions regarding this bid, including those of a technical nature, are to be directed to Daryl Andersen or Russell Oaklund, phone (402) 443-4675, email dandersen@lpnnrd.org.

*****IMPORTANT CONTRACTOR INFORMATION – MUST BE COMPLETED BELOW*****

COMPANY: Dvarak well

SIGNED BY: [Signature]

ATTACHMENT #1
Well Depth Estimates

Site Number	Total Well Depth-ft	Filter Pack Depth-ft	GPS Coordinates	Screen Depth-ft
01-LPN-21	165	98 - 112 AND 148 - 162	N 41.474698° W -097.172144°	100-110 AND 150-160



2/28/2022

Projects being worked on:

Field Climate/Metos:

Fieldclimate admin site

A few sites still not reporting properly, will probably require some field work

Waiting on SIM cards for some replacements out in the field

Only 6 Field Units not reporting. (SIM Card issues)

Some loggers still need to be connected and set up

Phase Area:

Put together graphs/charts over past few weeks

General Database Work:

Cleaning up tasks/workflow dashboard as things get done

Cleaning up People database

Updated producer contact information updates

Work with producer side on phase reports/entry questions

Checking flow meter reports as they come in

Finding and fixing mistakes in the database

Water Programs Conference:

Attended conference virtually