Water Committee Meeting
Thursday, October 1, 2020 7:30 AM
Lower Platte North NRD Office
P.O. Box 126
Wahoo, NE 68066

1. UNFINISHED BUSINESS

2. REGULATORY

A. GROUND WATER MANAGEMENT AREA

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

   The District received 17 applications for new irrigated acres in the Hydrologically Connected Area. All applications listed on the attached table meet the 300 point ranking threshold. The 17 applications total 1,111 acres and account for 145.447 acre feet of new depletions.

   Staff showed the list to the Committee and didn't see an issue with any of the variances.
2. Variance Requests in the Non-Hydrologically Connected Area (Normal Development Area)

   One application was received prior to the August 15th deadline but was mixed in to the HCA applications. Randall Rasmussen has applied for a 17 acre expansion in the SE1/4SW1/4 S16-16-8E, Saunders County. This application had a ranking score of 370, and a total depletion of 3.825 acre feet.
3. Variance Requests in the Restricted Development Areas

   Attached are the list of conditions for Roger Harders Variance approval. Staff sent this to Roger on September 10. Staff also had Katie review this area for thoughts on monitoring well location. That information is also attached.

   a. Hollst Bros. RDA Expansion Application

      Hollst Bros. have applied for an expansion of 62.5 acres from an existing well in S30-T15N-R9E, Saunders County, Restricted Development Area.Well G-069761 currently irrigates 200.23 acres and pumps out of the dakota aquifer which underlies the quaternary formation.

This application would fall under GWMA Rules & Regulations Section P Rule #1: "**Rule 1:** The District will allow expansion of new acres but does not allow for any more consumptive use in the RDA. Any development of new irrigated acres in the RDA shall be offset with an equal number of irrigated acres retired within the same aquifer subarea and shall be considered a transfer. The RDA areas within Lower Platte North NRD are on file in the District office and shown on Exhibit A."

With a rolling allocation placed on the well of 27 acre inches, the additional 62.5 acres would set the rolling three year allocation at 20.58 acre inches.

4. Well Permit Program

a. Well Permits Approved

b. Wells Permits Approved: #

c. **Landowner**	d. **Number of Wells**	e. **Number of New Irrigated Acres**	f. **Typ**
i.	j.	k.	
o.	p.	q.	
u.	v.	w.	
aa.	bb.	cc.	d
gg.	hh.	ii.	

mm.

nn.
oo.
pp.
qq.
rr.
ss. The total number of approved permits for 2020 is #

Location of Approved Well Permits for 2020: Correct as of ####

tt. **County**	uu. **Irrigation - New**	vv. **Irrigation - Replacement**	ww.
bbb. **Butler**	ccc.	ddd.	eee.
jjj. **Colfax**	kkk.	lll.	mmm.
rrr. **Dodge**	sss.	ttt.	uuu.
zzz. **Boone**	aaaa.	bbbb.	cccc.
hhhh. **Madison**	iiii.	jjjj.	kkkk.
pppp. **Platte**	qqqq.	rrrr.	ssss.
xxxx. **Saunders**	yyyy.	zzzz.	aaaaa.

fffff. **Total**	ggggg.	hhhhh.	

nnnnn.

5. Cost Share Programs

a. Irrigation Well Sample Kits

312 kits have been sent out.

b. Flow Meter Maintenance Program

Attached is an article on mechanical vs electronic meters along with LPN approved meters as of 11/11/2018.

Does the Committee want to revise the approved flow meter list?

Committee and staff discussed the options and viewed the current list. The plan is to invite Lindsay Corp. to a Committee Meeting to discuss the meters they are offering. More discussion will continue throughout the fall and winter before a final list is updated.

6. Bellwood Phase 2 Area

7. 2020 is the eighteenth year for this Phase 2 Area. (In 2015 this area was reduced from 32 sections to 21 sections.)

8. a

9. **Ye**	10. **Nitrate-nitrogen** 11. **Range**	12. **Percent** 13. **Nitrate-nitrogen**	15. **Percent** 16. **Nitrate-nitrogen**	18. **Percent** 19. **Nitrate-nitrogen**	21. **Percent** 22. **Nitrate-nitrogen**

		14. **0 to 8.0 ppn**	17. **8.01 to 10.00 ppn**	20. **10.01 to 15 ppn**	23. **greater than 15 ppn**
24. 20	25. 0 to 25 ppn	26. 46.3% (44 of 95)	27. 8.4% (8 of 95)	28. 45.3% (43 of 95)	29.
30. 20	31. 0 to 25 ppn	32. 47% (44 of 94)	33. 15% (14 of 94)	34. 38% (36 of 94)	35.
36. 20	37. 0 to 24 ppn	38. 41% (29 of 71)	39. 14% (10 of 71)	40. 45% (32 of 71)	41.
42. 20	43. 0 to 31 ppn	44. 48% (48	45. 9% (9 of	46. 43% (43	47.

		of 100)	100)	of 100)	
48. 20	49. 0 to 28 ppn	50. 53.75% (43 of 80)	51. 7.5% (6 of 80)	52. 38.75% (31 of 80)	53.
54. 20	55. 0 to 22 ppn	56. 45.5% (41 of 90)	57. 15.5% (14 of 90)	58. 39% (35 of 90)	59.
60. 20	61. 0 to 35.7 ppn	62. 48.65% (54 of 111)	63. 11.71% (13 of 111)	64. 39.64% (44 of 111)	65.
66. 20	67. 0 to 26.6 ppn	68. 51% (56 of 110)	69. 6% (7 of 110)	70. 43% (47 of 110)	71.

72. 20	73. 0 to 28.9 ppn	74. 57% (61 of 107)	75. 9% (10 of 107)	76. 34% (36 of 107)	77.
78. 20	79. 0 to 25.8 ppn	80. 50% (53 of 107)	81. 9% (10 of 107)	82. 41% (44 of 107)	83.
84. 20	85. 0 to 22.3 ppn	86. 51% (55 of 108)	87. 13% (14 of 108)	88. 36% (39 of 108)	89.
90. 20	91. 0 to 32.3 ppn	92. 43% (31 of 72)	93. 8% (6 of 72)	94. 49% (35 of 72)	95.
96. 20	97. 0 to 35.1 pp	98. 34% (25 o	99. 11% (8 of	100. 55% (41 o	101.

	n	f 74)	74)	f 74)	
102. 20	103. 0 to 23.5 ppn	104. 36% (27 of 74)	105. 15% (11 of 74)	106. 49% (36 of 74)	107.
108. 20	109. 0 to 30.9 ppn	110. 40% (25 of 63)	111. 11% (7 of 63)	112. 49% (31 of 63)	113.
114. 20	115. 0 to 24.5 ppn	116. 46% (22 of 48)	117. 10% (5 of 48)	118. 44% (21 of 48)	119.
120. 2	121. 0. (8 to 20.5	122. 34% (19 of 56)	123. 11% (6 of 56)	124. 36% (20 of 56)	125. 19% (11 of 56)

126.

All sample results from Lab have been received.

127. Richland - Schuyler Phase 3 Area

128. 2020 is the fifth year of this Phase 3 Area. This Phase 3 area went into effect September 1, 2015. The 55 sections of this area first went into a Phase Area in 2004. The ten sections that were in Phase 2 are now in Phase 3. As such, the 2020 numbers (at bottom of table) are for 65 sections.

129. **Year**	130. **Nitrate-nitrogen Range**	131. **Percent** 132. **Nitrate-nitrogen** 133. **0 to 8.0 ppm**	134. **Percent** 135. **Nitrate-nitrogen** 136. **8.01 to 10.00 ppm**	
143. 2004	144. 0 to 47 ppm	145. 30% (42 of 139)	146. 10% (14 of 139)	
149. 2005	150. 0 to 120 ppm	151. 31.3% (74 of 236)	152. 10.2% (24 of 236)	
155. 2006	156. 0 to 53 ppm	157. 28% (50 of 181)	158. 14% (26 of 181)	
161. 2007	162. 0 to 99 ppm	163. 32% (75 of 231)	164. 10% (22 of 231)	
167. 2008	168. 0 to 46 ppm	169. 28% (53 of 190)	170. 12% (23 of 190)	
173. 2009	174. 0 to 57 ppm	175. 33% (72 of 216)	176. 6% (13 of 216)	
179. 2010	180. 0 to 57.5 ppm	181. 31% (70 of 229)	182. 7% (15 of 229)	
185. 2011	186. 0 to 65.8 ppm	187. 28% (67 of 241)	188. 9% (21 of 241)	
191. 2012	192. 0 to 52.6 ppm	193. 29% (70 of 241)	194. 9% (21 of 241)	
197. 2013	198. 0 to 94.0 ppm	199. 25% (63 of 252)	200. 9% (23 of 252)	
203. 2014	204. 0 to 101.0 ppm	205. 27% (68 of 251)	206. 9% (22 of 251)	
209. 2015	210. 0 to 53.3 ppm	211. 23% (55 of 238)	212. 12% (29 of 238)	
215. 2016	216. 0 to 50.5 ppm	217. 25% (58 of 228)	218. 10% (22 of 228)	
221. 2017	222. 0 to 53.4 ppm	223. 25% (60 of 238)	224. 6% (14 of 238)	
227. 2018	228. 0 to 56.9 ppm	229. 26.5% (50 of 189)	230. 6.3% (12 of 189)	
233. 2019	234. 0 to 39.4 ppm	235. 25% (53 of 209)	236. 11% (22 of 209)	
239. 2020	240. 0 to 50.8	241. 25% (59 of 234)	242. 6% (14 of 234)	

245. All sample results from Lab have been received. There are, however, two dozen kits to Phase 3 Area producers which have not yet been returned.

246. GROUND WATER QUALITY SAMPLING

Some maps showing nitrates results. These are the samples that NRD staff collected.

Staff presented the nitrate maps showing the preliminary nitrate results from the water sampling conducted in summer 2020. The Committee is concerned on the percentage of wells over 15 ppm in the Schuyler-Richland Phase Area. It was recommended that staff should have discussions with public health officials for their thoughts on the nitrate issues. Staff will be contacting this group for future education to the Committee/Board.

3. GROUND WATER PROGRAMS

A. DECOMMISSIONED WELL PROGRAM

1. Well Estimates

2. # new wells has been reviewed and approved for decommissioning since the last Committee meeting.

3. **Well Owner**	4. **Type of Well**	5. **Cost Share Estimate**	6. **County**
7. GDR Farms	8. Irrigation	9. $1,000.00	10. Butler
11.	12.	13.	14.
15.	16.	17.	18.

19.

20. Plugged Wells

21. # wells have been plugged, reviewed, and ready for cost share payment approval this month.

22. **Well Owner**	23. **Type of Well**	24. **Cost Share Estimate**	25. **County**
26.	27.	28.	29.
30.	31.	32.	33.
34.	35.	36.	37.

38.

B. LOWER PLATTE NORTH NRD GROUND WATER STUDIES

1. Phase Area Update

Staff has been working directly with LRE/JEO on the Nitrogen Risk Management Tool. Here is some information from the conversations, which staff/committee can give some input. Attached is conceptual flow chart.

Staff showed the flow chart to the Committee and explained that after the assessment tool is developed, it can assists in identifying areas of greatest concerns in terms of contamination leaching. The nitrate assessment tool should help in placing best management practices in strategical locations.

SWB Model

- Model in initial calibration stage
- A qualitative calibration will be completed using Dr. Snow's vadose data provided by the NRD.
- Model will be run at this time with the following landcover categories:

1. Corn
2. Soybeans
3. Alfalfa
4. Pasture/Grass
5. Wheat/small grain (Action item: Roscoe will discuss with Joel on the roots zones to see of other category may be broken out of this)

2. **BMPs - Tool input (Committee Input)**

- 2 crop rotation
- Manure Application
- Variable Rate N application
- Split application
- Tissue sampling
- No till
- Buffer strips
- Residue management
- Flow Meters to monitor water usage
- Using Phase Reports as a tool before applying fertilizer
- Soil Sampling/Recommended Fertilizer rate
- Introducing microbial life with the application of bioremediation products
- Chemigation
- Soil Moisture Probes
- Cover crops
- Rye
- Barley

- Forage Mix
- Remote reading of rainfall, soil moisture, humidity and a number of other crop health factors to give the crop the fertilizer it needs at the time it needs it for maximum efficiency.

3. Irrigation Methods and Nitrogen Application

- The NRD will provide literature on common practice methods associated nitrogen applications associated with different irrigation types.
    - Possible irrigation Categories:
        - No irrigation
        - Center Pivot
        - Chemigation (this may apply to many methods)
        - Furrow
        - Drip
- This may be used in place of a range of nitrogen application categories:
        - No Nitrogen
        - Reduced Nitrogen
        - Typical for Crop
        - Long-term typical applications
        - Heavy long-term application
- Further discussion with the NRD to define the methods is necessary on this to nail down the approach to determining the qualitative risk associated with variable nitrogen loadings. (Action item: TBD)

4. ELM Modeling Project

The LLNRD has had an account open for the Elm Modeling project that still had some cash in it. We have decided to close that account and distribute the money based on participation percentage back to the Districts.
You will be receiving a check in the mail that reflects those amounts. Don't spend it all in one place!
Thanks!
Russ

LCNRD - $400.92
LENRD - $2,502.30
LNNRD - $891.70
LPNNRD - $894.01
MNNRD - $760.37
UENRD - $3,023.04
ULNRD - $3,513.82

The Lower Platte North will be receiving $894.01 for its portion from LLNRD.

C. Long Range Plan 2020-21

Staff explained the changes made to the Long Range Plan, which the Committee had no issue with. The Committee did discuss the process of implementing flow meters district wide. Staff explained that if the NET grant is approved for BMPs in the phase areas, the NRD would be offering cost-share to start the process of installing flow

meters in these areas in 2021. Staff reported to the Committee, that at this time around 1000 wells are required to have flow meters and is in the process of getting about 2 dozens producers, since 2008, into compliance with this requirement.

Attached is the Long Range Plan that was presented at September Board Meeting. The Plan was tabled as concern was raised over the direction of a Board Member on Water Use within the District. Staff added these statements on page 11 (15) and 13 (17).

To start the process of collecting accurate water use data to assist in future water studies and increase water consumption efficiency.

6. Integrated Water Management. Siting of potential recharge sites, storage reservoirs (both surface and groundwater), and potential water reuse projects to enhance the water supply in the District. Additional water use devices, monitoring wells, streamflow gauging, and precipitation sites will likely be necessary. Effects of climate change will also need to be considered as part of integrated water management.

The following statement was already included on page 12 (16)

Develop a groundwater model for each sub-area. Additional information on water use from all wells will be needed for accurate information.

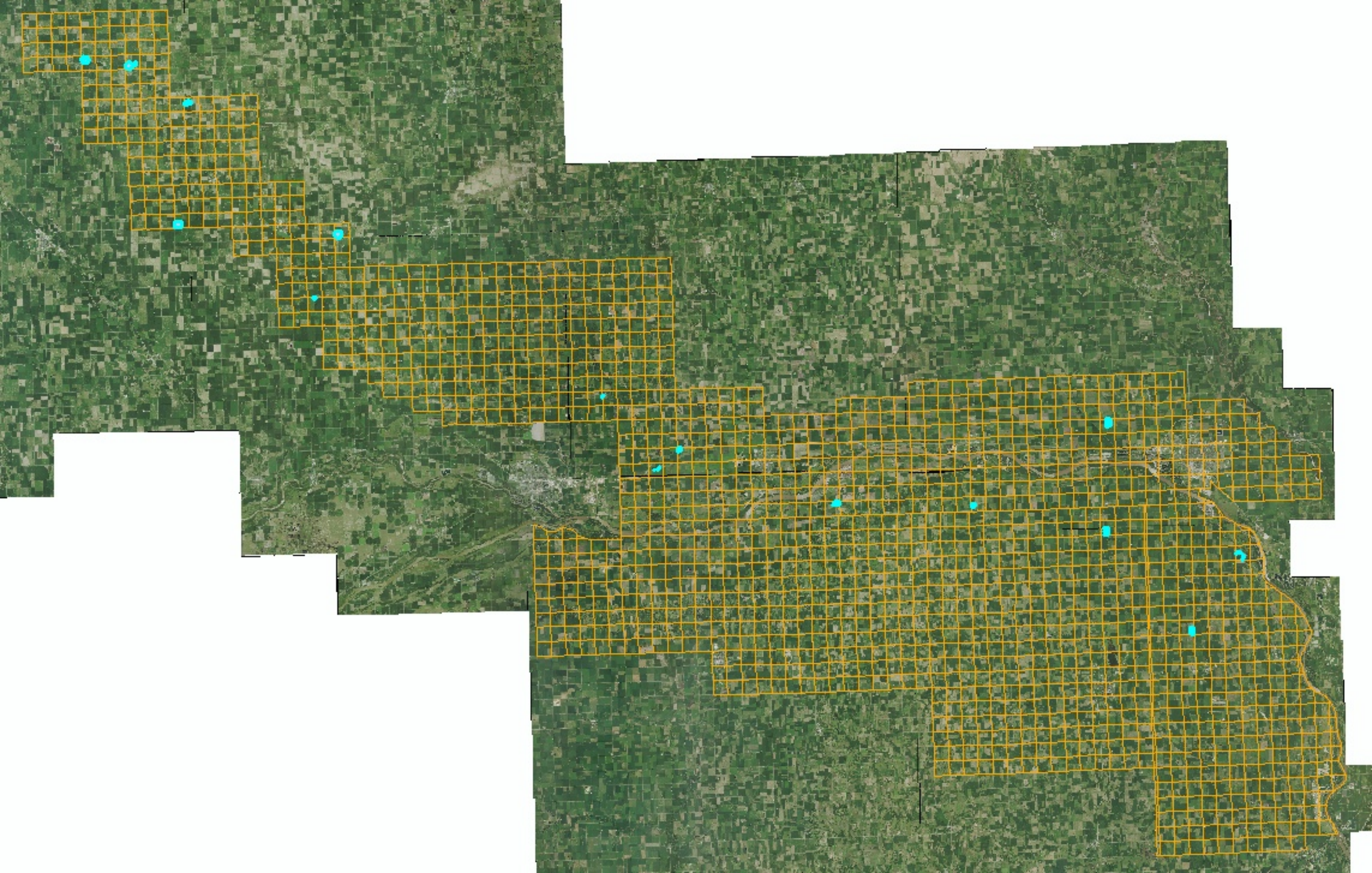
Is the Committee wanting to make a motion to install Water Use Devices District Wide? If yes, what would be the time table? Groundwater Rules and Regulation change? What is the purpose or justification to go District wide with Water levels, as a whole, still above trigger levels?

4. SURFACE WATER PROGRAMS

5. OTHER

A. COMMENTS FROM THE PUBLIC

VarianceNumber	Applicant	ApplicationType	County	SubArea	RankingScore	Acre Feet Depletion	Acres	Section	Township	Range	Direction
LPN-V-020-0517	Joe E Kavan	expansion	Saunders	Morse Bluff	472.5	6.03	40	31	17	6	E
LPN-V-020-0507	Kerry K Knuth	new	Saunders	Todd Valley	463.9	10.88	78	15	15	8	E
LPN-V-020-0504	Arnold Oehlrich	expansion	Colfax	Schuyler	434.8	2.28	13	16	17	2	E
LPN-V-020-0505	David Feist	expansion	Saunders	Leshara Platte Valley	427.4	6.7	35	20	16	9	E
LPN-V-020-0502	Josh Faltys	new	Colfax	Lower Shell Creek	426.1	5.3	38	11	16	2	E
LPN-V-020-0508	Keith Lloyd	expansion	Platte	Middle Shell Creek	420	1.78	10	15	19	3	W
LPN-V-020-0503	Alan Thorson	new	Platte	Upper Newman Grove	409.7	19.296	134	18	20	4	W
LPN-V-020-0516	June Loseke	expansion	Platte	Lower Shell Creek	395.9	1.296	6	24	18	1	E
LPN-V-020-0513	Raymond J Kucera Jr	expansion	Saunders	Todd Valley	393.5	11.8	82	10	16	7	E
LPN-V-020-0510	Alan Kettelson	new	Boone	Upper Newman Grove	387.8	11.85	135	22	22	5	W
LPN-V-020-0511	Krista J Martin	new	Dodge	North Bend	375	5.13	40	3	17	7	E
LPN-V-020-0506	Juranek Ag LLC	expansion	Butler	Octavia	366.4	11.7	65	33	17	4	E
LPN-V-020-0518	Chad King	expansion	Madison	Upper Newman Grove	359.4	7.898	65	5	21	4	W
LPN-V-020-0514	Dean Preister	new	Platte	Lower Newman Grove	351.9	21.067	152	24	20	3	W
LPN-V-020-0512	Krista J Martin	new	Dodge	North Bend	351.6	7.05	55	3	17	7	E
LPN-V-020-0509	Alan Kettelson	new	Boone	Upper Newman Grove	345.5	11.61	120	19	22	5	W
LPN-V-020-0515	Gary A Seier	expansion	Boone	Upper Newman Grove	342.7	3.78	43	22	22	5	W
					Acre Feet Depletion	**145.447**	1111	Total Acres			



Lower Platte North NRD (LPNNRD)

Potential Conditions for Restricted Development Area

Section 23-T14N-R6E

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- Variance will be reviewed annually and if this irrigation well is causing well interference with nearby well owners such as declining groundwater energy levels in the aquifer either during static or pumping conditions, the variance can be withdrawn as stated in the LPNNRD Groundwater Management Rules and Regulations.

- Well Permit will be reviewed annually and if this irrigation well is causing well interference with nearby well owners such as declining groundwater energy levels in the aquifer either during static or pumping conditions, the well permit can be suspended.

- Approved Lower Platte North NRD Flow meter must be properly installed according to manufacturer's specifications. In addition, installation must meet all the conditions as specified on the LPNNRD approved list of mechanical flow meters with remote read capability.

- Annual allocation will be a fixed amount of 7-acre inches per year. A rolling allocation over a several year period will not be used, therefore no carryover of acre inches of water to subsequent years will be allowed.

- Annual reporting of flow meter reading (totalizer) shall be submitted to the LPNNRD by December 15th of each year.

- Install 3 soil moisture sensors at well owners preferred location within the irrigated portion of the field, one at each depth of 1 foot, 2 foot, and 3 foot and a data logger to record these readings during the summer months or irrigation season. LPNNRD personnel will have access to this data logger and site where soil moisture sensors are installed. Annual report required on soil moisture readings by December 15 of each year.

- Install a time recorder on the pivot panel or well to monitor date and time when the well is running. This information will be available to LPNNRD personnel and sent to NRD by December 15 of each year. Failure to submit this information may result in LPNNRD revoking the variance.

- The well pump and irrigation system will only be allowed to run at night between the hours of 8:00 pm to 9:00 am of the following day, for a total of 13 hours in any 24-hour period.

- The producer would be allowed to waive the irrigation times of 8:00 pm to 9:00 am when chemigation is occurring. This will allow the producer to watch the equipment to ensure the safety of the soil and water. NRD would like communication when this is occurring.

- If repairs are needed, the producer and/or repair person would be allowed to run the equipment outside the allowable irrigation times. NRD would like communication when this is occurring.

- The Well Driller will install a small diameter tubing (PVC~1 inch inside diameter) into the gravel pack of this well to within the bottom 10 feet of the well. This tube will be installed with a datalogger and cables at well owner producer cost (LPNNRD will provide their specification for these).

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- Well owner agrees to allow LPNNRD personnel access to the irrigation well and monitoring during reasonable hours to inspect and monitor the equipment.

- Well owner agrees to pay the cost to install a 4-inch diameter monitoring well in the west side of his field boundary (map location will be supplied by the LPNNRD); drilled and screened to a comparable depth of the irrigation well for use by LPNNRD personnel. LPNNRD will supply the specifications for this monitoring well. The monitoring shall be constructed, and monitoring equipment installed before the irrigation well is test pumped.

- Thirty-six-hour Pump Test will be required of completed irrigation well. LPNNRD must be notified of when pump test will occur so personnel can be on hand to monitor the test. During the test, the well must consistently pump a minimum of 450 GPM or variance is revoked. A water flow meter must be installed by the landowner prior to the pump test. The pump test needs to be performed in the fall with an exception granted for late spring.

- Water Quality sample will be taken during pump test. Parameters to be measured are temperature, pH, conductivity, nitrate-nitrogen, and parameters to measure irrigation suitability.

- Landowner/Producer will be responsible to purchase the data loggers and cables for the monitoring well and PVC tube along with the water flow meter. LPNNRD will supply the remote read equipment for both sites to read the data loggers and flow meter.

- Surface water permits does not need to be relinquish on this tract and can be used for irrigation if needed. The surface water irrigation will not be included in the allocation amount.

- The variance and well permit are not approved and is void until agreement is signed.

This agreement is effect if the irrigation well is active on this tract and hereby approved and executed after parties' signatures on the dates below.

_____ _____

Landowner Producer (if different)

_____ _____

Date Date

_____

Lower Platte North Board Chairman

_____

Date

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Lower Platte North NRD (LPNNRD)

Potential Conditions for Restricted Development Area

Section 23-T14N-R6E

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Roger suggested changes are highlighted

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- Well Permit will be reviewed annually and if this irrigation well is causing well interference with nearby well owners such as declining groundwater energy levels in the aquifer either during static or pumping conditions, the well permit can be suspended.

- Approved Lower Platte North NRD Flow meter must be properly installed according to manufacturer's specifications. In addition, installation must meet all the conditions as specified on the LPNNRD approved list of mechanical flow meters with remote read capability.

- Annual groundwater allocation will be fixed amount of 4-acre-inches per year set upon approval of the well permit. If 4 inches are not used in the crop year, the difference between actual use and the fixed amount can be banked and carried over. The irrigation system, however, shall not pump over 6 inches in one year. It was requested to have an allocation of 7-acre-inches per year with no carry-over.

- Annual reporting of flow meter reading (totalizer) shall be submitted to the LPNNRD by December 15th of each year.

- Install 3 soil moisture sensors at well owners preferred location within the irrigated portion of the field, one at each depth of 1 foot, 2 foot, and 3 foot and a data logger to record these readings during the summer months or irrigation season. LPNNRD personnel will have access to this data logger and site where soil moisture sensors are installed. Annual report required on soil moisture readings by December 15 of each year.

- Install a time recorder on the pivot panel or well to monitor date and time when the well is running. This information will be available to LPNNRD personnel and sent to NRD by December 15 of each year. Failure to submit this information may result in LPNNRD revoking the variance.

- The well pump and irrigation system will only be allowed to run at night between the hours of 9:00 pm to 6:00 am (8:00 pm to 7:00 am) of the following day, for a total of 9 hours in any 24-hour period.

- The producer would be allowed to waive the irrigation times of 8:00 pm to 7:00 am when chemigation is occurring. This will allow the producer to watch the equipment to ensure the safety of the soil and water. NRD would like communication when this is occurring.

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_____ _____

Landowner Producer (if different)

_____ _____

Date Date

_____

Lower Platte North Board Chairman

_____

Date

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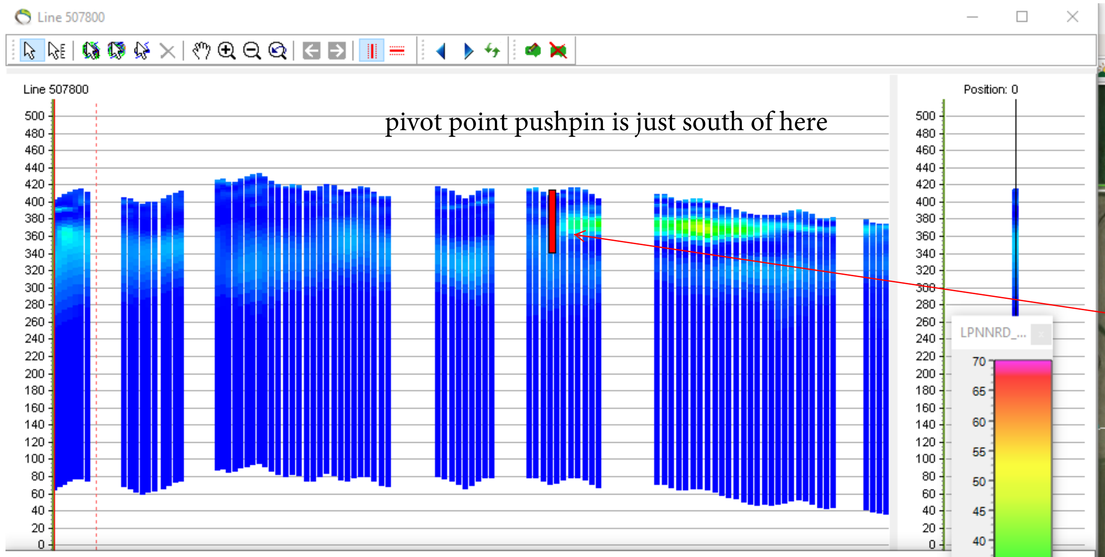
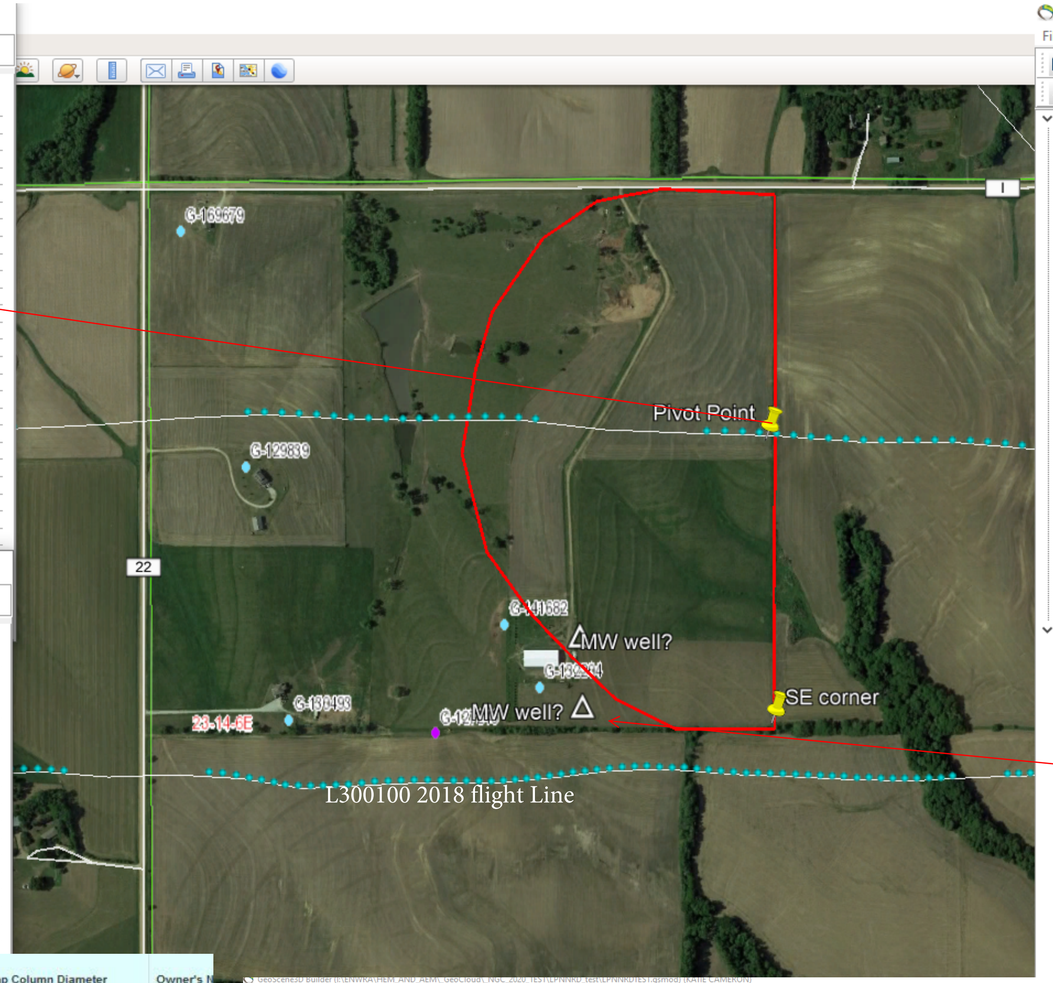




L507800 2018 flight Line

MW location for irr well at SE corner?

Registration# / Well ID / Permit Number	Use / Status	Well Location / Footage / Latitude / Longitude	Filing Date / Decommission Date / Times Replaced / Online Registration ID (NOLID)	Gallons/Minute / Static Level / Pumping Level / Series	Pump Column Diameter / Pump Depth / Well Depth	Owner's N / Owner's ID / Address
G-127249 WellID: 158455 LPN-004529 View Details View Logs View Scans	I A	Saunders Lower Platte North 14N 6E 23 NESW 2505S 1388W Map It 41° 0' 8.500" -96° 42' 42.600"	4/22/2004 5/10/2004 10837911112991	98 750 gpm 154 ft 178.5 ft PRO	8.62 in 200 ft 215 ft	Don Fiedle OwnerID: T 980 Count Fremont N

Registration Number G-127249, Well ID 158455

Geo Logs

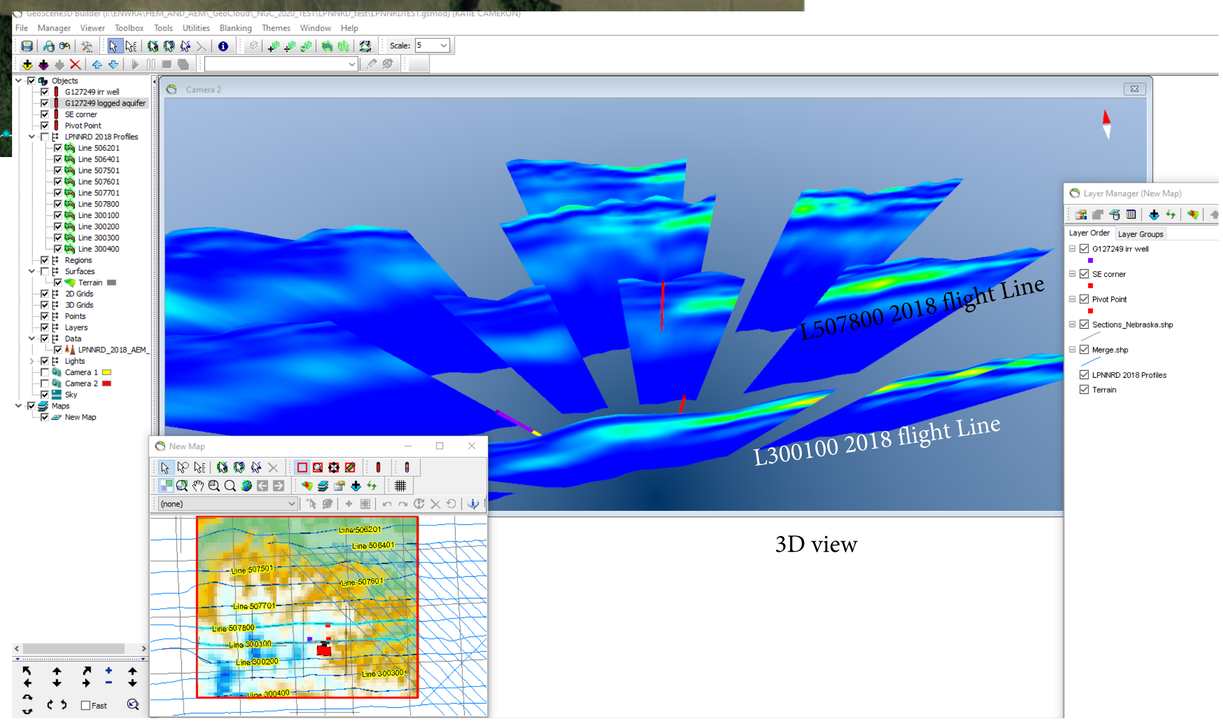
1377 ft elev ground

FromDepth	ToDepth	Description	Color	Density	Composition
0	2	Top soil			Other
2	25	Brown clay			Other
25	35	Light yellow brown clay w/some limestone			Other
35	49	Gray brown clay			Other
49	65	Harder brown clay, sticky			Other
65	105	Gray brown clay w/some limestone, small rock @ 90`			Other
105	115	Gray brown clay & gray clay, small rock @ 110` & 115`			Other
115	150	Gray clay, sticky			Other
150	154	Gravel			Other
154	170	Clay gray/touch clay			Other
170	195	Med reddish gravel-tight			Other
195	205	Coarse gravel, tight greenish red			Other
205	211	Med small reddish green gravel			Other
211	231	Gray clay			Other

1227
1223
1207
41 ft gravel
1166
1146

reported water level is here

clay layer confines for what lateral distance?

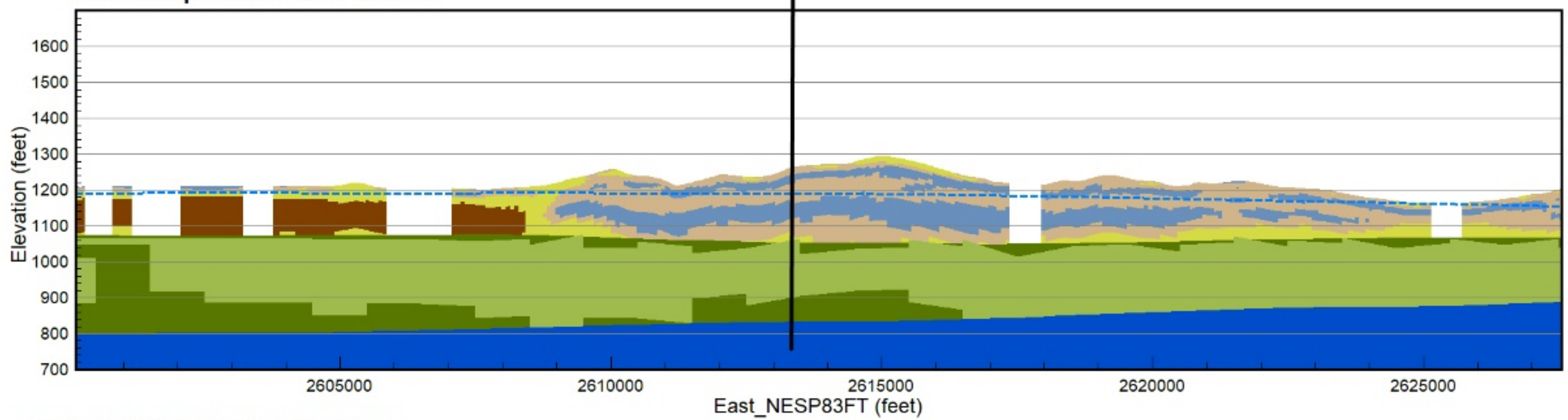


3D view


T15N R9E S19
G-069761
T15N R9E S30

Flight Path Map Line L505101

AEM Interpretation Line L505101



Quaternary/Ogallala Aquifer Material Legend

Non Aquifer (<12 ohm-m)	Marginal Aquifer (12-20 ohm-m)	Aquifer (20-50 ohm-m)	Coarse Aquifer (>50 ohm-m)

Stratigraphy Interpretation

IP | Kd | Kgg | Kc | Kn | To | Q

Kd Aquifer Material

Shale/Clay Dominant | Sandstone/Sand Dominant

Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

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

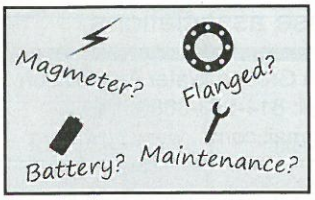
Approved List of Magnetic Flow Meters and Required Conditions

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	

LPNNRD will inspect systems for proper installation of flow meters.



WTR

Four Keys for Selecting an Irrigation Flow Meter Part 3

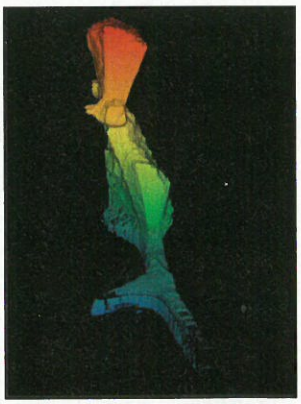
Adapted from Information by Katie Englin
Agricultural Irrigation Specialist, Seametrics

As promised, here is Tip #4 . . .

4. Electromagnetic or mechanical? Also called magnetic meters or magmeters for short, electromagnetic meters operate by *Faraday's law* - if a conductive fluid, such as irrigation water, goes through a magnetic field, it creates a small voltage. Motion of a conductive fluid through the field generates a small amount of electricity, just like a generator (more flow = more voltage). Electrical coils placed outside the flow are momentarily energized. A magnetic field crosses the flow at right angles, electrodes measure the changing voltage, and the display unit shows rate and total. In the past 15 years or so, magnetic meter technology has advanced so much that some are now available battery powered, making them great for irrigation use. Most come standard with many features, that are optional on mechanical propeller meters, and the out-of-pocket cost for a magmeter will be lower than a mechanical propeller meter. To ensure you get the best value for your money, consider what you need - add for pulse output, straightening vanes (for tight space installations), high-capacity bearing assembly, digital readout, data logging, and any other options needed on the mechanical propeller meter - then compare the price to a battery-powered electromagnetic meter that normally includes all the options as standard features. In the end, magmeters offer higher accuracy over broader flow ranges, no moving parts to replace, durability, no flow obstruction, long battery life, low maintenance, longer warranties, and minimal straight-run requirements for tight space installations. In addition to full-bore, some magmeters are available in saddle insertion style for ease in both new and retrofit/replacement installations of existing saddle propeller meters.

Also called propeller meters or prop meters for short, mechanical propeller meters consist of a rotating device, typically a helical-shaped impeller, positioned in the flow stream. The impeller's rotational velocity is directly proportional to that of the flow. As water flows through the pipe, it spins the propeller. The spinning motion is then carried to the head of the meter, through either gears or a drive cable. The instantaneous flow rate and total volume can be seen on the mechanical or digital meter register. Though they operate under the same principle, these meters are available in a variety of installation configurations to suit installer needs: saddle style, flanged style, threaded ends, grooved ends, etc., which can make installation simpler. Propeller meters offer an economical flow metering solution when all that's needed is mechanical rate and total volume flowed. They typically work fine in clean water applications, but water carrying debris can damage the moving parts. While mechanical propeller meters used to be the most economical choice for irrigation, it's typically no longer the case. Many times, choosing a mechanical propeller meter is much like ordering your meal from the à la carte menu at a restaurant. If all you want is a taco and glass of water, you will get a low-cost meal; but add rice, beans, guacamole, and sour cream, and you will likely pay more from the à la carte menu than purchasing a combination plate with all of the "options" you want. So, if you need anything other than mechanical rate and total flow, comparing the cost and benefits of electromagnetic before making a purchase, may be wise.

We hope you've enjoyed this series.



External view of data gathered from inside the narrow stope.

Autonomous Drones Explore Historic Mine

MIN

Adapted from Information by Exyn Technologies

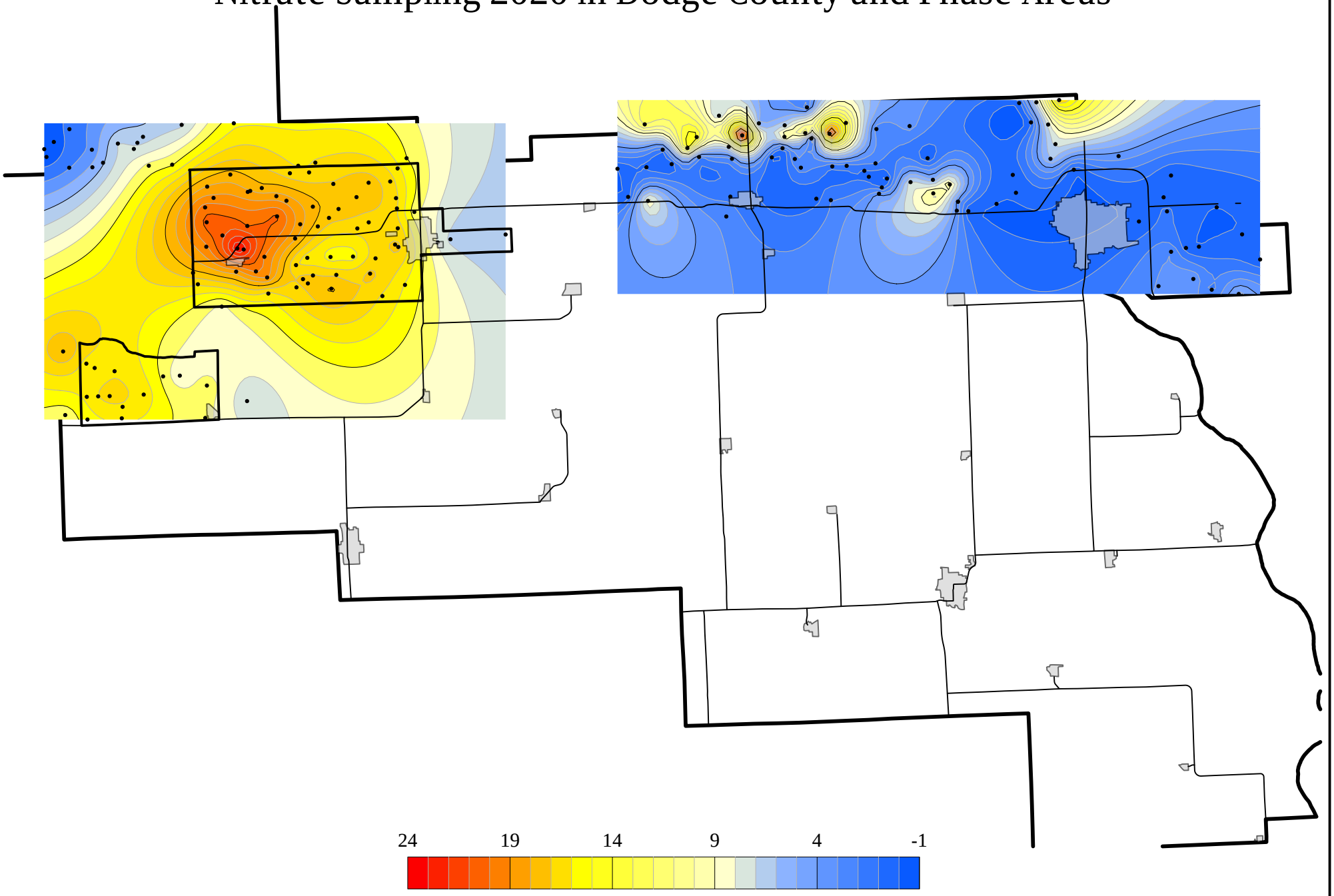
Exyn Technologies completed a successful mission in partnership with Canada-based Rupert Resources to produce highly detailed 3D models of a historic gold mine in Central Lapland of Northern Finland, with autonomous drones. By using these drones, Rupert Resources was able to plan for a potential restart of operations by estimating tonnage previously removed from the mine, as well as calculating the remaining ore in heavily restricted areas.

Exyn's fully autonomous aerial robots mapped 30 stopes in three days with a single drone. In addition, Exyn mounted a version of its robot to a car to scan all access drifts which, together with the stope maps, provided a complete mine map in under four days.

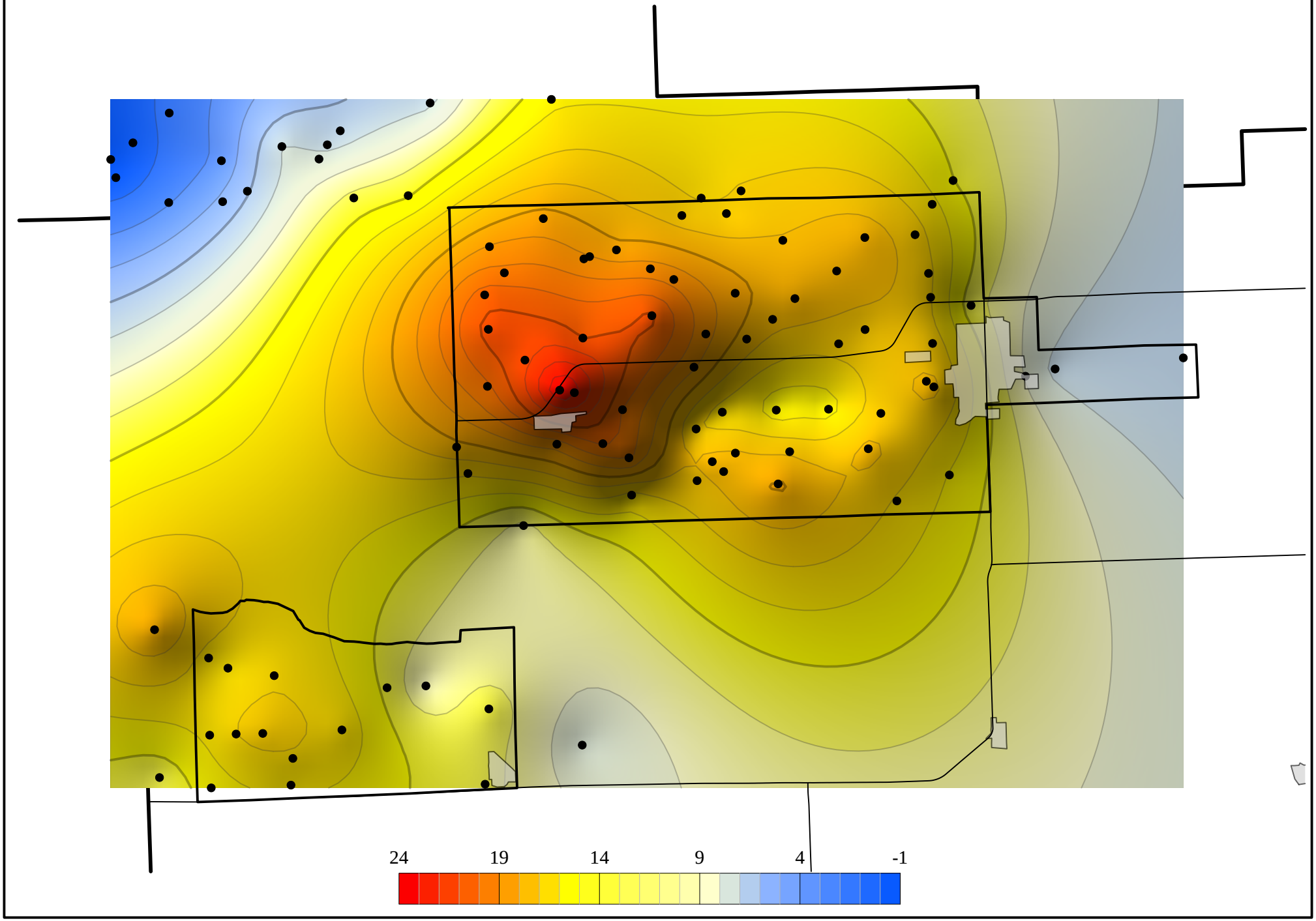
"Rupert is actively seeking new technologies where we think big gains can be made in terms of safety, productivity, and accuracy," said Jukka Nieminen, managing director of Rupert Finland. "Exyn achieved accurate assessment of the volume of remaining stopes at Pahtavaara with an unprecedented level of detail, and obviously the use of remote technologies means that this was achieved with a greatly reduced degree of risk. We have no hesitation in recommending this technology."

The industrial-grade autonomous drones provided a safe, efficient way to explore otherwise inaccessible areas for mining operations.

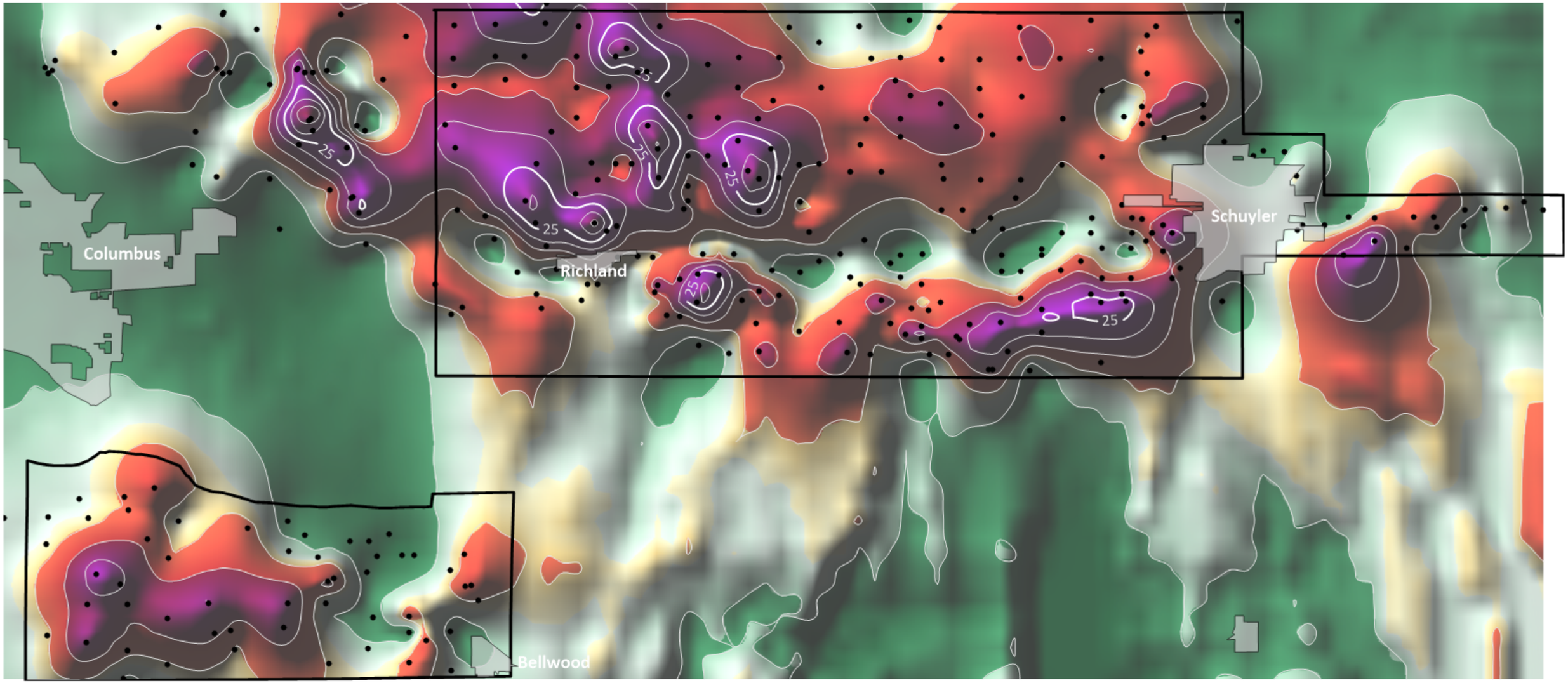
Nitrate Sampling 2020 in Dodge County and Phase Areas



Phase Area Nitrate Sampling - 2020



Nitrate Contamintation in LPN Phase Areas and Adjacent Ground in LLNRD

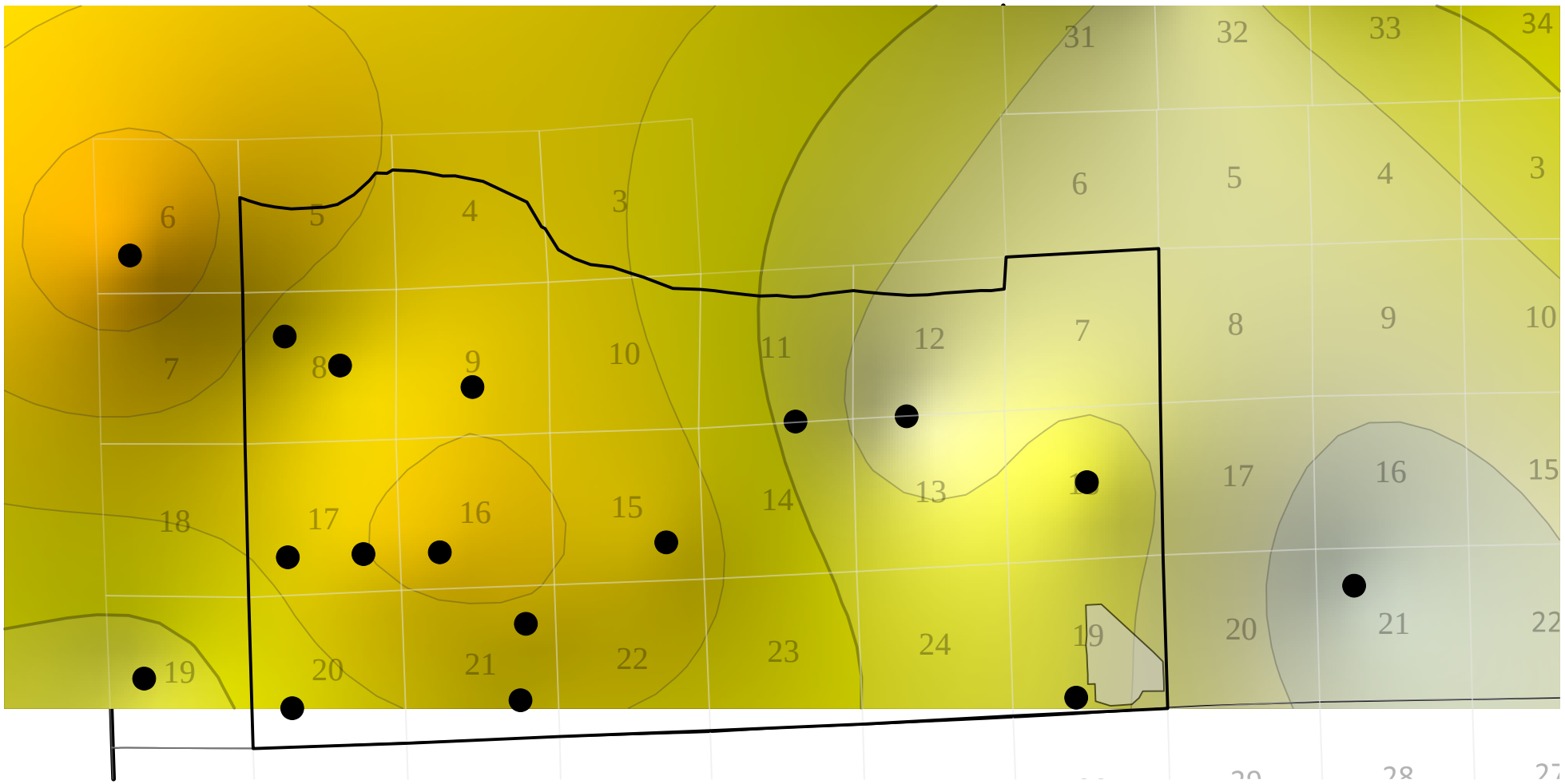


Nitrate Levels PPM

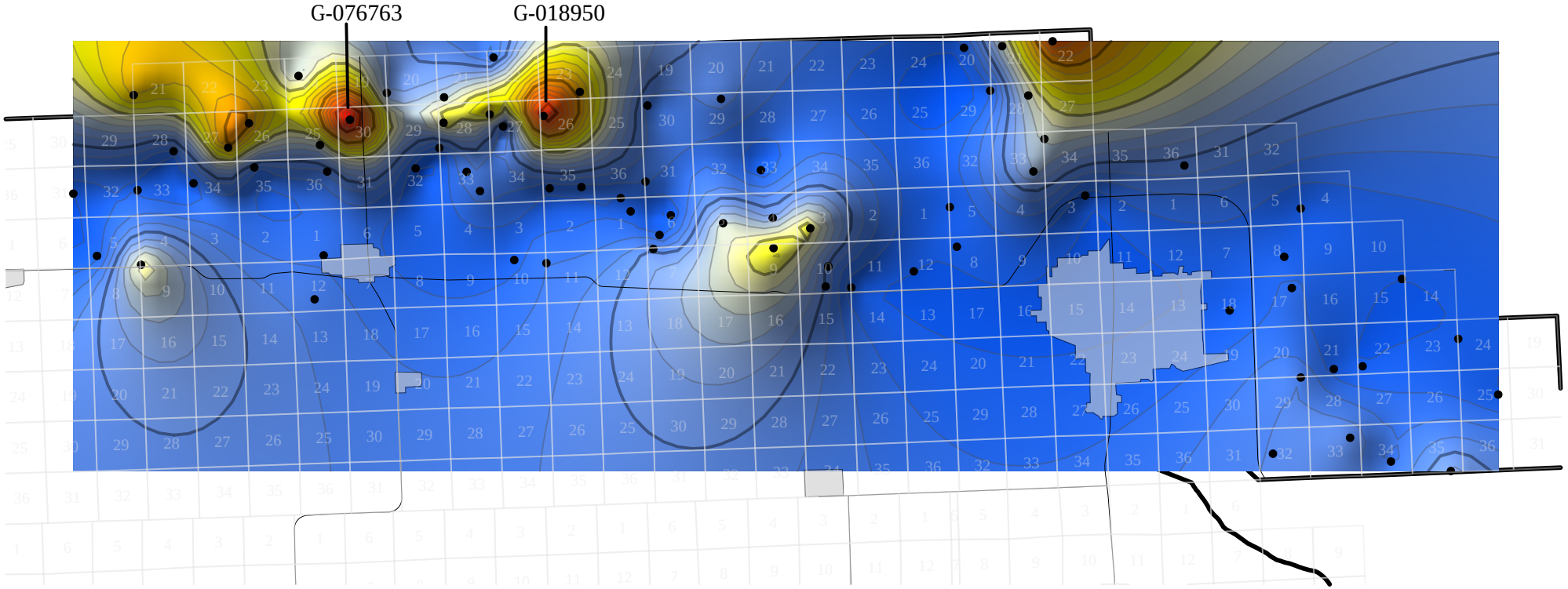
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38

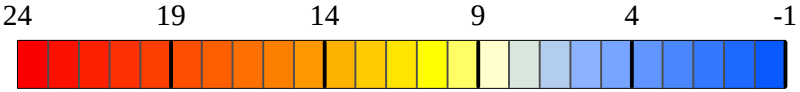
N

Bellwood Nitrate Sampling - 2020

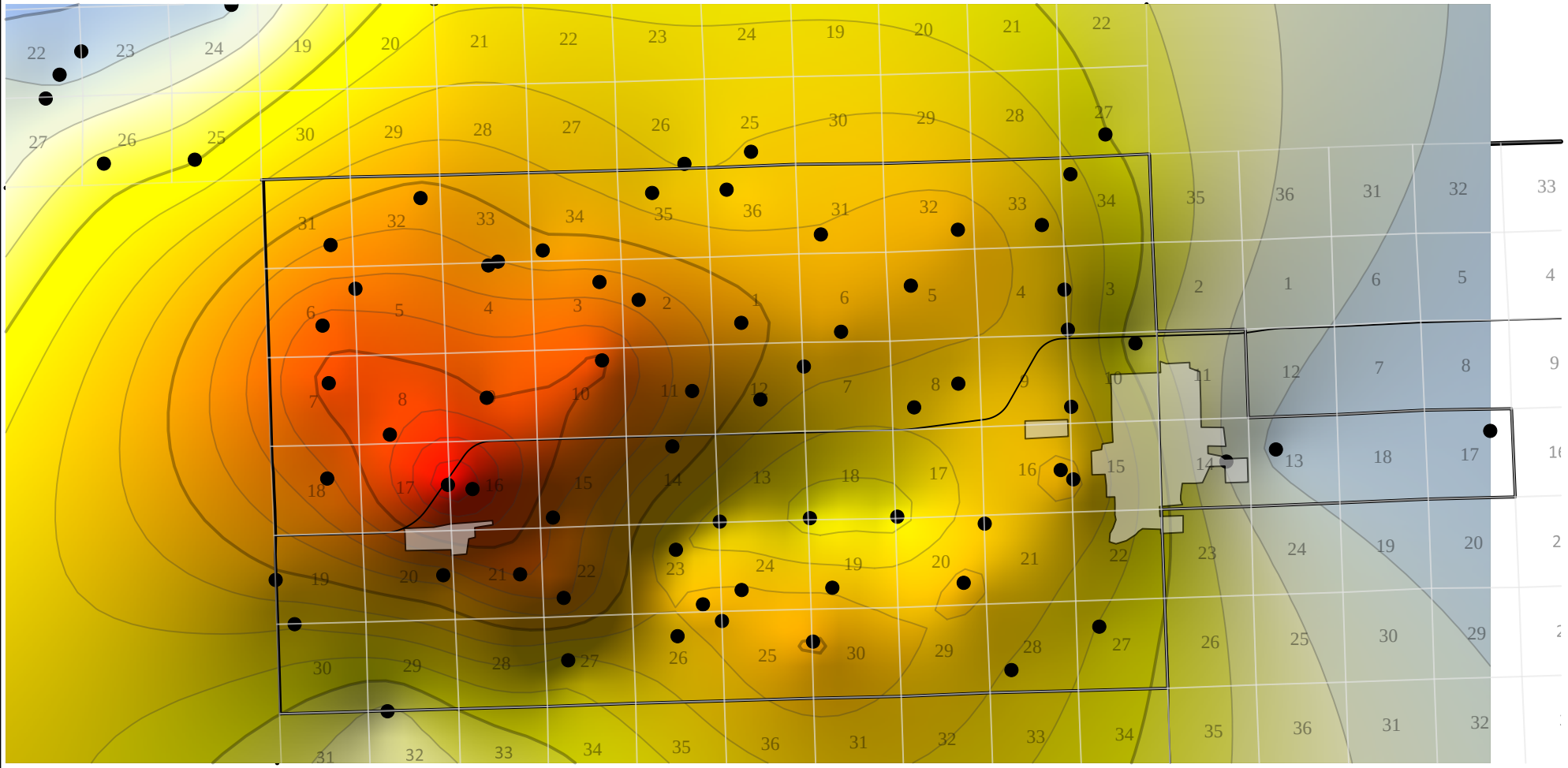


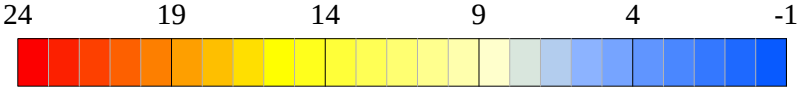
Dodge County Nitrate Sampling - 2020





Richland-Schuyler Nitrate Sampling - 2020





Web-Based Tool Flow Process

Land Cover Scenarios

1. Corn
   Developed / Uban
   Forest
   Grass / Pasture
   Open Water
   Wetlands

Or

2. Soybeans
   Developed / Uban
   Forest
   Grass / Pasture
   Open Water
   Wetlands

Or

3. Alfalfa
   Developed / Uban
   Forest
   Grass / Pasture
   Open Water
   Wetlands

SWB Model

- Land Cover (1 of 3 – scenarios as input)
- Surface Water Flow Direction/Elevation
- Soil-Water Capacity
- Soil Type
- Precip. and Temp.

Run SWB

SWB Results (3 resulting rasters depending on land covers that could change – corn, beans, alfalfa)

Layers to turn on and off when in the Web Tool (not part of analysis when running Tool)

- -Depth to GW
- -GW Surface
- -LIDAR DEM
- -Saturated Sand
- -Cross Section Transects
- -Links to Cross Section pdfs
- -Links to AEM pdfs
- -Others

Static Input Variables

Aquifer Vuln. Raster (Total clay thickness above aquifer)	Reclassify Thickness (1 through 5)	Variable Weight (Manually Entered Percent)
Depth to Groundwater	Reclassify Thickness (1 through 5)	Variable Weight (Manually Entered Percent)

Manual Input Variables

Irrigation (Pick List - Yes/No or Type)	Reclassify Risk (1 or 5)	Variable Weight (Manually Entered Percent)
SWB Results (Pick List - 1 of 7 pre run land cover scenarios from SWB model output)	Reclassify Risk (1 through 5)	Variable Weight (Manually Entered Percent)
Nitrate Application Rate (lbs/acre)	Reclassify Risk (1 through 5)	Variable Weight (Manually Entered Percent)
Target Land Use Area(s) (Tool runs on selected areas)		

Run Tool

Web-Based Desktop Tool (Input Weights = 100%)

Tool Output

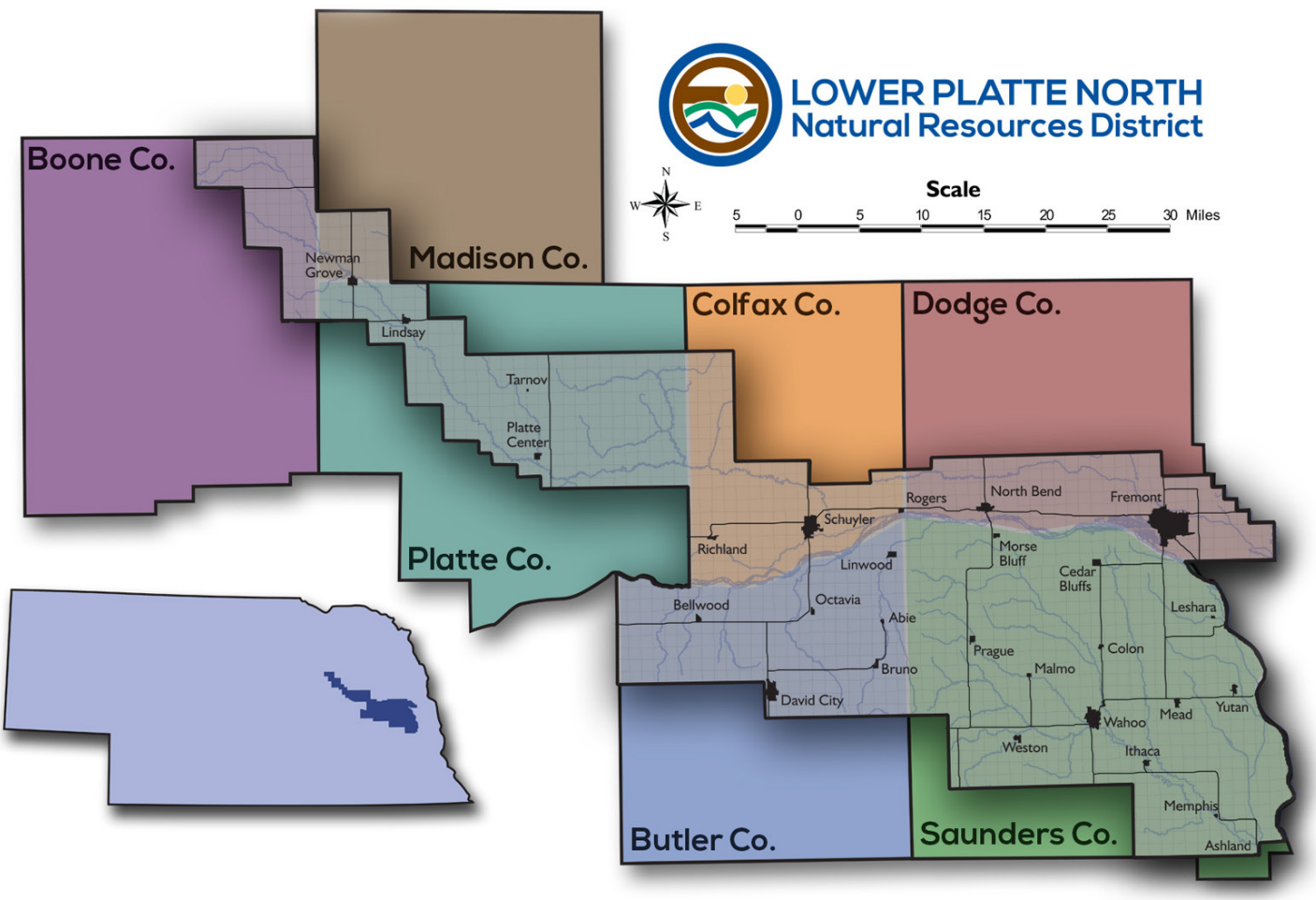
Potential Nitrate Loading Risk

Re-Run Tool
(Revise Input Values/Weights)

LRE WATER

LOWER PLATTE NORTH
Natural Resources District

Long Range Implementation Plan
Fiscal Year 2021


LOWER PLATTE NORTH
Natural Resources District
N
W
E
S
Scale
5 0 5 10 15 20 25 30 Miles
Boone Co.
Madison Co.
Colfax Co.
Dodge Co.
Platte Co.
Butler Co.
Saunders Co.
Newman Grove
Lindsay
Tarnov
Platte Center
Rogers
North Bend
Fremont
Schuyler
Richland
Linwood
Morse Bluff
Cedar Bluffs
Bellwood
Octavia
Abie
Leshara
Prague
Colon
Bruno
Malmo
David City
Wahoo
Mead
Yutan
Weston
Ithaca
Memphis
Ashland

CONTENTS

Introduction

The Lower Platte North Natural Resources District (LPNNRD) is one of 23 Natural Resources Districts created in 1969 with the passage of LB 1357 by the Nebraska Unicameral. Since its formation in 1972, the LPNNRD has been assisting people in the Lower Platte North River Basin in the development and protection of our soil and water resources. Nebraska Statutes require that Natural Resources Districts develop a Long Range Implementation Plan. The purpose of this plan is to summarize accomplishments during fiscal year 2019 (July 1, 2019 to June 30, 2020) and planned District activities for fiscal year 2020 (July 1, 2020 to June 30, 2021). There are also objectives for a five-year period from fiscal years 2022 to 2026. The plan serves as an implementation tool of the district's Master Plan, which is updated every ten years.

Authority and Responsibilities

The Natural Resources Districts have been given statutory responsibility outlined in Sections 2-3229, R.R.S. 1943. In this section it states that "The purposes of the Natural Resources Districts shall be to develop and execute, through the exercise of powers and authorities contained in this act, plans, facilities, works and programs relating to: (1) erosion prevention and control, (2) prevention of damages from flood water and sediment, (3) flood prevention and control, (4) soil conservation, (5) water supply for any beneficial uses, (6) development, management, utilization, and conservation of groundwater and surface water, (7) pollution control, (8) solid waste disposal and sanitary drainage, (9) drainage improvement and channel rectification, (10) development and management of fish and wildlife habitat, (11) development and management of recreational and park facilities, and (12) forestry and range management."

Lower Platte North NRD programs and projects are available to meet the goal of properly developing our water and related land resources.

Description of the District

The Lower Platte North Natural Resources District is located in the Lower Platte River Basin in eastern Nebraska and includes 1,031,000 acres of land. A portion of Saunders, Butler, Platte, Dodge, Colfax, Boone and Madison Counties are within the district (see Appendix A), which includes twenty-eight cities, towns and villages. Besides the Platte River, other notable tributaries in the district include Wahoo Creek, Skull Creek, Bone Creek, Loseke Creek, Taylor Creek, Shell Creek, Elm Creek, Clear Creek, Rawhide Creek, Silver Creek, Sand Creek, and Duck Creek.

The population of the district is approximately 63,500, of which about half is rural and half urban. The Lower Platte North NRD is financed by a tax levy which may be up to four and one-half cents per $100 valuation for general purposes and another one cent for water programs. The FY 2021 tax levy is .03383 cents per $100 valuation.

Governing Body

The Lower Platte North Natural Resources District (LPNNRD) is governed by a 19-member Board of Directors. The directors are elected at the general election for a term of four years, with half of the members up for election every two years.

The district is divided into nine (9) subdistricts. Two board members are elected from each of the nine subdistricts, and one board member is elected at large every four (4) years.

The district operates by a set of bylaws which are kept on file at the district headquarters at Wahoo, Nebraska.

FY 2020 Platte River Basin Activities

One of the great natural resources of Nebraska is the Platte River. It is the feature that attracted early settlers to our state and guided the wagon trails. Today, we look at the Platte River differently. It is a water source for agriculture and cities like Fremont, Lincoln and Omaha, a haven for wildlife, and a place for recreation. Issues surrounding the Platte are a top priority at the LPNNRD, since approximately 72 miles of the river flow directly through, or border, the district.

Ice Jam Agreement

In 1994, the LPNNRD entered into an agreement with the Papio-Missouri River NRD, Lower Platte South NRD, and Cass, Douglas, Sarpy and Saunders Counties to more effectively deal with ice jams and their resulting flood damages along the Lower Platte River. This area of concern is primarily from Fremont, Nebraska to the mouth of the Platte River. This group has pooled funds of at least $150,000 to retain an explosives contractor to use explosives when needed, to remove ice jams in a timely manner.

During the winter of 2019-20, the explosives contractor was not used.

Rock & Jetty Program

This program was developed to offer cost-share assistance to landowners to construct erosion control devices for stream bank stabilization and to assist Dike and Drainage Districts with maintenance of dikes along the Platte and Elkhorn rivers and perennial streams. In FY 2020, $120,000 was budgeted for projects because of the Great Flood Event in March 2019, we assisted a couple landowners on maintenance projects at a cost of $6,000. We will continue to budget a larger amount for FY 2020-2021 to assist those who have not had time to get repairs started or completed.

FY 2021 Platte River Basin Objectives

- Administer $120,000 in the Rock & Jetty Program to assist with priority stream bank stabilization for cooperators sustaining damage from the March 2019 flooding. This includes assisting cooperators with meeting the regulations of the Clean Water Act and 404 permits.
- Participate with USACE and LPSNRD to finalize flood damage repairs to the Clear Creek Levee and Fuse Plug Levee portion of the Western Sarpy/Clear Creek Levee Project.
- As a member of the Joint Water Management Advisory Board, provide leadership and assistance to move forward with exploring flood reduction solutions for the lower one-third of Dodge County within the District.
- Support the Lower Platte Weed Management Area financially and technically in controlling noxious and invasive weeds.
- Support the Nebraska Land Trust in acquiring easements for the protection and preservation of quality lands.

FY 2022-2026 Long Range Platte River Basin Objectives

- Continue to budget cost-share funds for priority bank stabilization along the Platte and Elkhorn rivers and other perennial streams in the district.
- Continue to be an active member on the Joint Water Management Advisory Board.
- Promote riparian buffer zones along the Platte River and other perennial streams.
- Continue to explore new, innovative and cost-effective ways to protect against stream bank erosion.
- Provide education on stream bank

protection and regulations.

- Support and budget annually, as needed, for the Ice Jam Agreement Fund.
- Keep up to date on Clean Water Act and Endangered Species Act regulations.
- Continue to participate with the City of Fremont to study potential nonstructural measures to reduce flooding and economic losses from the Lower Platte River.
- Work with the City of Schuyler as they evaluate the need for future federal funding for completing a levee system and non-structural approaches to reduce flooding and economic losses from the Platte River through the LPNNRD District-Wide Hazard Mitigation Plan.
- Encourage cities and counties to initiate floodplain management planning to promote wise floodplain development.
- Assist dike and drainage districts within the LPNNRD to properly repair and maintain levy projects.
- Budget annually as needed to support the Lower Platte Weed Management group in controlling noxious weeds.

One of the Lower Platte North NRD's major responsibilities is to conserve and protect our ground and surface water supplies. To accomplish this goal, the Lower Platte North continues to participate in water quality studies, ground water level monitoring, and water resource educational activities.

FY 2020 Ground & Surface Water Activities

Ground Water Management Area

LPNNRD implemented a District-wide Groundwater Management Area (GWMA) on January 1, 1997, to address both water quality and quantity concerns. This action was based on data gathered since 1985 indicating where groundwater quality conditions have deteriorated beyond those established as health standards, such as nitrate nitrogen. On that date, groundwater quality Phase I (education) regulations became effective for the entire District. One primary rule in Phase I requires certification for fertilizer and water use. The District has developed a groundwater program emphasizing a protection-based approach rather than a reactive, corrective approach. Since that time, advanced Phase areas have been determined by trigger levels listed in the rules and regulations of the GWMA. The District has two Phase groundwater quality control areas, those being Bellwood and Richland/Schuyler. The Bellwood Phase 2 Area was established in 2003. This area covers approximately 30 square miles in the western portion of the Platte Valley in Butler County and includes the town of Bellwood. In 2015 nitrate levels decreased to a point that the trigger levels were not being achieved, so this area was decreased to 20 square miles. The Richland/Schuyler Phase 2 Area was established in 2004. In 2015 this area was raised to Phase 3 because of the rising nitrates. This area covers approximately 55 square miles in the Platte Valley of Colfax County and includes the towns of Richland and Schuyler. In 2015, 10 additional sections north of the Richland/Schuyler Area became a Phase 2 area and in 2020 raised to Phase 3. Elevated nitrate-nitrogen levels continue to be the major concern in both Phase areas.

In June 2018, the District updated its Groundwater Rules and Regulations by adding a Phase Four under Water Quality and managing water by consumptive use or acre feet limitations. As of July 1, 2020, the District had 9143 registered active wells with 4585 irrigation wells and 207 wells in our GWEL network.

In Summer of 2012, the District saw mid-summer declines in the Bruno area and the uplands of Platte and Colfax Counties. These are now designated as the Butler-Saunders and Platte-Colfax Special Quantity Subareas. The District mandated water flow meters, rolling allocations and annual reports in these areas starting in 2016.

In 2012 seven NRD's agreed to develop a Lower Platte Basin plan, which is a cooperative agreement for the Basin Plan. This plan was approved in December of 2017 with each district assigned a depletion allotment within the Basin. The allotment is in 5-year increments starting in 2016 with a formula to determine the acre feet used for new water uses. The District completed its V-IMP in June of 2018 by adding an additional rule of requiring municipalities to report yearly water use, with an annual report due to NeDNR.

In 2016 the Lower Platte River Consortium, made up of the Lower Platte South NRD, the Lower Platte North NRD, the Papio-Missouri River NRD, Lincoln Water System (LWS), Metropolitan Utilities District (MUD), and the Nebraska Department of Natural Resources (NeDNR), embarked on an effort to develop a drought contingency plan to maintain/mitigate sustainable water supplies to the Lower Platte River during drought conditions. The final report was finalized in the Spring of 2020.

Current rules and regulations of the GWMA are available at the LPNNRD headquarters in Wahoo and via the district website at www.lpnnrd.org.

Ground Water Quality Sampling

The Lower Platte North NRD continues efforts to develop a ground water quality inventory. The District has been divided into four primary aquifer regions: Todd Valley, Platte Valley, Shell Creek and the Uplands, and further divided into 26 subareas. Staff samples the same 53 wells each summer, weather permitting, to determine long term trends for nitrate-nitrogen. This is referred to as the Statewide Network. The data collected is provided to the Nebraska Department of Environment and Energy (NDEE). NDEE in turn provides this to the Nebraska Legislature on an annual basis.

In 2020 samples were collected from 51 of the 53 sites.

Year	Nitrate-Nitrogen Range	% Nitrate-nitrogen 0-8.0 ppm	% Nitrate nitrogen 8.01-10.0 ppm	% Nitrate nitrogen > 10 ppm
2020	0 - 24.2 ppm	70.6% (36 of 51)	3.9% (2 of 51)	25.5% (13 of 51)

Samples for pesticide analysis were collected from seven of these sites (18%). The pesticide analysis was for a suite of 25 parameters, and all results were less than reporting level.

Ground Water Energy Level Monitoring Network

One of the responsibilities of all NRDs in the State is to monitor fluctuations in groundwater levels. With the help of area cooperators, a ground water energy level monitoring network has been established in the LPNNRD. This monitoring network has been established to obtain a better understanding of the groundwater levels throughout the District. As of Spring 2020, the LPNNRD had 207 wells in the groundwater energy level monitoring network. These wells are monitored each spring and fall, with selected wells also measured in late August.

The LPNNRD compares the latest spring reading to the 1987 base-year to determine if a subarea needs to be declared a Level 2 or Level 3 groundwater management area. Level 2 and 3 management areas require flow meters on wells, annual reporting of water use, and establishment of acre-inch allocations. For the 26 subareas within the District, 24 subareas are currently at Level 1 management, while the other 2 subareas still need additional information before these can be designated. The District prefers at least three years of data before the subarea can be designated as a Level 1, 2, or 3 management area.

Spring and Fall readings in 2019 showed a continued rise in groundwater energy levels due to abundant rainfall. Due to the likely effects of climate change we seem to be experiencing more rainfall in the summer months of June through August and as a consequence less irrigation is needed. Of course there are exceptions such as 2012, which was a drought year. Spring readings in 2020 showed 75% of the wells measured had levels higher in Spring 2020 compared to Spring of 2019. This was a 5% decline from a year ago.

Chemigation

Chemigation is the practice of applying fertilizers or other agricultural chemicals to land or crops through an irrigation system. To protect Nebraska's groundwater from possible back-flow of chemicals into irrigation wells. The Act requires the operator of a chemigation system to obtain a permit prior to use. To obtain this permit, the chemigation equipment must be properly equipped, inspected and approved by the NRD before applying any chemicals. The number of chemigation permits continues to slowly rise throughout the district due to chemigation's efficient application rate when the crops are in the most need of nutrients. In sandier soil types, chemigation is extremely effective due to the soils incapability

to hold essential nutrients in the root zone after heavy rains.

Chemigation Permits	Total	Renewal	New	Emergency
November 2019	719	665	54	0
November 2020	748	695	53	0

In 2014, the Legislature approved changes to Title 195 that would allow individual NRD's to set chemigation fees. Chemigation fees for LPNNRD are: $90 for a New permit, $30 for a Renewal permit, and $300 for an Emergency permit. New permits are to be inspected each year they are permitted and renewal permits are to be inspected on a 3 year rotation. Failure to renew by June 1st of the following year the permit was obtained will cause the permit to lapse. If a renewal permit lapses and the producer decides to use chemigation as a practice of crop application the individual must obtain a new permit and an inspection is required.

Decommissioned (Abandoned) Wells

Decommissioned (Abandoned) wells are a health and safety concern and have been ruled as illegal by the Nebraska Legislature. It is estimated that there are approximately one-thousand improperly abandoned wells within the Lower Platte North Natural Resources District boundaries. A well not used for three consecutive years or one which is no longer useful is considered to be abandoned and needs to be properly decommissioned.

The Lower Platte North NRD offers up to 75% cost share assistance to landowners to properly decommission abandoned water wells. In addition, the district will assist with up to 75% of the cost for pump and obstruction removal on domestic and stock wells. To receive cost share assistance, the actual decommissioning must be performed by a certified well driller or pump installer. The landowner has six months from the time of application to accomplish this task unless good cause is shown.

Since 1992 the district has administered local and state cost-share dollars to decommission 651 wells. Through this program in FY 2019-2020, a total of $7,031.30 was administered by LPNNRD for the plugging of 10 wells. The district will administer approximately $12,500 of state and local funds to plug additional wells during the current fiscal year.

Registered Wells

The Nebraska Legislature declared that the conservation and the beneficial use of ground water are essential to the future well-being of the State. State Law requires that all water wells in the State of Nebraska be registered with the Department of Water Resources. Wells that are not registered are illegal and should be registered as soon as possible. A breakdown by decade from 1970 to present shows the growth of active irrigation wells in the District.

Table of Active Irrigation Wells within LPNNRD compiled by Completion Date

Date	Number of Active Irrigation Wells in the District
December 31, 1970	1,428
December 31, 1980	2,756
December 31, 1990	3,241
December 31, 2000	3,686
December 31, 2010	4,307
December 16, 2016	4,528
August 1, 2017	4,539
January 1, 2020	4,585

Well Permits

In May of 2008, the LPNNRD placed a flow meter and water reporting condition on well permits for all permits issued after that date. All well permits require well owners to install a flow meter and report their water use for the calendar year to the LPNNRD by January 31 of the following year. This reporting requirement is effective the year the well is drilled and for each year thereafter, until the well is decommissioned. Summer of 2020

brought drier conditions and as wells were being pumped harder than the last 3 years, replacement well permit requests across the District have increased. As of September 1st, 2020, the District has issued 30 well permits with 7 new irrigation wells, 16 replacement irrigation wells, 4 livestock well, 1 municipal well, 1 commercial and 1 well listed as other.

Special Studies

The LPNNRD has done a number of studies within the District. The following is a list of studies within the District.

Elkhorn Loup Model

The Elkhorn-Loup Model (ELM) project is a study of surface water and groundwater resources in the Elkhorn River basin upstream of Norfolk, Nebraska and the Loup River basin upstream of Columbus, Nebraska. Parts of this basin overlap and cover portions of upper Shell Creek.

Eastern Nebraska Water Resources Assessment

LPNNRD is a partner in the Eastern Nebraska Water Resources Assessment (ENWRA). The ENWRA study has been utilizing Airborne Electromagnetic (AEM) over eastern Nebraska to better model the geology of the glaciated portion of the State. It has opened several questions concerning bedrock aquifers both in water quantity and water quality such as salinity. New flights were conducted in the summer of 2018 with the final report received in summer 2019. A 2-year study is being conducted in the Platte-Colfax Area (SQS#2) utilizing the AEM, additional data loggers and other geologic logs to determine the relationship between confining and unconfining layers along with determining drawdown levels for management decisions. The flights and the results can be found on the ENWRA website at (www.enwra.org).

Platte River Modeling Study

The University of Nebraska conducted a groundwater modeling effort of the Platte River in the LPNNRD. The purpose of this project is to develop a regional groundwater flow model that will be used to analyze the interactions of aquifer-stream-well systems and to determine the 10-50 boundary line for wells that are hydrologically connected to rivers and streams. The model focused on the analysis of wells in the following counties: Saunders, Butler, Colfax, and Dodge, which are administered by the Lower Platte North NRD.

Eastern Nebraska HEM Aquifer Mapping (Swedeburg Area)

In April 2009 portions of the Swedeburg subarea aquifers were mapped using electromagnetic sensors mounted on a helicopter (HEM). This was followed in October 2010 with the installation of three test holes by UNL's Conservation & Survey Division (CSD) to ground truth HEM data. For 2012, the correlation of the HEM data to the test holes has been completed and a presentation was given with those results at the December 2012 Board meeting. The HEM worked well to define upper resistive materials (sands and gravels) but had mixed results at deeper formations greater than 80 feet deep. A final report was delivered to LPNNRD in February 2013.

Platte and Elkhorn River Valley Integrated Water Monitoring

Many geologists and hydrologists theorized that ground water from the Platte River south of Fremont was flowing toward the Elkhorn River, but the quantity was unknown. This study determined the amount and is a cooperative effort between Papio-Missouri NRD (lead agency), Lower Platte North NRD, and U.S. Geological Survey for real time continuous monitoring of groundwater energy levels and streamflow between the Platte River at the Leshara streamgage and Waterloo streamgage on the Elkhorn River.

Lower Platte River Consortium Study

Municipal wellfields in the Lower Platte River Basin depend on the Platte River to recharge the groundwater for their use. This study looked at long term water supplies in the Lower Platte River Basin, and the ability to enhance streamflow, especially in drought conditions, to sustain these municipal water systems. Sustaining water in the river would also provide a benefit to wildlife and agriculture by lessening the likelihood of a 'call' on the river. Due to different hydrologic conditions in the Platte River, such as gaining and losing segments, siting of future reservoirs, groundwater storage projects, etc. becomes important in order to most effectively move water to a desired location downstream. The plan was completed in Spring 2020 with a desktop exercise planned to determine potential projects to pursue in Fall of 2020.

Certifying Acres

In July 2009, the District signed a contract with GIS workshop to develop a database of county assessor records as the preliminary step to certifying irrigated acres. Using these records, LPNNRD staff mailed out letters to landowners to verify irrigated ground. As of January 2017, all counties within LPNNRD have been largely certified.

If a landowner believes the irrigated acres listed on their Acre Certification form to be incorrect, LPNNRD uses a combination of aerial photography and FSA records to determine the correct irrigated acres. Unless there is a clear delineation in the field, FSA considers a field to be fully irrigated, even if the corners are dry. As such, FSA records, while useful, are limited in what they show. When certifying acres has been completed, it will provide a true inventory of the irrigation needs of the District, which will be an important part of future groundwater management and planning.

In addition to cataloging irrigated acres, LPNNRD staff have been actively working with the Nebraska Department of Natural Resources (NeDNR), as well as local landowners to bring all irrigation wells in LPNNRD into compliance with Nebraska Revised Statute 46-602 (7).

Nebraska Ordnance Plant Water Pollution Clean Up at Mead

During the 1940s, 1950s and 1960s, an Army Ordnance Plant near Mead was used to assemble bombs and served as an early Atlas Missile ICBM site. Over time, the soil and groundwater at the plant site became polluted with various explosive residues and solvents. The cleanup has been divided into three basic project areas: Soils (OU1), Ground Water (OU2), and Building contamination (OU3). This area has been under study by the Army Corps of Engineers (COE) since 1988. Tours and open houses are conducted on an annual basis.

Wellhead Protection Program

The LPNNRD implemented a wellhead protection program in FY 2001. The goal of the program is to minimize potential polluting activities on the land surrounding a community's public water supply well(s). The District has identified 22 communities with public supply wells and they have been encouraged to become involved in the program. The City of Ashland, with assistance from LPSNRD, will be conducting some investigations within its wellhead management area in 2019-2020. The Cities of David City, Schuyler and Wahoo have expressed interest in conducting projects in their wellhead management area.

Rural Water Districts

In recent years, the District has worked with communities who have had difficulties with water quality and quantity by forming two rural water systems. The Butler County system linked the village of Bruno in 2006, who was having water quality and quantity problems, to David City. Also in 2006, the Saunders County system linked the village of Colon, who was experiencing water quality concerns, to Wahoo. The LPNNRD operates both of these systems.

The District purchases water from the larger communities and delivers it to the smaller communities; RW staff manage and maintain Colon's system and billing while Bruno manages their infrastructure and household billing. Both systems are designed to serve rural customers along each service route. Combined, the two systems serve over 135 households in Saunders and Butler Counties. To address fiscal concerns both RWDs have implemented a phase rate increase strategy to more diligently manage the financial standings of both districts. The District has been in contact with several other communities and anticipates several more communities and rural customers to be serviced by rural water systems in the future. Both systems are greater than 10 years old and repairs/replacements of meters is expected to take up RWD staff's time in FY 2021 as a number of meters and components are showing the signs of wearing out.

Geographic Information System (GIS) and Global Positioning System (GPS)

LPNNRD has been using Geographic Information System (GIS) technology since 1996. GIS is an automated system combining database information and maps. Features on a map, created with GIS technology, contain attribute or feature descriptions that are referenced by location. The data used by a GIS system consists of Vector and Raster Data. Vector data consists of point (wells), line (roads) and polygon data (irrigation boundaries); with Raster data consisting of pixels, where each pixel on the screen corresponds to a data point. Raster data includes aerial photography and elevation data such as LiDAR (a highly accurate elevation dataset). The District has incorporated the use of GIS into most district functions, including the certification of irrigated acres, maintenance, project planning, modeling of groundwater availability, and the movement of contaminants such as nitrates through the soil profile.

In addition to in-house GIS activities, LPNNRD GIS staff assist a variety of partners, including projecting FSA aerial photography into Nebraska State Plane Feet coordinates for NeDNR, custom authoring of maps for the Nebraska Land Trust, coordination of helicopter flight lines for invasive species control with the Lower Platte Weed Management Area, and helping other NRDs with GIS questions as they emerge.

LPNNRD entered into an agreement with Phoenix Web Group to create a robust, relational database. GIS will be the backbone of this database and will allow LPNNRD to quickly, and efficiently, look up any information pertaining to any project or cost share that has been completed for any constituent with land in LPNNRD.

The Global Positioning System (GPS) relies on 28 NAVSTAR satellites, which provide world wide positioning and navigation information around the clock. Receivers acquire signals from satellites to determine precise locations on earth. The data obtained from taking GPS positions can be downloaded and mapped with GIS, making the two technologies complementary. In recent years, LPNNRD partnered with NRCS on the purchase of a sub centimeter GPS base station. This allows NRCS and NRD staff to quickly and efficiently perform a variety of tasks in the field with survey level precision.

Drone technology is becoming increasingly common among hobbyists and professionals. LPNNRD purchased a Skydio 2 drone and will begin incorporating drone technology into the various department workflows. Drone technology will allow staff to safely inspect damage to structures such as dams or ditches without putting themselves at risk, allow for water department staff to monitor irrigation or document violations of rules and regulations, and allow for I&E staff to obtain a unique view of the various programs conducted. As staff become more familiar with the technology, the utilization of drones will become a common occurrence.

FY 2021 Ground and Surface Water Objectives

- Continue to monitor changes in groundwater levels and quality in the district.
- Continue with LPNNRD Groundwater Management Area (GWMA) programs to help avoid the Lower Platte Basin being designated "fully appropriated."
- Continue to implement Voluntary Integrated Water Management Plan (V-IMP) for the District and basin-wide plan. Utilize acre feet allotments assigned to the District for the benefit of the basin.
- As part of the GWMA, continue with LPNNRD certification classes, demonstration plots, generation of maps indicating problem areas, and evolving the development of a master database.
- Continue to cooperate with the United States Geological Survey (USGS) in monitoring groundwater levels at two sites.
- Continue to cooperate with the United States Geological Survey (USGS) in monitoring surface water levels at four sites and one site for contamination evaluation.
- Use the Subarea Delineation Study to identify 'small pocket aquifers' in the Swedeburg, Prague, Yutan, and Yutan South subareas. Review other aquifer subareas to determine if Stay Management Areas are justified in other portions of our District.
- Continue sampling of approximately 53 wells in our District that are part of the Nebraska State-wide Network.
- Continue to monitor the Phase Areas in Richland-Schuyler and Bellwood for nitrate and elevate these areas as needed.
- Implement extensive sampling of soil and water in the Phase Areas for the purpose of identifying workable best management practices for curbing the rising nitrate trend.
- Administer $15,000 of state and local cost-share funds to decommission abandoned water wells, and provide 100% cost-share assistance within Wellhead Protection Areas to communities that are actively doing projects within it's management area.
- Maintain a multi-agency groundwater energy level monitoring network in the Wann Basin of the Platte Valley north of Ashland to pool information from different agencies collecting water level data. This information is being used by the COE and MUD to refine their groundwater modeling efforts.
- Continue to implement the Chemigation Program to inspect safety equipment on permitted irrigation systems in the district.
- Continue with the District's Well Permitting Program and Variance Process throughout the District.
- Continue to review water use reports submitted to the LPNNRD as part of the well permitting process from new and replacement wells.
- Provide information and education on water conservation and safe disposal of farm and household chemicals.
- Continue to site registered and unregistered wells in the district using GPS.
- Promote and sponsor Spring Conservation Sensation
- Provide information on Integrated Pest Management in news releases and the "Viaduct" newsletter to encourage reduced use of pesticides.
- Support and promote urban water conservation and chemical disposal throughout the District.
- Assist in organizing the annual NRD Water Programs Conference held each year to update the NRD's on activity of State and Federal Agencies, new research and Legislative issues.
- Continue to install flow meters on irrigation wells that are part of our Ground Water Energy Level (GWEL) Network.
- Expand the GWEL network to monitor aquifer sub-areas as designated in the 2009 Subarea Delineation Study. This will be done by incorporating additional high capacity wells and the drilling of new monitoring wells.

- Continue to monitor clean up efforts by the COE at the Former Ordnance Plant at Mead, Nebraska.
- Work with the COE to establish spacing requirements for future high capacity irrigation, industrial, and/or municipal wells that are requesting to be installed near known contaminant plumes from the Former Ordnance Plant near Mead, so these wells will not interfere with the COE's clean up efforts.
- Continue to monitor clean up efforts by the University of Nebraska at the ARDC facilities east of Ithaca, Nebraska.
- Maintain transducers placed in District monitoring wells to record changes in groundwater energy levels and to start the process of installing real-time remote reads.
- Declare Level 2 or Level 3 Management areas as warranted caused by declining groundwater energy levels in 50% or more of the monitoring wells reaching their trigger levels after three consecutive spring readings.
- Review livestock permits from NDEE.
- Investigate irrigation runoff and groundwater management area complaints as needed.
- Expand the NeRain program within our District.
- Continue to be a sponsor member of the Elkhorn – Loup Model (ELM)
- Continue groundwater studies with the University and NeDNR in the SQS areas. Study will focus on confine and unconfined aquifers and drawdowns within these areas.
- Communicate with well drillers and pump installers on water concerns within the District.
- Continue to assist the Eastern Nebraska Water Resources Assessment (ENWRA) with the use of AEM (Airborne Electromagnetic) to study the eastern glaciated portions of Nebraska to provide a geologic framework map.
- Improve irrigation efficiency by working with UNL Extension on the Nebraska Agricultural Water Management Network (NAWMN) to install Watermark sensors and ET gauges with producers each year in our District.
- Continue with the process of updating Irrigated Acre Certification within the District.
- Continue working on projects identified within the Shell Creek Watershed Water Quality Plan.
- Update water quality objectives as identified in the Wahoo Creek Watershed and the Shell Creek Watershed Water Quality Plans.
- To implement the online reporting dashboard for producers to enter their data for the purpose to improve efficiency and quality of data.
- To start the process of developing a hydro-geological framework utilizing AEM data, boreholes and other geological information.
- To start the process of collecting accurate water use data to assist in future water studies and increase water consumption efficiency.

FY 2022-2026 Long Range Ground and Surface Water Objectives

- Continue groundwater quality sampling throughout the LPNNRD, both the State-wide network and intensive sampling of selected regional aquifers.
- Continue water quality education programs based on the goals and objectives of the LPNNRD Groundwater Management Area, which includes LPNNRD certification classes for landowners, municipal and industrial water users.
- If needed, designate further Phase II, III & IV boundaries for the Groundwater Quality Management Areas.
- To educate the need for check valves in protecting the aquifer from contamination.
- Continue with nitrogen application demonstrations and participate with demonstrations on integrated pest

management and sustainable agriculture.

- Assist in the proper decommissioning of water wells in the district.
- Continue to use GPS to site registered and unregistered wells within the district.
- If necessary, designate Level II and III boundaries within the district to manage declining groundwater levels.
- If necessary, designate new Special Quantity Subareas (SQS) within the district to manage mid summer declines of groundwater energy levels in aquifers that operate under large pressure swings.
- Continue measurement of ground water energy levels in the district.
- Develop a groundwater model for each sub-area. Additional information on water use from all wells will be needed for accurate information.
- Continued partnership with the Eastern Nebraska Water Resources Assessment (ENWRA) and apply information to the glaciated portions of our District.
- Additional studies to identify vulnerable aquifers and modify GWMA rules and regulations to protect these aquifers and their long term sustainability. Continue geophysical work, installation of monitoring wells and test holes to better define these vulnerable sub-areas. Additional AEM flights with 1/4 to 1/3 mile spacing would gratefully assist in defining such areas. Eventually cover the entire District with these detailed AEM investigations.
- Continue using AEM (airborne electromagnetic) information to analyze bedrock aquifers both in water quantity and water quality. Test holes and monitoring wells will have to be installed and sampled to determine these as a possible source of usable groundwater. New management strategies need to be developed for these aquifers such as summer trigger levels for confined bedrock aquifers, especially if these are hydrologically isolated from overlying alluvial aquifers. This could develop into three dimensional management where aquifers at different depths are treated by a separate set of rules for each one. This could become very complex but will likely be the only way to sustain the use of these aquifers far into the future.
- Install precipitation gauges near monitoring wells in important sub-areas.
- Utilize the completed Lower Platte River Consortium Study for possible locations for recharge and reservoir sites to better convey water downstream to municipal wellfields.
- Complete water quality objectives as identified in the Watershed Quality Plans.
- Continue to update the Groundwater Management Plan to include Integrated Management of surface and ground water. It may be necessary to install additional surface water gauging sites coupled with nearby groundwater monitoring wells as tools for integrated water management.
- Expand the GWEL network to have continuous recording monitoring wells in each sub-area to better manage the resource with the ability for remote real-time readings. This is especially important in confined aquifers.
- Continue to update the certification of irrigated acres
- Continue to assist District communities who have difficulties with water quality and quantity by helping determine rural water system feasibility.
- Keep the Saunders County Rural Water System study as an alternative in the event of changing federal regulations governing municipal water supplies.
- Update the Platte Valley modeling efforts using MODFLOW software. This information will be used to further define the 10/50 boundary line.
- Keep abreast of updates and new iterations of the Elkhorn – Loup Model (ELM) to determine which areas in the Shell Creek watershed are in hydrologic connection with the Elkhorn or Loup River basins.

In summary, the LPNNRD needs to focus on six areas in the next five years:

1. Further AEM flights and test holes to better map the geologic framework of the District especially in the SQS areas and other areas where confined aquifers dominate.

2. Using information from the AEM flights and test holes, establish a monitoring well network in these confined aquifers to record spring and summer ground water energy levels. It is midsummer declines (late July to mid-August) when large drops in aquifer pressure can cause some wells to run low on water. Map locations of potential recharge sites.

3. Establish ground water management rules to better address confined aquifers. This could involve comparing spring to summer ground water energy levels and comparing this to the potentiometric aquifer thickness and the depth of bedrock. The current management rules for unconfined aquifers should be adequate for future conditions. These controls are based on three consecutive spring readings at or below their trigger levels in at least 50% of the GWEL wells in a given subarea.

4. AEM flights have given a new interest in bedrock aquifers such as the Dakota formation. Monitoring wells in selected areas are needed to determine the water quality and quantity of these bedrock aquifers. Also are these bedrock aquifers in hydrologic connection to any overlying aquifers? If this is the case and new high capacity wells are being established in these bedrock aquifers then management should shift focus to the more vulnerable aquifer to sustain long term viability of both aquifers. If these bedrock aquifers are isolated from the overlying aquifer then "three dimensional management" where wells are managed differently due to their depth may be in order. This could get complex but management needs to take the chemical and physical characteristics of the aquifer in account. For example, what is the salinity of the groundwater and is the bedrock aquifer cemented, unconsolidated, sandstone, limestone, or shale.

5. Horizontal wells. In the immediate future horizontal high capacity irrigation water wells will likely be established in thin aquifers to increase well output or yield. On the plus side, these could replace several vertical wells that are used in series and therefore be a cost savings to the well owner. On the negative side these could quickly dry up thin aquifers less than 20 feet in thickness and affect nearby wells. How do you manage such a system? At the least you could require 600 feet spacing from any point of the lateral to a neighbor's well but again this may not provide much protection in thin aquifers such as the area immediately west of Fremont. Other management options would be to restrict the number of acres irrigated, restrict the length and direction of the laterals, restrict well output such as limit the gallons per minute, establish water allocation, install monitoring wells such as near the end of the laterals to track groundwater levels, etc.

6. Integrated Water Management. Siting of potential recharge sites, storage reservoirs (both surface and groundwater), and potential water reuse projects to enhance the water supply in the District. Additional water use devices, monitoring wells, streamflow gauging, and precipitation sites will likely be necessary. Effects of climate change will also need to be considered as part of integrated water management.

In response to the Erosion and Sediment Control Act (LB 474), passed in 1986, the Natural Resources Commission developed the Nebraska Soil and Water Conservation Strategy. This strategy outlines a course of action for efficiently conserving and managing the state's natural resources.

The Lower Platte North NRD administers the Erosion and Sediment Act and has patterned its local program after the state strategy. The district administers state and local cost-share funds through Soil and Water Conservation Programs (SWCP) to offer incentives to farmers for installation of land treatment practices. LPNNRD staff also worked with NRCS/FSA staff to utilize Farm Bill Programs to repair erosion problems.

FY 2020 Soil Conservation Activities

Soil and Water Conservation Programs (SWCP)

Under Soil and Water Conservation Programs (SWCP), the LPNNRD administered $87,074.48 of state funds and $22,236.77 of local funds for land treatment practices during fiscal year 2020. In addition, 9 Buffer Strip contracts were administered with $ 15,008 in state funds.

For fiscal year 2021, $83,029.99 of state funds (from the Nebraska Department of Natural Resources) and $25,000 of local funds will be allocated for soil and water conservation practices.

Wahoo Creek Water Quality Land Treatment Efforts

Wahoo Creek in Saunders County, Nebraska, has resided on the Environmental Protection Agency's (EPA) Section 319 list of impaired water bodies. To address the impaired status of Wahoo Creek, LPNNRD in partnership with the U.S. Environmental Protection Agency (EPA) and the Nebraska Department of Environment and Energy (NDEE) developed the Wahoo Creek Watershed Water Quality Management Plan in 2013. This plan identifies goals to reduce excess phosphorus, nitrogen, soil sediments and E. coli bacteria in the Wahoo Creek Watershed. This plan meets the EPA requirement of containing "Nine Elements" of an effective watershed plan. The plan identifies water quality goals to protect and enhance the quality of all water resources within the Wahoo Creek. Sub-watersheds within the Wahoo Creek Watershed were prioritized for future water quality projects. In 2012, LPNNRD in partnership with EPA, NDEE and the Natural Resource Conservation Service (NRCS) identified four Wahoo Creek sub-watersheds as Water Quality Initiative (WQI) areas to receive special EQIP and EPA 319 funding for landowners to complete conservation practices to help achieve the numerous identified water quality goals.

Approximately $23,000 of 319 Grant Funds in FY 2020 were spent in the Wahoo Creek watershed. These cost-share monies helped construct practices including approximately 14,000 linear feet of terraces, 6,439 linear feet of tile outlets, and 5 water and sediment control basins. The Wahoo Creek Grant also included approximately 120 acres in the Lands for Conservation program that helps generate Summer work in the watershed.

We are now implementing Wahoo Creek Watershed Water Quality Plan Phase II Part B, which is combining $200,000 of EPA 319 funds and $90,000 of Nebraska Environmental Trust Funds along with other federal, state and local funds for completing numerous water quality BMP's over the next two years. To accomplish water quality goals, as outlined in the EPA Water Quality Watershed Plan, is to continue this partnership effort for many years to come.

Shell Creek Watershed EPA Section 319 Water Quality Improvement Efforts

Shell Creek is a major tributary of the Lower Platte River. Land use in the approximately 305,000 acre watershed is predominantly row crop agriculture. The designated beneficial uses (Primary Contact Recreation and Aquatic Life) of some segments of Shell Creek are impaired by elevated levels of Escherichia coli (E. coli) bacteria, selenium, Atrazine and excessive erosion from storm water flow.

The Shell Creek Watershed Improvement Group (SCWIG) is a volunteer committee that formed in 1999 to lead local efforts to identify problems and to promote implementation of conservation practices to improve water quality in Shell Creek. This evolved into an advisory group to LPNNRD continuing to provide local leadership toward reducing erosion and quality impairments in the watershed. A community-based planning approach was used to gather input from the citizens of the watershed for development of the 2016 Shell Creek Watershed Environmental Enhancement Plan (2016 Plan) that emphasizes combinations of practices that improve water quality.

Over the past 20 years, the Shell Creek Watershed has benefited with over $2 million in EPA Section 319 funds combined with approximately $4 million in partnering federal and local funds for assisting landowners in establishing Best Management Practices on their farms. These efforts resulted in Shell Creek becoming the first watershed in the nation to be delisted for atrazine contamination in FY 2018. In FY 2021, we will be working with Colfax County on a Shell Creek Channel and Bank Stabilization Project near Schuyler in preparation for the Union Pacific Railroad bridge replacement near Colfax County Road 15. There is $365,000 of EPA 319 grant funding and $104,000 of NET funds available for this project and other channel, wetland and upland projects in the Shell Creek Watershed.

Erosion and Sediment Complaints

The LPNNRD responds to occasional erosion and sediment complaints. In most cases, these complaints are resolved before going through the formal complaint process. Many cases are drainage issues that are resolved between the District and landowners. During FY 2020 the district received no formal complaints, but one verbal and some minor drainage issues.

FY 2021 Soil Conservation Objectives

- Use technical assistance from the NRCS in the planning, design, construction, and maintenance of conservation measures applied to the land.
- Use Federal, state and local funds to promote and implement land and water treatment projects in the Dunlap Creek, North Branch and Miller Branch of Wahoo Creek, along with Cottonwood Creek Watershed and Shell Creek Watershed, to reduce erosion and improve water quality.
- Continue encouraging the implementation of summer conservation construction utilizing federal funding within the Wahoo Creek Watershed through the Lands for Conservation program; for FY 2021 the NRD has approved $21,780 for the set aside of 110 acres.
- Administer $83,029.99 of State NSWCP funds and $25,000 of local cost-share and grant funds to landowners for the construction of terraces, tile outlets, waterways, diversions, small dams, planting of permanent vegetation, and maintaining water quality.
- Continue to promote conservation tillage measures, pasture & range management, sustainable agriculture, and the Conservation Reserve Program (CRP), through news releases and the district's newsletter.
- Recognize the Outstanding Soil and Water Conservationist, at the LPNNRD Recognition Banquet.
- Continue to assist landowners in resolving soil erosion and sediment complaints.
- Provide financial support and staff time to

conservation education activities.
- Continue to work closely with locally-led conservation groups to promote soil and water conservation throughout the district.
- Partner with the Shell Creek Watershed Improvement Group (SWIG), EPA/NDEE and NET toward continuing implementation of Best Management Practices in the Shell Creek Environmental Enhancement Plan Implementation.
- Work with NRCS, NDEE, NET, and Saunders County and the Wahoo Creek locally led Steering Committee in pursuing additional federal and state funds to assist with land treatment practices as defined in water quality objectives in the Wahoo Creek Watershed Water Quality Plan.

FY 2022-2026 Soil Conservation Long Range Objectives

- Maintain existing land treatment practices and programs.
- Continue to work with all counties in the district to reduce roadside erosion.
- Administer the NDEE/EPA 319 Grant Program to improve water quality throughout Wahoo Creek, Shell Creek priority watersheds.
- Begin implementing Best Management Practices under NDEE/EPA Corridor Alliance Watershed Water Quality Plan.
- Look for new and innovative soil and water conservation methods.
- Partner with NRCS, UNL Extension and landowners to improve all aspects of their water and soil quality.
- Continue to support the Land and Range Judging Contests.
- Continue targeting SWCP land treatment program funds for priority watersheds in the District.
- Use existing and new technology and GIS software programs for implementing and promoting soil conservation practices.
- Promote the use of and make available soil surveys and land use information.
- Continue to support Locally Led Landowner Groups to promote and implement soil and water conservation practices.

Watershed projects have been completed in five of eleven sub-watersheds (see Appendix E) in the LPNNRD to help reduce floodwater and provide grade stabilization. These completed projects include Bellwood, Clear Creek, Cottonwood Creek, Sand and Duck Creek and Swedeburg watersheds, along with Rawhide Creek. Current high priority flood reduction areas include Shell Creek, Wahoo Creek, Skull Creek and Bone Creek watersheds. On federal and state projects where the LPNNRD acts as project sponsor, the district obtains land rights and mitigates for loss of trees, wildlife habitats and fences destroyed by project construction. The LPNNRD is also responsible for operation and maintenance activities on these projects after they are built.

The LPNNRD offers local assistance for the construction of small dams that can help counties and/or landowners protect county roads, control erosion and provide water for livestock and wildlife.

FY 2020 Flood Control and Damage Reduction Activities

Wahoo Creek Flood Reduction Efforts

In 2017, the Natural Resource Conservation Service (NRCS) approved $1.5 million under their Regional Conservation Partnership Program (RCPP) to assist with planning, design and construction of three Wahoo Creek flood reduction dams, sites 26a, 26b & 27. These dam sites were originally identified as potential projects in the NRCS Wahoo Creek Watershed Plan completed in 1998. The total estimated cost to complete the three dams is $4.1 million. In addition to RCPP funding, there is another $2.3 million of state funds approved through the Nebraska Department of Natural Resources Water Sustainability Fund, leaving $1.5 million needed from local sources. An RCPP agreement with NRCS was approved in September 2017 to accomplish planning, design, permits and construction of the project by the end of 2022.

In the fall of 2017, NRCS approved additional funding for the Wahoo Creek Watershed under the federal Watershed Flood Prevention Operations Program (WFPO), historically referred to as P.L. 566. LPNNRD then entered into a three year agreement with NRCS to use federal funds for planning to include sites 26a, 26b, 27 plus an additional eight remaining Wahoo Creek Watershed flood reduction dam sites (55, 66, 77, 82, 83, 84, 85 & 86). Additional federal funds were approved for project design of the eight additional sites. In the fall of 2018, LPNNRD hired Olsson (Engineering) for completing the design, permitting, bid letting and construction oversight for dam sites 26a., 26b. & 27 through RCPP, along with designing the another eight dams sites that were identified from the planning effort with funding through the NRCS's WFPO program.

After the watershed plan is completed in 2021, dam designs will be started to be completed in 2021- 2022. It is anticipated that future federal and state assistance through the federal WFPO program and the state Water Sustainability Fund will be provided to help complete construction of the remaining eight additional dams, which is estimated at $11.5 million. LPNNRD would be responsible for projects permits and land right costs estimated at $6.5 million.

Sand Creek Environmental Restoration Project (Lake Wanahoo)

With the invaluable assistance of numerous local, state and federal partners, 2011 witnessed the completion of construction on Lake Wanahoo's earth embankment. The breakwater feature and the fisheries component were completed a few years prior to the embankment. Recreation components were completed for Lake Wanahoo in FY 2011. Construction of seven upstream flood reduction/environmental

enhancement structures were completed in FY 2012 - FY 2014.

In FY19, LPNNRD assumed Lake Wanahoo's recreation management responsibilities from the Nebraska Game and Parks Commission.

Operation and Maintenance

District staff completed inspections on 45 watershed structures and special projects in the NRD in FY 2020. These inspections help detect problems before they become serious. Also during the 2020 fiscal year, noxious weeds and volunteer trees were sprayed on 45 dams, Clear Creek Levee and the Rawhide Ditch System. Annual maintenance activities such as removing debris, repairing fences and unplugging risers were completed at many of the dam locations.

The Wanahoo Stilling Basin Was damaged due to high flows during the March 2019 flooding. FYRA Engineering was hired to redesign the basin to make it more robust. Valley Corporation is the contractor hired to perform the construction work starting in November 2020 with the hope that work can be completed before Spring flows.

The Cottonwood Dam 21-A just north of Malmo, NE is classified as a High Hazard Dam. NeDNRD Dam Safety has discovered that the east end of the dam which ties to the emergency spillway is too low and the emergency spillway elevation is too high. Since a County Road runs over this dam, the District has asked Saunders County Highway Dept. to be involved. LPNNRD is using Saunders County's Engineering firm to design a remedy with the approval of NeDNR Dam Safety. We are anticipating having this accomplished by June 2021.

Army Corps of Engineers 205 Flood Studies

Over the past few years, the District has partnered with local entities and the US Army Corps of Engineers to study flood protection alternatives for their areas. In 2004, LPNNRD partnered with Fremont, Inglewood and Dodge County to look at a potential levee project to remove areas from the Platte River 100-year ice induced floodplain. In FY 2017, the Fremont study evolved into a General Investigation (GI) Study which determined that there is not a feasible structural solution (levee) to the City of Fremont's flood threat from the Platte River. In 2018 the GI Study evolved back to a 205 Non-Structural Study for the City of Fremont and Dodge County which is ongoing.

In 2005, LPNNRD entered into an interlocal agreement with the City of Schuyler to evaluate levee protection options to protect the city from flooding from the Platte River and Shell Creek. In FY 2012, the Schuyler 205 Study was completed and entered into the project design phase. In FY 2014 the design phase was completed and LPNNRD assisted Schuyler with obtaining needed land rights for the Shell Creek Levee portion of the project which began construction activities in the spring of 2014 and most construction activities were completed in the fall of 2015. LPNNRD continued to assist Schuyler in FY 2018 with closing out the project with the Army Corps of Engineers. Schuyler continues to do a good job in maintaining the levee.

FY 2021 Flood Control and Damage Reduction Objectives

- Continue with accelerated land treatment efforts in identified priority watersheds in the District.
- Complete biennial inspections on 45 watershed structures; spray noxious weeds & cut and treat trees on 45 dams, Clear Creek Levee and Rawhide ditch; complete regular maintenance activities at all sites.
- Continue to be an active partner on the Joint Water Management Advisory Board to explore flood reduction and drainage solutions in the lower one-third of Dodge County within LPNNRD.
- Partner with the City of Fremont, Dodge County and Papio-Missouri River NRD to

establish cameras and water sensors at five locations along the Platte River.

- Partner with Dodge County, City of Fremont, Dodge County, City of North Bend and the North Bend Drainage District toward completing the North Bend Drainage Project.
- Partner with City of Fremont, Dodge County and the Fremont Rod & Gun Club on completing the Platte River Levee Breach Repair Project.
- Continue to educate the public on watershed management and flood reduction in LPNNRD newsletters, news releases and our website.
- Cooperate with landowners and counties in evaluating small dam sites for cost-share throughout the district.
- Continue to partner with the Army Corps of Engineers, FEMA, City of Fremont, Englewood and Dodge County on exploring non-structural opportunities for feasible flood control solutions.
- Support the City of Schuyler for exploring non-structural opportunities for feasible flood control solutions from the Platte River through the LPNNRD District-wide Hazard Mitigation Plan.
- Work with Communities, Counties and other entities on projects identified in our District-wide All Hazard Mitigation Plan.
- Complete the Wahoo Creek Watershed Plan that identifies the future completion of eleven flood water reduction dams.
- Complete engineering designs on Wahoo Creek Dam Sites 26a, 26b and 27.
- Begin engineering designs on Wahoo Creek Dam Sites 55, 66, 77, 82, 83, 84, 85, 86.
- Commit funds and staff time toward seeking federal and state funds for constructing the remaining eight unfunded flood water control structures (sites 55, 66, 77, 82, 83, 84, 85, 86) in the Wahoo Creek Watershed.
- Begin the process of updating LPNNRD's district-wide All Hazard Mitigation Plan.
- Short term improvements to be accomplished in FY 2021 will be a renovation to the Wanahoo Dam Stilling Basin which was damaged due to the March 2019 Flood Event and the restructuring of the Cottonwood Dam 21-A emergency spillway.

FY 2022-2026 Flood Control and Damage Reduction Long Range Objectives

- Continue to commit funds and staff time toward obtaining additional funding for flood water control/reduction structures in the Wahoo Creek Watershed.
- Continue to budget staff time and funds to maintain and operate completed flood control structures that are sponsored by the LPNNRD.
- Continue to explore flood reduction opportunities for Shell Creek and Skull Creek Watersheds.
- Continue to encourage cities and counties in the district to accept and implement Floodplain Management Authorities.
- Assist Fremont, Inglewood and Dodge County with non-structural flood protection projects as identified by the Army Corps of Engineers study and the Hazard Mitigation Plan Flood Resiliency study.
- Assist Schuyler with non-structural Platte River flood protection project opportunities as they become available.
- Assist District Communities in evaluating future flood protection for their communities through updating the District's Hazard Mitigation Plan and assisting with identified projects.
- Construct Wahoo Creek flood water reduction dams 26a, 26b and 27.
- Complete engineering designs for eight remaining Wahoo Creek Dam Sites 55, 66, 77, 82, 83, 84, 85 & 86.
- Commit funds and staff time toward obtaining federal and state funds for construction the remaining eight flood water reduction dams in the Wahoo Creek Watershed.

The district administers several programs designed to enhance the region's forest, range, and wildlife land, including the Tree Planting Program, Wildlife Habitat Programs with Game & Parks and Pheasants Forever, SWCP Program, and Mitigation Program. The district also sponsors educational activities such as Range Judging and Land Judging contests, and other school-oriented activities.

FY 2020 Forestry, Range, and Wildlife Habitat Activities

Tree Program

One of the most visible and popular programs offered by the LPNNRD is the district's tree planting program. As a direct result of this program, begun in 1973, an estimated 851,000 trees and shrubs have been planted in the district. Trees and shrubs may be obtained from the NRD for windbreaks, shelterbelts, wildlife habitat, woodlots, and Christmas tree plantings. Besides providing a planting service, the NRD also designs tree plans and offers technical advice on ground preparation for tree sites.

During the spring of 2020, 6,400 trees and shrubs were distributed to District residents. Of this total, 1,450 were planted by the NRD field crew at 4 sites.

Wildlife Program

Lower Platte North continues to encourage landowners to set aside land for wildlife habitat by using Federal Programs and Programs provided by Nebraska Game & Parks and Pheasant Forever. Programs such as Corners For Wildlife and Wild Nebraska.

The district assisted with one Corners for Wildlife payment in FY 2019-2020.

Community Forestry Program

For FY 2019-2020 the Covid-19 Pandemic hindered our educational opportunities regarding our tree program. The LPNNRD still donated 900 seedlings for children in Fremont, David City and Newman Grove for educational purposes. The District budgets $2,000 for tree educational purposes and for community development projects. The District did not receive any request for Community Forestry funding.

FY 2021 Forestry, Range, and Wildlife Habitat Objectives

- Plant and distribute conservation trees and shrubs through the district's Tree Planting Program.
- Continue to include tree planting as an eligible cost-share practice under the SWCP program.
- Offer trees and give staff presentations to elementary students across the district.
- Assist cooperators to sign up for Wildlife Programs.
- Cooperate with the Extension Service and the NRCS in obtaining tree orders from District residents.
- Recognize a cooperator for outstanding tree planting efforts at the Recognition Picnic/Banquet.
- Provide cost-sharing for the conversion of cropland to grassland through the SWCP program.
- Cooperate with Pheasant Forever Chapters to enhance wildlife habitat and establish windbreaks.

FY 2022-2026 Forestry, Range, and Wildlife Habitat Long Range Objectives

- Sell as many trees and shrubs each year through the district's Tree Planting Program, and to plant as many trees and shrubs for qualified property owners.

- Provide information and education on tree planting, woodland management, grassland management, and proper wildlife habitat enhancement through the media, tours, and schools.
- Continue to administer Wildlife Habitat programs in cooperation with the Nebraska Game and Parks Commission and other partnering entities as opportunities arise.

FY 2020 Recreation Activities

Czechland Lake Recreation Area

Czechland Lake Recreation Area is a multipurpose project located one mile north of Prague, Nebraska on Highway 79. Flood control, recreation and education are the main benefits of the project. Located at a convenient distance from Omaha, Lincoln, Fremont and Wahoo, the 85 surface acre lake is situated on 265 acres of public access land operated and maintained by the LPNNRD.

State park permits and fees are not required for entrance to the area. Czechland Lake has 11 electrical camper pads at an $18/night fee for the use of a camping pad. There are also three non-electrical pads. A Nebraska Fishing License is required for anglers. The lake fishery is managed by the Nebraska Game and Parks Commission, which stocks and monitors fish populations. Catfish, Bluegill, Northern Pike and Largemouth Bass were initially stocked in Czechland Lake.

Originally built as one of twelve floodwater structures in the Cottonwood Creek Watershed, Czechland Lake has developed into one of the area's most popular recreation spots. The reservoir and recreation area development was built at a total cost of $1.8 million. Funding for the project was shared by the Nebraska Natural Resources Commission, Saunders County, USDA Natural Resources Conservation Service and LPNNRD. Grant monies from the U.S. Environmental Protection Agency have been used to reduce nonpoint source pollution entering the lake and to provide educational resources.

The Czechland recreation area was used extensively during FY 2020 generating approximately $10,020 in camping revenue. Mowing, trash removal, repair and upkeep of park equipment, and thistle control kept LPNNRD park staff very busy during the spring and summer.

Homestead Lake (Skull Creek Site #55)

Construction was completed on Homestead Lake in 2001. The dam offers flood control for nearby communities, and has been developed for public recreation. Recreation facilities include a shelter, restroom, picnic areas, a boat ramp, and hunting areas. FY 2020 proved to be another very popular year for recreators as the area was extensively used.

Lake Wanahoo

Work was completed on recreation facilities at Lake Wanahoo one mile north of Wahoo in FY 2012. Recreation facilities at the 1,600 acre site straddle the 662-acre lake, with camping and boating access on the west side and a day use area on the east. A rocked hiking/biking trail winds throughout the park, linking the east and west side recreation areas over a breakwater levee one mile north of the dam. Mowed trails north of the levee provide access to undeveloped areas set aside for wildlife habitat.

The camping area contains 74 camper pads, 54 tent camping sites and 6 small cabins. All camper pads are equipped with electrical hookups and are rock surfaced. All tent sites have fire rings and picnic tables.

The camping area also offers access to a large boat ramp that's wide enough to accommodate four boats at a time. Boating at the lake is no-wake only.

The day use area on the east side of the lake has two large picnic shelters and two smaller ones, all offering scenic views of the lake. In FY 2017, a dump station for RV's was constructed on the east day use area as well as a disc golf course/nature educational trail.

Both the camping and day use areas provide excellent fishing access, with a total of seven fishing jetties. One jetty on each side has an attached handicapped pier. The lake was stocked with largemouth bass, bluegill, blue

catfish, crappie, northern pike, and walleye beginning in 2008.

Limited hunting opportunities will continue to be available at Lake Wanahoo through the Game & Parks Commission PATH Program, where adults can schedule a time to mentor a youth hunter at designated hunting sites north of the recreation area.

The Lake Wanahoo Recreation Area was opened to the public in spring 2012. An operation and maintenance plan was developed with the assistance of the Nebraska Game and Parks Commission and Pheasants Forever in FY 2014 which identified activities were implemented in 2015 .

In FY 2019, LPNNRD assumed the responsibilities of administering Lake Wanahoo as a public recreation area from the Nebraska Games & Park Commission.

In FY 2020, the addition of the Wanahoo Education Building was completed and open for use as an educational facility and private rental space. Pork Chop Island was completed in FY 2020 and open for primitive camping accessible by boat, canoe or kayak. Also in FY 2020, six primitive cabins were constructed on the west side of Lake Wanahoo. The 10'x12' cabins offer primitive cabin rental opportunities and are equipped with electricity, air conditioning, drop-down bunks and a sleeping loft.

Wildlife Habitat Public Access Areas

Under the WILD Nebraska program, administered jointly with the Nebraska Game & Parks Commission, the LPNNRD encourages landowners to allow public access on habitat lands signed up under the program.

FY 2021 Recreation Objectives

- Continue to budget funds for maintenance, including grass mowing, tree trimming, grading roads, outhouse cleaning, trash removal, painting and noxious weed control, at Lake Wanahoo, Czechland Lake and Homestead Lake Recreation Areas.
- Continue LPNNRD's administration of recreation management at the Lake Wanahoo recreation area.
- Explore new outdoor recreation opportunities.

FY 2022-2026 Recreation Long Range Objectives

- Continue to evaluate the development of new outdoor public recreational facilities as opportunities arise.
- Continue to assist NE Game & Parks and Pheasant Forever in developing new areas offering public access.

DRAINAGE IMPROVEMENT & CHANNEL RECTIFICATION

It is the general policy of the LPNNRD not to provide financial assistance for drainage improvement and channel rectification unless a project has public benefit and is sponsored by a county, city and a group of landowners through an established Improvement Project Area Under this policy, the district has cooperated on several projects that have provided public benefit.

FY 2021 Drainage Improvement & Channel Rectification Objectives

- Continue to oversee the progress of the Rawhide Creek West Branch Project to ensure that landowners control vegetation on Rawhide Creek to help it stay clean.
- Provide continued assistance to Platte Center with stabilizing a segment of Elm Creek.
- Work with local landowners and Colfax County to improve Shell Creek flows east of Schuyler.

FY 2022-2026 Drainage Improvement & Channel Rectification Long Range Objectives

- Evaluate potential technical and funding assistance to counties, cities and other entities in the district that sponsor sound drainage and channel improvement projects.

Twenty 25 years ago, vast changes occurred in Nebraska's solid waste regulations. Landfills that weren't properly designed, operated or sited were required to shut down, as were unauthorized dumps. In order for a landfill to operate, it must be approved by the State and receive a permit. If a permit is not issued, the landfill cannot legally operate. Currently, the only permitted landfill in the Lower Platte North NRD is a facility near David City.

FY 2021 Waste Disposal & Pollution Objectives

- Promote recycling efforts in the district through education programs, newsletters, and news releases.
- Participate in education efforts to promote the reduction of pollution to our air, water, and soil resources.
- Cooperate and be supportive of other group and agency pollution control efforts, education, and/or regulation.

FY 2022-2026 Waste Disposal & Pollution Long Range Objectives

- Assist and encourage all District communities in establishing collection locations for recyclable wastes.
- Assist District cities and counties in establishing pickup days for hazardous household and farmstead wastes.
- Promote waste reduction efforts in the district through education and incentives.

A major responsibility of the Lower Platte North NRD is to keep the public aware of the district's various projects and programs, and to inform and educate children and adults about the wise use and management of our natural resources.

FY 2020 Information & Education Activities

During fiscal year 2020, the Lower Platte North NRD conducted many activities to help residents learn the importance of our soil and water resources and to stay informed of issues and concerns regarding natural resources. Some of the highlights included:

Education Programs

Although FY 2020 year was unlike any other in the past, the district was able to continue with two year-long programs. The St. Wenceslaus Pre-kindergarten students learn about wildlife, trees, birds, recycling and water conservation through books, pictures, stories, and hands-on activities. The district teamed up Wahoo Public 8th Grade students for the Survival Club program, making a total of two full school years of the program. LPNNRD staff and other outdoor enthusiasts meet monthly with students during the school year to learn about hiking, knot tying, 2-legged predators, 4-legged predators, fishing, everyday carry kits, fire building and other outdoor survival skills. Towards the end of the school year, the Survival Club meets at Lake Wanahoo for a year-end campout to test their new outdoor skills.

The district continues to participate in the Career Exploration Opportunities (CEO) Program with Wahoo Public Schools. During the fall semester of 2019 and spring semester of 2020, LPNNRD staff hosted one high school senior each semester as he rotated between each department to learn about the LPNNRD responsibilities.

Since the completion of the Education Building on the East side of Lake Wanahoo, the LPNNRD staff has been able to hold events in conjunction with area teachers and students for hands-on education.

The Lower Platte North NRD and Lower Platte South NRD rotate in hosting the East Central Land Judging Contest. Land Judging is a competition for high school students that challenges them to gain a better understanding of soil structure and land evaluation. The Lower Platte North NRD works with local NRCS employees to choose a site location and help with site preparation. In October 2019, the Lower Platte South NRD coordinated and hosted the East Central Land Judging Contest for 250 students from 12 schools. The Lower Platte North NRD staff assisted in the scoring efforts during the contest. In October 2020, the LPNNRD will host the contest.

Many events that were scheduled for spring and summer during FY 2020 had to be postponed or canceled due to the pandemic. The annual LPNNRD Spring Conservation Sensation would have held the 30th annual year, but canceled once schools began closing down. In the past, fifth and sixth grade students from Saunders, Butler, Platte, Colfax and Dodge Counties participated in various activities. Hands-on activities are presented by LPNNRD staff, additional personnel from various agencies and organizations, and volunteers to teach students about the environment, natural resources, tree planting, lake ecosystems, wildlife education and more. The district is preparing to hold a celebration to honor the 30th annual year of this event.

Among other events that were canceled included two programs the LPNNRD coordinates with the Saunders County UNL-Extension–the 4H/NRD Outdoor Recreation Workshop, Saunders County Youth Ag Tour.

These events are held for area 4H and FFA students to attend and learn about a variety of outdoor recreation activities, conservation and agriculture.

"Test Your Well Nights" is a program that partners with area FFA chapters to host public events, providing nitrate testing on water samples from private wells at no cost to the attendees. The district attended a joint effort event with the Lower Platte South NRD at Ashland-Greenwood High School in the Spring of 2020.

District staff provided various presentations and activities during natural resources festivals, field days, out-of-school time programs, school classrooms, and online activities on the LPNNRD website. As a result of the district's educational outreach efforts, there was interaction with approximately 1,654 youth during FY 2020.

Awards, Contests and Events

The LPNNRD provided displays at exhibit booths during the Nebraska Soybean Day & Expo in December 2019 and the Butler County Chamber AG Expo in February 2020. The LPNNRD had planned to provide displays for up to five area county fairs in the district, until almost all fairs were canceled or held limited schedules for the summer of 2020.

Publications

In FY 2012, the district switched distribution of "The Viaduct" newsletter from direct mail subscriptions to inserts in area newspapers. In FY 2020, more than 27,000 copies of the newsletter were distributed in area newspapers and via email.

Various brochures describing LPNNRD programs and services were updated as needed in FY 2020. These brochures are displayed in the office and distributed during LPNNRD sponsored events and exhibit booths. A Fact Sheet for use with the NARD's public relations campaign at public events is updated yearly.

Press releases are distributed to district papers and radio stations. Numerous ads spotlighting different NRD programs and upcoming deadlines air on KTIC Radio throughout the year. Digital ads on the Wahoo newspaper website continued in FY 2020.

Website

The NRD's website at www.lpnnrd.org contains information on nearly all of the district's projects and programs, along with staff and director information, committee and board meeting minutes, and more. Online application and registration forms for various projects and programs are available as well. Online payment capabilities continue to allow customers to pay for trees, rural water bills, and Lake Wanahoo permits. During FY 2020, the district began tracking the activity on the website including which pages are viewed to help keep current information available online.

Video Promotion

During FY 2018, the district worked with redthread to create a 1 minute and 30 second video that promotes the conservation efforts of the district. The video is very unique to the Lower Platte North NRD because no professional acting or voice talent was hired for the video. A past director, current director, and current staff are featured in the video. The children of a current employee and a current director were also featured in the video.

During FY 2019, redthread created a promotional video for the Lake Wanahoo NRD Recreation Area. With the need to bring nature and outdoor recreation to people during the pandemic, the commercial was featured in 30-second spots on News Channel Nebraska during the summer of 2020.

KLKN produced a video to promote LPNNRD's water conservation efforts. The video featured LPNNRD Water Department staff and various water quality and quantity efforts.

During FY 2020, redthread created a promotional video for the duties and responsibilities of the Operations and Maintenance department, and a

video to promote the activities of the Projects department.

These videos are shown as commercials through area television stations, educational purposes for presentations and featured on social media platforms.

FY 2021 Information & Education Objectives

- Provide LPNNRD staff as requested to speak to community organizations and schools on NRD activities and environmental topics.
- Provide various education programs, events, and activities to area schools and out-of-school time programs.
- Sponsor the East Central Region Land Judging Contest in the fall of 2020.
- Sponsor the Annual Spring Conservation Sensation in spring 2021.
- Develop new programs and promotional projects to aid in outreach efforts of the district.
- Continue with the annual awards and recognition program.
- Publish the district newsletter "Viaduct" biannually in an electronic format and as a printed newspaper insert in 10 area newspapers.
- Send timely news releases to the local media on various LPNNRD programs, projects, and activities.
- Disperse pamphlets and other publications about LPNNRD programs.
- Update the district's website frequently.
- Continue to provide a display at county fairs (up to five major counties) within the district.
- Continue social media outreach for the district through the use of tools such as Facebook, Twitter, YouTube, etc.
- Provide district elementary students free trees, as requested, in the spring.

FY 2022-2026 Information & Education Long Range Objectives

- Assist NARD with participation in the planning and execution of the 2021 NCF Envirothon to be held in Nebraska.
- Search for new and effective ways to inform and educate the public on the NRD purpose and programs.
- Participate with the Information & Education Staff Group to coordinate statewide I&E activities and produce statewide products.
- Increase participation in activities sponsored by other agencies related to NRD responsibilities.
- Seek to have conservation/environmental education as a part of the school curriculum.
- Support environmental education activities and events.
- Assist in the development of an outdoor classroom for a district school.

LPNNRD Staff

The staff of the Lower Platte North NRD includes 16 full-time and part-time employees stationed at the district office in Wahoo. The NRD administers a full-time field technician, four field office assistants in Natural Resource Conservation Service county offices, and a Recreation Facilitator for Czechland Lake Recreation Area.

In addition to the listed full-time and part-time positions, the district employs seasonal conservation technicians to assist in the layout of land treatment structures. There are also seasonal summer employees hired to help with Lake Wanahoo, water sampling, tree planting and maintenance of NRD projects. Personnel positions and assigned responsibilities could increase in the future as increased project and program responsibilities increase.

Current staff as of September 1, 2020:

Daryl Andersen, **Water Resources Manager**
Tyler Benal, **Water Resources Specialist**
Jill Breunig, **Bookkeeping Department Head/Administrative Assistant**
Will Brueggemann, **Water Resources Specialist**
Duke Dokulil, **Operations & Maintenance Technician**
Sean Elliott, **Projects/Rural Water Manager**
Eric Gottschalk, **General Manager**
Bob Heimann, **Operations & Maintenance Manager**
David Moore, **Operations & Maintenance Technician**
Tom Mountford, **Assistant Manager**
Russell Oaklund, **Lead Water Resources Specialist**
Dave Odvody, **Recreation Facilitator**
Chris Poole, **Grants/GIS Department Head**
Karen Rezac, **Department/Administrative Assistant**
Lacey Sabatka - **Information & Education Coordinator**
Bret Schomer, **Wanahoo Recreation Supervisor/Water Resources Specialist**

Staff Support for NRCS Offices:

Vacant, **Conservation Technician**
Kimberly Piitz , **NRD/NRCS Field Office Assistant (Butler County)**
Kristin Miller, **NRD/NRCS Field Office Assistant (Colfax County)**
Ashley Keeler, **NRD/NRCS Field Office Assistant (Dodge County)**
Marla Milliken, **NRD/NRCS Field Office Assistant (Saunders County)**
Melissa Foreman, **Shell Creek Watershed Coordinator (LPN & SCWIG Volunteer)**

FY 2021 Financial Objectives

- Funding required for the LPNNRD projects and programs for Fiscal Year 2021 requires a general operating budget of $7,782,546 of which $3,458,000 is required from the district's local tax levy. The 2021 tax levy of .03383 cents per $100 actual valuation is required from District property. Projected expenses and income for FY 2021-2026 are shown in Appendix F.
- A tax levy of .03383 means that an owner of a $150,000 home will pay $50.75 in NRD taxes in FY 2021. An owner of farm land valued at $7,000 per acre will pay $2.37 an acre/year to the NRD in FY 2021. The LPNNRD levy represents about two percent of the total property tax collected.

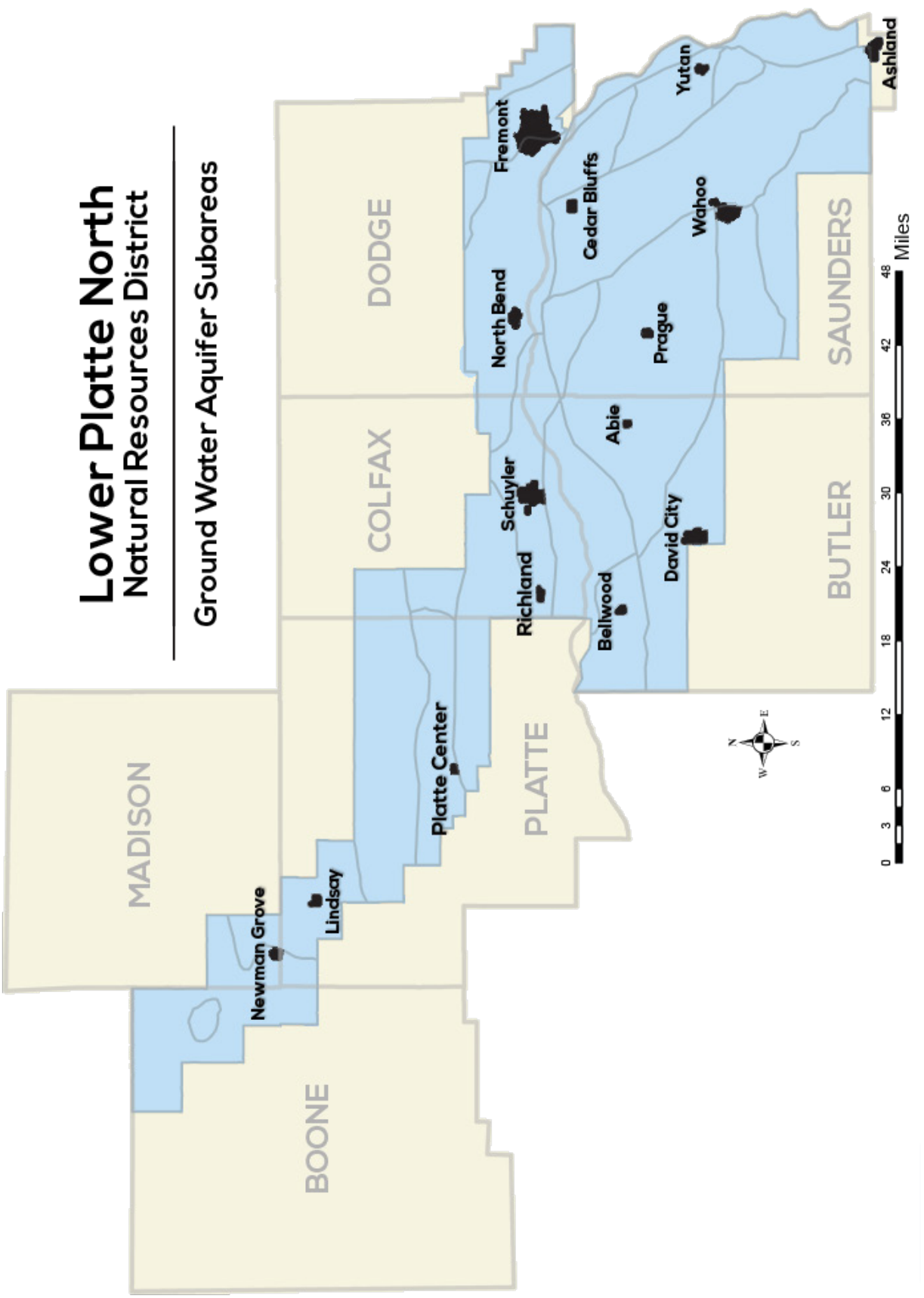
FY 2022-2026 Financial Long Range Objectives

- Although it is expected that the amount of revenue from all sources will fluctuate during the next few years, it is anticipated that the LPNNRD will operate at a mill levy between $0.035 and $0.045 per $100 actual valuation as the District continues to assist with flood reduction project priorities and to address our responsibilities with groundwater water quality and quantity management.

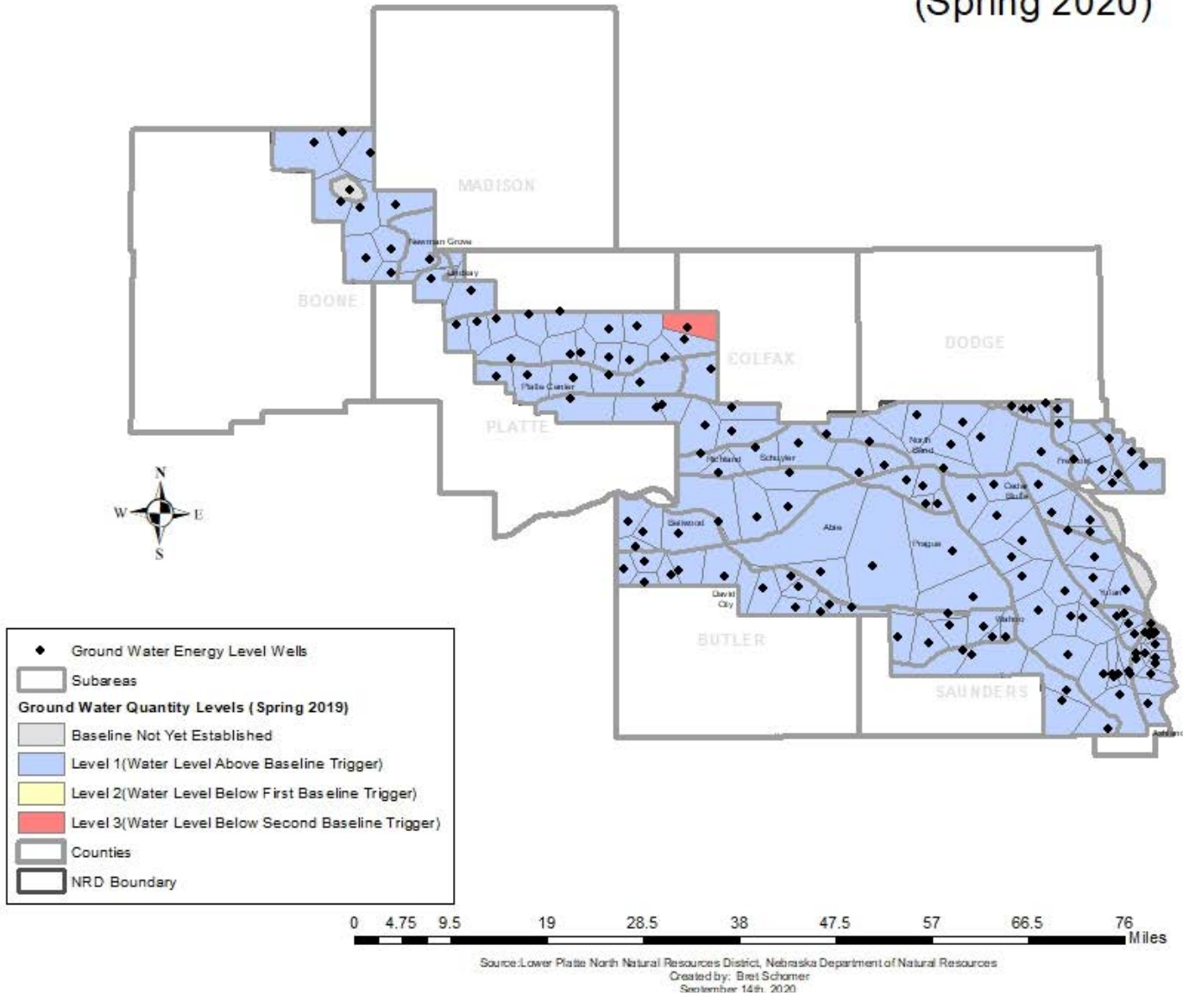
COUNTY	% OF COUNTY IN DISTRICT	ACRES IN DISTRICT	RURAL POPULATION IN DISTRICT	URBAN POPULATION IN DISTRICT	TOTAL
Boone	12.78	56,175	231	--	231
Butler	44.38	167,700	1,863	3,724	5,587
Colfax	40.76	108,582	1,218	6,379	7,597
Dodge	31.96	111,147	3,075	27,923	30,998
Madison	6.25	22,998	129	721	850
Platte	37.78	165,401	2,222	637	2,859
Saunders	81.39	395,098	7,028	8,313	15,341
TOTAL		1,027,101	15,766	47,697	63,463

Twenty-eight cities, towns and villages are located within the Lower Platte North NRD, listed below with their populations (according to 2010 United States Census):

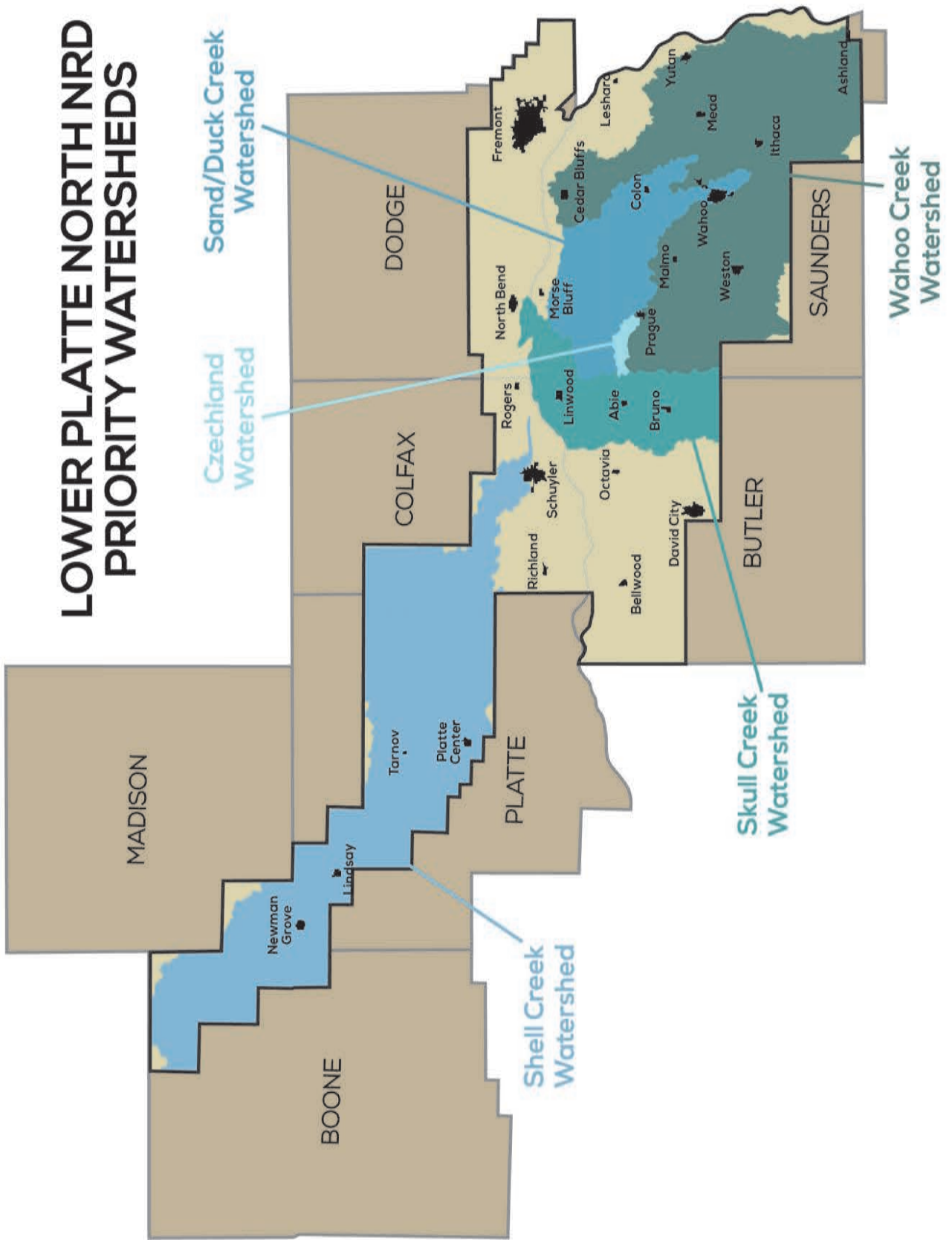
Abie 69
Ashland 2,453
Bellwood 435
Bruno 88
Cedar Bluffs 610
Colon 110
David City 2,906
Fremont 26,397
Inglewood 325
Ithaca 148
Leshara 112
Lindsay 255
Linwood 88
Malmo 120
Mead 569
Memphis 114
Morse Bluff 135
Newman Grove 721
North Bend 1,177
Octavia 127
Platte Center 336
Prague 303
Richland 73
Rogers 95
Schuyler 6,211
Tarnov 46
Wahoo 4,508
Weston 324
Yutan 1,174


Lower Platte North
Natural Resources District
Ground Water Aquifer Subareas
MADISON
BOONE
PLATTE
COLFAX
DODGE
SAUNDERS
BUTLER
Newman Grove
Lindsay
Platte Center
Richland
Schuyler
Bellwood
Abie
David City
North Bend
Prague
Cedar Bluffs
Fremont
Wahoo
Yutan
Ashland
N
E
S
W
0
3
6
12
18
24
30
36
42
48
Miles

Lower Platte North Natural Resources District
Ground Water Energy Level Network
(Spring 2020)



Source:Lower Platte North Natural Resources District, Nebraska Department of Natural Resources
Created by: Bret Schorner
September 14th, 2020


LOWER PLATTE NORTH NRD
PRIORITY WATERSHEDS
Sand/Duck Creek Watershed
Czechland Watershed
Wahoo Creek Watershed
Skull Creek Watershed
Shell Creek Watershed
DODGE
COLFAX
BUTLER
SAUNDERS
PLATTE
BOONE
MADISON
Fremont
North Bend
Morse Bluff
Cedar Bluffs
Leshara
Colon
Yutan
Mead
Ithaca
Ashland
Wahoo
Malmo
Weston
Prague
Rogers
Linwood
Abie
Bruno
Schuyler
Octavia
David City
Richland
Bellwood
Tarnov
Platte Center
Lindsay
Newman Grove

APPENDIX E – Projected Budget (Income), Fiscal Years 2021-2026

Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
AVAILABLE CASH (Sinking Funds, etc.)	$503,026	$685,919	$881,970	$1,030,572	$1,132,771	$1,088,679
FEDERAL INCOME						
NRCS (WFPO & RCPP)	$500,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000
FEMA (Stilling Basin)	$1,209,595					
FEMA (Flood Funds)	$312,619					
FEMA (HMP)	$18,400					
NDEE (EPA 319)	$330,000	$250,000	$250,000	$250,000	$250,000	$250,000
BOR	$52,500					
STATE INCOME						
NE Buffer Strip Program	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000
Decommissioned Well Fund	$3,500	$4,000	$4,000	$4,000	$4,000	$4,000
Natural Resource WQ Fund	$45,000	$50,000	$50,000	$50,000	$50,000	$50,000
Shell Creek Implementation	$90,000	$150,000	$100,000	$100,000	$100,000	$100,000
Wahoo Creek Phase II (NET)	$70,000	$150,000	$150,000	$100,000	$100,000	$100,000
Water Sustainability Fund & EA App.	$224,000	$500,000	$500,000	$500,000	$500,000	$500,000
Water Department (NET)	$66,000	$50,000	$50,000	$50,000	$50,000	$50,000
Sand Creek - NRDF	$220,000					
Lake Wanahoo Other	$55,000	$55,000	$55,000	$55,000	$55,000	$55,000
Wild NE	$3,820	$4,000	$4,000	$4,000	$4,000	$4,000
OTHER INCOME						
Rural Water Income	$110,100	$110,100	$110,100	$110,100	$110,100	$110,100
Property Tax	$3,458,000	$3,458,000	$3,458,000	$3,458,000	$3,458,000	$3,458,000
Investment Income	$15,331	$16,000	$16,000	$16,000	$16,000	$16,000
Equipment, Rent, Parks, Salaries, Etc.	$394,305	$400,000	$400,000	$400,000	$400,000	$400,000
Other Income	$74,350	$75,000	$75,000	$75,000	$75,000	$75,000
TOTAL	**$7,782,546**	**$7,185,019**	**$7,331,070**	**$7,429,672**	**$7,531,871**	**$7,637,779**

APPENDIX F – Projected Budget (Expenses), Fiscal Years 2021-2026

ADMINISTRATION						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Bonds	$0	$500	$500	$500	$500	$500
Dues & Memberships	$36,336	$37,000	$37,000	$37,000	$37,000	$37,000
Fees & Licenses	$10,600	$11,024	$11,465	$11,924	$12,401	$12,897
GIS	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
Insurance	$57,149	$59,435	$61,812	$64,285	$66,856	$69,530
Interest Expense	$0	$0	$0	$0	$0	$0
Legal Notices	$5,000	$5,200	$5,408	$5,624	$5,849	$6,083
Maintenance Contracts	$7,500	$7,725	$8,034	$8,355	$8,690	$9,037
Office Supply & Expense	$12,350	$12,844	$13,358	$13,892	$14,448	$15,026
Computer Supply & Expense	$26,500	$26,500	$27,000	$28,000	$29,000	$31,000
Postage	$4,000	$4,160	$4,326	$4,499	$4,679	$4,867
Professional Services	$138,300	$150,000	$150,000	$150,000	$150,000	$150,000
Rent Expense	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Support to Organizations	$1,000	$1,200	$1,300	$1,400	$1,500	$1,600
Telephone	$17,000	$17,680	$18,387	$19,123	$19,888	$20,683
Utilities	$8,500	$8,840	$9,194	$9,561	$9,944	$10,342

INFORMATION & EDUCATION						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Education	$11,500	$11,960	$12,438	$12,936	$13,453	$13,992
Information	$33,015	$34,336	$35,709	$37,137	$38,623	$40,168
Scholarships & Grants	$3,000	$3,120	$3,245	$3,375	$3,510	$3,650
Other	$10,550	$10,972	$11,411	$11,867	$12,342	$12,836

OPERATION & MAINTENANCE						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Auto & Truck Expense	$22,000	$22,880	$23,795	$24,747	$25,737	$26,766
Building Maintenance	$9,200	$9,568	$9,951	$10,349	$10,763	$11,193
Community Forestry Program	$2,000	$2,000	$2,500	$2,500	$3,000	$3,000
Operation & Maintenance	$269,050	$279,812	$291,004	$302,645	$314,750	$327,340
Project Repairs	$3,000	$15,000	$15,000	$15,000	$15,000	$15,000
Stream Bank Stabilization	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Wildlife Habitat	$3,820	$5,000	$5,000	$5,000	$5,000	$5,000
Other	$49,050	$50,000	$50,000	$50,000	$50,000	$50,000

PERSONNEL						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Directors Expense	$34,500	$35,880	$37,315	$38,808	$40,360	$41,975
Directors Per Diem	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Employee Benefits	$426,745	$443,815	$461,567	$480,030	$499,231	$519,201
Payroll Taxes	$93,000	$96,720	$100,589	$104,612	$108,797	$113,149
Personnel Expense	$34,800	$45,000	$45,000	$45,000	$45,000	$45,000
Salaries	$1,268,151	$1,303,767	$1,342,880	$1,383,166	$1,424,661	$1,467,401

APPENDIX F – Projected Budget (Expenses), Fiscal Years 2021-2026

PROJECTS						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Inter-governmental	$450,700	$500,000	$500,000	$500,000	$500,000	$500,000
Special Projects	$8,500	$10,000	$15,000	$20,000	$25,000	$30,000
Wanahoo	$45,000	$15,000	$15,000	$15,000	$15,000	$15,000
Other Projects	$0	$200,000	$250,000	$250,000	$250,000	$250,000

PLATTE RIVER CORRIDOR ALLIANCE						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
WQ Monitoring	$6,562	$6,562	$7,000	$7,000	$7,000	$7,000

WATER						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Groundwater Management Plan	$35,100	$50,000	$55,000	$60,000	$65,000	$70,000
Groundwater Programs	$56,750	$59,020	$61,381	$63,836	$66,389	$69,045
Regulatory	$1,750	$2,000	$2,000	$2,000	$2,000	$2,000
Surface Water Programs	$17,500	$17,000	$17,000	$17,000	$17,000	$17,000
Special Projects	$146,500	$150,000	$150,000	$150,000	$150,000	$150,000
Land Treatment	$780,000	$500,000	$500,000	$500,000	$500,000	$500,000

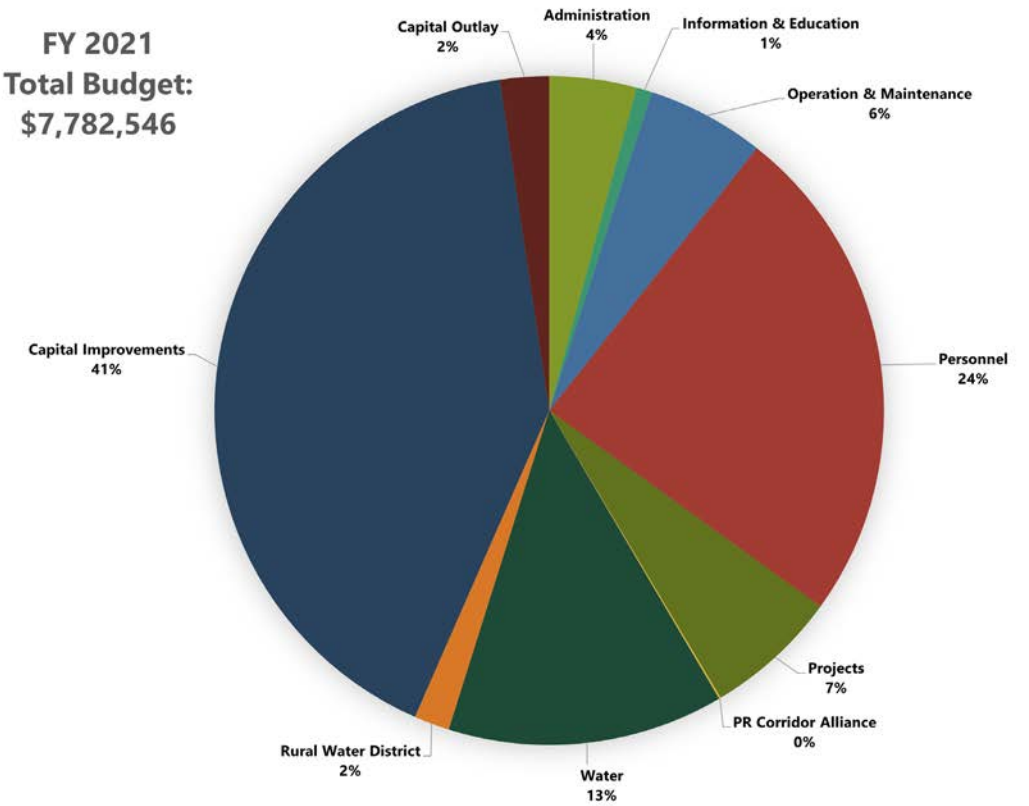
RURAL WATER DISTRICT						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Rural Water District	$133,275	$130,000	$130,000	$130,000	$130,000	$130,000

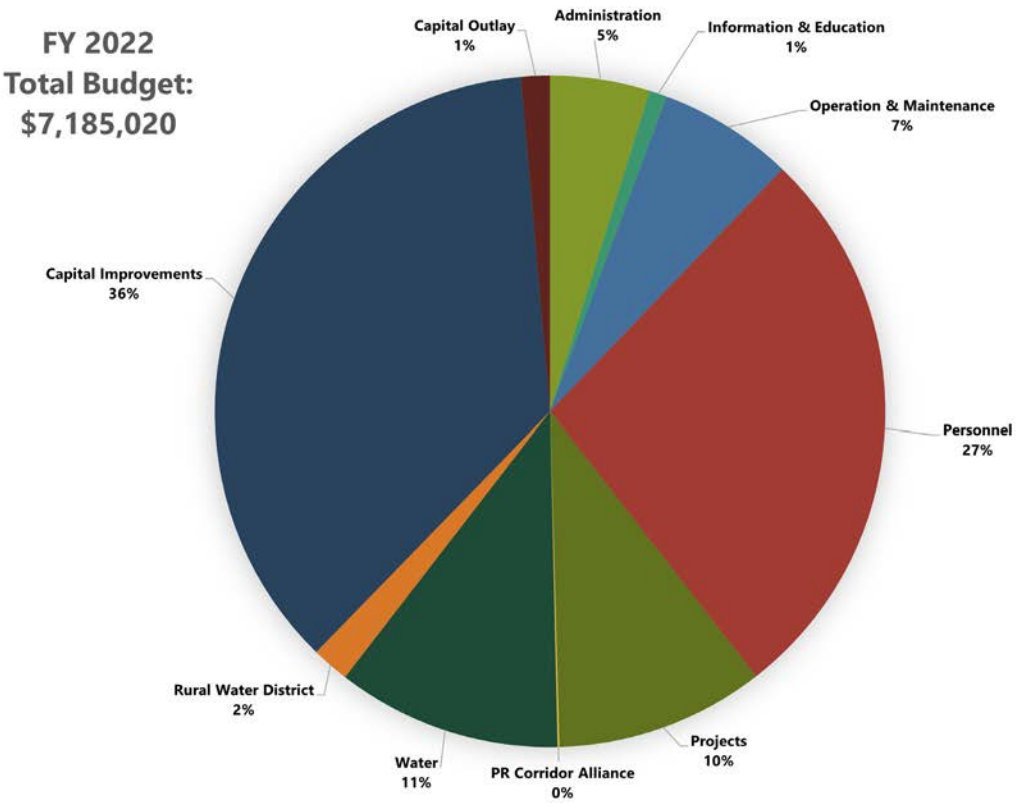
CAPITAL IMPROVEMENTS						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Wanahoo Recreation	$125,000	$75,000	$75,000	$75,000	$75,000	$75,000
Wanahoo Stilling Basin & Oversight	$1,612,793	$0	$0	$0	$0	$0
Wahoo Creek	$873,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000
Cottonwood 21A Spillway	$50,000	$0	$0	$0	$0	$0
Buildings	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Large Structure O&M Sinking Fund	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Flood Reduction Sinking Fund	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000

CAPITAL OUTLAY						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
Capital Outlay	$184,000	$100,000	$100,000	$100,000	$100,000	$100,000

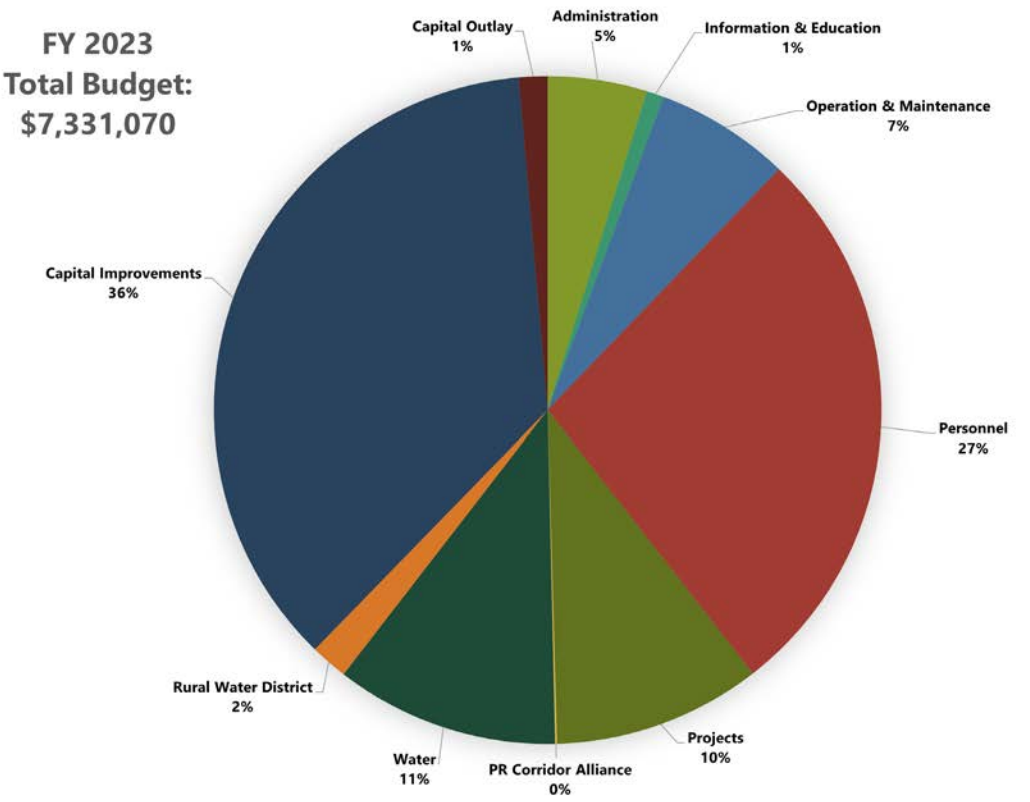
BUDGET TOTAL						
	FY 2021	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
BUDGET TOTAL	$7,782,546	$7,185,020	$7,331,070	$7,429,672	$7,531,871	$7,637,779

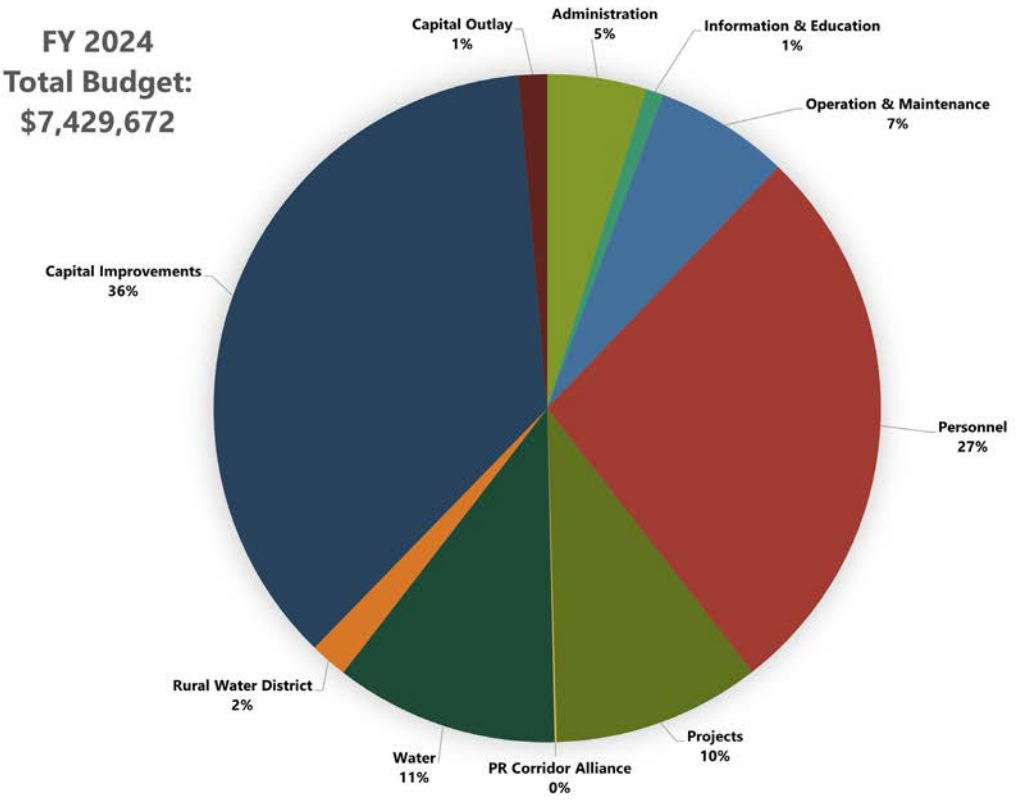
APPENDIX G – Projected Expenses Breakdown, Fiscal Years 2021-2026



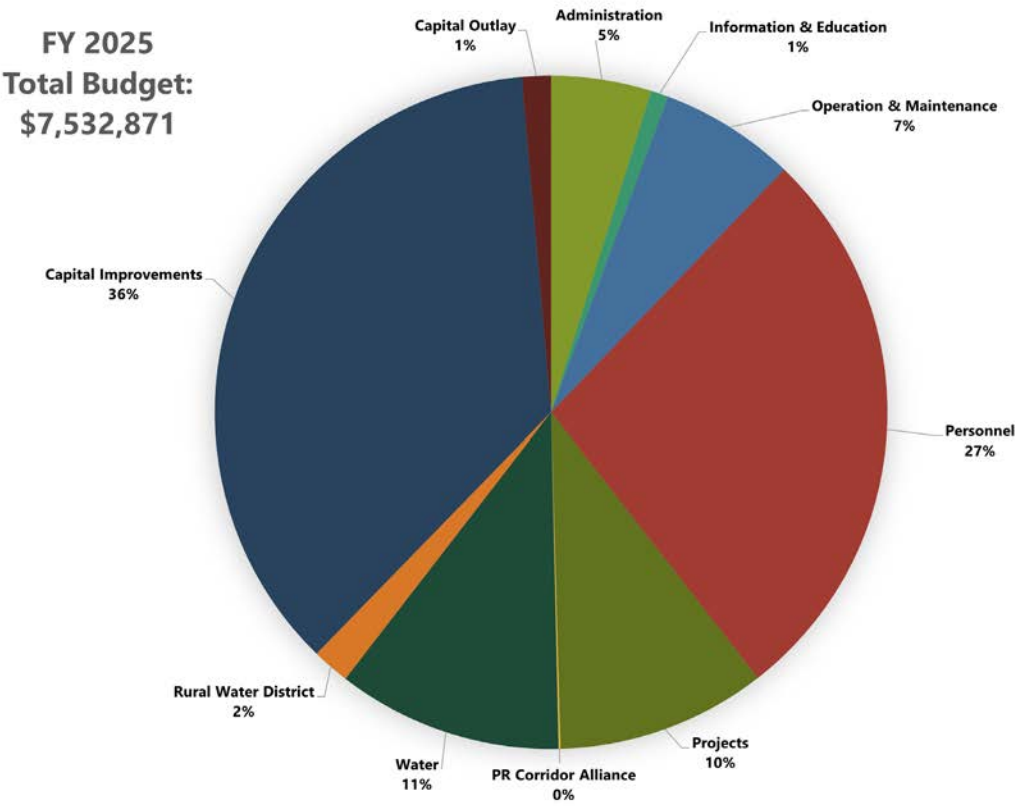


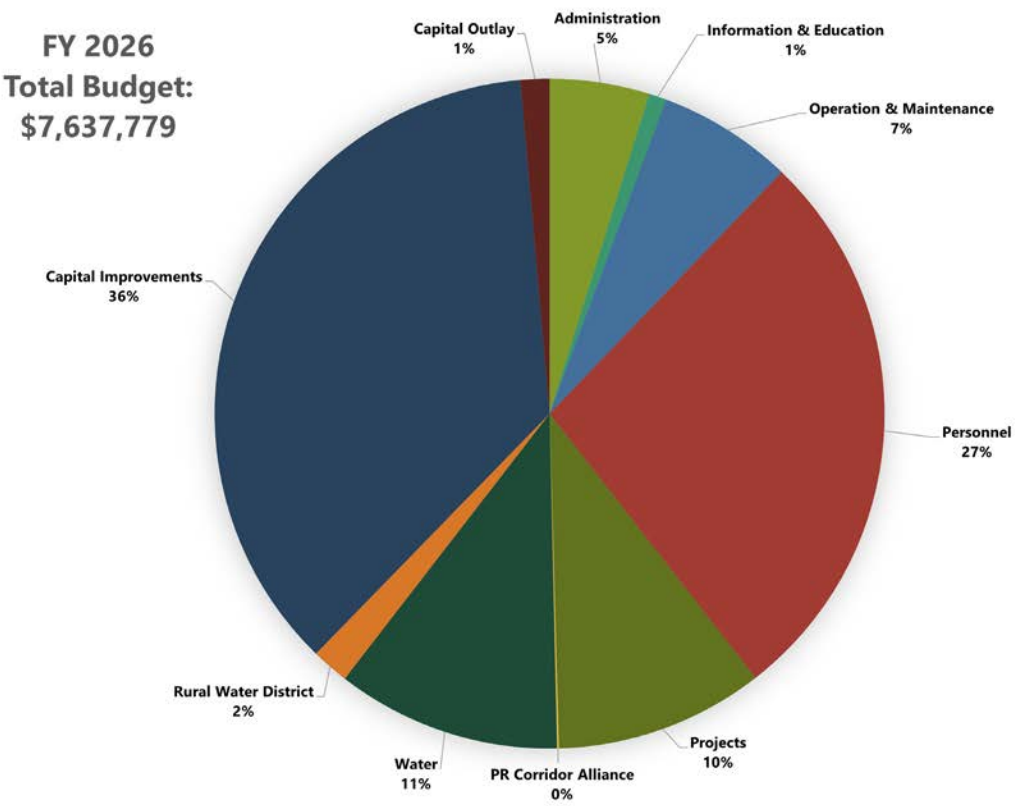
APPENDIX G – Projected Expenses Breakdown, Fiscal Years 2021-2026

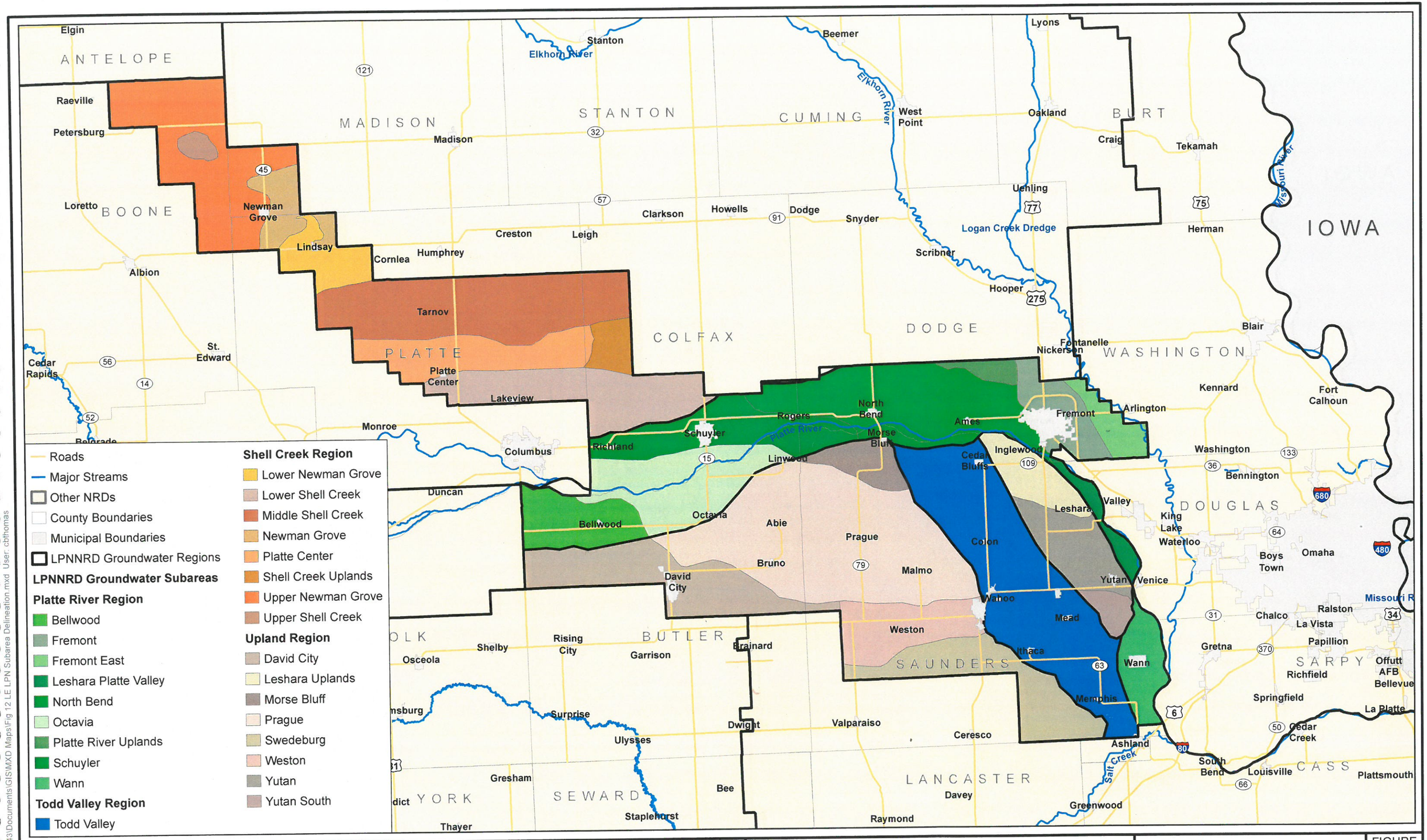




APPENDIX G – Projected Expenses Breakdown, Fiscal Years 2021-2026







F:\Projects\014-0743\Documents\GIS\MXD Maps\Fig 12 LE LPN Subarea Delineation.mxd User: cbthomas

PROJECT: 014-0744

DRAWN BY: CW

DATE: September 18, 2015

Sources:
NDNR: NRD Boundaries
USGS: National Hydrography Dataset
Lower Platte North NRD: Groundwater Regions
U.S. Census Bureau: Roads, County Boundaries, Municipal Boundaries
Olsson (2009): Groundwater Subareas

0 3.5 7 14 Miles

1 in = 7 miles

SUBAREA DELINEATION MAP
Lower Platte North NRD

OLSSON ASSOCIATES

FIGURE 12