

Lewis & Clark NET Project Observation Well Network

A Good Start at Defining the District's Hydrogeology

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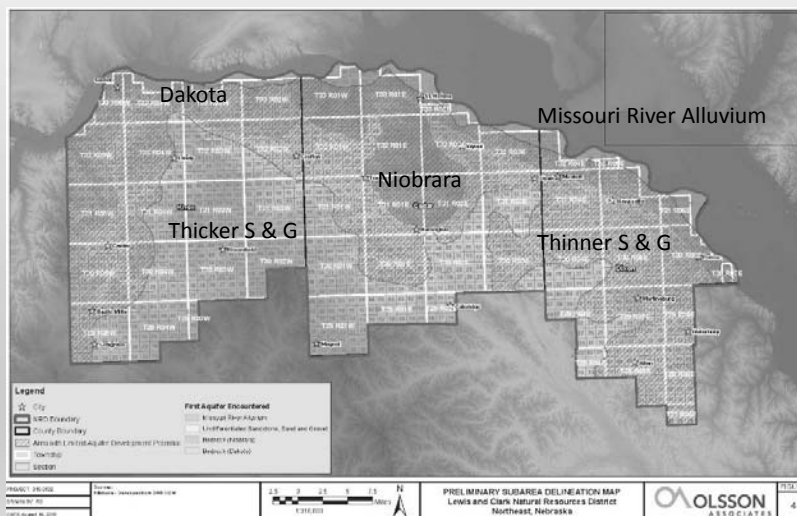
Presentation Outline

- Developing an observation well network.
- Monitoring program: Groundwater data
- Progress of the NET Project and 2016 plan
- Hydrogeology of the L&C NRD: Status July 2016
- Hydrogeology of the L&C NRD: Path Forward

Process – Observation Well Networks

- Targets: Aquifer Types & Documented Problems
- Preliminary Target Hydrogeology
- TH Drilling, Sampling, & Geophysical Logging
- Well Design & Construction

Targets: Aquifer Types



Targets: Problem Areas

- Water Quality: Defined by the NRD well sampling program.
- Well Interference: Defined by documented calls to the NRD in 2012.
- Areas with little to no subsurface data—or areas of complex/unique geology.

ACCESS: Willing landowner

Preliminary Hydrogeology

Report No: **HERRICKA WATER SURVEY-FIELD LOG** Well Number: **01-14-14** T.D. **740** Date **4/23/14**

Company: **CEDEK** Loc: **NN NN NN** Sec. **25** T. **20N** R. **1**

Lat. in section: **62** 1/4 Section, half **31** 1/4 Sec. 25

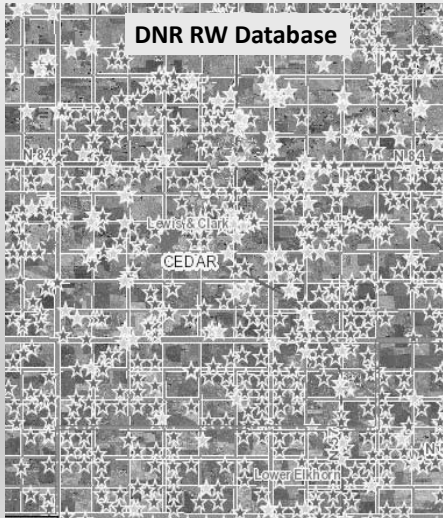
Lower in (to): **Upper**, **2nd** zone, **terrace**, **intermediate**, **main**, and **base**.

Lower description: **TOP of KALAPITU. STRATA - SUBARB. STRATA (W.E.)**

Section: **42** 1/4 **SE 1/4** **T20N R1E S25E**

Fielding Date: **CONSTRUCTION - FOR LANDM**

DEPTH (FT)	TEMP (°C)	PH	SPECS			REMARKS
			TD	ST	WC	
10	1					TOP SOIL DEBRIS
15	5					SILT, NO BED
5	10					DO, silty sly. 10
10	12					DO, real sly. 10
12	15					SH, silty red
15	20					DO, clay
20	25					DO, silty - red
25	31					DO, silty
31						at - relay. Hggher bed
40						DO
44						DO
44						DO, silty
52	55					DO, silty, rd p-c
55	57					SI
59	62					DO, silty, rd p-c
62	65					DO, silty, rd p-c
65	70					DO
70	75					DO
75	80					NO SAMPLE - LOSS



Test-Hole Drilling



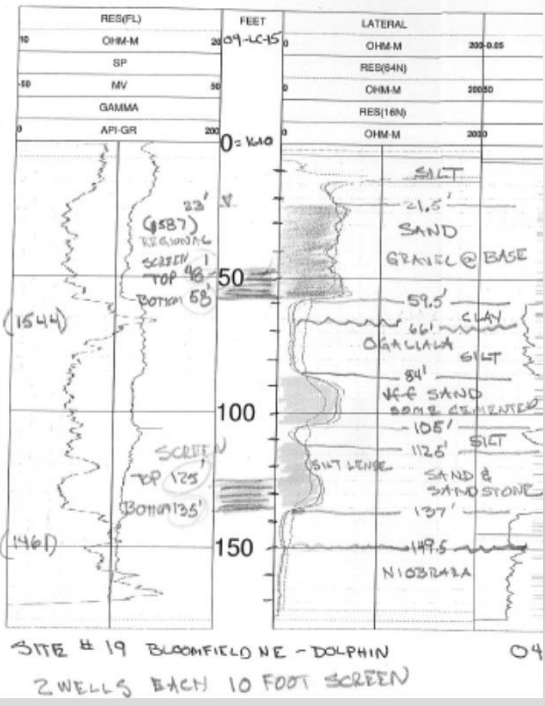
Test-Hole Sampling



Geophysical Logging



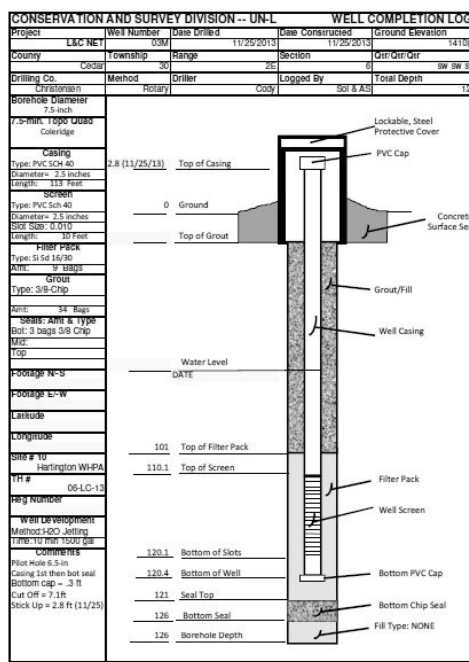
Observation Well Design



Well Construction



Well Construction



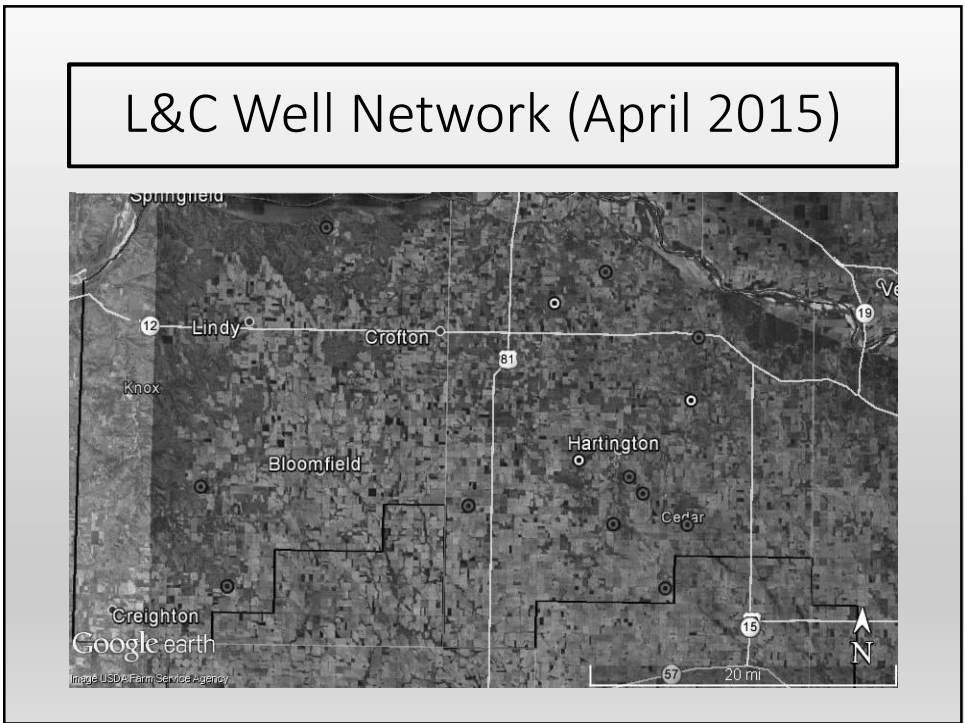
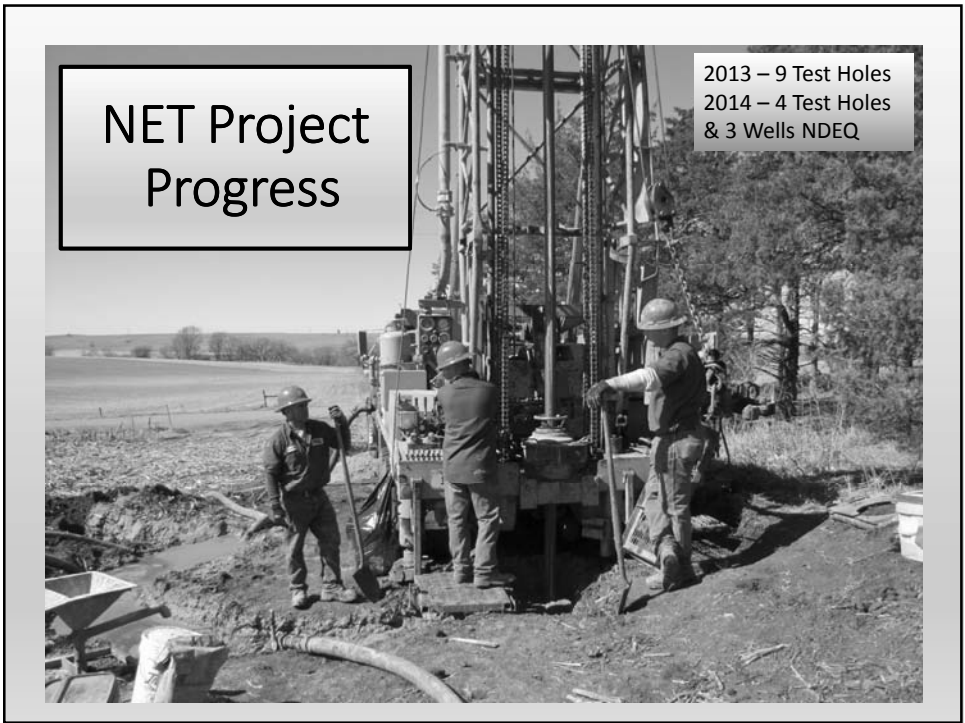
Monitoring Program Groundwater Data

- Monitoring Equipment Design
- Placement of Equipment
- Monitoring Schedule
- Data Collection
- Data Organization & Analysis

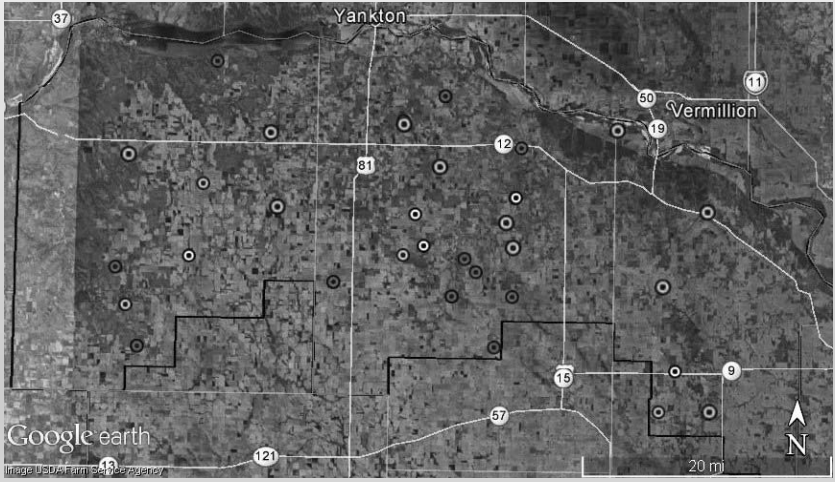
Groundwater Monitoring Equipment

- Pumps to obtain groundwater samples for laboratory testing.
Monthly for 1st year
- Pressure transducers to monitor long-term & seasonal water level changes.
Readings every 8 hours

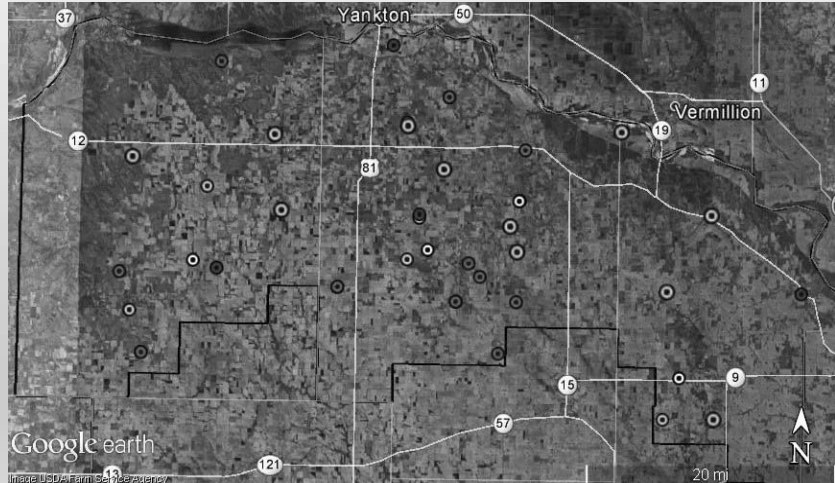




L&C Well Network (October 2015)



L&C Well Network (July 2016)



Hydrogeology of the L&C NRD Status -- July 2016

- 33 New Test Holes (78 Historical CSD Test Holes)
 - 28 - NET 2013 to 2016
 - 4 - DEQ 2014
 - 1 - ELM 2008
- 44 New Wells (Creighton Study: Spalding)
 - 32 - NET 2013-2016
 - 3 - DEQ
 - 4 - NRD Prior Funds
 - 5 - NRD Potential New Funds

- 6 - Surficial Geologic 7.5-minute quadrangles and associated CSD test holes.
- 111 - locations with quality controlled geologic data.
- 30 - sites with access to discrete intervals of the groundwater flow system and local hydrogeology completed. (Also - Creighton Study: Lackey, 1992)
- **XX** - Registered wells with drillers' logs.
- AEM survey lines (ENWRA & Creighton Area).

Questions on where we are & how we got here?



Hydrogeology of the L&C NRD Path Forward

- Groundwater Data Collection and Initial Analysis
- Initial Hydrogeological Analysis
- Mass Water Level Readings (Spring)
- **AEM Surveys** (Example): 3-Mile Grid with Local Higher Density
- Definition of Aquifers x, y, & z. (County Atlases)
- Quantified Aquifer Parameters and Correlation to AEM Survey Results (Aquifer and Slug Tests)