

Central Sands Private Well Network 2011 Nitrate-N Sampling Results

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Glacial Outwash and Sandy Soils in Central Minnesota







- High value crops such as edible beans, corn and potatoes dominate the landscape.
- Intensely irrigated.





- In 2000, a statistically designed network was installed to sample the water table at the edge of fields.
- Since 2000, quarterly median results of this network have been over 10 mg/L.

PROJECT GOALS

• Phase 1.

- Short term goal: Determine *current* nitrate concentrations in private wells throughout the Central Sands region.
- Identify areas of concern.
- Phase 2.
 - Long term goal: Determine long-term trends; whether nitrate concentrations are stable, increasing, or decreasing.
 - Continue to assess areas of concern







- In order to accomplish the goals of the first phase, MDA established a grant project with the Wadena County SWCD.
 - MDA was responsible for the design of the network and the original parcel list.
 - > Wadena coordinated the survey work and sample analyses.



- An unaligned randomly started grid was placed over the 14 counties.
- Grid nodes are approximately 2 miles apart.



- Grid nodes that were in township with < 20% row crops, were clipped out.
- Municipalities and public land were also clipped out.



- 1. A 1.5 mile buffer was drawn around each grid.
- 2. The buffers were then placed over parcel data.
 - Homesteaded with building values > \$20K.
 - Approximately 2300 buffers.
- 3. 3 parcels were randomly selected from each buffer.
- 4. Each received an invitation letter and survey about their well.
- 5. The first person to respond was enrolled in the networkcompetition is a great way to get people involved!

1. Where did the water sample come from? 1 (If municipal well, stop here and return	☐ Sub-division form, you will not b	2☐ Lake Home 3☐ C be included in the private well no	ountry 4						
2. If the water sample came from the country , do you have livestock (more than 10 head of cattle, 30 head of hogs or an equivalent number of other livestock)? $1\Box$ Yes $0\Box$ No									
3. If the sample came from the country, do you mix or store fertilizer (500 lb. or more) on the farm site? 1 \square Yes 0 \square No									
4. Does farming take place on this property?	1 Ves	0 🗖 No							
5. Does your well have a county well index number? Yes or No (found on your well casing) If yes, what is the County Well Index number?or don't know (found on your well casing)									
6. Approximate age of your well?	1 0 - 10 years	2 11 - 20 years 3 21 - 5	0 years 4□ over 50 years						
7. Approximate depth of your well?	1 🗌 0 - 50 Feet	2□ 51 - 100 feet 3□ 100 -	300 feet 4 over 300 feet						
8. Distance to an active or inactive feedlot?	1 🗌 0 - 50 Feet	2□ 51 - 100 feet 3□ 100 -	300 feet 4 over 300 feet						
9. Distance to a septic system?	1 🗌 0 - 50 Feet	2□ 51 - 100 feet 3□ 100 -	300 feet 4 over 300 feet						
10. Distance to an agricultural field?	1 🗌 0 - 50 Feet	2□ 51 - 100 feet 3□ 100 -	300 feet 4 over 300 feet						
11. Type of well construction? 1 Drilled	2 Sand point	3 Hand dug well 4 Flo	wing 5 Other						
12. Is this well currently used for human consumption (Drinking or Cooking)? $1\Box$ Yes $0\Box$ No									
13. Please check any water treatment you have other than a water softener . 0 □ None 1□ Reverse Osmosis 2□ Distillation 3□ Filtering system 4□ Other									
14. When did you last have your well tested for nitrates, lead, hardness, bacteria, etc.?									
1 □ Never tested 2 □ W	/ithin the past year	3 Within the	last 3 years						
4 Within the last 10 years $5 \square G$	reater than 10 yea	rs 6 Don't reme	ember						

Final Sample Status of the Well Survey

performed by The Minnesota Center for Survey Research-U of M

- A total of 6605 surveys were sent out to parcel owners.
- 2989 (46%) returned a completed survey.
- 1822 (61%) of the 2989 were sent a water sample kit
 - Which means that more than one well owner responded per buffergood response!





- 1822 well owners were sent a sample kit that contained a bottle, sampling instructions, and a prepaid mailer to send the sample back to the lab.
- 1555 well owners sent in their water sample.



1555 wells were sampled in the first phase.

Central Sands Private Well Network 2011 Nitrate-N Results Summary									
County	Number of Samples	Min	Median	Max	% at or below 3 (mg/L)	% between 3 -10 (mg/L)	% at or above 10 (mg/L)		
Becker	123	<.03	<.03	15.4	93%	5%	2%		
Benton	57	<.03	<.03	15.6	79%	12%	9%		
Cass	82	<.03	<.03	9.5	96%	4%	0%		
Crow Wing	66	<.03	<.03	8.3	92%	8%	0%		
Douglas	90	<.03	<.03	8.8	94%	6%	0%		
Hubbard	65	<.03	<.03	29.3	85%	8%	8%		
Kandiyohi	117	<.03	<.03	38.7	93%	3%	4%		
Morrison	124	<.03	<.03	33.9	78%	11%	11%		
Ottertail	320	<.03	<.03	32.7	90%	4%	5%		
Роре	93	<.03	<.03	35.0	94%	1%	5%		
Sherburne	42	<.03	<.03	40.0	91%	5%	5%		
Stearns	167	<.03	<.03	49.8	82%	13%	4%		
Todd	137	<.03	<.03	81.0	93%	5%	2%		
Wadena	72	<.03	0.09	49.2	75%	17%	8%		
Average	1,555 total samples	<.03	0.01	31.9	89%	7%	5%		





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Well Construction and Nitrate Concentrations







First Phase Summary

• 1555 Well owners were the cornerstone of this project.

• Nitrate-N concentrations are lower in the private wells than in the MDA monitoring wells.

• Well construction, well depth, and well age may be important factors in the quality of water in private wells.







What's Next???

- Continue monitoring with the long term volunteers (558).
- Find ways to keep the volunteers involved and interested.
- Prioritizing areas of concern, targeting townships for Nitrate-N sampling





Full Report at:

 <u>http://www.mda.state.mn.us/protecting/cleanwaterfu</u> <u>nd/gwdwprotection/characterizingnitrates.aspx</u>

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Phase 2: Long-Term Trends

- 558 well owners volunteered to participate in the long-term network.
- Counties will verify well information by visiting the well sites and confirming well identification numbers.
- Wadena county will perform the nitrate-n analysis with a table top UV Spectrophotometer.

