

Minnesota Department of Agriculture 2012 Nitrate Clinic Outreach Summary Report



In accordance with the American with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711 or 1-800-627-3529. MDA is an equal opportunity employer and provider.

INTRODUCTION

In 1993, the Minnesota Department of Agriculture (MDA) developed an onsite, walk-in style water testing clinic with the objective of increasing public awareness in regard to nitrate levels in private well water. The program was successful in achieving high monitoring rates in counties that have a chronic problem with nitrate-N concentrations greater than 10 mg/L. Between 1999 and 2006, the program was funded through the Environment and Natural Resource Trust Fund. However, in 2006, this funding ended and the program was not continued. Counties were still able to use the MDA nitrate testing equipment, but had to provide their own personnel to run the clinic and record the nitrate-N analysis results. In 2011, the Nitrate Testing Clinic Program was reinstated using Clean Water Funds and continued for the year 2012.

Over the summer of 2012, 2063 samples were analyzed from 40 counties (Table 1). The overall statistics of these counties were in the southern and central portions of Minnesota, where nitrate levels have historically been an issue. Of all wells tested, 7.7 percent tested greater than 10mg/L. This quantity of nitrates is considered toxic for infants and small children. Counties with the greatest concern were spread throughout the state; Rock, in the southwest, Winona, in the southeast, and Dakota in the east central portion of Minnesota (Table 1).

There was a negligible decrease in the overall participation between 2011 and 2012 with an increase in the amount of wells that were considered dangerous for human consumption by the EPA. Most homeowners that are aware of nitrate problems with their water supply are more likely to have their water tested more frequently (Figure 12.) Additionally, some counties had very few participants come to the outreach clinic, and with such a small number of samples (Table 1.), it is impossible to have these samples serve as a representative sample to the county.

The surveys are voluntary and no one was turned away because they did not want to complete the form. All private information is kept confidential under Minnesota Statutes Chapter 13 and used to compare nitrate results to well characteristics, land use, frequency of nitrate testing, and home treatment for nitrate removal. Once the surveys are collected, statistical comparisons are run to generate the results of this report.

The following section summarizes the participant surveys. There were 2063 samples analyzed in 2012 with 1385 voluntary surveys completed. This means that 67.1% of all samples had a survey completed with a particular sample or series of samples. There are several reasons for this disparity:

- Multiple wells on the property
- Homeowners bring in a 'before and after' sample to find if home water treatment techniques are effectively removing nitrates
- A neighbor's water sample can be brought in by constituents, and those constituents are unaware of the neighbor's well statistics
- A small number of people do not wish to complete the voluntary survey

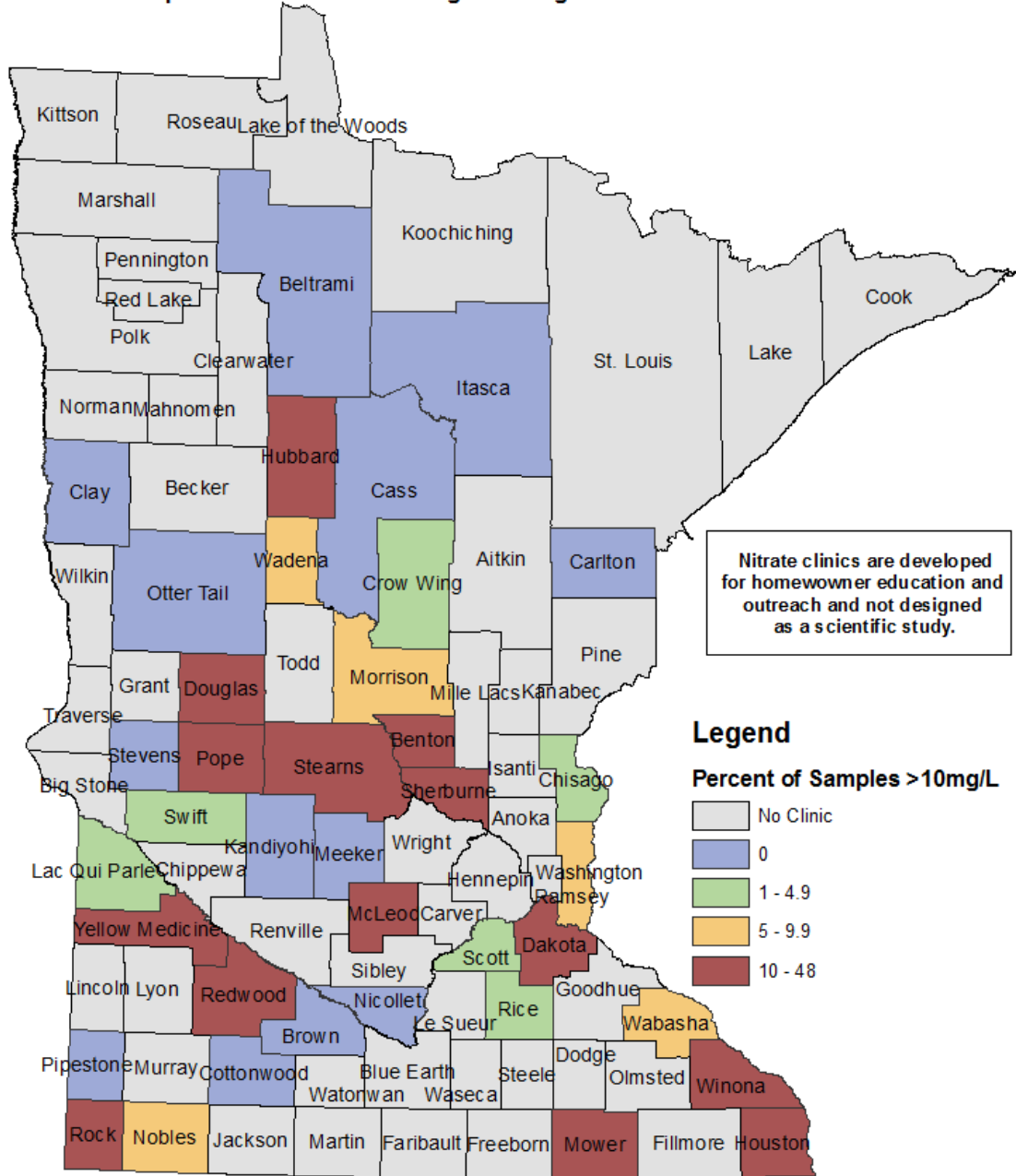
In conclusion, this program is important for many reasons. The first and foremost is this is an educational outreach program to help homeowners find out what their nitrate levels are in their well water. MDA provides technical assistance for reducing nitrates in groundwater, information on other potential contaminants, such as lead and arsenic, and how to finding additional testing services for contaminants other than nitrates or to confirm analysis.

- The township information can be used to determine where gaps in data are located and where to apply further outreach clinics
- Assist MDA in targeting pesticide BMP promotional areas and effort
- Provide assistance to local NRCS/SWCD in terms of competing for federal and state cost sharing programs
- Provide public information on well construction, specifically sand points, well codes, set back distances, and well depth. Demonstrate to private well owners why this information is important for public health and livestock wellbeing

2012 Nitrate Clinic Summary

Percentage of Samples >10 mg/L

Be aware that nitrate clinic data may have a high bias and do not represent Minnesota's average drinking water nitrate concentrations.



Prepared by the Minnesota Department of Agriculture 2013



Figure 1. Counties that participated in the Nitrate Outreach Clinics in 2012 and the percentage of samples greater than 10mg/L

Survey Results Summary

Responses for the well construction questioned showed that 69% of all surveyed wells were drilled. Sand point wells are usually constructed by the home owner. Though, shallow wells, such as sand points, are more likely to have high concentrations of nitrate contamination. The 'Other' category was typically a hand dug well used primarily for livestock purposes. Also, 'Unknown' construction states that the homeowner is unaware of how the well was built. Table 2 summarizes the well construction type compared to nitrate concentrations in the well water. Shallow wells tend to have a higher percentage of nitrate concentrations greater than 10 mg/L than deeper wells (Table 2 and Figure 3 and 4). Older wells have a greater risk of high nitrate concentrations since they are generally not constructed to current well code and are usually less than 50 feet deep. This trend is consistent with the data mean, median, and percentage over 10mg/L (Table 3 and Figure 4).

Distance to septic systems was relatively consistent to overall nitrate levels (Table 4 and Figure 5). In regards, to the proximity to agricultural fields and feedlots, the data was consistent in that generally, the closer a well is located to these types of land uses, the greater the risk of nitrate problems (Table 6, Table 7, Figure 7 and Figure 8). Though, only a small number of respondents stated that there is >500 pounds of fertilizer on the premises, the statistics demonstrated a higher nitrate concentration median and % > 10 mg/L (Table 10 and Figure 9). This trend also holds for farming on the property, which correlates with the proximity to feedlots and agricultural fields (Table 11 and Figure 10).

The frequency of well testing by those whom chose to participate in the Nitrate Outreach Clinic would suggest that once home owners are aware of nitrate issues in their drinking water, they are more likely to test their well water more often (Figure 11). The majority of participants had not had their wells tested for nitrates for at least three years (Table 12). Additionally, 24.7% of all participants had their wells tested for the first time in the Nitrate Outreach Clinic.

Types of effective media are starting to change with the waning influence of newspapers, so this question was added to the 2012 survey to find how the public heard about the clinics. Of the respondents, 39% read about the event in their local newspaper. The second largest responses of known types of media were 'other' with 14%. The other category included announcements from lake association and town hall meetings, as well as township newsletters. The least effective method of announcement was on MDA's website with only 1% of responses (Figure 12).

Table 1. Counties that participated in the 2012 Nitrate Outreach Program and total samples tested.

County	Number of Samples	Minimum	Maximum	Median	Percentage of Nitrate Samples >10 mg/L
Beltrami	55	0	9.67	0.36	0
Benton	38	0	35.8	0.5	10.53
Brown	23	0	9.06	0	0
Carver	N/A	N/A	N/A	N/A	N/A
Chippewa	N/A	N/A	N/A	N/A	N/A
Chisago	35	0	10.01	0.02	2.86
Clay	35	0	2.57	0.05	0
Cottonwood	12	0	7.59	0.17	0
Crow Wing	63	0	12.5	0.2	1.59
Dakota	223	0	33	0.56	22
Douglas	20	0	16	0	10
Houston	56	0	26.28	0.54	12.5
Hubbard	72	0	34.08	0.88	13.89
Itasca	37	0	4.6	0	0
Kandiyohi	57	0	4.1	0	0
Lac Qui Parle	31	0	13.79	0.17	3.23
Lyon	N/A	N/A	N/A	N/A	N/A
McLeod	10	0	12.78	0.14	10
Meeker	10	0	3.1	0.11	0
Morrison	101	0	35.9	1.2	9.9
Mower	37	0	20	0.5	10.81
Nicollet	53	0	5.6	0	0
Nobles	38	0	54.39	0.39	7.89
Otter Tail	63	0	2.6	0	0
Pipestone	4	0	1.2	0.75	0
Pope	28	0	29.87	0.19	14.85
Redwood	10	0	13.31	0.54	10
Rice	55	0	29.13	0.003	1.92
Rock	19	0	82	5.7	47.37
Scott	201	0	77.6	0.05	3.98
Sherburne	32	0	46.21	0.31	12.5
Stearns	67	0	19.45	0.04	10.34
Stevens	23	0	1.97	0.07	0
Swift	49	0	10.19	0.13	2.04
Wabasha	16	0	16.91	0.61	6.25
Wadena	29	0	17.63	0.1	6.9

Note: N/A occurs where a county hosted a clinic. However, no samples were tested.

Table 1 con't. Counties that participated in the 2012 Nitrate Outreach Program and total samples tested.

County	Number of Samples	Minimum	Maximum	Median	Percentage of Nitrate Samples >10 mg/L
Washington	365	0	20.53	0.4	5.2
Watonwan	N/A	N/A	N/A	N/A	N/A
Winona	85	0	21.54	0.09	22.35
Yellow Medicine	11	0	24.47	0.09	18.18
Overall	2063	0	21.26	0.16	7.70

Note: N/A occurs where a county hosted a clinic. However, no samples were tested.

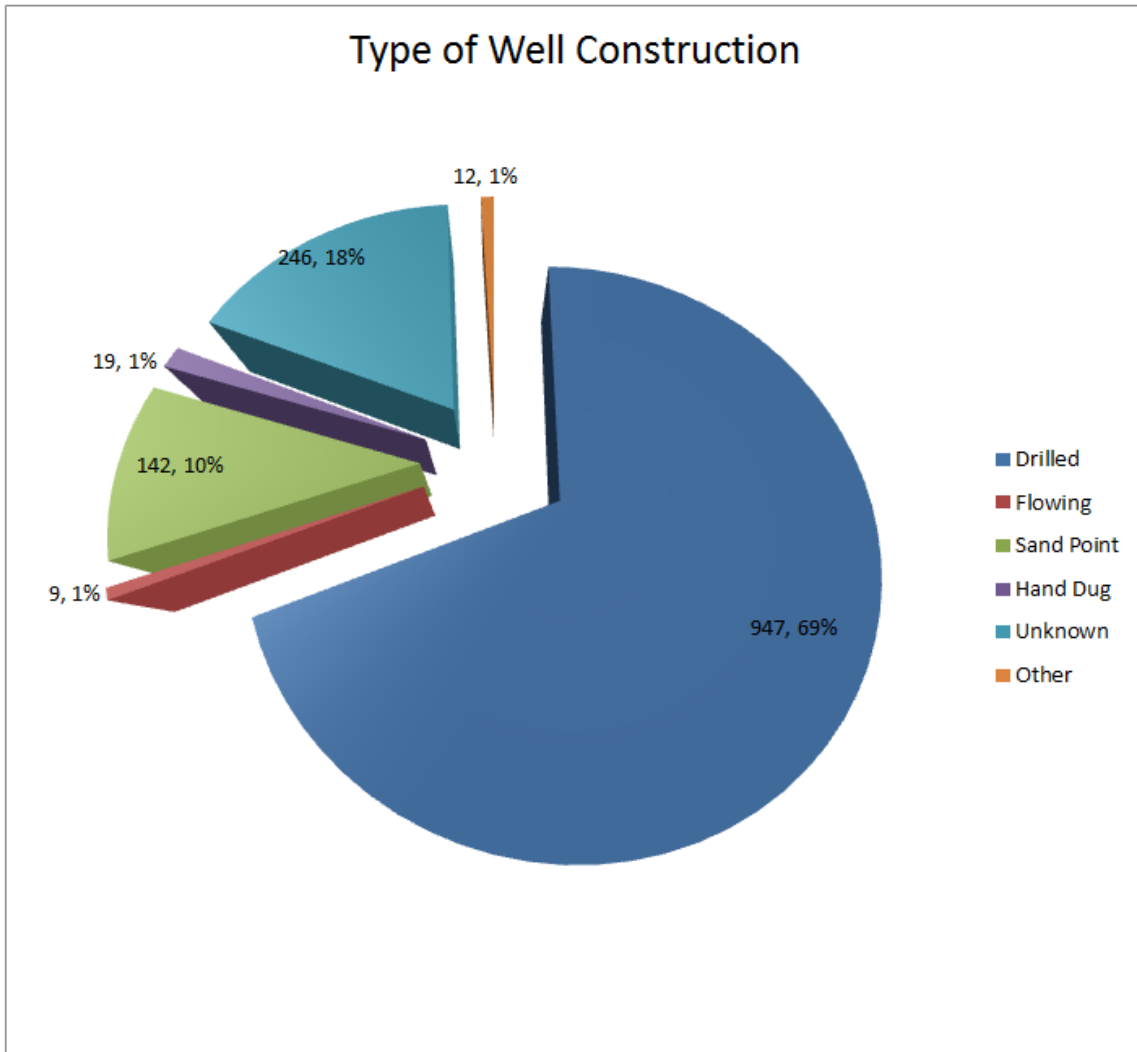


Figure 2. Type of Well Construction 1

Table 2. Nitrate-N results compared to well construction type.

Well Type	# of Surveys	0<3 mg/L	3<10 mg/L	≥10 mg/L	% 0<3	% 3<10	% ≥10	Average	Median
Drilled	947	750	135	62	79.2	14.3	6.5	2.4	0.13
Flowing	9	8	1	0	88.9	11.1	0.0	0.5	0.0
Sand Point	142	111	25	6	78.2	17.6	4.2	2.4	0.5
Hand Dug	19	6	6	7	31.6	31.6	36.8	8.7	7.8
Unknown	246	191	41	14	77.6	16.7	5.7	2.5	0.2
Other	11	6	2	4	50.0	16.7	33.3	8.1	2.9

Well Construction and Nitrate-N Concentrations

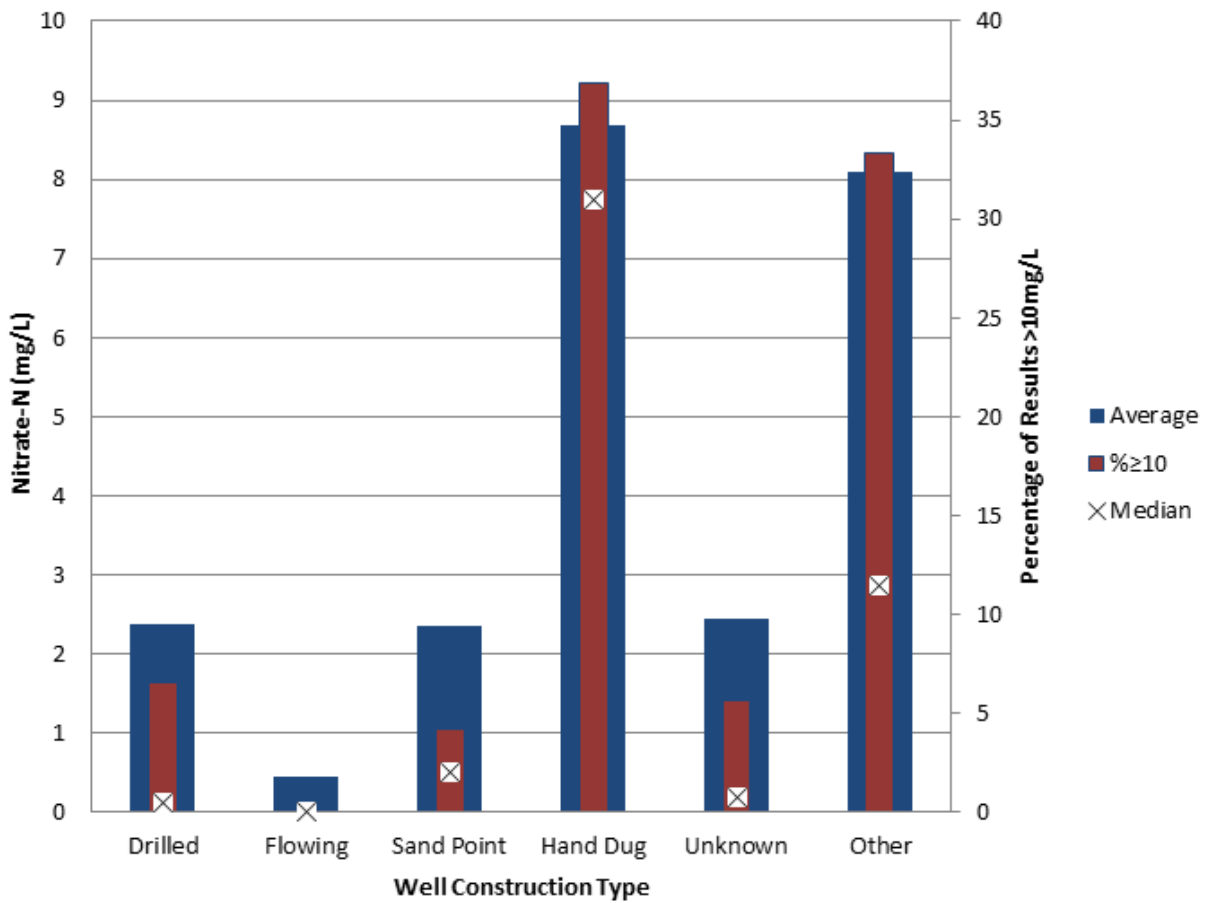


Figure 3. Well Construction and Nitrate-N Concentrations.

Table3. Well age and Nitrate-N concentrations.

Well Age (Years)	# of Surveys	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
0-10	226	193	26	7	85.4	11.5	3.1	1.6	0.1
11-20	304	254	37	13	83.6	12.2	4.3	1.6	0.1
21-50	535	414	81	40	77.4	15.1	7.5	2.7	0.2
>50	156	92	37	27	59.0	23.7	17.3	5.3	1.8
Unknown	164	121	34	9	73.8	20.7	5.5	2.3	0.2

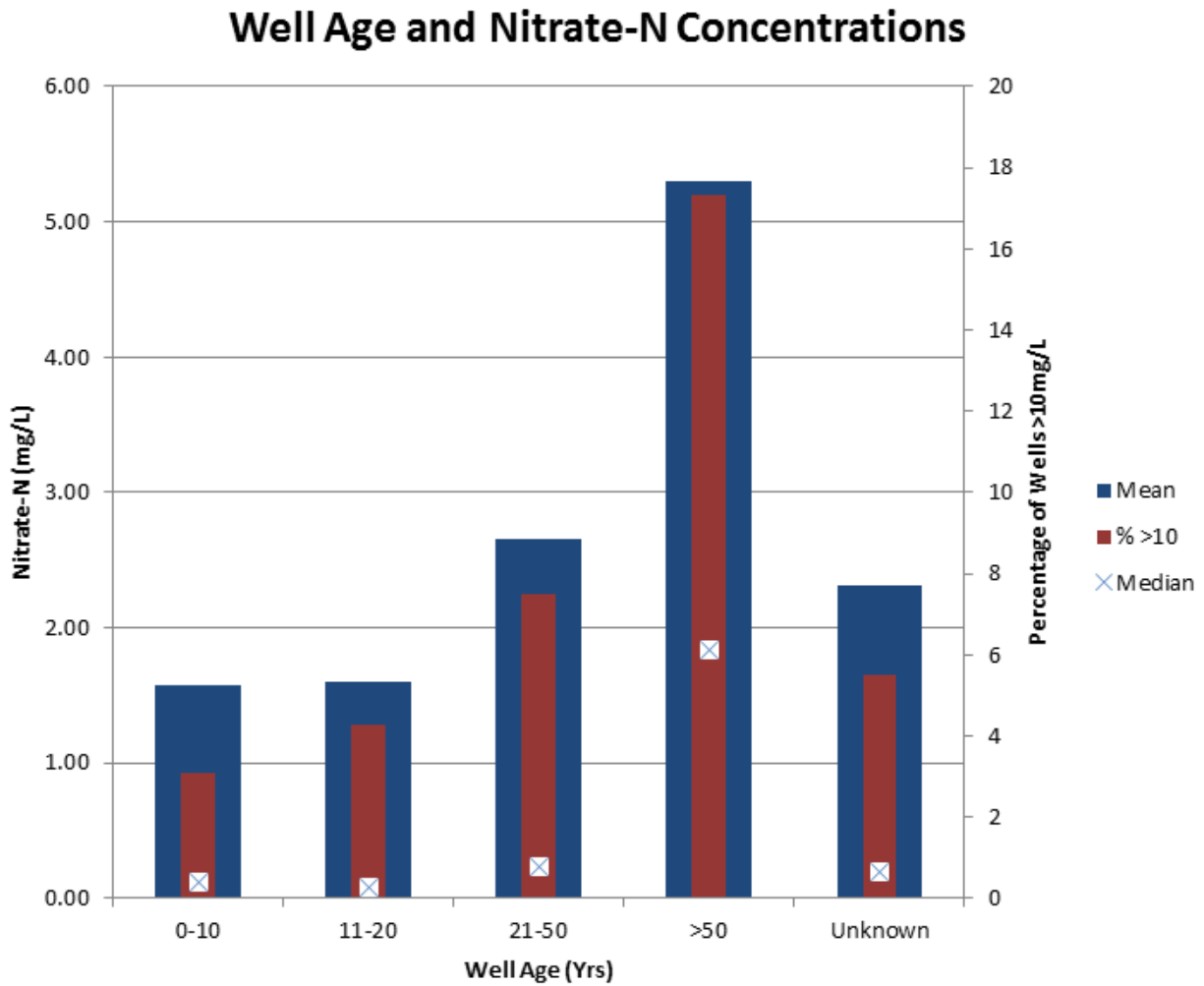


Figure 4. Well Age and Nitrate-N concentrations.

Table 4. Septic distance and well Nitrate-N concentrations.

Septic Distance (Feet)	# of Surveys	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
0-50	76	57	14	5	75.0	18.4	6.6	2.8	0.3
51-100	384	300	55	29	78.1	14.3	7.6	2.4	0.2
101-300	445	349	61	35	78.4	13.7	7.9	2.8	0.2
>300	213	157	41	15	73.7	19.3	7.0	2.8	0.2
Unknown	267	211	45	11	79.0	16.9	4.1	2.0	0.2

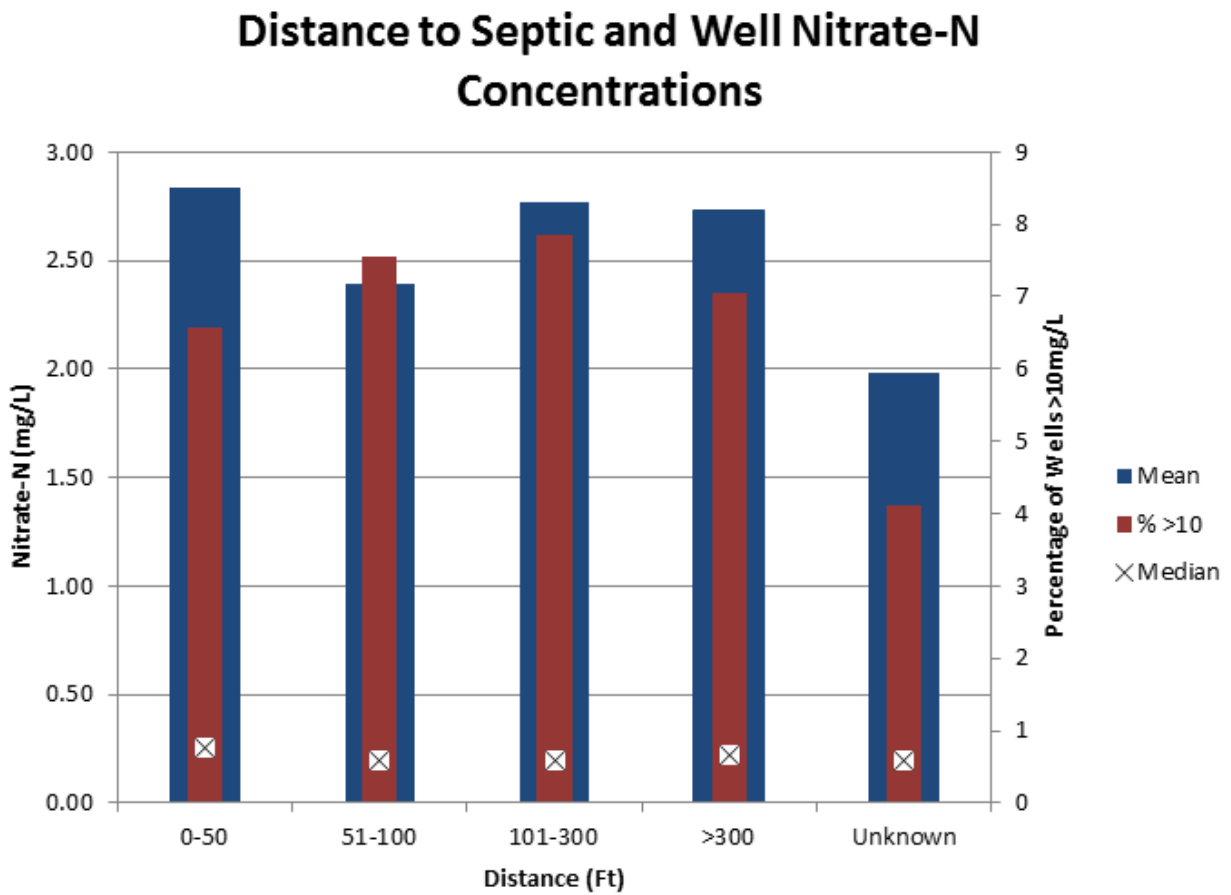


Figure 5. Distance to septic systems compared to Nitrate-N concentrations.

Table 5. Well depth and Nitrate-N concentrations.

Well Depth (Feet)	Total	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
0-50	203	145	35	23	71.4	17.2	11.3	3.5	0.6
51-100	324	247	45	32	76.2	13.9	9.9	3.2	0.2
101-300	439	358	56	25	81.6	12.8	5.7	2.0	0.1
>300	96	73	19	4	76.0	19.8	4.2	2.1	0.0
Unknown	323	251	60	12	77.7	18.6	3.7	2.0	0.2

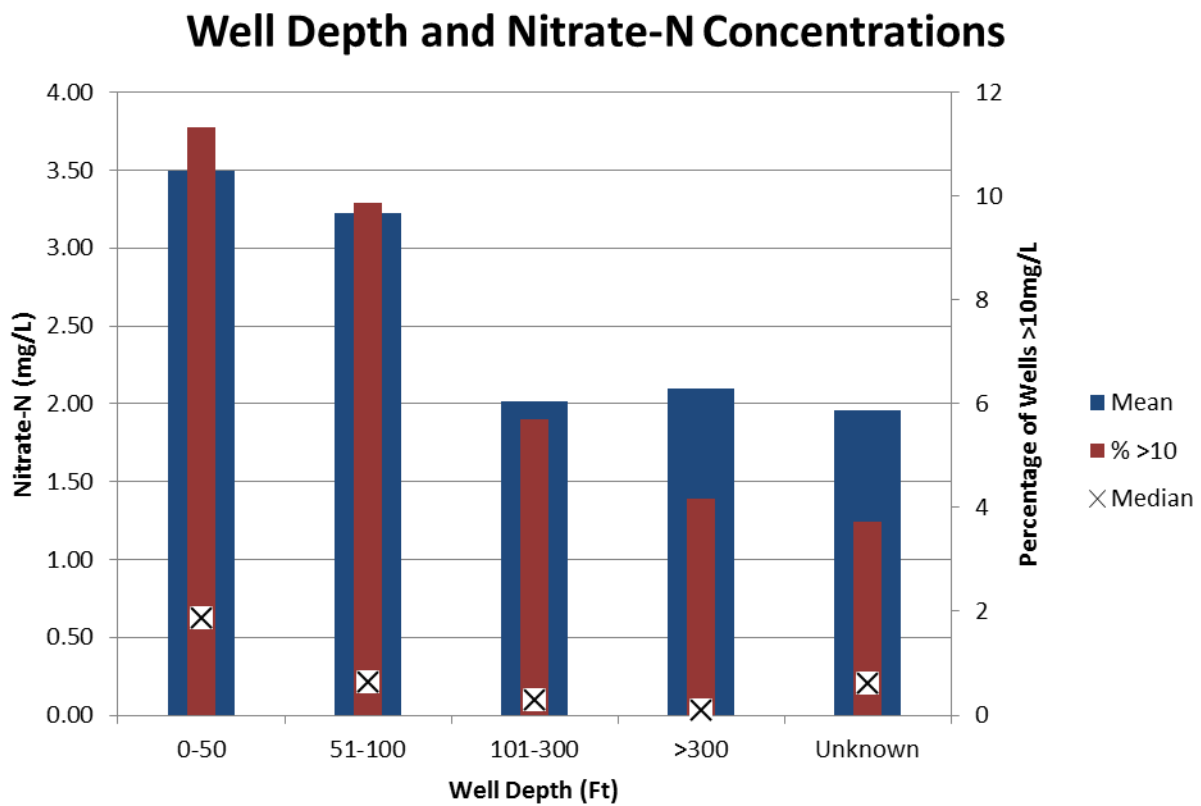


Figure 6. Well depth, in feet, compared to Nitrate-N concentrations and percent of wells with Nitrate-N concentrations >10mg/L.

Table 6. Distance to feedlots and Nitrate-N concentrations.

Distance to Feedlot (Feet)	# of Surveys	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
0-50	76	53	14	9	69.7	18.4	11.8	3.8	0.4
51-100	37	25	7	5	67.6	18.9	13.5	4.3	0.3
101-300	61	42	13	6	68.9	21.3	9.8	3.3	0.7
>300	867	680	126	61	78.4	14.5	7.0	2.5	0.2
Unknown	344	274	55	15	79.7	16.0	4.4	1.9	0.2

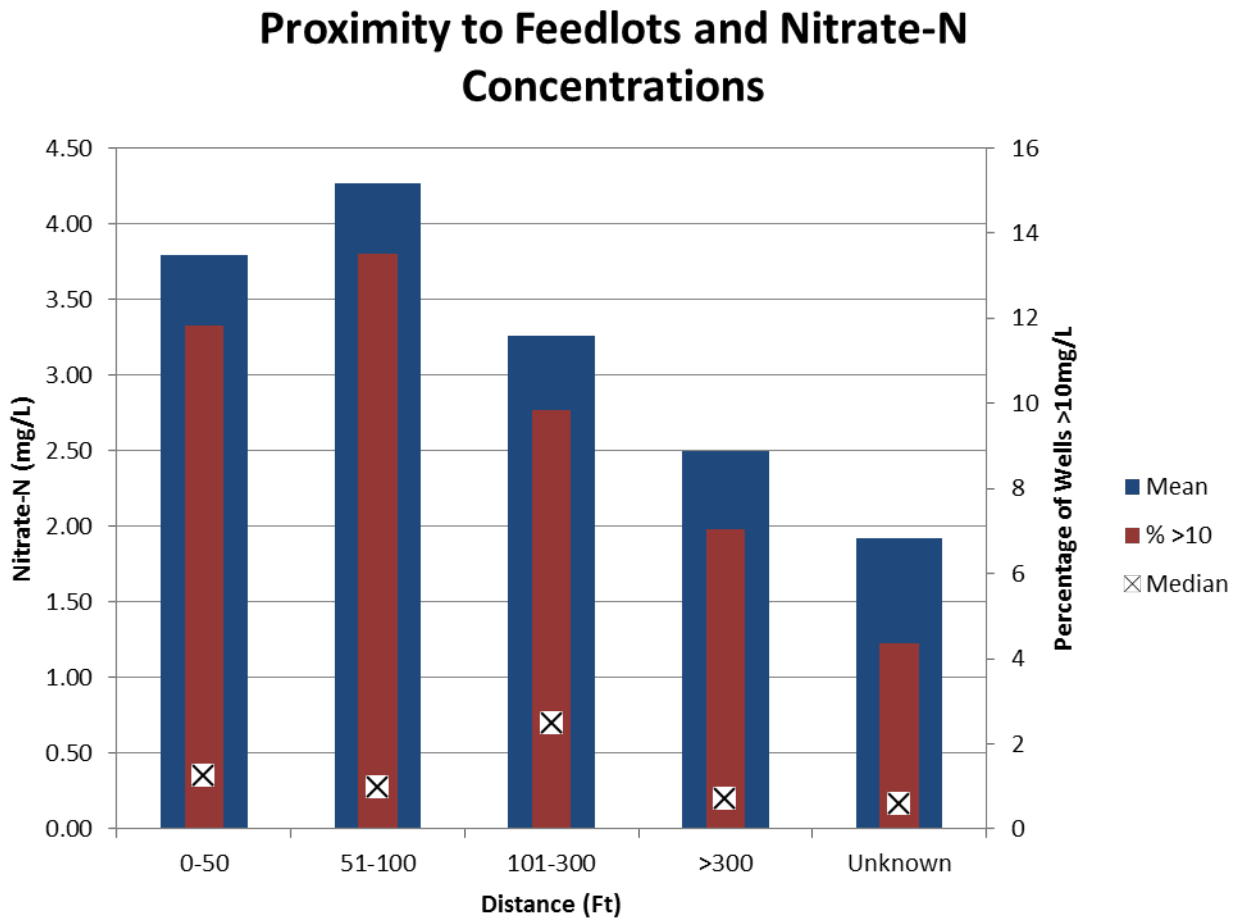


Figure 7. Well head distance from a feedlot in feet and Nitrate-N concentrations and percentage of wells with Nitrate-N concentrations >10 mg/L.

Table 7. Distance to Agricultural Fields and Nitrate-N Concentrations

Distance to Field (Feet)	# of Surveys	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
0-50	73	51	18	4	69.9	24.7	5.5	3.7	0.2
51-100	102	62	20	20	60.8	19.6	19.6	4.5	0.6
101-300	214	165	25	24	77.1	11.7	11.2	3.2	0.2
>300	709	562	109	38	79.3	15.4	5.4	2.2	0.2
Unknown	285	234	41	10	82.1	14.4	3.5	1.8	0.2

Proximity to Agricultural Fields and Nitrate-N Concentrations

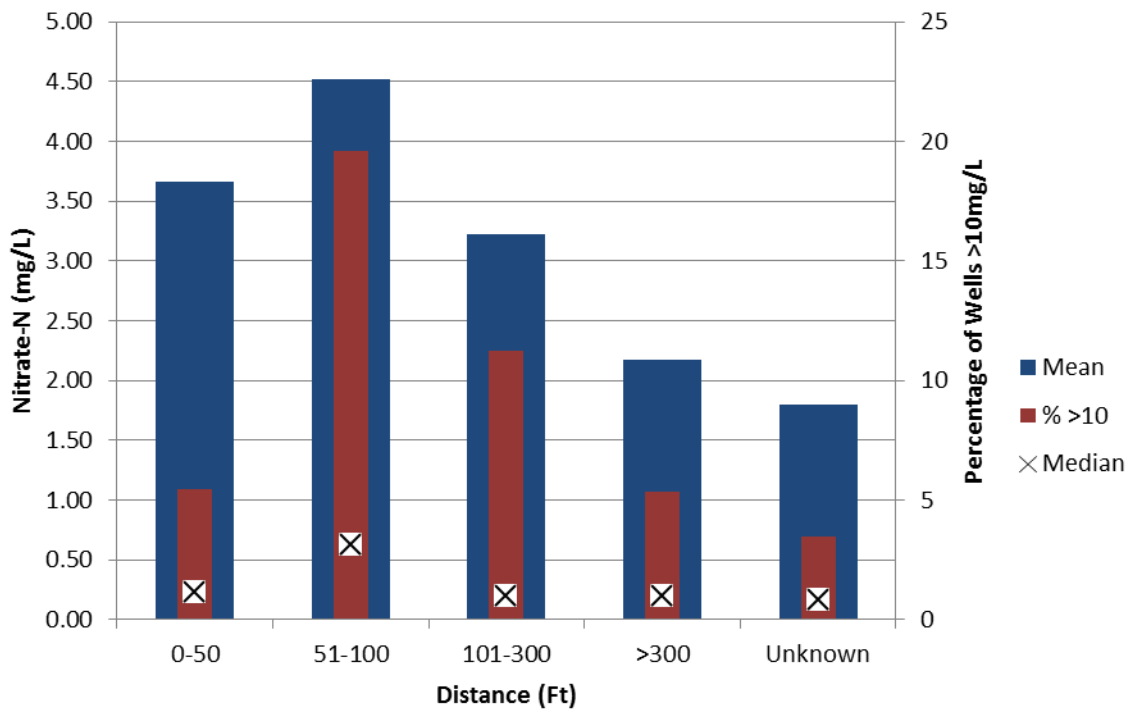


Figure 8. Distance to Agricultural Fields and Nitrate-N Concentrations and Percentage of Wells with Nitrate-N Concentrations >10 mg/L.

Table 2. Properties storing >500lbs of fertilizer on site and Nitrate-N concentrations in wells.

Fertilizer Storage >500 lbs on Property	# of Surveys	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
Yes	30	14	9	7	46.67	30	23.33	6.94	3.08
No	1202	932	187	83	77.54	15.56	6.9	2.50	0.20
Unknown	152	128	18	6	84.21	11.84	3.95	1.70	0.17

Storing >500lbs of Fertilizer on Property and Nitrate-N Concentrations

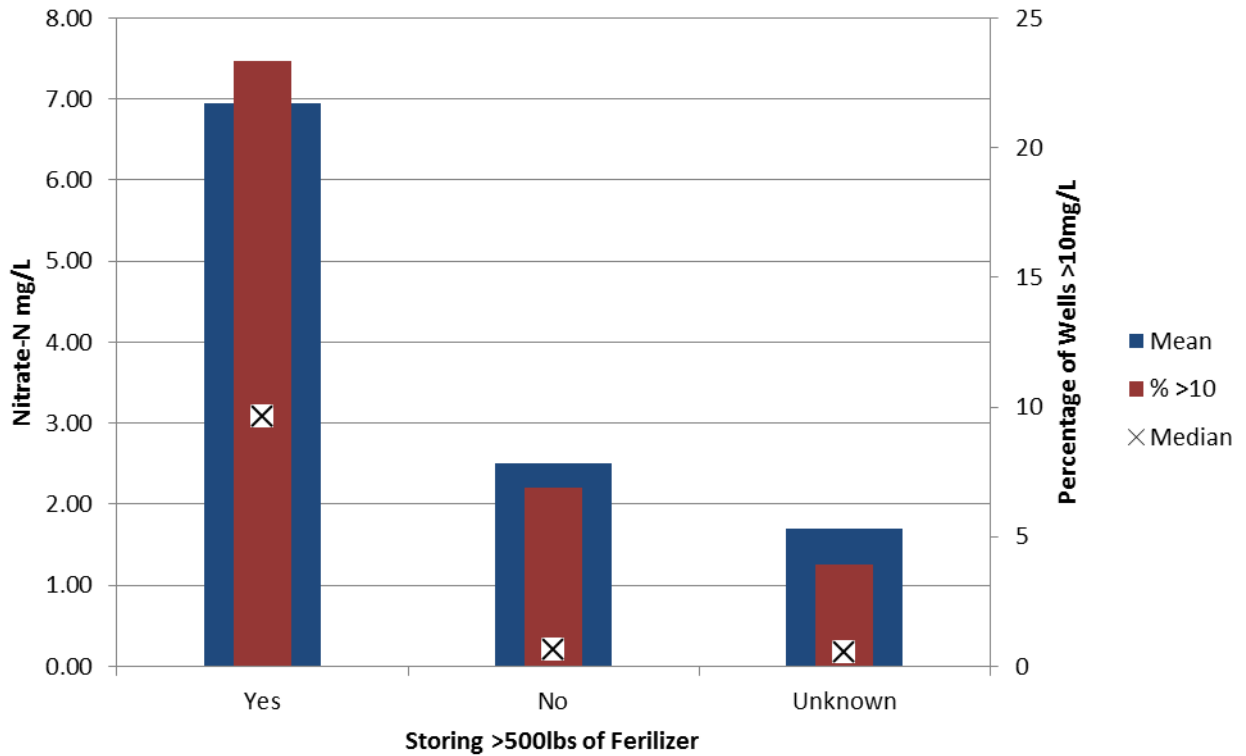


Figure 9. Storing >500lbs of fertilizer on site and well Nitrate-N concentrations.

Table 9. Farming on property and well Nitrate-N concentrations.

Farming on Property	# of Surveys	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
Yes	272	184	54	34	67.65	19.85	12.5	4.15	0.35
No	747	587	111	49	78.58	14.86	6.56	2.31	0.12
Unknown	366	303	50	13	82.79	13.66	3.55	1.69	0.20

Farming on Property and Well Nitrate-N Concentrations

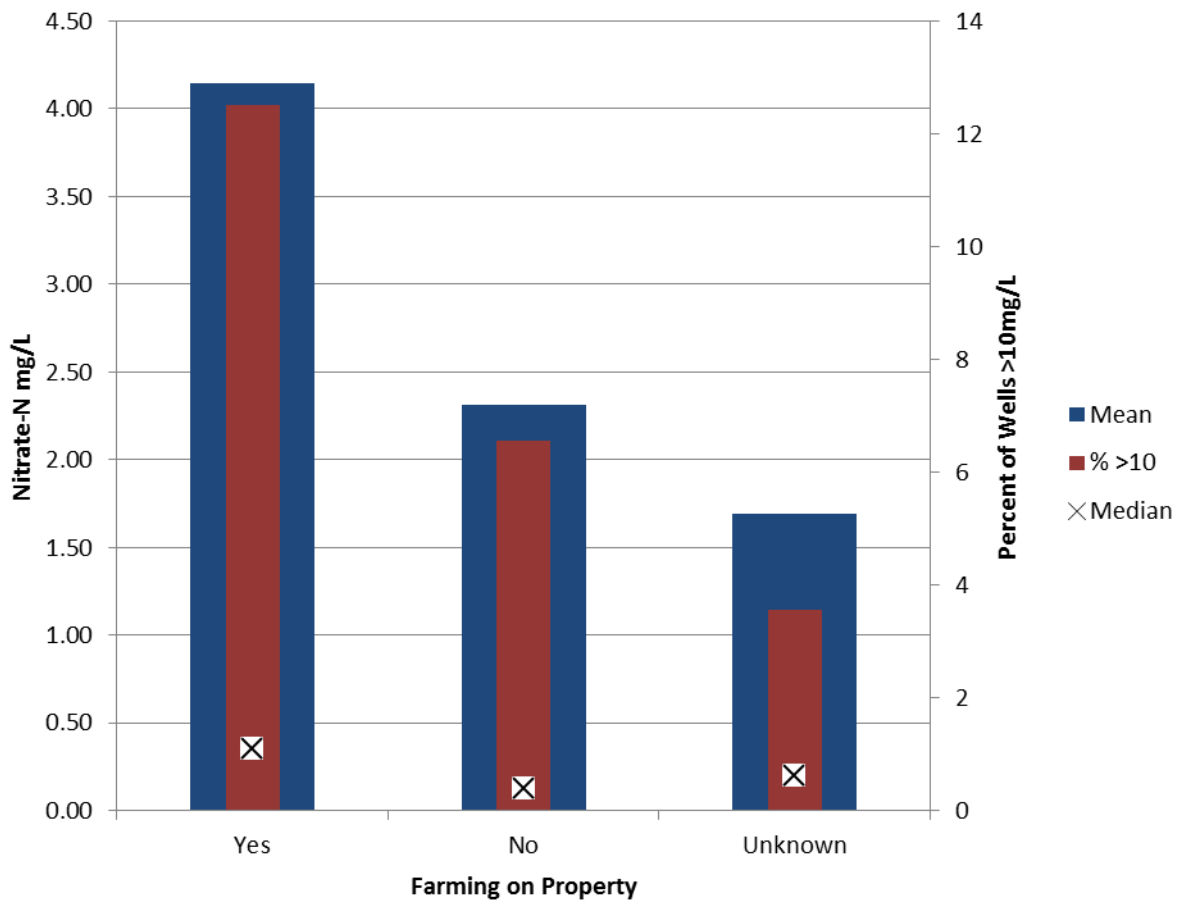


Figure 10. Farming on property and well Nitrate-N concentrations and the percentage of well with Nitrate-N concentrations >10mg/L.

Table 3. The frequency of Nitrate-N testing and Nitrate-N concentrations in wells.

Time since last Nitrate-N test (years)	# of Surveys	0-3 mg/L	3-10 mg/L	>10 mg/L	% 0-3	% 3-10	% >10	Mean	Median
<1 yrs	93	59	21	13	63.44	22.58	13.98	4.26	1.40
1-3 yrs	178	131	30	17	73.6	16.85	9.55	3.52	0.30
3-10 yrs	332	250	54	28	75.3	16.27	8.43	2.91	0.20
>10 yrs	199	156	32	11	78.39	16.08	5.53	2.21	0.29
Never	342	287	44	11	83.92	12.86	3.22	1.55	0.12
Unknown	241	193	33	15	80.08	13.7	6.22	2.15	0.13

Well Testing Frequency and Nitrate-N Concentrations

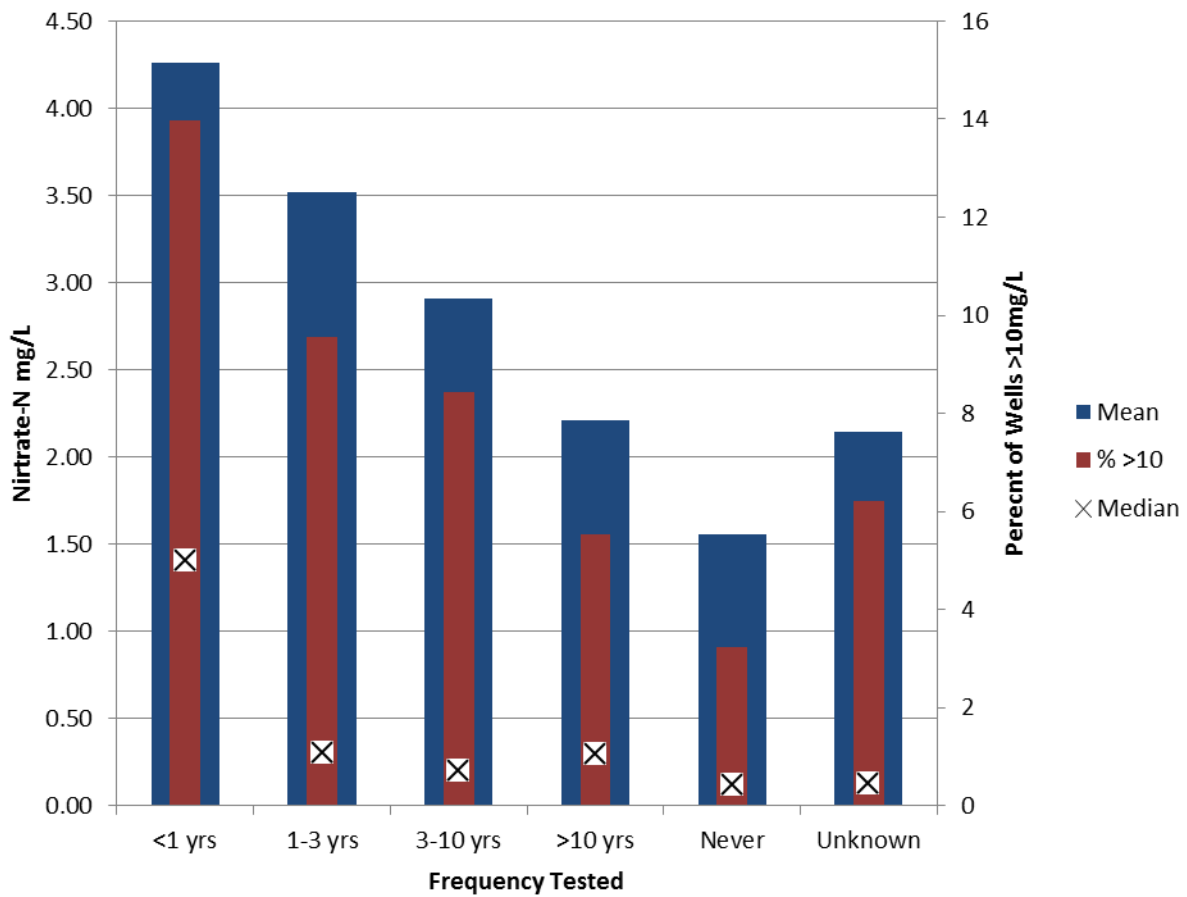


Figure 11. Frequency of testing for Nitrate-N concentrations and percentage of wells with Nitrate-N concentrations >10mg/L.

Types of Successful Media

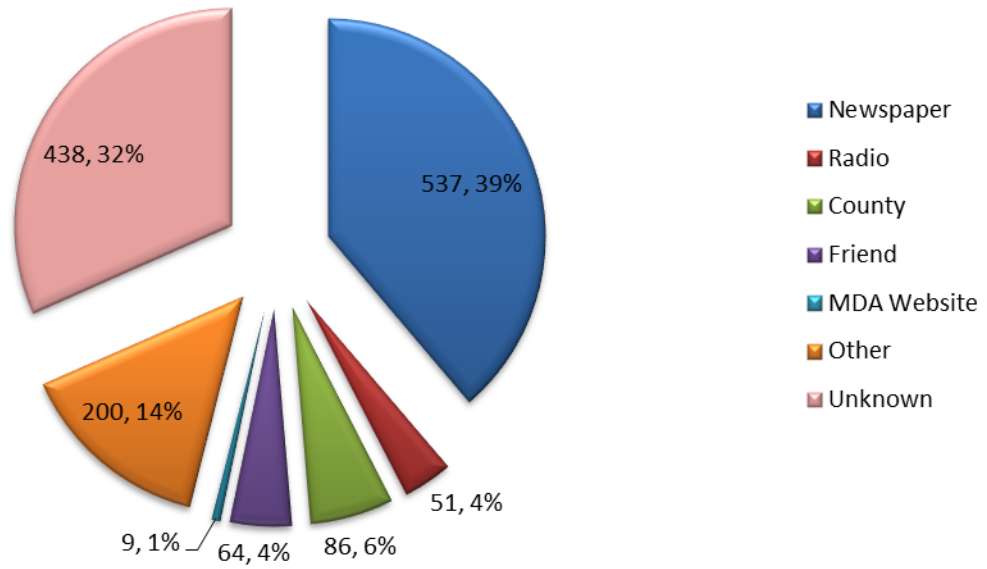


Figure 12. Types of media used to by counties to inform the public of Nitrate Outreach Clinics.