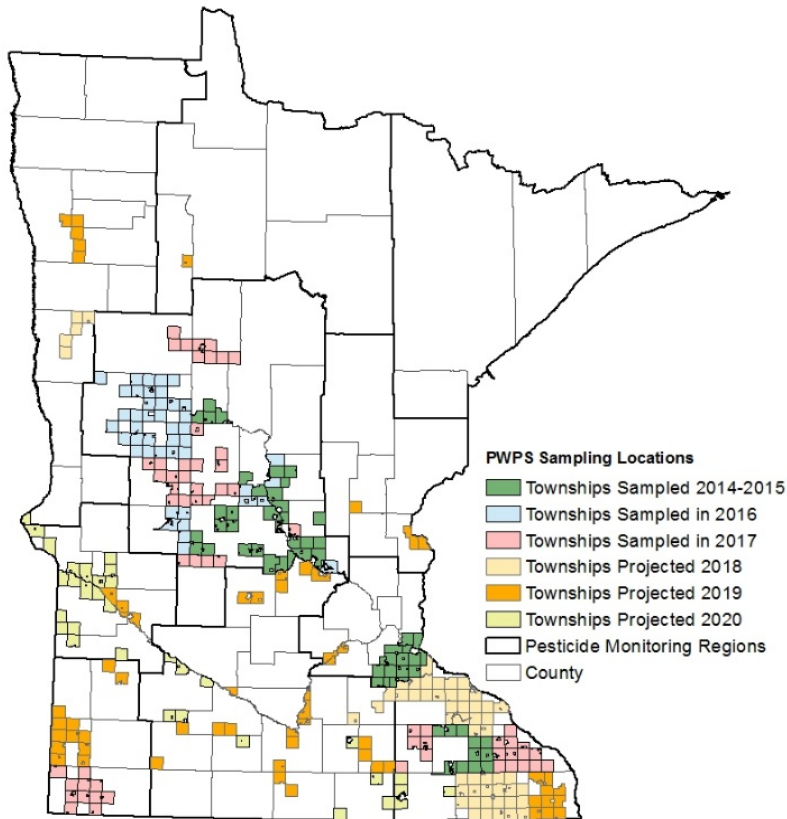


Private Well Pesticide Sampling (PWPS) Project

- Pesticide component of the Township Testing Program
- Homeowners that had a nitrate detection during the initial Township Testing Program sampling have the opportunity to have their well sampled for pesticides



Private Well Pesticide Sampling (PWPS) Project

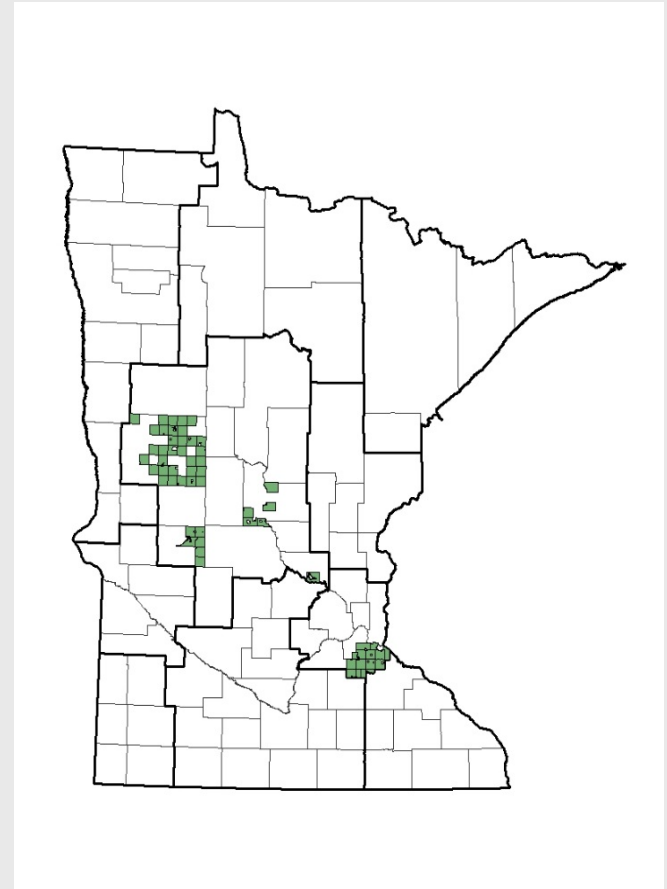


- 2,625 wells in 10 counties from 2014-2016
- 1,110 wells in 2017, results pending
- Anticipate 6,300 wells by 2020
- 2014-2015 samples analyzed for 22 pesticides (MDA List 1) by contract lab, Six pesticide detections (0.3%)
- 2016 samples & beyond will be analyzed for at least 124 pesticides by contract lab
- Will resample wells analyzed in 2014-2015 as time and budget allow

PWPS Project Results - Wells Sampled 2016



- Sampled 1,171 wells in 2016 in five counties
- 375 wells in Dakota had already been sampled in 2014-2015, remaining wells had not been sampled



PWPS Project Results – 2016 Overall Results

Pesticide Analyte	Detection Frequency	Median (ng/L)	90 th percentile (ng/L)	Maximum (ng/L)	Health Reference Value	Health Reference Value Type
Metolachlor ESA	70%	69	870	6,900	800,000	HRL
Alachlor ESA	55%	65	1,500	12,000	50,000	RAA
Metolachlor OXA	45%	<MRL	420	12,000	800,000	HRL
Acetochlor ESA	21%	<MRL	81	2,300	300,000	HRL
Desethylatrazine	19%	<MRL	78	380	3,000	Parent HRL
Atrazine	19%	<MRL	53	320	3,000	HRL
Bentazon	8%	<MRL	<MRL	2,900	30,000	HRL
Alachlor OXA	7%	<MRL	<MRL	5,300	50,000	RAA
Metribuzin DADK	6%	<MRL	<MRL	7,400	10,000	RAA

- Pesticide or pesticide degradates were detected in 76% of the wells sampled in 2016
- 53 pesticides and degradates were detected above the Method Reporting Limits (MRL)
- Metolachlor ESA (corn herbicide degradate) was the most frequently detected pesticide (70%)
- Most of the detections were very low level
- One diuron exceedance in Sherburne County

PWPS Project Results – 2016 Overall Results (continued)

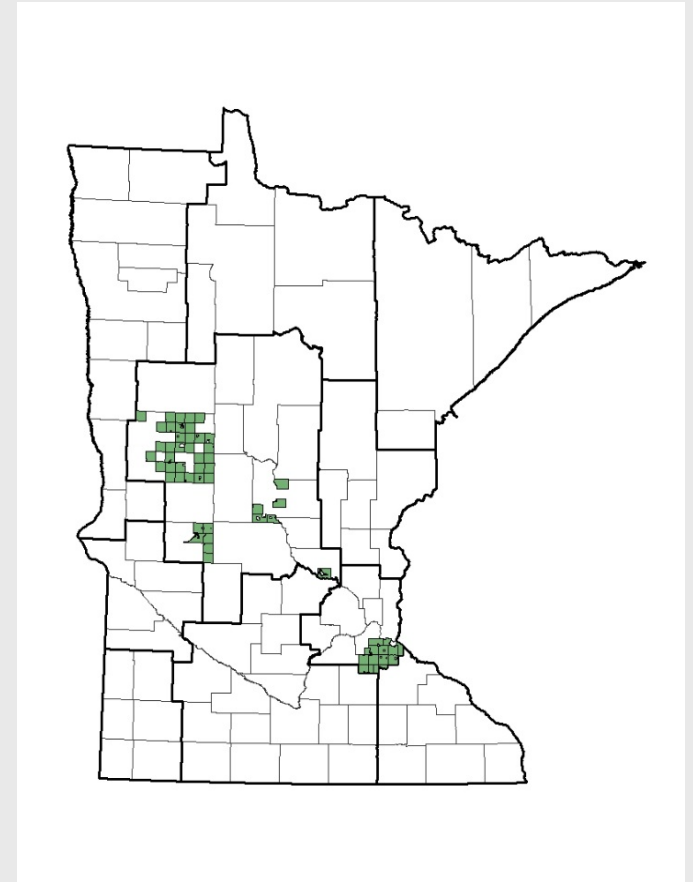
- Pesticides detections were:
 - 83 % Herbicide degradates
 - 14% Herbicides
 - 2% Insecticides
 - 1% Fungicides
- Six neonicotinoids (insecticides) were analyzed, three were detected
- Glyphosate was not detected, AMPA (glyphosate degradate) was detected in one sample in Morrison County
- 12% of the wells sampled had a single pesticide detection, maximum detected pesticides in a single well was 15
- Cumulative Risk Assessment

Pesticide Detections	Number of Wells Sampled	Percentage of Wells
0	284	24.3%
1	139	11.9%
2	158	13.5%
3	171	14.6%
4	128	10.9%
5	134	11.4%
6	55	4.7%
7	43	3.7%
8	26	2.2%
9	18	1.5%
10	7	0.6%
11	4	0.3%
12	3	0.3%
13	0	0.0%
14	0	0.0%
15	1	0.1%
	1,171	100%

2016 County Comparison Results

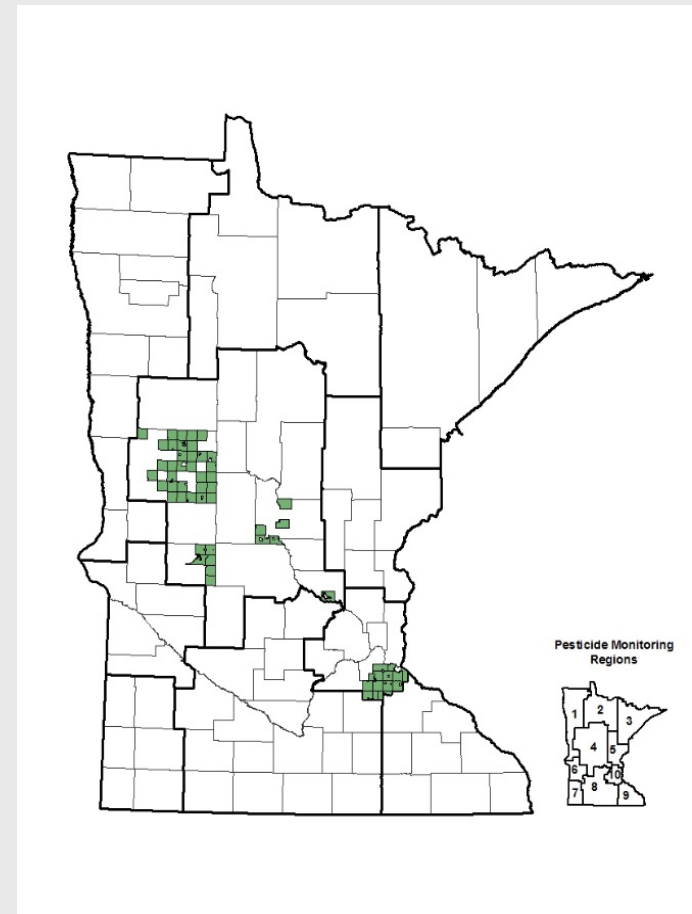
County	Wells Sampled	Detection Frequency	Number of Pesticides Detected
Dakota County	375	93%	31
Sherburne County	120	84%	24
Morrison County	232	79%	31
Otter Tail County	407	57%	41
Pope County	28	46%	12

- Detection frequency per county ranged from 46%-93%
- Number of pesticides detected per county ranged from 12-41



Comparison with MDA Ambient Monitoring Network

- The MDA has 10 PMR's (Pesticide Monitoring Regions) throughout the state
- PMR 4 – Central Sands
 - Large glacial outwash sand plains
 - Highly sensitive to surface activities
 - Irrigated fields are common
 - Four of the five PWPS Counties sampled in 2016

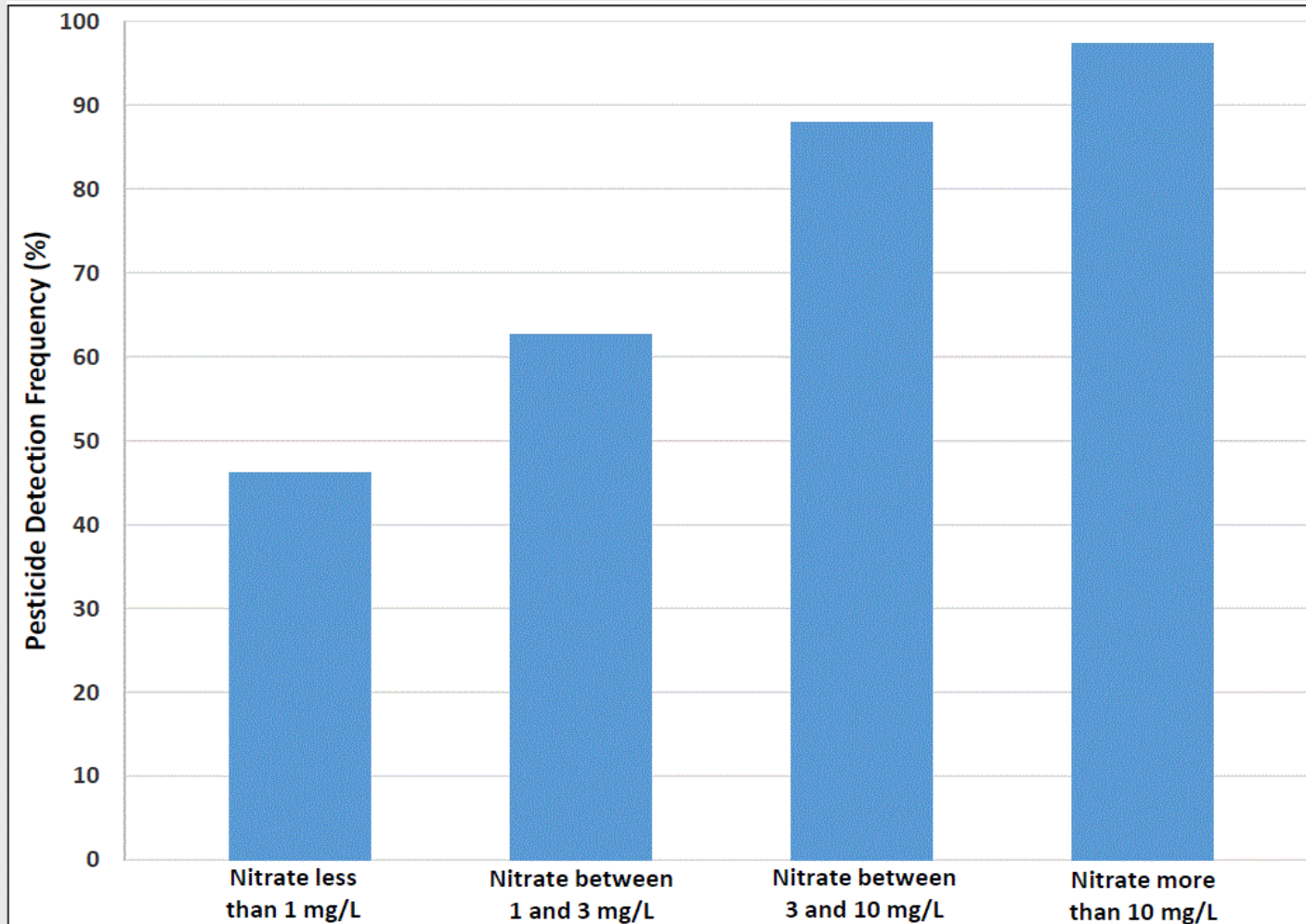


Comparison with MDA Ambient Monitoring Network (continued)

Pesticide Analyte	PWPS Detections/Total Samples	PMR 4 Detections/Total Samples	PWPS Detection Frequency (%)	PMR 4 Detection Frequency (%)	PWPS Maximum (ng/L)	PMR 4 Maximum (ng/L)
Metolachlor ESA	479/794	78/88	60	89	6,900	16,900
Alachlor ESA	300/794	19/88	38	22	12,000	1,740
Metolachlor OXA	238/794	45/88	30	51	12,000	6,730
Acetochlor ESA	123/794	39/88	15	44	2,300	7,660
Desethylatrazine	78/794	6/88	10	7	360	222
Atrazine	68/794	5/88	9	6	320	285
Metribuzin DADK	67/794	18/88	8	20	7,400	2,370
Bentazon	46/794	21/88	6	24	2,900	24,500

- Specific pesticides and pesticide degradates that were detected compared favorably.
- Frequency & concentrations were typically higher in the ambient monitoring wells
- Likely due to location & depth

Nitrate & Pesticide Co-occurrence



Summary

- Local partners and private well owners are the cornerstone of this program
- Approximately 20,042 wells were sampled for nitrate in 19 counties between 2013-2016
- Nitrate concentrations in 9.5% (1,912) of those wells were greater than or equal to 10 mg/L
- By the end of 2019, over 30,000 homeowners will have tested their well for nitrate
- Pesticides were detected in 76% of the wells sampled in 2016, concentrations were generally very low & compare to results from the MDA's ambient monitoring program
- Most commonly detected pesticides were also similar to the MDA's ambient monitoring program
- More likely to see pesticide detections in wells with elevated nitrate

For Additional Information

For more information:

Township Testing Program

- Visit www.mda.state.mn.us/townshiptesting

Nitrogen Fertilizer Management Plan

- Visit www.mda.state.mn.us/nfmp

Draft Nitrogen Fertilizer Rule:

- Visit www.mda.state.mn.us/nfr

Private Well Pesticide Sampling

- Visit www.mda.state.mn.us/pwps

Pesticide Monitoring Well Network

- Visit www.mda.state.us.mn/monitoring.

Questions?



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