

Private Well Pesticide Sampling Project – July 2017 Update

The Private Well Pesticide Sampling (PWPS) Project is a follow-up program to the Minnesota Department of Agriculture (MDA) Township Testing Program. The primary goal of the PWPS Project is to provide information to homeowners and the general public about the presence of pesticides in private drinking water wells. Testing is targeted in areas of the state with vulnerable groundwater and row crop agriculture. From 2014-2016, the MDA sampled approximately 2,625 wells in ten counties for nitrate and pesticides (Figure 1).

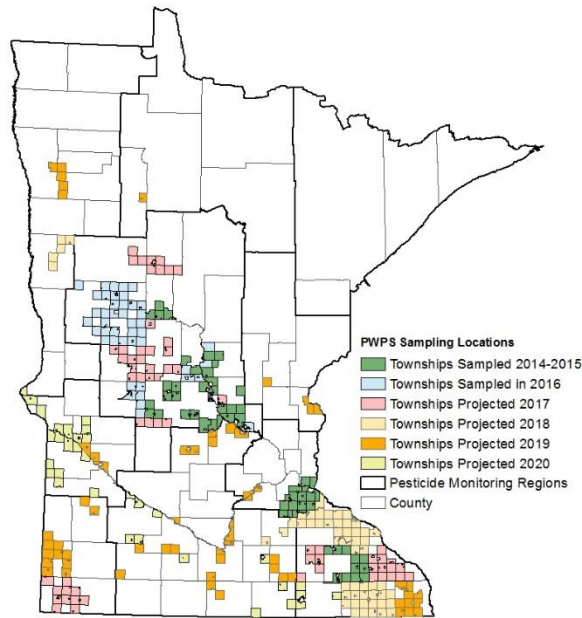


Figure 1. Areas offered or projected to be offered private well pesticide sampling by 2020.

How does it work?

Homeowners first participate in the Township Testing Program to test for nitrate in their drinking water well. If nitrate is detected, they are offered follow-up nitrate and pesticide testing. To ensure accurate results, the samples are collected by trained MDA staff. These tests detect both commonly used pesticides and pesticide break-down products (degradates).

Program Background

The PWPS Project began with a Pilot Project in Dakota County in 2014 and was expanded in 2015 to include townships in Benton, Morrison, Olmsted, Sherburne, Stearns, Wadena and Washington counties (Figure 1). Samples collected in 2014-2015 were analyzed for nitrate and a list of 22 pesticides and pesticide degradates. No samples exceeded drinking water health reference values.

In 2016 the MDA contracted with a laboratory capable of detecting many more pesticides and at lower concentrations (parts per trillion). This change occurred to improve the comparability with the MDA laboratory methods. Homeowners who had their well sampled in 2014-2015 will be given the opportunity to

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have their wells re-sampled using the new laboratory methods. Sampling with the new laboratory began in 2016 and will continue in the remaining counties with the expectation that all sampling will be completed by the end of the project in 2020.

Pesticide Detection Results for 2016

All of the 1,171 wells sampled in 2016 were analyzed for 126 pesticide and pesticide degradates. Results indicate that pesticides or pesticide degradates were detected in 76% of the wells tested (Table 1). Consistent with the MDA’s ambient network monitoring, metolachlor ESA (a corn herbicide degradate) was the most frequently detected compound (Table 2). Herbicide-related compounds were also the most frequently detected type of pesticide in the 2016 sampling (Figure 2). Only one well exceeded a drinking water reference value (for diuron, a herbicide). Follow-up sampling from this well later in the year indicated lower levels, below the drinking water reference value.

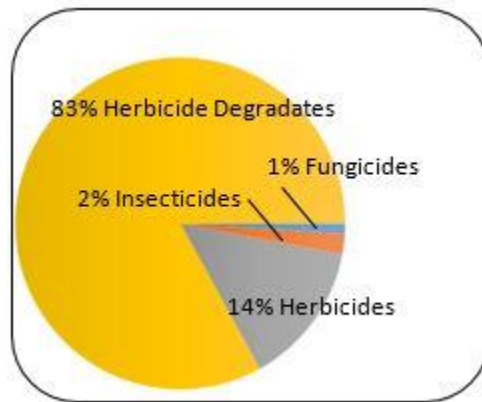


Figure 2. Frequency of pesticide detections by type.

Table 2 presents concentration statistics and drinking water reference values for the pesticides that were detected in greater than 5% of the samples in the 2016 sampling in the seven counties sampled (Dakota, Morrison, Ottertail, Pope, Sherburne, Stearns and Washington). All of the most frequently detected pesticides and degradates listed in Table 2 are herbicides. With the exception of bentazon, Best Management Practices (BMPs), to reduce the impact to groundwater, have been developed for all of the herbicides listed in Table 2. Maximum concentrations presented in Table 2 indicate that, of the most frequently detected pesticides, only metribuzin DADK exceeded 50% of the drinking water reference value.

The MDA will conduct additional sampling of any wells that exceed 50% of a reference value. It is worth noting that many of the sampled wells had multiple detections of different pesticides. The cumulative, or compounding, health risk associated with low levels of multiple pesticides in drinking water is not well understood at this time. In general, vulnerable populations, such as infants, children, and pregnant/nursing women, are at greatest risk for pesticide exposure. For more about evaluating your pesticide risk from drinking water and diet, please visit the Minnesota Department of Health (MDH) website [“Evaluating Your Pesticide Risk”](http://www.health.state.mn.us/divs/eh/pesticide/evaluating) (www.health.state.mn.us/divs/eh/pesticide/evaluating).

Table 1. 2016 Private Well Pesticide Sampling project pesticide detection frequency (seven counties).

Year	# of counties	# of wells sampled	# of wells sampled with at least one pesticide detection	Pesticide sample detection frequency (%)	# of pesticides analyzed	# of detected pesticides
2016	7	1,171	887	76	126	53

Table 2. Private Well Pesticide Sampling project concentration statistics and health reference values for pesticide chemicals detected in greater than 5% of samples in the seven counties sampled. All concentrations are reported in ng/L, which is equivalent to parts per trillion (ppt).

Pesticide Analyte	Detection Frequency	Median (ng/L)	90 th percentile (ng/L)	Maximum (ng/L)	Health Reference Value (ng/L)	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

<MRL* = concentration was below the method reporting limit from the laboratory.

HRL** = Health Risk Limit, a promulgated drinking water standard established by the MN Department of Health.

RAA*** = Risk Assessment Advice, a non-promulgated drinking water advice level established by the MN Department of Health.

Pesticide and Nitrate Results

The relationship between pesticide detections and nitrate concentration range is presented in Figure 3. In general, as the concentration of nitrate increases, the likelihood of detecting at least one pesticide increases. For wells with greater than 10 mg/L nitrate, the detection frequency for occurrence of at least one pesticide was 97%. When nitrate concentrations were less than 1 mg/L, the frequency of pesticide detection was 46%. These results are generally consistent with the MDA’s previous findings from the shallow monitoring wells in agricultural areas of the state.

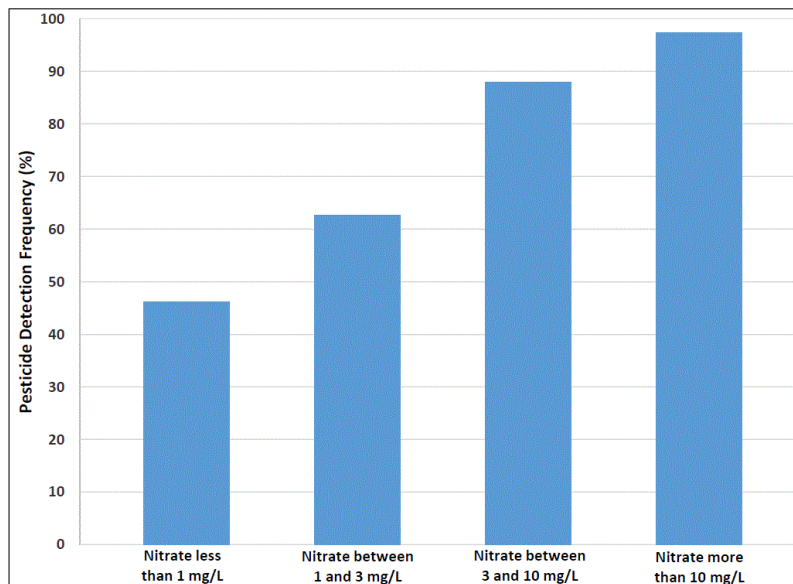


Figure 3. The relationship between nitrate concentration and pesticide detection frequency.

Next Steps

The laboratory results are shared with participating homeowners and will be presented in a report that will be posted on the MDA’s website (see link below). The MDA will also follow-up and resample wells in which pesticide concentrations exceed 50% of the appropriate drinking water reference value. For additional information on the projects discussed in this fact sheet, please contact Jeff Paddock at 651-201-6560 or visit:

[Private Well Pesticide Sampling Project](http://www.mda.state.mn.us/pwps) (www.mda.state.mn.us/pwps)

[Township Testing Program](http://www.mda.state.mn.us/townshiptesting) (www.mda.state.mn.us/townshiptesting)

Otter Tail County Private Well Pesticide Sampling Project – July 2017 Update

Otter Tail County was sampled in 2016 for 126 pesticides and pesticide degradates (parts per trillion reporting level). Pesticides were detected in 57% of the wells. As indicated in Table 3, none of the pesticides detected in 2016 exceeded 50% of the appropriate health reference values.

Table 3. 2016 Private Well Pesticide Sampling Project concentration statistics and reference values for pesticides detected in Otter Tail County during the 2016 sampling. Samples were collected from 408 private drinking water wells, with an overall pesticide detection frequency of 57%. All concentrations are reported in ng/L, which is equivalent to parts per trillion (ppt).

Pesticide Analyte	Detection Frequency	Median (ng/L)	90 th percentile (ng/L)	Maximum (ng/L)	Health Reference Value (ng/L)	Health Reference Value Type
2,4-D	1%	< MRL*	< MRL	120	2,000	RA**
Acetochlor ESA	9%	< MRL	< MRL	620	300,000	HRL***
Acetochlor OXA	0.49%	< MRL	< MRL	170	100,000	HRL
Alachlor	0.25%	< MRL	< MRL	32	2,000	HRL
Alachlor ESA	25%	< MRL	386	8,400	50,000	RAA****
Alachlor OXA	3%	< MRL	< MRL	990	50,000	RAA
Atrazine	6%	< MRL	< MRL	320	3,000	HRL
Deisopropylatrazine	1%	< MRL	< MRL	180	3,000	Parent HRL
Desethylatrazine	5%	< MRL	< MRL	360	3,000	Parent HRL
Hydroxyatrazine	4%	< MRL	< MRL	51	20,000	HBV*****
Bentazon	5%	< MRL	< MRL	2,400	30,000	HRL
Carbendazim	0.49%	< MRL	< MRL	13	9,000	RA
Clopyralid	0.25%	< MRL	< MRL	290	200,000	RA
Clothianidin	3%	< MRL	< MRL	370	200,000	HBV
Cyanazine	0.25%	< MRL	< MRL	83	1,000	HRL
Dimethenamid ESA	0.25%	< MRL	< MRL	8	300,000	RAA
Dimethenamid OXA	0.25%	< MRL	< MRL	10	300,000	RAA
Flufenacet OXA	0.25%	< MRL	< MRL	9	2,000	RA
Flumetsulam	0.49%	< MRL	< MRL	95	400,000	RA
Hexazinone	0.25%	< MRL	< MRL	39	10,000	RA
Imazamox	1%	< MRL	< MRL	92	20,000,000	RA
Imazapic	0.74%	< MRL	< MRL	170	30,000	RA
Imazapyr	0.49%	< MRL	< MRL	37	900,000	RA
Imidacloprid	2%	< MRL	< MRL	320	90,000	RA
Metolaxyl	1%	< MRL	< MRL	33	20,000	RA
Metolachlor	1%	< MRL	< MRL	430	300,000	HRL
Metolachlor ESA	49%	< MRL	853	6,900	800,000	HRL
Metolachlor OXA	25%	< MRL	146	12,000	800,000	HRL
Metribuzin	0.49%	< MRL	< MRL	93	10,000	HRL
Metribuzin DA	0.49%	< MRL	< MRL	660	10,000	RAA
Metribuzin DADK	7%	< MRL	< MRL	7,400	10,000	RAA
Metsulfuron Methyl	0.25%	< MRL	< MRL	700	400,000	RA
Prometon	0.74%	< MRL	< MRL	490	10,000	RA
Propachlor ESA	0.25%	< MRL	< MRL	180	15,000	Parent RA
Propiconazole	0.25%	< MRL	< MRL	32	90,000	RA
Saflufenacil	0.49%	< MRL	< MRL	69	40,000	RA
Simazine	0.49%	< MRL	< MRL	170	4,000	HRL
Sulfometuron Methyl	0.49%	< MRL	< MRL	130	100,000	RA
Thiamethoxam	1%	< MRL	< MRL	190	20,000	RA
Triallate	0.49%	< MRL	< MRL	180	10,000	RA
Triclopyr	0.25%	< MRL	< MRL	1,900	80,000	RA

< MRL* – concentration was below the method reporting limit from the laboratory. RA* – Rapid Assessment, a non-promulgated drinking water value established by the MN Department of Health. HRL*** – Health Risk Limit, a promulgated drinking water standard established by the MN Department of Health. RAA**** – Risk Assessment Advice, a non-promulgated drinking water advice level established by MN Department of Health. HBV***** – Health Based Value, a non-promulgated drinking water value established by the MN Department of Health.