

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).

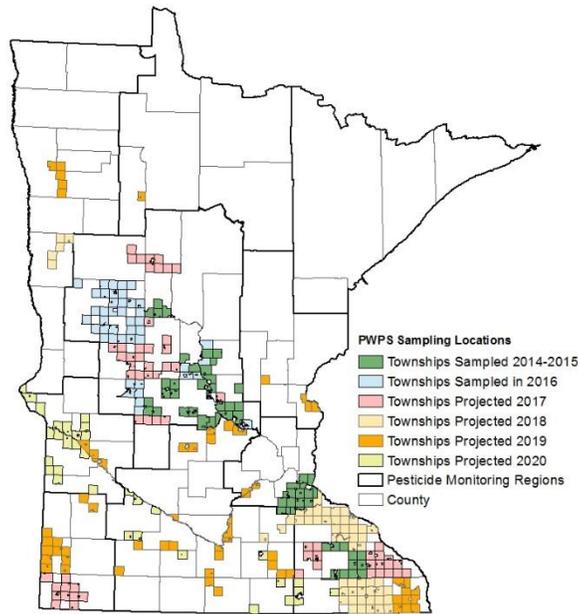


Figure 1. Areas offered or projected to be offered private well pesticide sampling by 2020.

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.

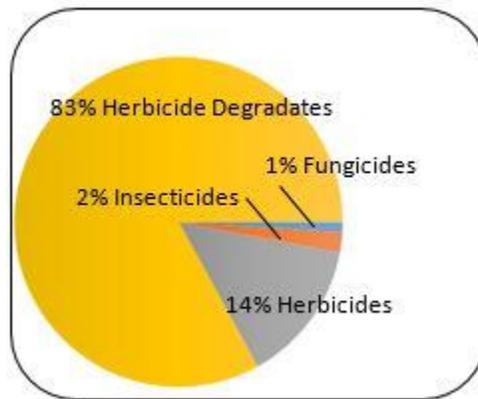


Figure 2. Frequency of pesticide detections by type.

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.

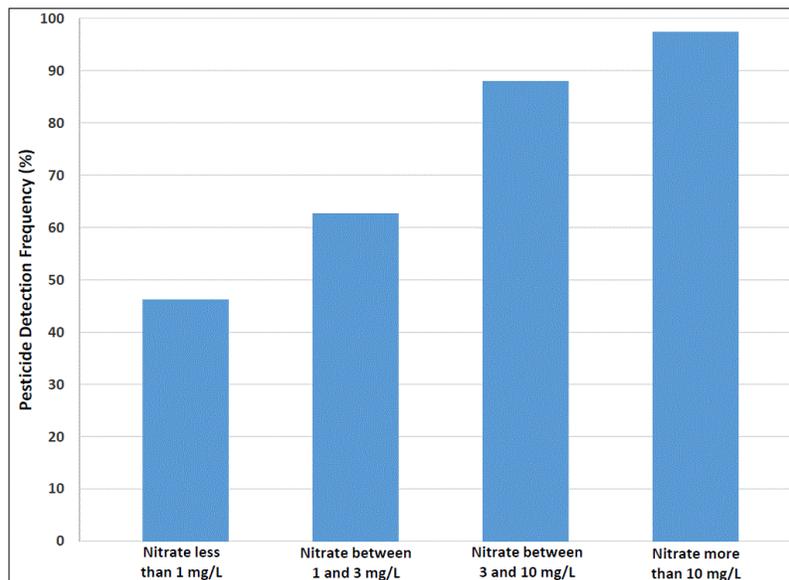


Figure 3. The relationship between nitrate concentration and pesticide detection frequency.

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)

Sherburne County Private Well Pesticide Sampling Project – July 2017 Update

Sherburne County was sampled in 2016 for 126 pesticides and pesticide degradates (parts per trillion reporting level). Pesticides were detected in 84% of the wells. As indicated in Table 3, one of the pesticides detected in 2016 (diuron) exceeded 50 percent of the appropriate health reference values, as well as the actual value. Follow-up sampling indicated that the diuron concentration had decreased to below the health reference value. In addition to the 2016 sampling event, the MDA sampled 301 wells in Sherburne County for a less extensive list of pesticides in 2015. These results were not included with the 2016 statistics. In the future, the MDA will offer homeowners who had their wells sampled in 2015 the opportunity to have their wells resampled for the full list of 126 pesticides.

Table 3. 2016 Private Well Pesticide Sampling project concentration statistics and reference values for pesticide chemicals detected in Sherburne County during the 2016 sampling. Samples were collected from 119 private drinking water wells, with an overall pesticide detection frequency of 84%. 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	3%	< MRL*	<MRL	180	2,000	RA**
Acetochlor ESA	8%	<MRL	<MRL	140	300,000	HRL***
Acetochlor OXA	0.84%	<MRL	<MRL	52	100,000	HRL
Alachlor ESA	64%	220	2,100	12,000	50,000	RAA****
Alachlor OXA	13%	<MRL	60	5,300	50,000	RAA
Atrazine	12%	<MRL	39	170	3,000	HRL
Desethylatrazine	22%	<MRL	69	230	3,000	Parent HRL
Hydroxyatrazine	0.84%	<MRL	<MRL	34	20,000	HBV*****
Bentazon	16%	<MRL	44	1,400	30,000	HRL
Carbendazim	2%	<MRL	<MRL	210	9,000	RA
Dimethenamid	0.84%	<MRL	<MRL	54	300,000	HRL
Dimethenamid ESA	0.84%	<MRL	<MRL	10	300,000	RAA
Diuron	0.84%	<MRL	<MRL	5,800	2,000	RA
Flufenacet OXA	0.84%	<MRL	<MRL	35	2,000	RA
Flumetsulam	0.84%	<MRL	<MRL	55	400,000	RA
Imidacloprid	0.84%	<MRL	<MRL	26	90,000	RA
MCPA	0.84%	<MRL	<MRL	23	3,000	HRL
Metalaxyl	5%	<MRL	<MRL	100	20,000	RA
Metolachlor	6%	<MRL	<MRL	340	300,000	HRL
Metolachlor ESA	76%	110	1,900	5,500	800,000	HRL
Metolachlor OXA	58%	52	2,100	5,800	800,000	HRL
Metribuzin DADK	23%	<MRL	1,000	4,100	10,000	RAA
Picloram	0.84%	<MRL	<MRL	150	300,000	RA
Propachlor OXA	0.84%	<MRL	<MRL	10	15,000	Parent 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.