

# Targeted Sampling Summary Report, 2020

ANNUAL REPORT



Wisconsin Department of Agriculture, Trade and Consumer Protection  
*Agricultural Resource Management Division*  
Environmental Quality Unit  
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## Background

Wisconsin's groundwater law, chapter 160, Wis. Stats., requires agencies to sample and monitor groundwater for substances related to facilities, activities and practices under their jurisdiction, that have a reasonable probability of entering the groundwater resources of the state, and to determine if preventive action limits or enforcement standards have been exceeded at points of standards application. The statute further specifies that agencies develop monitoring plans that include provisions for conducting four types of monitoring: problem assessment, regulatory, at-risk and management practice monitoring (§160.27; §160.05).

## Purpose of Targeted Sampling

It is estimated that agriculture contributes \$104.8 billion annually<sup>1</sup> to Wisconsin's economy. Growers use millions of pounds of pesticides, and millions of tons of fertilizers annually to grow a wide variety of crops. DATCP's Targeted Sampling Program (TSAMP) helps the agency meet its statutory obligation to protect groundwater. The agency utilizes a targeted approach to select drinking water wells that are at risk of being impacted by agricultural chemicals. The program tests private wells located within or near agricultural areas for pesticides and nitrate-nitrogen (nitrate).

## Program Approach and Selection Criteria

The potential for agricultural chemicals to influence groundwater at any particular location is dependent on site-specific conditions. Criteria used to select study areas for TSAMP testing focus on those conditions that make groundwater prone to contamination. These criteria vary from year to year and between study areas. Criteria used for study area selection are listed below.

- Areas susceptible to groundwater contamination due to geology (i.e. sandy soils with shallow groundwater, shallow depth to bedrock, or karst features).
- Areas where prior testing by others (county government, university, private owner, etc.) indicates elevated nitrate, pesticides or other unusual test results.
- Areas within or near an existing atrazine prohibition area (PA), or areas where other restrictions on pesticide use has occurred out of concern for groundwater protection.
- Areas with little variation in crop rotation (e.g. corn, cranberry, and ginseng grown year after year) increasing the likelihood of repetitive pesticide-use in the area.
- Areas where crops are grown that require extensive chemical or fertilizer inputs and/or irrigation.
- Areas where pesticides with characteristics of high mobility and resistance to degradation are used.

TSAMP planning was performed early in the year for sample collection during the summer months. Planning starts with staff and management agreeing on the number of samples to be collected for the coming year. Program goals vary from year to year. Generally, about half of the wells sampled each year are new to the program, and half are repeat samples. Repeat testing is performed at wells previously sampled five or more years earlier. Using this approach water quality observations can be made for the target area while water quality trends over time can also be measured. Permission to sample private wells is typically obtained in

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<sup>1</sup> [Contribution-of-Ag-to-WI-Econ-4-Update.pdf \(wisc.edu\)](#)

advance, but staff may also seek permission from a well owner while in the area based on observations made the day of sampling.

Another goal of TSAMP is to identify known well construction information. Well construction information (well depth, casing depth, well age, geologic formation, or other construction characteristics) can be compared with water quality observations. For example, water quality for wells that are 80 to 100 feet deep may be compared to other wells at similar depths within the target area rather than comparing results from shallower wells. Likewise, wells that are cased to the bedrock surface may be compared to wells cased at greater depth into bedrock.

Samples are collected using standard sampling protocols and then hand delivered to the DATCP Bureau of Laboratory Services (BLS) for pesticide and nitrate analyses. Homeowners are provided a copy of their analytical results within 10-days of receiving the data from BLS. Staff assist with interpretation of results and assist in resolving any water contamination issues.

### 2020 PROGRAM SPECIFICS

For 2020, staff planned for collection and analysis of up to 100 samples. The program contacted 150 homeowners whose wells were sampled in 2015, and 72 agreed to participate in resampling efforts. Staff then identified two new areas and contacted homeowners for first time sampling to reach the 100-sample goal. Between June and August, staff then collected 92 samples from agricultural areas in 13 counties. 2020 samples include 72 wells previously sampled in 2015 and 20 new wells. [Figure 1](#) shows private wells sampled in 2020. [Figure 2](#) shows all TSAMP wells sampled since 2010. [Table 1](#) lists criteria used to select areas tested in 2020 and shows the number of samples collected from each area.

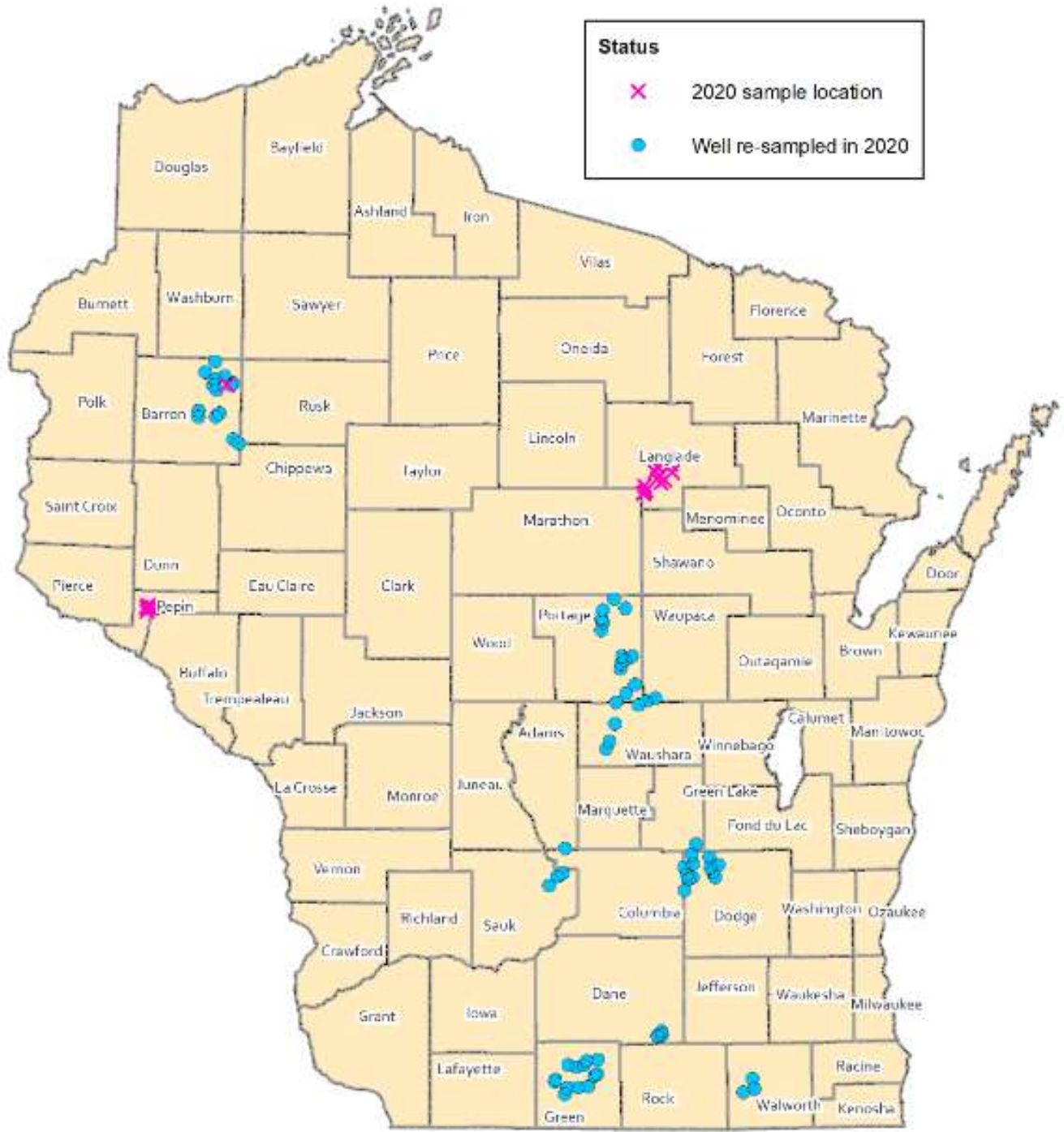
### ANALYTICAL TESTING AND GROUNDWATER STANDARDS

BLS performed all groundwater analytical testing using GC/MS/MS and LC/MS/MS in accordance with ISO 17025 accreditation standards. All samples were tested for 107 pesticides and nitrate. A full listing of compounds analyzed is included in [Appendix A](#) along with established and proposed Preventive Action Limits (PALs) and Enforcement Standards (ESs) for each compound (ch. NR 140, Wis. Adm. Code).



A homeowner's use of pesticides near a well can increase the potential for well contamination.

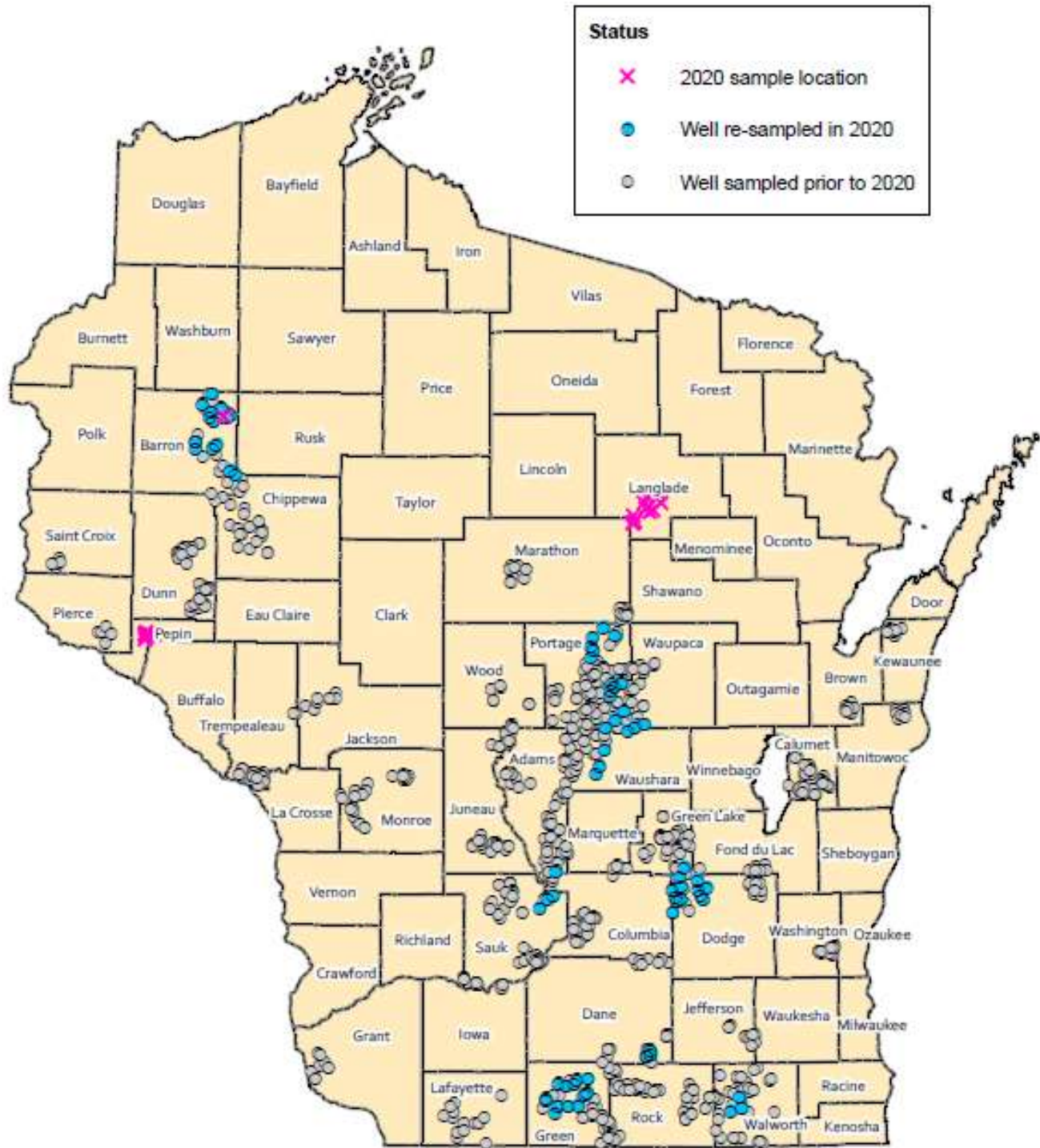
Figure 1: 2020 TSAMP Well Locations



*Note:* Figure 1 shows locations for all 92 TSAMP wells tested in 2020. Twenty wells at new locations were sampled (X), and 72 wells previously sampled in 2015 were resampled in 2020 (●).



Figure 2: TSAMP Well Locations since 2010



*Note: Figure 2 shows first time well locations sampled in 2020 (X), and those wells sampled in 2015 and resampled in 2020 (●). Historic TSAMP locations from all samples collected since 2010 are shown as Grey dots (●). These areas also show where repeat sampling is likely to occur in future years.*

Table 1: TSAMP Summary for 2020

Community/Area	Counties	TSAMP Well Selection Criteria and Study Area Conditions	Number of Samples
Baraboo, Wisconsin Dells	Sauk/Adams	Area susceptible to groundwater contamination; limited variation in cropping patterns. Repeats of wells sampled in 2015.	4
Barron, New Auburn, Rice Lake, Chetek,	Barron	Limited variation in cropping patterns. Repeats of wells sampled in 2015 plus one new well added.	16
Albany, Belleville, Monroe, Monticello	Green	Area susceptible to groundwater contamination near existing pesticide prohibition area; limited variation in cropping patterns. Repeats of wells sampled in 2015.	13
Edgerton, Stoughton	Dane	Proximity to existing pesticide prohibition area; limited variation in cropping patterns. Repeats of wells sampled in 2015.	4
Fox Lake, Randolph, Markesan	Dodge/Green Lake	Limited variation in cropping patterns. Repeats of wells sampled in 2015.	13
Antigo, Bryant	Langlade	Area susceptible to groundwater contamination; significant irrigation; limited variation in cropping patterns. New area in 2020.	12
Stevens Point, Almond, Amherst, Custer, Hancock, Wautoma, Waupaca, Wild Rose	Portage/Waupaca/Waushara	Area susceptible to groundwater contamination; significant irrigation; limited variation in cropping patterns. Repeats of 2015 sampling.	20
Arkansaw	Pepin	Area susceptible to groundwater contamination; significant irrigation; limited variation in cropping patterns. New area in 2020.	7
Delavan, Elkhorn	Walworth	Limited variation in cropping patterns. Repeats of wells sampled in 2015.	3

## Results

A total of 92 groundwater samples were collected from private drinking water wells as a part of the TSAMP effort in 2020. A copy of test results were mailed to all well owners upon receipt of the data from BLS. A summary of all compounds detected is shown in [Table 2](#).

### NITRATE

In 2020, nitrate nitrogen was measured above the detection limit in 78-percent of samples collected. Nitrate exceeded the 10 mg/l ES in 33.7-percent of wells sampled. The percentage of wells with ES exceedances for 2020 is higher than results from the 2017 statewide random sampling survey. In that survey, 8-percent of wells sampled exceeded the ES for nitrate ([Wisconsin DATCP, 2017](#)). A higher exceedance rate was expected because TSAMP is a targeted form of sampling for pesticides and nitrates.



Table 2: Summary of compounds detected in 92 samples in 2020, relative to PAL and ES

Compound Detected	Range Detected *	Detections			NR 140 PAL / ES
		Total	>=PAL	>=ES	
NITROGEN (NO3+NO2 as N)	0.559 -- 40 mg/l	72	64	34	2 / 10 mg/l
ATRAZINE TCR	0.052 - 0.998 µg/l	29	7	0	0.3 / 3.0 µg/l **
ATRAZINE	0.051 - 0.450	6	**	**	**
DE-ETHYL ATRAZINE	0.050 - 0.379	29	**	**	**
DEISOPROPYL ATRAZINE	0.684 - 0.092	2	**	**	**
DIAMINO ATRAZINE	0.253- 0.689	6	**	**	**
ACETOCHLOR ESA	0.051 - 0.741	14	0	0	46 / 230 ***
ALACHLOR ESA	0.0561 - 3.16	33	0	0	4 / 20
ALACHLOR OA	0.686	1			Not Established
BENTAZON	1.07	1	0	0	60 / 300
CARBARYL	0.073	1	0	0	4 / 40
CHLORANTRANILIPROLE	0.054 - 0.090	2	0	0	3,200 / 16,000 P
CLOPYRALID	0.061	1			Not Established
CLOTHIANIDIN	0.010 - 0.342	15	0	0	200 / 1000 P
DIMETHENAMID ESA	0.051 - 0.488	5			Not Established
DIMETHENAMID OA	0.115	1			Not Established
FLUMETSULAM	0.0697	1	0	0	2,000 / 10,000 P
FOMESAFEN	1.11	1	0	0	5 / 25 P
IMAZETHAPYR	0.857	1			Not Established
IMIDACLOPRID	0.0205 - 0.144	6	6	0	0.02 / 0.2 P
METOLACHLOR	0.339 - 0.857	2	0	0	10 / 100
METOLACHLOR ESA	0.056 - 11.2	45	0	0	****
METOLACHLOR OA	0.30 - 9.04	7	0	0	260 / 1300
METRIBUZIN DA	0.696	1			Not Established
METRIBUZIN DADK	0.144 - 1.58	9			Not Established
SAFLUFENACIL	0.0534	1	0	0	46 / 460 P
THIAMETHOXAM	0.065 - 0.225	6	0	0	10 / 100 P

Notes: (\*) Units: Nitrate = mg/l (milligrams per liter, equivalent to parts per million) and Pesticides = µg/l (micrograms per liter, equivalent to parts per billion).

(\*\*) The NR 140 PAL and ES is 0.3 and 3 µg/l for Atrazine TCR, the sum of atrazine + three metabolites.

- (\*\*\*) The NR 140 PAL and ES is 46 and 230 µg/l for the sum of acetochlor ESA + acetochlor OA.
- (P) Proposed NR 140 PAL and ES: not promulgated by administrative rule at time of reporting.
- (\*\*\*\*) The NR 140 PAL and ES is 260 and 1,300 µg/l for the sum of metolachlor ESA + metolachlor OA.

Table 3 shows a summary of changes observed in nitrate concentrations for the 72 samples collected in 2015 and 2020. One program goal is to resample wells on a 5-year cycle and evaluate trends in concentrations over time. However, with only two years of data, limited conclusions can be made about trends in contaminant concentrations at any location. Additional samples from these wells will be needed in future years to further evaluate long-term trends.

Table 3: Number of samples showing an increase, no change, or a decrease in nitrate concentration

Nitrate comparison for 72 wells sampled in both 2015 and 2020		
Increased Nitrate	No Change	Decreased Nitrate
<b>37 had increased nitrate</b>	<b>16 did not change</b> ...all were below detection limits in both sample events	<b>19 had decreased nitrate</b>
17 increased less than 2 mg/l		8 decreased less than 2 mg/l
9 increased by 2 to 5 mg/l		7 decreased by 2 to 5 mg/l
6 increased by 5 to 10 mg/l		2 decreased by 5 to 10 mg/l
3 increased more than 10 mg/l		2 decreased more than 10 mg/l

Nitrate occurrence data is further evaluated in four tables below. Each table summarizes a specific subset of wells sampled and presents the results relative to the nitrate PAL (2 mg/l) and ES (10 mg/l). [Table 4A](#) summarizes nitrate occurrence for all 92 wells sampled in 2020. [Table 4B](#) provides nitrate occurrence data for the 20 wells sampled for the first time in 2020. [Table 4C](#) summarizes the nitrate data for 72 wells sampled a second time in 2020, and [Table 4D](#) provides the data for those same 72 wells sampled in 2015.

Table 4A: Nitrate Summary - Samples Results for all 92 wells tested in 2020

Nitrate Occurrence Data--All 92 Wells Sampled in 2020		
28 wells sampled had from 0 to 2 mg/L	30%	66% ≤ 10 mg/L
9 wells sampled had from > 2 to 5 mg/L	10%	
24 wells sampled had from > 5 to 10 mg/L	26%	
24 wells sampled had from > 10 to 20 mg/L	26%	34% > 10 mg/L
7 wells sampled exceeded > 20 mg/L	8%	

Table 4A shows that 30-percent of samples collected in 2020 detected nitrate less than or equal to 2 mg/l (the PAL). An additional 10-percent of samples contained nitrate at concentrations greater than 2 to 5 mg/l, and 26-percent of samples detected nitrate greater than 5 to 10 mg/l (the ES). Overall, 66-percent of wells tested in 2020 detected nitrate below the ES. The ES was exceeded in the remaining 34-percent of wells tested in 2020.

Table 4B provides a similar summary for the 20 wells sampled for the first time in 2020. Similar results were observed for this smaller dataset; 65-percent of samples detected nitrate at concentrations less than or equal to the ES while 35-percent exceeded the ES.

Table 4B: Nitrate Summary -Results for 20 new wells tested in 2020

Table 4B: Nitrate Occurrence--20 Wells Sampled First Time in 2020		
3 wells sampled had from 0 to 2 mg/L	15%	65% ≤ 10 mg/L
4 wells sampled had from > 2 to 5 mg/L	20%	
6 wells sampled had from > 5 to 10 mg/L	30%	
5 wells sampled had from > 10 to 20 mg/L	25%	35% > 10 mg/L
2 wells sampled exceeded 20 mg/L	10%	

Observations over time can also be made by comparing 2015 and 2020 results. Tables 4C and 4D (below) summarize nitrate occurrence data for all 72 locations sampled first in 2015 and again five years later in 2020.

Table 4C and 4D: Nitrate Occurrence Comparison - Results for 72 locations in 2020 vs 2015

Table 4C: Nitrate Occurrence--72 wells in 2020		
25 wells sampled ranged from 0 to 2 mg/L	35%	67% ≤ 10 ppm
5 wells sampled ranged from >2 to 5 mg/L	7%	
18 wells sampled ranged from >5 to 10 mg/L	25%	
19 wells sampled ranged from >10 to 20 mg/L	26%	33% > 10 ppm
5 wells sampled exceeded 20 mg/L	7%	

Table 4D: Nitrate Occurrence - Same 72 wells in 2015		
27 wells sampled ranged from 0 to 2 mg/L	37%	71.5% ≤ 10 ppm
11 wells sampled ranged from >2 to 5 mg/L	15%	
15 wells sampled ranged from >5 to 10 mg/L	21%	
15 wells sampled ranged from >10 to 20 mg/L	21%	26.5% > 10 ppm
4 wells sampled exceeded 20 mg/L	5.5%	

As shown, the number of wells with nitrate concentrations ranging from non-detect to the PAL (2 mg/l) decreased 2.5 percent (from 37.5 to 35 percent). The number of wells with nitrate detections between the PAL and the ES (10 mg/l) decreased eight percent. The number of wells with concentrations exceeding the ES, increased from 26.5-percent to 33-percent. These results suggest that nitrate concentrations have increased in this set of wells from 2015 to 2020.

## Pesticides

### DETECTIONS:

One or more pesticide compounds were detected in 77-percent of samples collected in 2020 (71 of 92 samples). A total of 25 different pesticides or pesticide metabolites were detected in samples (see Table 2). The five most frequently detected compounds are listed below along with the number of times (n) each compound was detected.

- Metolachlor ESA (n=45)
- Alachlor ESA (n=33)
- De-ethyl atrazine (n=29)
- Clothianidin (n=15)
- Acetochlor ESA (n=14)

Four of the most frequently detected compounds are metabolites of the herbicides metolachlor, alachlor, atrazine and acetochlor. Each of these compounds are in products commonly used to control weeds in corn or other crops grown in the state. Metolachlor ESA and alachlor ESA were reported as the two most frequently detected pesticide residues in the latest statewide sampling of private wells conducted by DATCP ([Wisconsin DATCP, 2017](#)). Alachlor ESA concentrations are expected to decline over time because alachlor is a cancelled product, and use was significantly reduced use by growers prior to cancellation in June 2016 ([EPA, June 30,](#)

[2016](#)). The compound clothianidin is a systemic neonicotinoid insecticide that is used to control insects in corn, small grains, soybeans and vegetable crops. Two additional neonicotinoid insecticides that were also detected less frequently include imidacloprid (n=6) and thiamethoxam (n=6).

### STANDARDS COMPARISON:

Pesticides detected were compared to existing and proposed groundwater quality standards listed in Wis. Admin. Code Ch. NR 140 (NR 140), and results are summarized in Table 2. The right column of Table 2 shows established and proposed Preventive Action Limits (PALs) and Enforcement Standards (ESs) for compounds detected. Seven pesticide compounds currently have no water quality standards. There were no pesticide compounds detected above an applicable ES, but the PAL for both atrazine TCR and imidacloprid was exceeded in several samples. Atrazine TCR (the sum of atrazine plus its three metabolites) exceeded the 0.3 µg/l PAL in seven samples with the highest concentration measuring 0.998 µg/l, about one-third the established 3.0 µg/l ES. Imidacloprid exceeded the proposed 0.02 µg/l PAL in six samples with the highest concentration measuring 0.144 µg/l, about 70 percent of the proposed 0.2 µg/l ES for imidacloprid.

### PROPOSED STANDARDS:

The DNR is currently undertaking administrative rulemaking efforts to update NR 140 and establish new ES and PAL standards for a list of chemical compounds that threaten Wisconsin groundwater quality. These changes include proposed standards for 17 pesticide compounds. Seven pesticide compounds with proposed standards were detected in 2020. They include chlorantraniliprole, clothianidin, flumetsulam, fomesafen, imidacloprid, saflufenacil and thiamethoxam. The status of DNR rulemaking efforts for NR 140 can be viewed at the following link: [DNR/Groundwater/NR140.html](https://dnr.wisconsin.gov/topic/groundwater/NR140.html).

## Data Summaries for 2020 TSAMP Study Areas

Results for all samples collected in 2020 are presented in data summary tables that follow. These summary tables are organized by county in the order listed below.

- Sauk County and Adams County
- Barron County
- Green County
- Dane County
- Dodge County and Green Lake County
- Langlade County
- Portage, Waupaca, and Waushara Counties
- Pepin County
- Walworth County

### SUMMARY: NORTHERN SAUK/SOUTHERN ADAMS COUNTIES

In 2020, DATCP collected samples from four wells in Adams and Sauk counties. All four wells were initially sampled in 2015. Three samples were from wells located southwest of the Wisconsin River in Sauk County while one was collected east of the Wisconsin River in Adams County. These homes have Baraboo and Wisconsin Dells addresses. Well locations are shown on the image to the right.

Crops observed in this study area include mainly corn, soybeans, forage crops and some wheat. Well records show that static water depths vary greatly with location, ranging from 26 to 176 feet below ground surface (bgs). Well water is drawn from sand and gravel deposits and underlying sandstone bedrock.





Sauk County (3) and Adams County Results (1)

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ALACHLOR ESA	ATRAZINE TCR	METOLACHL-ESA	NITRATE
NQ770	ADAMS	Jul-15	205	50	79	6	85	Sandstone		0	0	0
NQ770	ADAMS	Aug-20	205	50	79	6	85	Sandstone	0	0	0	0
AM456	SAUK	Jun-15				6				0	0	0
AM456	SAUK	Aug-20				6			0.427	0	0.0692	0
CQ657	SAUK	Jun-15	97		94	6	26	Sand&Grvl		0	0	0
CQ657	SAUK	Aug-20	97		94	6	26	Sand&Grvl	0	0	0	0
PX962	SAUK	Jun-15	300		260		176	Sandstone		0	0.104	5.99
PX962	SAUK	Aug-20	300		260		176	Sandstone	0.0636	0.0541	0.0582	5.34

**Notes:** Sample Date is listed by month and year; shaded rows show data from 2015. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter ( $\mu\text{g/l}$ ) and nitrate concentrations are reported in milligrams per liter ( $\text{mg/l}$ ). Compound names may be abbreviated, see Table 2 for full names. Zero (0) = less than reporting limit shown in Appendix A. Blank cells indicate that compound was not analyzed.

- Nitrate was detected in only one of the five wells sampled. As shown, well PX962 detected nitrate at 5.34 mg/l in 2020, slightly lower than the concentration detected in 2015 (5.99 mg/l).
- Pesticide residues alachlor ESA and metolachlor were detected in samples collected from two wells.
- Atrazine residues (atrazine TCR) were detected in one sample.
- No compounds exceeded its respective ESs.

## SUMMARY: BARRON COUNTY

In 2020, DATCP collected samples from 16 residential wells in Barron County. These wells are in agricultural areas extending from near Rice Lake in the northeast to near Barron in the center and near Chetek in the southeast. Well locations sampled in Barron County are shown on the figure to the right.



Crops observed at the time of sampling were mainly corn and soybean crops with some forage crops. Well records obtained for these wells indicate the static water table present from 24 to 65 feet. Records indicate water is drawn from sand and/or gravel deposits and that well depths were 50 to 138 feet deep.

### Barron County Results (16)

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ATRAZINE TCR	CLOTHIANIDIN	DIMETHEN-ESA	METOLACHL-ESA	NITRATE
BI249	BARRON	Jul-15	85						0		0	0	0	0	0
BI249	BARRON	Jul-20	85						0	0	0	0	0	0	0
FY442	BARRON	Jul-15	50		46	6	33	Sand&Grv	0		0	0	0	0.103	2.06
FY442	BARRON	Jul-20	50		46	6	33	Sand&Grv	0	0.0601	0	0	0	0.429	3.34
MP269	BARRON	Jul-15	138		134	6	24	Sand&Grv	0		0	0	0	0	0
MP269	BARRON	Jul-20	138		134	6	24	Sand&Grv	0	0	0	0	0	0	0
NA170	BARRON	Jul-15	60		56	6	40	Sand&Grv	0		0.153	0	0	0.256	2.54
NA170	BARRON	Jul-20	60		56	6	40	Sand&Grv	0	0	0.1685	0	0	0.0779	13.8
OO029	BARRON	Jul-15	60		57	6	26.5	Sand&Grv	0.289		0.0627	0	0	1.05	11.7
OO029	BARRON	Jul-20	60		57	6	26.5	Sand&Grv	0.0981	0.188	0.0596	0	0	2.21	12.3
OP919	BARRON	Jul-15	78		74	6	49	Sand&Grv	0		0.0624	0	0	4.06	7.94
OP919	BARRON	Jul-20	78		74	6	49	Sand&Grv	0	0	0.0613	0	0.0514	0.18	7.63
RR850	BARRON	Jul-15	97		93	6	65	Gravel	0		0	0	0	0.943	2.59
RR850	BARRON	Jul-20	97		93	6	65	Gravel	0	0.0561	0	0	0	1.58	6.25
TV720	BARRON	Jul-15	60		57	6	43	Sand&Grv	0.086		1.3078	0	0.122	0.254	37.6
TV720	BARRON	Jul-20	60		57	6	43	Sand&Grv	0	3.16	0.6724	0.0185	0.488	0.11	31
VS000	BARRON	Jul-15							0		0	0	0	0	0
VS000	BARRON	Jul-20							0	0	0	0	0	0	0
VS002	BARRON	Jul-15							0		0	0	0	0.39	3.84
VS002	BARRON	Jul-20							0.225	0.11	0.0584	0	0	0.258	8.08
VS003	BARRON	Jul-15							0		0.0642	0	0	0.305	17
VS003	BARRON	Jul-20							0.0511	0	0	0	0	0.119	14.8
VS007	BARRON	Jul-15							0		0	0	0	1.39	12
VS007	BARRON	Jul-20							0	0.324	0	0	0	1.83	13.4
VS009	BARRON	Jul-15	79		75		55		0		0	0	0	1.44	5.4
VS009	BARRON	Jul-20	79		75		55		0	0	0	0	0	1.15	4.78
VS010	BARRON	Jul-15							0		0	0	0	0	0.601
VS010	BARRON	Jul-20							0	0	0	0	0	0	0.561
YK605	BARRON	Jul-15	59		56	6	29	Sand&Grv	0		0	0	0	0.677	4.95
YK605	BARRON	Jul-20	59		56	6	29	Sand&Grv	0	0	0	0	0	0.366	6.29
VJ768	BARRON	Jul-20	78		75	6	56	Sand&Grv	0	0.79	0.0568	0	0.0713	3.54	12.7

**Notes:** Sample Date is listed by month and year; shaded rows show data from 2015. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.

Zero (0) = less than reporting limit shown in Appendix A. Blank cells indicate that compound was not analyzed.

- In 2020, nitrate was detected in 13 of 16 samples collected. Nitrate detections ranged in concentration from 3.34 at well FY442 to 31 mg/l at well TV720. The average concentration for the 13 samples with detections is 18.7 mg/l. Nitrate exceeded the 10 mg/l ES in six of the 16 samples (37.5 percent).
- In 2015, nitrate was detected in the same 13 wells sampled in 2020. Similar to the 2020 results, well TV720 had the greatest nitrate concentration (37.6 mg/l). Nitrate exceeded the 10 mg/l ES in four of the 15 wells sampled (26.7 percent).
- A comparison of nitrate concentrations in samples collected in 2015 to those collected in 2020 indicates that nitrate concentrations increased in samples collected at seven wells and decreased in samples collected at five wells. Three wells remained the same with no nitrate detected.
- Pesticides were detected in 13 of 16 samples collected in 2020.
- Six pesticides or pesticide metabolites were detected. The most frequently detected pesticides include metolachlor-ESA (12), alachlor-ESA (7) and atrazine TCR (6).
- No pesticides exceeded an ES. Atrazine-TCR exceeded the PAL (0.3 µg/l) in one sample.
- Clothianidin was the only insecticide detected. It was detected in one sample at a concentration significantly below the proposed 200 µg/l PAL.

### SUMMARY: GREEN COUNTY

In 2020, DATCP collected samples from 13 residential wells in Green County. All of these wells were also sampled in 2015. These wells are located near agricultural fields in the vicinity of Albany, Belleville, Monroe and Monticello. Well locations sampled in Green County are shown on the figure to the right.

Crops observed at the time of sampling were mainly corn and soybean crops with some forage crops. Well construction records found for six wells indicate the static water table present from 25 to 165 feet deep. Available records suggest wells are cased into bedrock (sandstone) with one well having as much as 62 feet of casing and an overall depth of 230 feet.



### Green County Results (13)

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ATRAZINE TCR	CARBARYL	CLOPYRALID	CLOTHIANIDIN	DIMETHEN-ESA	FLUMETSULAM	METOLACHL-ESA	NITRATE
FB057	GREEN	Jun-15							0		0.983	0	0	0	0	0	2.11	7.48
FB057	GREEN	Jul-20							0.0539	1.19	0.516	0	0	0	0	0	2.05	8.54
FY531	GREEN	Jun-15	230		62		165		0		0	0	0	0	0	0	0	9.36
FY531	GREEN	Jul-20	230		62		165		0	0	0	0	0	0	0	0	0	14
JE181	GREEN	Jun-15							0		0.071	0	0	0	0	0	0	10.6
JE181	GREEN	Jul-20							0	0	0.091	0	0	0.0322	0	0	0.149	16
JE183	GREEN	Jun-15	180		41		90		0		0	0	0	0	0	0	0	0
JE183	GREEN	Jul-20	180		41		90		0	0	0	0	0	0	0	0	0	0
JE184	GREEN	Jun-15							0		0	0	0	0	0	0	0	4.39
JE184	GREEN	Jul-20							0	0	0	0	0	0	0	0	0	6.84
MF446	GREEN	Jun-15	130		41		34		0		2.837	0	0	0	0	0	5.24	18.7
MF446	GREEN	Jul-20	130		41		34		0	0	0.998	0	0	0.0294	0	0	2.6	21.5
PX959	GREEN	Jun-15							0		0	0	0	0	0	0	0	4.73
PX959	GREEN	Jul-20							0	0	0	0	0	0	0	0	0	5.15
PX985	GREEN	Jun-15							0		0.49	0	1.18	0	0	0.511	0.177	11.2
PX985	GREEN	Jul-20							0	0	0	0	0.0607	0.017	0	0	0.093	10.7
PX986	GREEN	Jun-15	116		40		55		0.209		0.072	0	0	0	0.135	0	0.473	11.3
PX986	GREEN	Jun-20	116		40		55		0.0942	0.094	0	0	0	0	0	0	0.319	18.7
PX988	GREEN	Jun-15							0		0	0	0	0	0	0	0	1.35
PX988	GREEN	Jul-20							0	0	0.501	0	0	0	0	0	0.358	7.42
PX989	GREEN	Jun-15							0		1.029	0	0	0	0	0	0	6.47
PX989	GREEN	Jul-20							0	0.232	0.816	0	0	0	0	0	0.099	7.69
QK453	GREEN	Jun-15	160	6	61		115 Sandstone		0		0.058	0	0	0	0	0	0.074	5.73
QK453	GREEN	Jul-20	160	6	61		115 Sandstone		0	0	0	0	0	0	0	0	0	8.29
QO761	GREEN	Jun-15	105	6	60		25 Sandstone		0		0	0	0	0	0	0	0	0.973
QO761	GREEN	Jul-20	105	6	60		25 Sandstone		0	0	0	0.0727	0	0	0	0	0	1.61

**Notes:** Sample Date is listed by month and year; shaded rows show data from 2015. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.

Zero (0) = less than reporting limit shown in Appendix A. Blank cells indicate that compound was not analyzed.

- In 2020, nitrate was detected in 12 of 13 samples collected. Nitrate detections ranged in concentration from 1.61 (well QO761) to 21.5 mg/l (well MF446). The average detected nitrate concentration is 17.6 mg/l. Nitrate exceeded the 10 mg/l ES in five of the 13 samples collected (38.4 percent).
- In 2015, nitrate was detected in the same 12 of 13 wells sampled. Similar to the 2020 results, the sample at well MF446 had the greatest nitrate concentration (18.7 mg/l). Nitrate exceeded the 10 mg/l ES in four of the 13 samples collected (30.8 percent).
- A comparison of nitrate concentrations in samples collected in 2015 to those collected in 2020 indicates that nitrate concentrations increased in samples collected from all but two wells. The samples from just one well (PX985) showed a decreased nitrate concentration, whereas one well (JE183) had no nitrate detected in both years.
- Pesticides were detected in 8 samples collected in 2020. Six pesticides or pesticide metabolites were detected. The most frequently detected pesticides were metolachlor-ESA (7) and atrazine TCR (5).

- Two insecticides, carbaryl and clothianidin were detected in samples collected in 2020. The carbamate insecticide carbaryl was detected in one sample, while the neonicotinoid insecticide clothianidin was detected in three samples.
- No pesticides exceeded an ES. Atrazine-TCR exceeded the 0.3 µg/l PAL in four samples.

**SUMMARY: DANE COUNTY**

In 2020 DATCP collected samples from four residential wells in Dane County; the wells were also sampled in 2015. Three wells have Stoughton mailing addresses and one has an Edgerton address. Well locations sampled in Dane County are shown on the figure to the right.



Crops observed during sampling included mainly corn and soybeans with some forage crops. No well construction records were found for any of the wells.

**Dane County Results (4)**

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ATRAZINE TCR	DIMETHEN-ESA	FLUMETSULAM	METOLACHL-ESA	NITRATE
VS014	DANE	Aug-15							0.0851		1.094	0	0	2.26	19.5
VS014	DANE	Jun-20							0.109	1.12	0.7115	0	0	1.58	16.4
VS018	DANE	Aug-15							0		0.0729	0	0	0.432	35.4
VS018	DANE	Jun-20							0	0	0	0	0	0.431	19.3
VS019	DANE	Aug-15							0.0886		0.7543	0	0	1.25	14.4
VS019	DANE	Jun-20							0.0696	0.463	0.106	0	0	0.876	11.2
VS020	DANE	Aug-15							0.537		0	0	0	2.88	23.4
VS020	DANE	Jun-20							0.741	0.142	0	0.0643	0.0697	1.1	19.2

*Notes: Sample Date is listed by month and year; shaded rows show data from 2015. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.*

*Zero (0) = less than reporting limit shown in Appendix A. Blank cells indicate that compound was not analyzed.]*

- Nitrate was detected at concentrations exceeding the 10 mg/l ES in all samples (100 percent) collected during both years.
- Nitrate concentrations at each well sampled in 2020 were lower than concentrations observed in 2015. The average nitrate concentration for samples collected in 2020 is 16.5 mg/l, and the average for 2015 samples is 23.2 mg/l.
- Pesticides were detected in all four samples. Six different pesticides or pesticide metabolites were detected in 2020. The most frequently detected pesticides were metolachlor-ESA (4), alachlor-ESA (3) and acetochlor ESA (3).
- No pesticides exceeded an ES. Atrazine TCR exceeded the 0.3 µg/l PAL in one 2020 sample.
- No insecticides were detected.



### SUMMARY: DODGE COUNTY AND GREEN LAKE COUNTY

In 2020 DATCP collected samples from 12 residential wells in Dodge County and one in Green Lake County. All wells were sampled in 2015. These wells are located near agricultural fields in the vicinity of Randolph, Markesan, Fox Lake and Beaver Dam. Crops observed during sampling included mainly corn, soybeans and forage crops. The approximate locations of these wells are shown on the figure to the right.



Well construction records were found for four wells. Three well records show that wells were installed in bedrock wells at depths between 105 and 238 feet, and with casing depths between 40 and 174 feet. Bedrock unit descriptions are not included on the well construction logs. The fourth well record shows a cased depth of 68 feet with an overall depth of 68 feet. This well is likely screened in unconsolidated sand or gravel rather than bedrock.

### Dodge County (12) and Green Lake County Results (1)

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ATRAZINE TCR	CLOTHIANIDIN	IMAZETHAPYR	METOLACHLOR	METOLACHL-ESA	METOLACHL-OA	THIAMETHOXAM	NITRATE
AM427	DODGE	Jun-15							0		0	0	0	0	0.115	0	0	0
AM427	DODGE	Jun-20							0	0.34	0	0	0	0	0.162	0	0	0
ED114	DODGE	Jun-15	68		68	6			0		0	0	0	0	0.976	0	0	6.88
ED114	DODGE	Jun-20	68		68	6			0	0	0	0.01	0	0	1.84	0	0	6.52
EW292	DODGE	Jun-15							0		0	0	0	0	0.083	0	0	0
EW292	DODGE	Jun-20							0	0	0	0	0	0	0	0	0	0
PX951	DODGE	Jun-15							0		0	0	0	0	1.41	0	0	9.51
PX951	DODGE	Jun-20							0	0	0	0.029	0	0	0.984	0	0	11.4
PX953	DODGE	Jun-15							0		0	0	0	0	0	0	0	1.1
PX953	DODGE	Jun-20							0	0	0	0	0	0	0	0	0	1.21
PX955	DODGE	Jun-15							0		0	0	0	0	0.719	0	0	0.738
PX955	DODGE	Jun-20							0.052	0	0	0	0	0	0.581	0	0	0.803
PX956	DODGE	Jun-15							0		0	0	0	0	0.448	0	0	4.44
PX956	DODGE	Jun-20							0	0.083	0	0	0	0	0.395	0	0	0.559
PX957	DODGE	Jun-15							0		0.148	0.131	0.265	0	17	0.998	0	19.5
PX957	DODGE	Jun-20							0.069	0	0.093	0.047	0.857	0.339	5.94	0.476	0.065	9.42
PX958	DODGE	Jun-15							0		0	0	0	0	0.37	0	0	0
PX958	DODGE	Jun-20							0	0.108	0	0	0	0	0.343	0	0	0
PX965	DODGE	Jun-15	198		174		42		0		0	0	0	0	0	0	0	0
PX965	DODGE	Jun-20	198		174		42		0	0	0	0	0	0	0	0	0	0
PX971	DODGE	Jun-15							0		0.315	0	0	0	2	0	0	3.33
PX971	DODGE	Jun-20							0	0.2	0	0	0	0	3.26	0.3	0	3.59
PX972	DODGE	Jun-15	105		40		45		0		0	0	0	0	0.477	0	0	9.03
PX972	DODGE	Jun-20	105		40		45		0	0	0	0	0	0	2.05	0	0	10.7
PX966	GREEN L	Jun-15	238		167		55		0		0	0	0	0	0.07	0	0	2.13
PX966	GREEN L	Jun-20	238		167		55		0	0.24	0	0	0	0	0.185	0	0	2.51

**Notes:** Sample Date is listed by month and year; shaded rows show data from 2015. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.

Zero (0) = less than reporting limit shown in Appendix A. Blank cells indicate that compound was not analyzed.

- In 2020, nitrate was detected in 9 of the 13 samples collected; samples from four wells had no nitrate. Nitrate concentrations ranged from 0.559 at well PX956 to 11.4 mg/l at well PX951. The average detected nitrate concentration is 5.2 mg/l. Nitrate exceeded the 10 mg/l ES in two samples collected (15.4 percent).
- In 2015, nitrate was detected in the same nine wells sampled in 2020. As observed in 2020, nitrate was not detected in the remaining four wells sampled. Detections of nitrate in 2015 were similar in concentration to 2020; results ranged from 0.559 at well PX956 to 11.4 mg/l at well PX951. The average detected nitrate concentration is 6.3 mg/l. Only one of the wells sampled exceeded the ES for nitrate (7.7 percent).
- A comparison of nitrate concentrations in samples collected in 2015 to those collected in 2020 indicates that nitrate concentrations increased in samples collected at seven wells, while decreases were observed in samples from two wells. Nitrate concentrations varied by less than 2 mg/l between 2015 and 2020 for most wells. The notable exception is samples from wells PX956 and PX957. Concentrations decreased from 4.44 to 0.555 mg/l at PX956, and from 19.5 to 9.42 mg/l at PX957 between 2015 and 2020.
- Pesticides were detected in 10 samples collected in 2020 and in 11 samples collected in 2015. The most frequently detected pesticides are metolachlor-ESA (10) and alachlor ESA (5). Note that alachlor ESA was not analyzed in 2015 samples.
- Two insecticides were detected, clothianidin and thiamethoxam. Clothianidin was detected in three samples collected in 2020 and one in 2015. Thiamethoxam was detected in just one sample in 2020.
- In 2020, no pesticides were detected in excess of an established or proposed ES or PAL. In 2015, atrazine-TCR exceeded the 0.3 µg/l PAL at well PX971.

### SUMMARY: LANGLADE COUNTY

In 2020 DATCP collected samples from 12 residential wells near Antigo and Bryant in Langlade County; none of these wells were sampled in 2015. Many of the fields in the area are irrigated. Crops observed at the time of sampling included potatoes, snapbeans, corn, small grains and forage crops. The approximate locations of wells sampled is shown on the figure to the right.

Well construction records for five of these wells indicate the water table is encountered at depths ranging from 17 to 76 feet deep. Well records also show that wells were installed in unconsolidated deposits of sand and gravel, and cased to depths between 58 to 157 feet deep with short screens. Construction records for the remaining seven wells could not be located.



## Langlade County Results (12)

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ATRAZINE TCR	CHLRNTRANILIPRLE	CLOTHIANIDIN	IMIDACLOPRID	METOLACHL-ESA	METRIBUZIN DADK	THIAMETHOXAM	NITRATE	
AY520	LANGLADE	Jul-20	66		63	5	17	Sand	0	0	0	0	0	0	0.147	0	0	0	8.14
BA528	LANGLADE	Jul-20	160		157	6	20	Sand	0	0	0	0	0	0	0.057	0	0	0	2.15
GW221	LANGLADE	Jul-20							0	0	0	0	0	0	1.3	0	0	0	14.7
GW224	LANGLADE	Jul-20							0	0	0	0.09	0.072	0.021	0.137	0	0.135	0	4.71
WA851	LANGLADE	Jul-20							0.138	0	0	0	0.141	0	0.844	0.21	0.154	0	17.1
WA852	LANGLADE	Jul-20							0	0.175	0.146	0	0	0	0.061	0.163	0	0	15.7
WA853	LANGLADE	Jul-20							0	0	0	0	0	0.058	1.05	0	0	0	9.5
WA854	LANGLADE	Jul-20							0	0	0	0	0	0	0.189	0.144	0	0	0
WA855	LANGLADE	Jul-20							0	0	0.249	0	0	0	1.86	0	0	0	10.6
WT014	LANGLADE	Jul-20	117		114	6	76	Sand&Grvl	0	0	0	0	0	0	0	0.168	0	0	8.07
WT027	LANGLADE	Jul-20	65		62	5	38	Sand&Grvl	0.104	0.203	0.125	0	0	0.022	0.654	0.233	0	0	6.43
XT212	LANGLADE	Jul-20	61		58	5	18	Sand&Grvl	0	0	0.05	0	0	0	0.069	0	0	0	5.45

**Notes:** Sample Date is listed by month and year. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.

Zero (0) = less than reporting limit shown in Appendix A.

- Nitrate was detected in samples collected from 11 of the 12 wells. Detections ranged from 2.15 mg/l at well BA528 to 17.1 mg/l at well WA851.
- The average concentration of nitrate detected is 9.3 mg/l.
- Nitrate exceeded the 10 mg/l ES in four of the 12 samples collected (33.3 percent).
- Pesticides were detected in all 12 samples collected. Nine pesticides or pesticide metabolites were detected. The most frequently detected pesticides are metolachlor-ESA (11), metribuzin DADK (5) and atrazine TCR (4).
- Three neonicotinoid insecticides were also detected in samples from four wells. The compound imidacloprid was detected in samples from three wells, while clothianidin and thiamethoxam were each detected twice.
- The insecticide chlorantraniliprole was detected in a sample from one well.
- No pesticides were detected at concentrations exceeding an ES. The compound imidacloprid exceeded the proposed 0.02 µg/l PAL in samples from three wells. Imidacloprid was not detected above the proposed 0.2 µg/l ES in any samples.

**SUMMARY: PORTAGE/WAUPACA/WAUSHARA COUNTIES**

In 2020 DATCP collected samples from 20 residential wells in the Central Sands (CS) vegetable growing region of Portage, Waupaca and Waushara Counties. Address locations included rural areas of Stevens Point, Almond, Amherst, Custer, Hancock, Wautoma, Waupaca and Wild Rose. Crops observed at the time of sampling included vegetable crops (mainly potatoes, some carrots and bean crops) intermixed with corn and hay or other forage and cover crops. Fields are sandy and irrigation is common. The approximate sample locations are shown on the figure to the right.



Well records obtained for 10 wells show that wells range in depth from 30 feet to 146 feet deep. Static water depths are reported from 8 to 112 feet deep. Water is drawn from coarse unconsolidated deposits of sand and gravel. Records for the remaining wells could not be located.

**Portage (13) / Waupaca (2) /Waushara Counties (5)**

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ALACHLOR OA	ATRAZINE TCR	CHLRNTRANLIPRLE	CLOTHIANIDIN	IMIDACLOPRID	METOLACHLOR	METOLACHL-ESA	METOLACHL-OA	METRIBUZIN DA	METRIBUZIN DADK	THIAMETHOXAM	NITRATE
BL442	PORTAGE	Jul-15							0		0	0		0	0	0	0	0	0	0	0	0.658
BL442	PORTAGE	Jun-20							0.114	0	0	0	0	0	0	0	0.056	0	0	0	0	0.735
DR129	PORTAGE	Jul-15	117	112	4	80	Sand&Grv		0	0.191				0	0	0	0	0	0	0	0	11.6
DR129	PORTAGE	Jun-20	117	112	4	80	Sand&Grv		0.199	0	0	0	0	0	0	0	0.074	0	0	0	0	11.4
DV731	PORTAGE	Jul-15	100	95		63	Sand&Grv		0	0.281	0.317			0	0	0	1.19	0.654				7.02
DV731	PORTAGE	Jun-20	100	95		63	Sand&Grv		0.252	0	0.063			0	0	0	0.224	0	0	0	0	5.57
GV177	PORTAGE	Jul-15				1.25			0	0	0			0	0	0	0	0	0	0	0	0
GV177	PORTAGE	Jun-20				1.25			0	0	0	0	0	0	0	0	0	0	0	0	0	0
JE199	PORTAGE	Jul-15							0	0	0			0	0.147	0	0.299	0				1.96
JE199	PORTAGE	Jun-20							0.189	0	0	0	0	0	0	0	2.75	0	0	0	0	13.3
LY234	PORTAGE	Jul-15	78	75	6	26	Sand&Grv		0	0.952				0	0	0	0	0	0	0	0	16.7
LY234	PORTAGE	Jun-20	78	75	6	26	Sand&Grv		0	0	0	0	0	0	0	0	0	0	0	0	0	13.9
NW339	PORTAGE	Jun-15	67.5	63.5	6	39	Sand&Grv		0	0	0			0	0	0	0.777	0				4.99
NW339	PORTAGE	Jun-20	67.5	63.5	6	39	Sand&Grv		0	0	0	0	0	0	0	0	3.21	0	0	0	0	12.9
PX974	PORTAGE	Jun-15							0	0	0			0	0	0	0	0	0	0	0	1.36
PX974	PORTAGE	Jun-20							0	0	0	0	0	0	0	0	0	0	0	0	0	1.39
PX976	PORTAGE	Jun-15	46	42		17			0	0.238	0			0	0	0	0.148	0				11.3
PX976	PORTAGE	Jun-20	46	42		17			0	1.93	0.686	0	0	0	0	0	0.885	0.669	0	0.891	0	16
PX979	PORTAGE	Jun-15							0	0	0			0	0	0	0	0	0	0	0	1.13
PX979	PORTAGE	Jun-20							0	0	0	0.632	0	0.342	0	0	4.44	0.681	0	0	0	39
QM501	PORTAGE	Jul-15	30	27	6	8	Sand		0	0	0			0	0	0	2.47	0				19.2
QM501	PORTAGE	Jun-20	30	27	6	8	Sand		0.132	0	0	0	0.035	0	0	0	0.99	0	0	0	0	25.4
RL544	PORTAGE	Jul-15	56	52	6	34	Sand&Grv		0	0	0.093			0	0.305	0.142	3.22	1.94			0.337	10.1
RL544	PORTAGE	Jun-20	56	52	6	34	Sand&Grv		0	0	0.061	0	0.062	0.046	0	2.02	1.13	0	0.423	0.225	7.99	
TO565	PORTAGE	Jun-15	123	120	6	84	Sand		0	0	0			0	0	0	0.065	0				0
TO565	PORTAGE	Jun-20	123	120	6	84	Sand		0.062	0.442	0	0	0	0	0	0	0.099	0	0	0	0	0

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WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ALACHLOR OA	ATRAZINE TCR	CHLORANTRANILIPROLE	CLOTHIANIDIN	IMIDACLOPRID	METOLACHLOR	METOLACHL-ESA	METOLACHL-OA	METRIBUZIN DA	METRIBUZIN DADK	THIAMETHOXAM	NITRATE	
JE188	WAUPACA	Jul-15							0		0	0		0	0	0	0	0	0	0	0	0	1.49
JE188	WAUPACA	Jun-20							0	0.063	0	0	0	0	0	0	0	0	0	0	0	0	1.88
JE189	WAUPACA	Jul-15							0		0	0		0	0	0	0	0	0	0	0	0	0.74
JE189	WAUPACA	Jun-20							0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.33
JE186	WAUSHAR.	Jul-15	146	142			112		0		0	0.35		0.29	0.262	0.063	2.85	1.41				0.47	30.6
JE186	WAUSHAR.	Jun-20	146	142			112		0	0.753	0	0.154	0.054	0.169	0.144	0.857	11.2	9.04	0.696	1.58	0.67	40	
MT478	WAUSHAR.	Jun-15	122	119	6	80	Sand&Grv		0		0	0		0	0	0	0	0	0	0	0	0	4.38
MT478	WAUSHAR.	Jun-20	122	119	6	80	Sand&Grv		0	0.451	0	0.09	0	0	0	0	0	0	0	0	0	0	7.42
PX981	WAUSHAR.	Jun-15							0		0	0		0	0	0	0.693	0				0	7.89
PX981	WAUSHAR.	Jun-20							0	0	0	0.109	0	0.044	0	0	0.344	0	0	0	0	0	8.54
PX983	WAUSHAR.	Jun-15							0		0	0		0	0	0	0	0	0	0	0	0	0
PX983	WAUSHAR.	Jun-20							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PX984	WAUSHAR.	Jun-15							0		0	0		0	0	0	0	0	0	0	0	0	9.68
PX984	WAUSHAR.	Jun-20							0	0	0	0.06	0	0	0	0	0	0	0	0	0	0	0

**Notes:** Sample Date is listed by month and year, shaded rows show data from 2015. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.

Zero (0) = less than reporting limit shown in Appendix A. Blank cells indicate that compound was not analyzed.

- All wells were sampled in both 2020 and in 2015 (shaded rows).
- In 2020 the average concentration of nitrate detected in 16 wells is 13 mg/l, compared to an average of 8.3 mg/l for nitrate detected in 17 well samples in 2015.
- In 2020 eight samples exceeded the 10 mg/l ES for nitrate (40%) compared to six samples in 2015 (30%).
- In 2020 nitrate concentrations ranged from no detection in four samples, to a high of 40 mg/l at JE186. In 2015 nitrate concentrations ranged from no detection in three samples to a high of 30.6 mg/l at JE186.
- For samples collected in 2020:
  - ◆ 80-percent contained one or more pesticides or pesticide metabolites.
  - ◆ 13 pesticides or pesticide metabolites were detected.
  - ◆ The most frequently detected pesticide compounds include metolachlor-ESA (11), alachlor-ESA (10), atrazine TCR (7), and clothianidin (5).
  - ◆ Samples from wells RL544 and JE186 contained three neonicotinoid insecticides (clothianidin, imidacloprid, and thiamethoxam). The sample from JE186 contained a fourth insecticide, chlorantraniliprole.
  - ◆ No pesticide compounds exceeded an ES.
  - ◆ Two compounds were detected in excess of established or proposed PALs. Atrazine-TCR exceeded the 0.3 µg/l PAL in the sample collected from PX979, and imidacloprid exceeded the proposed 0.02 µg/l PAL in samples from RL544 and JE186.



**SUMMARY: PEPIN COUNTY**

In 2020 DATCP collected samples from seven residential wells near Arkansaw, in Pepin County. The wells were sampled for the first time in 2020. Crops observed at the time of sampling included corn, bean crops, some wheat and other small grains and forage crops. Many fields in the area are irrigated. The approximate locations of wells sampled is shown on the figure to the right.



Well construction records could not be found for any of the wells sampled. Construction reports for other wells in the area show that water is generally drawn from saturated unconsolidated sand and gravel deposits on a terrace above the Chippewa River valley.

**Results for Pepin County (7)**

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ACETOCHLOR ESA	ALACHLOR ESA	ATRAZINE TCR	BENTAZON	CLOTHIANIDIN	DIMETHEN-ESA	DIMETHEN-OA	FOMESAFEN	IMIDACLOPRID	METOLACHL-ESA	METOLACHL-OA	METRIBUZIN DADK	SAFLUFENACIL	THIAMETHOXAM	NITRATE	
WA856	PEPIN	Aug-20							0	0.0849	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WA857	PEPIN	Aug-20							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WA858	PEPIN	Aug-20							0	0	0	0	0	0	0	0	0	0.0767	0	0	0	0	0	3.05
WA859	PEPIN	Aug-20							0	0.185	0.0647	0	0	0	0	0	0	0.187	0	0	0	0	0	23.7
WA860	PEPIN	Aug-20							0	0	0.0652	0	0	0	0	0	0	0.141	0	0	0	0	0	3.73
WA861	PEPIN	Aug-20							0	0	0.0675	0	0	0	0	0	0	0.118	0	0	0	0	0	8.37
WA862	PEPIN	Aug-20							0.0659	0.283	0	1.07	0.0212	0.199	0.115	1.11	0.0816	8.78	6.64	0.32	0.0534	0.128	22.9	

**Notes:** Sample Date is listed by month and year. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.

Zero (0) = less than reporting limit shown in Appendix A.

- Nitrate was detected in samples collected from five of seven wells at concentrations ranging from 3.05 mg/l at WA-858 to 23.7 mg/l at well WA859.
- The average concentration of nitrate detected is 12.4 mg/l.
- Nitrate exceeded the 10 mg/l ES in two of the seven samples collected (28.6 percent).
- Pesticides were detected in five of seven samples. Fourteen pesticides or pesticide metabolites were detected. The most frequently detected pesticide compounds are metolachlor-ESA (5), alachlor ESA (3) and atrazine TCR (3).
- Three neonicotinoid insecticides were detected in the WA862 sample.
- No pesticides were detected at concentrations exceeding an ES. The compound imidacloprid exceeded the proposed 0.02 µg/l PAL in one sample.

### SUMMARY: WALWORTH COUNTY

In 2020 DATCP collected samples from three residential wells in Walworth County. The wells sampled have Delevan or Elkhorn mailing addresses. These wells were also sampled in 2015. The approximate locations are shown in the figure to the right.



Crops observed during sampling included mainly corn and soybeans with hay and other forage crops. No well construction records were found for any of these wells.

### Walworth County Results (3)

WUWN	County	SampleDate	WellDepth	BedrockDepth	CasingDepth	CasingDiameter	StaticWaterDepth	Description	ALACHLOR ESA	ATRAZINE TCR	METOLACHL-ESA	NITRATE
PX992	WALWORTH	Jun-15								0	0.291	0
PX992	WALWORTH	Jun-20							0.289	0	0.245	0
PX996	WALWORTH	Jun-15								0	0	0
PX996	WALWORTH	Jun-20							0	0	0	0
PX998	WALWORTH	Jun-15								0	0.853	5.42
PX998	WALWORTH	Jun-20							0	0	1.23	7.68

**Notes:** Sample Date is listed by month and year, shaded rows show data from 2015. WUWN means Wisconsin Unique Well Number. Depths shown are in feet, casing diameter is in inches. Concentrations for pesticides are reported in micrograms per liter (µg/l) and nitrate concentrations are reported in milligrams per liter (mg/l). Compound names may be abbreviated, see Table 2 for full names.

Zero (0) = less than reporting limit shown in Appendix A. Blank cells indicate that compound was not analyzed.

- Nitrate was detected in one of the three wells sampled at concentrations below the 10 mg/l ES for both years.
- The nitrate concentration in 2020 was higher than the concentration detected in 2015.
- Pesticides were detected in two of the three samples collected. Only two pesticide compounds were detected in 2020, metolachlor-ESA (2) and alachlor-ESA (1).
- No pesticides exceeded an ES or a PAL.

## Recommendations

The occurrence of nitrate and pesticides in groundwater is influenced by environmental factors (soil types, geology, depth to groundwater, and weather events) as well as land management practices near the sample site (crops grown, cultivation, agrichemicals used, tile drainage and irrigation). Other factors related to well construction (casing depth, total depth) and proximity to agricultural fields further influence the potential for groundwater impacts. Identifying the extent to which these variables interact and contribute to the contaminants observed at a particular location presents challenges beyond the scope of this report. Regardless of these challenges, by sharing this report, others may be able to influence changes or make local land management or chemical use decisions that benefit water quality. We suggest the following.

- Share this summary report with health departments and land conservation departments in the counties where sampling occurred.
- Share monitoring data and report findings with EPA, DNR and DHS to help identify pesticides of interest for national tracking purposes or state standards development.
- Share this report with Groundwater Coordinating Council (GCC) members and member agencies.
- Attempt to resample all wells in five years (2025) to further evaluate trends in water quality.
- Resample private wells where pesticide concentrations are detected in excess of existing or proposed chapter NR 140 enforcement standards.

## APPENDIX A

### 2020 Sample Analytes and Applicable ch. NR 140 PALs, ESs and Reporting Limits

Analyte Description	PAL (µg/l)	ES (µg/l)	Reporting Limit (µg/l)
2,4,5-T			0.050
2,4,5-TP	5	50	0.050
2,4-D	7	70	0.050
2,4-DB			1.50
2,4-DP			0.050
ACETAMIPRID			0.010
ACETOCHLOR	0.7	7	0.050
ACETOCHLOR ESA	46	230	0.050
ACETOCHLOR OA	46	230	0.30
ACIFLUORFEN			0.050
ALACHLOR	0.2	2	0.050
ALACHLOR ESA	4	20	0.053
ALACHLOR OA			0.25
ALDICARB SULFONE			0.050
ALDICARB SULFOXIDE			0.071
AMINOPYRALID			0.150
ATRAZINE	0.3	3	0.050
DE-ETHYL ATRAZINE	0.3	3	0.050
DEISOPROPYL ATRAZINE	0.3	3	0.050
DIAMINO ATRAZINE	0.3	3	0.20
ATRAZINE TCR (calculated)	0.3	3	0.050
AZOXYSTROBIN			0.050
BENFLURALIN			0.050
BENTAZON	60	300	0.050
BICYCLOPYRONE			0.050
BIFENTHRIN			0.0050
BROMACIL			0.050
CARBARYL	4	40	0.050
CARBOFURAN	8	40	0.050
CHLORAMBEN	30	150	0.32
CHLORANTRANILIPROLE	3,200 p	16,000 p	0.050
CHLOROTHALONIL			0.10
CHLORPYRIFOS	0.4	2	0.050
CHLORPYRIFOS OXYGEN ANALOG			0.050
CLOMAZONE			0.050
CLOPYRALID			0.050
CLOTHIANIDIN	200 p	1,000 p	0.010
CYANTRANILIPROLE			0.050
CYCLANILIPROLE			0.20
CYFLUTHRIN			0.050
CYPERMETHRIN			0.10
CYPROSULFAMIDE			0.050
DACTHAL	14	70	0.050
DACTHAL DI-ACID *	14 p	70 p	0.50
DACTHAL MONO-ACID *	14 p	70 p	0.50
DIAZINON			0.050
DIAZINON OXYGEN ANALOG			0.050
DICAMBA	60	300	0.60
DICHOLOBENIL			0.050
DIMETHENAMID	5	50	0.050
DIMETHENAMID ESA			0.050
DIMETHENAMID OA			0.050
DIMETHOATE	0.4	2	0.050
DINOTEFURAN			0.010

p: proposed at time of reporting

\*: combined sum of Di and Mono Acid metabolites with parent Dacthal

Analyte Description	PAL (µg/l)	ES (µg/l)	Reporting Limit (µg/l)
DIURON			0.050
EPTC	50	250	0.050
ESFENVALERATE			0.025
ETHALFLURALIN			0.050
ETHOFUMESATE			0.050
FLUMETSULAM	2,000 p	10,000 p	0.050
FLUPYRADIFURONE			0.050
FLUROXYPYR			0.070
FOMESAFEN	5 p	25 p	0.050
HALOSULFURON METHYL			0.050
HEXAZINONE	40 p	400 p	0.050
IMAZAPYR			0.050
IMAZETHAPYR			0.050
IMIDACLOPRID	0.02 p	0.2 p	0.010
ISOXAFLUTOLE	0.3 p	3 p	0.050
ISOXAFLUTOLE RPA202248 (DKN)	0.3 p	3 p	0.050
LAMBDA-CYHALOTHRIN			0.020
LINURON			0.050
MALATHION			0.050
MCPA			0.050
MCPB			0.10
MCPP			0.050
MESOTRIONE			0.10
METALAXYL	160 p	800 p	0.050
METHYL PARATHION			0.050
METOLACHLOR	10	100	0.050
METOLACHLOR ESA	260	1,300	0.050
METOLACHLOR OA	260	1,300	0.27
METRIBUZIN	14	70	0.050
METRIBUZIN DA			0.10
METRIBUZIN DADK			0.12
METSULFURON-METHYL			0.050
NICOSULFURON			0.050
NORFLURAZON			0.050
OXADIAZON			0.050
PENDIMETHALIN			0.050
PERMETHRIN			0.030
PICLORAM	100	500	0.050
PROMETONE	20	100	0.050
PROMETRYN			0.050
PROPICONAZOLE			0.050
PROTHIOCONAZOLE-DESTHIO			0.050
SAFLUFENACIL	46 p	460 p	0.050
SIMAZINE	0.4	4	0.050
SULFENTRAZONE	100 p	1,000 p	0.050
SULFOMETURON-METHYL			0.050
TEBUPIRIMPHOS			0.050
TEMBOTRIONE			0.10
THIACLOPRID			0.010
THIAMETHOXAM	10 p	100 p	0.010
THIENCARBAZONE-METHYL	160 p	800 p	0.050
TRICLOPYR			0.050
TRIFLURALIN	0.75	7.5	0.050
NITROGEN-NITRATE/NITRITE (mg/l)	2	10	0.50 mg/l