An Evaluation of Atrazine in Wisconsin Groundwater

SPECIAL REPORT

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

The Wisconsin Department of Agriculture, Trade and Consumer Protection's (DATCP) Agrichemical Management (ACM) Bureau is responsible for assuring compliance with Wis. Admin. Code, ch. ATCP 30 – Pesticide Product Restrictions. Within that chapter, Subchapter VIII deals specifically with the legal and illegal use of any herbicide that contains the active ingredient atrazine. This report provides a summary of DATCP's historical efforts regarding atrazine management and an evaluation of groundwater quality trends associated with those management policies.

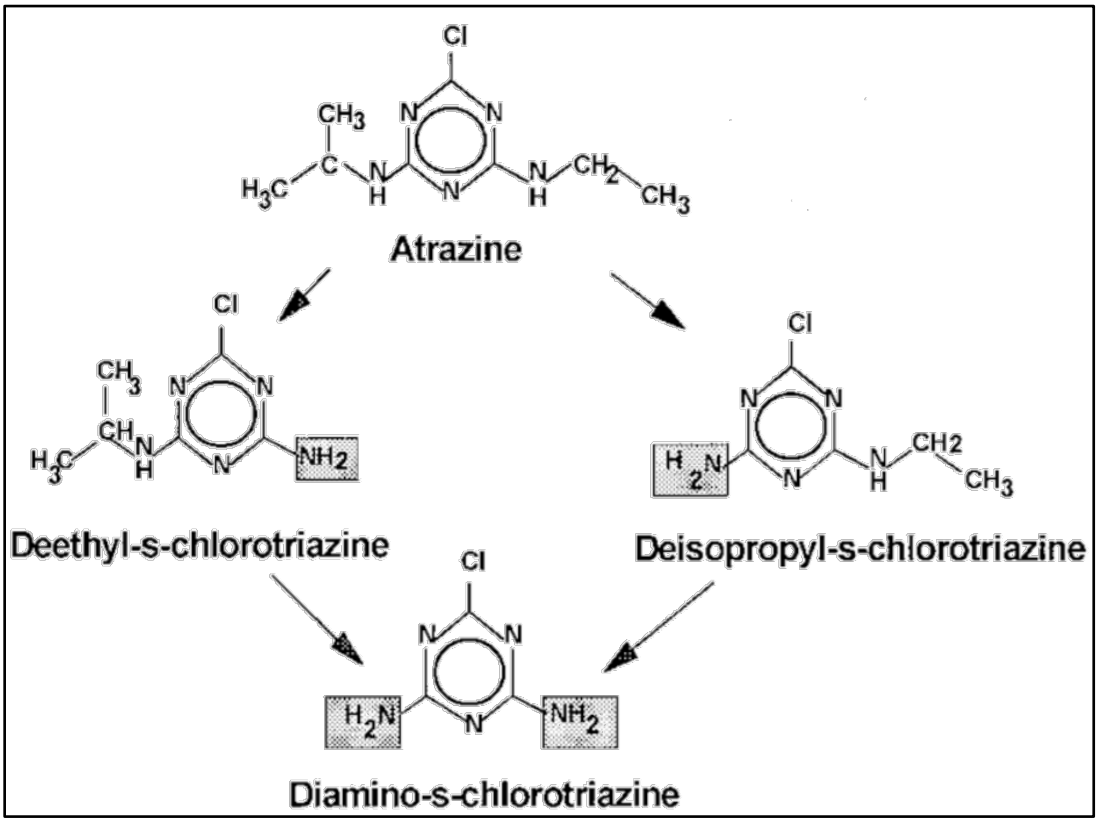
What is Atrazine?

Atrazine is an herbicide that has been in use since 1959. It is used to prevent the growth of annual grasses and broadleaf weeds on a variety of crops, though corn is the crop it is most commonly applied to in Wisconsin (United States Environmental Protection Agency, 2025). Atrazine is a popular option for Wisconsin's corn growers due to its relatively inexpensive and potent nature – 1 pound or less per acre is typically used to great effect.

After being applied to cultivated fields, atrazine is transported along a variety of pathways through the environment. It first accumulates in the soil to which it was applied and from there the herbicide can be taken up by plants rooted in the soil. From there, atrazine is transported by water from sources like rainfall and irrigation. In this way, atrazine can be carried from agricultural soils into surface waters (e.g. lakes and streams) or groundwater, where it can contaminate drinking water wells.

Atrazine also goes through changes on a molecular level through time. The atrazine parent molecule (the active ingredient in atrazine herbicide products) breaks down naturally into one of two daughter molecules: de-ethyl atrazine (2-chloro-4-amino-6-isopropylamino-s-triazine) and deisopropyl atrazine (2-chloro-4-amino-6-ethylamino-s-triazine). These molecules, in turn, will break down into another daughter molecule: diamino atrazine (2-chloro-4,6-diamino-s-triazine). Figure 1 shows this breakdown process.

Figure 1: Atrazine Metabolism Process (Stoker et al., 2002)



Each of these molecules – atrazine, de-ethyl atrazine, deisopropyl atrazine, and diamino atrazine – have a similar level of toxicity, and therefore can be evaluated for regulatory purposes both singularly and as a group. Atrazine Total Chlorinated Residues (TCR) is a term used by DATCP that refers to the sum total concentration of atrazine and these three breakdown products. This atrazine TCR grouping is typically used for regulatory matters by DATCP because it provides a more conservative estimation of water quality with respect to atrazine.

In addition to its intended effect of weed control, exposure to atrazine is associated with risks to human health and the environment. According to the U.S. Agency for Toxic Substances and Disease Registry, damage to the liver, kidneys, and heart has been observed in animals exposed to atrazine. Limited data also exists suggesting that there may be a link between atrazine exposure and several types of cancer (2011). Because of the potential for these detrimental health effects and its widespread use, atrazine is a contaminant of concern for drinking water resources in Wisconsin.

History of Atrazine Use and Regulation in Wisconsin

As noted previously, atrazine is an agrichemical that has been in use in Wisconsin for over six decades. In the mid-to-late 1980s, DATCP through its various groundwater sampling programs began detecting atrazine within private drinking water wells throughout Wisconsin. Concern over atrazine contamination in drinking water led to the establishment of an enforcement standard[1] for atrazine in groundwater in 1988. Wis. Admin. Code Ch. ATCP 30 was subsequently passed in 1991, defining specific regulatory actions for addressing atrazine contamination and further restricting the general use of atrazine. Since 1991, atrazine application rates in Wisconsin have been reduced to less than what is specified on the pesticide label. Application rates also vary based on soil type and prior application history as shown in Table 1.

Table 1: Atrazine Application Rate Limits in Wisconsin per Wis. Admin. Code ch. ATCP 30

Soil Texture	Maximum application rate if atrazine was applied the previous year	Maximum application rate if atrazine was not applied the previous year	Total application rate if seed or sweet corn requires a rescue treatment
Coarse	0.75 lb. per acre	0.75 lb. per acre	1.5 lbs. per acre
Fine or medium	1 lb. per acre	1.5 lbs. per acre	2 lbs. per acre

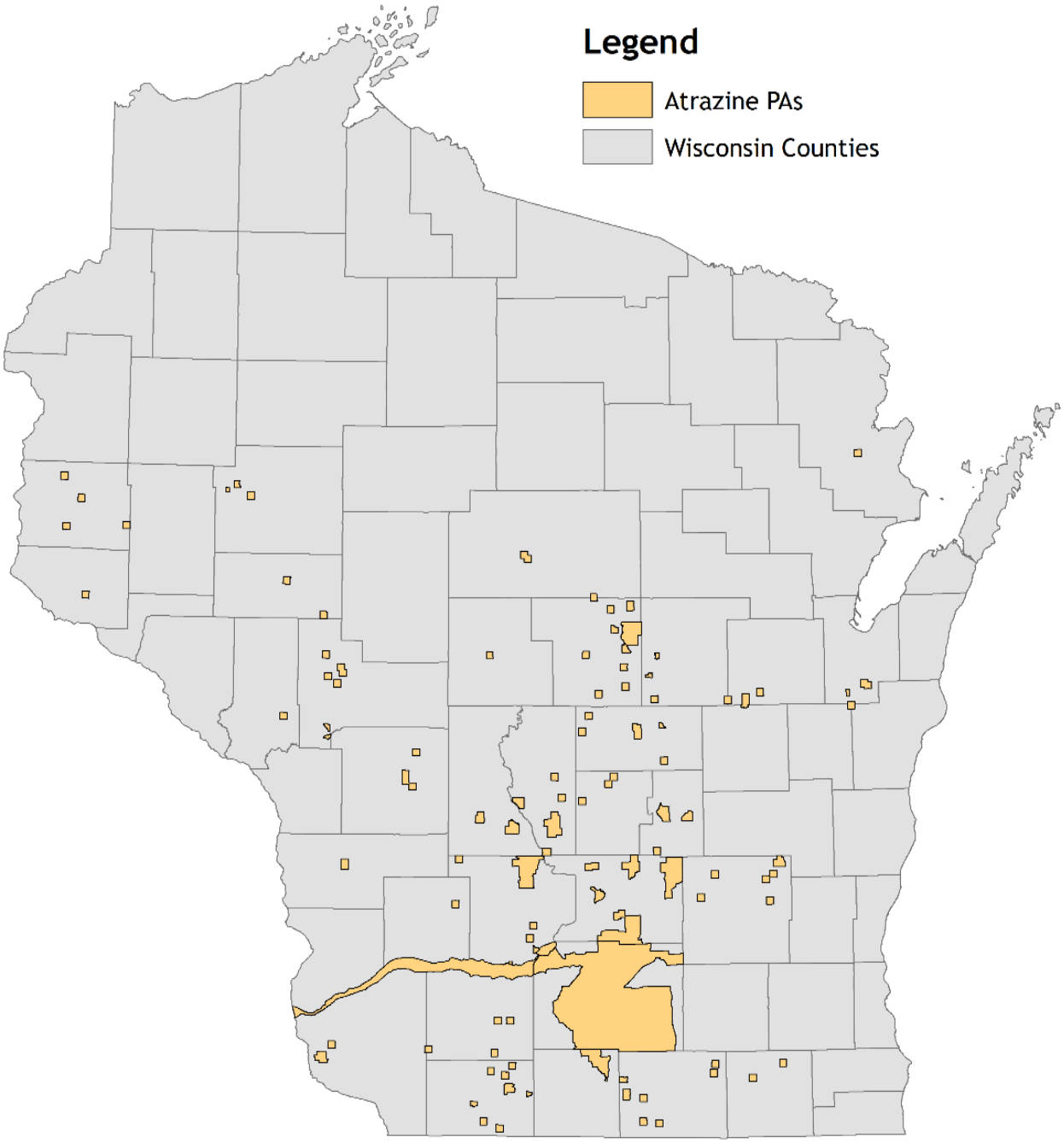
Wis. Admin. Code Ch. ATCP 30 requires DATCP to take regulatory action to lower concentrations of atrazine in wells where the Wis. Admin. Code ch. NR 140 ES was exceeded. These regulatory actions include verbal agreements with farmers about decreasing the application rate of atrazine on their fields, Special Orders for discontinuing the use of atrazine in specific areas, and the establishment of atrazine prohibition areas (PAs).

An atrazine PA, as outlined in Wis. Admin. Code Ch. ATCP 30, is an area in Wisconsin where the mixing, loading, and application of atrazine are prohibited. Outside of a PA, atrazine use is restricted, but not prohibited. The first atrazine prohibition areas in the state were established in 1991 in areas of the Lower Wisconsin River Valley, alongside a general decrease of atrazine application rates across the state. Atrazine prohibition areas continued to be established through the 1990s and 2000s until the 101st atrazine prohibition area was established in 2011 in Sauk County. As of the writing of this report, no additional atrazine prohibition areas have been established or expanded since then. Wisconsin's general restrictions and requirements for atrazine use have also not changed since 2010. The total area of all atrazine PAs covers approximately 1.2 million acres within the state, of which about 247,000 acres are planted in corn (United States Department of Agriculture…, 2022).

[1] The Wisconsin Department of Natural Resources (DNR) sets groundwater quality standards in Wisc. Admin. Code ch. NR 140, which includes substances of public health concern based on recommendations from Wisconsin Department of Health Services (DHS). These standards have two parts: the Enforcement Standard (ES), and the Preventive Action Limit (PAL). The ES is a level that, if exceeded, requires intervention from the appropriate authority. In the case of pesticides in drinking water, DATCP is required to intervene if levels exceed the ES. The PAL is a percentage of the ES: 10% of the ES for carcinogenic, mutagenic, or teratogenic properties; and 20% of the ES for all other substances. The PAL is intended to act as a trigger for intervention by the appropriate authority before the pollutant becomes a risk to public health.

Atrazine PAs are created only after a groundwater investigation has been conducted in the area where one or more private drinking water wells have been identified with an atrazine TCR concentration greater than the Wis. Admin. Code ch. NR 140 ES. The Wis. Admin. Code ch. NR 140 defines the ES for atrazine and its metabolites included in TCR as 3 micrograms per liter (µg/L) and the Preventive Action Limit (PAL) for those compounds as 0.3 µg/L. If the investigation concludes that general use of atrazine (rather than a spill or point source) is responsible for the contamination of the well(s), a proposed PA can be appended to administrative rule ATCP 30 through the administrative rulemaking process.

Figure 2: Atrazine Prohibition Areas in Wisconsin



In addition to empowering DATCP to create atrazine PAs, Wis. Admin. Code Ch. ATCP 30 also defines provisions for the repealment of atrazine PAs. There are three criteria that must be met for a PA to be repealed, according to Wis. Admin. Code Ch. ATCP 30.375:

1. "Tests on at least 3 consecutive groundwater samples, drawn from each well site in the prohibition area at which the concentration of atrazine and its metabolites previously attained or exceeded the enforcement standard under s. NR 140.10, show that the concentration at that well site has fallen to, and remains at, not more than 50% of the enforcement standard. The 3 consecutive samples shall be collected at each well site at intervals of at least 6 months, with the first sample being collected at least 6 months after the effective date of the prohibition. A monitoring well approved by the department may be substituted for any well site which is no longer available for testing."
2. "Tests conducted at other well sites in the prohibition area during the same retesting period, if any, reveal no other concentrations of atrazine and its metabolites that exceed 50% of the enforcement standard under s. NR 140.10."
3. "The department determines, based on credible scientific evidence, that renewed use of atrazine products in the prohibition area is not likely to cause a renewed violation of the enforcement standard."

DATCP's Environmental Quality (EQ) Unit collects data applicable to repealment criteria 1 and 2 through its groundwater sampling programs. However, the funding, planning, and execution of a credible scientific study that could potentially satisfy criterion 3 is seen by DATCP as the responsibility of any non-DATCP party interested in PA repealment.

Past Evaluations

In the years since atrazine PAs began to be implemented in Wisconsin, there have been a number of past projects and reports that evaluated several atrazine-related topics, including the impacts of PAs, the public's understanding of atrazine regulations, and the implications of PA repealment.

In 1997, DATCP published a report titled "An Evaluation of Wisconsin's Atrazine Rule," which examined the effects of the implementation of Wis. Admin. Code ch. ATCP 30. Until now, this had been the only comprehensive report on the state of atrazine use and presence in Wisconsin groundwater. This report concluded that there was evidence that the general levels of atrazine contamination in Wisconsin's groundwater was declining, but that the proportion of wells contaminated by atrazine had not changed significantly since the implementation of Wis. Admin. Code ch. ATCP 30 (Postle et al., 1997). The report incorporated findings from several smaller studies, including the "Atrazine Rule Evaluation Survey," the "Exceedence Survey," and the "Paired Well Survey". Findings for these studies are summarized below.

The "Atrazine Rule Evaluation Survey" was based on two statewide groundwater surveys completed in 1994 and 1996. These surveys were performed two years apart to determine if concentrations of atrazine were changing as a result of the implementation of Wis. Admin. Code ch. ATCP 30. This study included an evaluation of samples collected from 489 wells (138 of the 489 wells were sampled in both 1994 and 1996). Survey results presented in the 1997 report showed that atrazine concentrations in Wisconsin groundwater declined, suggesting that the stricter limits on general use of atrazine implemented with Wis. Admin. Code ch. ATCP 30 succeeded at reducing atrazine contamination in groundwater (Postle et al., 1997).

The "Exceedence Survey" was a project carried out in 1995 to assess the impact of atrazine prohibition areas, specifically on atrazine TCR concentrations in groundwater. In this survey, 90 private drinking water wells that were located within atrazine PAs and had previously registered an exceedance of the atrazine TCR ES were resampled. The survey found that 84% of these wells showed a decrease in atrazine TCR concentration. However, 43% of all the wells sampled detected atrazine TCR at concentrations exceeding the ES. These findings suggest that some atrazine PAs had the intended effect of reducing atrazine TCR contamination in groundwater, but improvement was still needed in many cases to meet groundwater quality standards (Postle, 1996).

The "Paired Well Study" was a project that, similar to the "Exceedence Survey," tried to assess the impact of atrazine PAs on groundwater quality. The difference between the two surveys was that the "Paired Well Study" collected samples from pairs of private drinking water wells located inside and outside of atrazine prohibition areas, with a focus on the comparison of atrazine TCR concentrations between both wells of each pair. Beginning in September 1995 samples were collected quarterly from selected wells for one year. It

was hypothesized that if the atrazine PAs were functioning properly, the wells located within atrazine PAs would show a marked decrease in atrazine TCR concentration over time compared to the paired wells located outside the atrazine PAs. Unfortunately, the results of this study were inconclusive, and no definitive assessment of the impact of the atrazine PAs on groundwater quality could be made from this study (Postle et al., 1997).

Another study not detailed in the 1997 report is the "Atrazine Reuse Study." This five year study began in 1998, and was intended to evaluate groundwater quality following the reintroduction of atrazine use to a small number of atrazine PAs. Prior atrazine studies were performed using private drinking water wells, but this study included the installation of monitoring wells within and nearby actively cultivated agricultural fields. Groundwater samples were then collected to determine if general use would lead to renewed exceedances of the Wis. Admin. Code ch. NR 140 ES for atrazine TCR. The primary objective of this study was motivated by the third atrazine PA repealment criterion laid out in ATCP 30.375, which calls for "credible scientific evidence, that renewed use of atrazine products in the prohibition area is not likely to cause a renewed violation of the enforcement standard." Unfortunately, the design of the study had considerable shortcomings, with little documentation and verification of atrazine application rates at fields where participating monitoring wells were located. Without this critical information, the credibility of the groundwater monitoring results are questionable, and no official report on the findings of this study was published by DATCP.

Motivation for this Report

A limited number of studies and reports were completed in the 1990's to evaluate Wisconsin's regulations for atrazine use as a groundwater protection tool within the first decade of PA implementation, but no additional evaluation was performed in the past 25 years. From the early 1990's when PAs were first implemented, DATCP staff have continued to collect groundwater samples from private wells in these areas, generating a robust dataset of monitoring results from atrazine PAs. Given the wealth of data collected over the decades, the DATCP EQ Unit considered it a priority to evaluate long-term monitoring data, and prepare this report to document the effectiveness of atrazine PAs on groundwater quality.

Methods

DATCP's EQ Unit staff manage several programs to assess the quality of Wisconsin's groundwater. These include the EQ Unit's annual sampling programs, such as the Targeted Sampling Program, Exceedance Sampling Program, and Field Edge Sampling Program. For each sampling program, groundwater samples are collected from wells in Wisconsin and analyzed for the concentration of a range of pesticides, including atrazine and its metabolites, along with nitrogen as nitrate + nitrite.

In addition to these annual sampling programs, the EQ unit has also completed other studies to examine pesticide contamination in groundwater, including several statewide surveys of agricultural chemicals in Wisconsin groundwater, the Atrazine Reuse Study, and the 2024-25 Atrazine PA Evaluation Project. Each of the annual sampling programs and studies either focuses on atrazine contamination specifically, or a range of pesticide contamination in groundwater that included atrazine. A description of each program follows.

Targeted Sampling Program

The Targeted Sampling Program is an annual, biased groundwater sampling effort that attempts to identify areas in Wisconsin where non-point contamination of groundwater by routine use of agrichemicals may be a concern. These areas are often identified through a variety of considerations, including land use, areas where particular crops (and therefore, particular pesticide varieties) are used, and collaboration with county-level administrations who conduct private well sampling efforts on their own initiative. After one or more areas have been identified, private well owners within these areas are contacted by DATCP, and groundwater samples are collected from the wells whose owners give DATCP permission to sample. Samples are then tested for over 100 pesticides compounds, including breakdown products and nitrogen as nitrate/nitrite. This range of analytes includes atrazine and its metabolites that are summed for atrazine TCR (Environmental Quality Unit, 2025b).

Exceedance Sampling Program

The Exceedance Sampling Program is designed to provide periodic monitoring of wells where one or more pesticides exceeded the Wis. Admin. Code ch. NR 140 ES. Private potable wells where such exceedances have been previously detected are recorded and investigated, and an attempt is typically made to sample each of these wells annually until the concentration of the exceeding pesticide has sufficiently declined to levels less than the corresponding Wis. Admin. Code ch. NR 140 ES. However, due to the large number of exceedances, not all wells can be sampled each year, and well owners may also decline DATCP's request to sample their well each year.

Atrazine TCR is an important focus of this sampling program because atrazine and its metabolites have established enforcement standards (per Wis. Admin. Code ch. NR 140), and it is one of the most frequently detected agrichemical contaminants found in Wisconsin's groundwater. Consequently, many wells that are a part of this sampling program are located within atrazine prohibition areas. However, there are also several wells where Wis. Admin. Code ch. NR 140 ES exceedances of atrazine TCR have been identified which are not located within PAs.

Partially related to the exceedance sampling program are atrazine legal use inspections and atrazine illegal use inspections. These inspections are carried out each year by DATCP field staff outside of PAs (for legal use inspections) and within PAs (for illegal use inspections) to verify that farmers are following regulations and restrictions laid out in Wis. Admin. Code ch. ATCP 30.

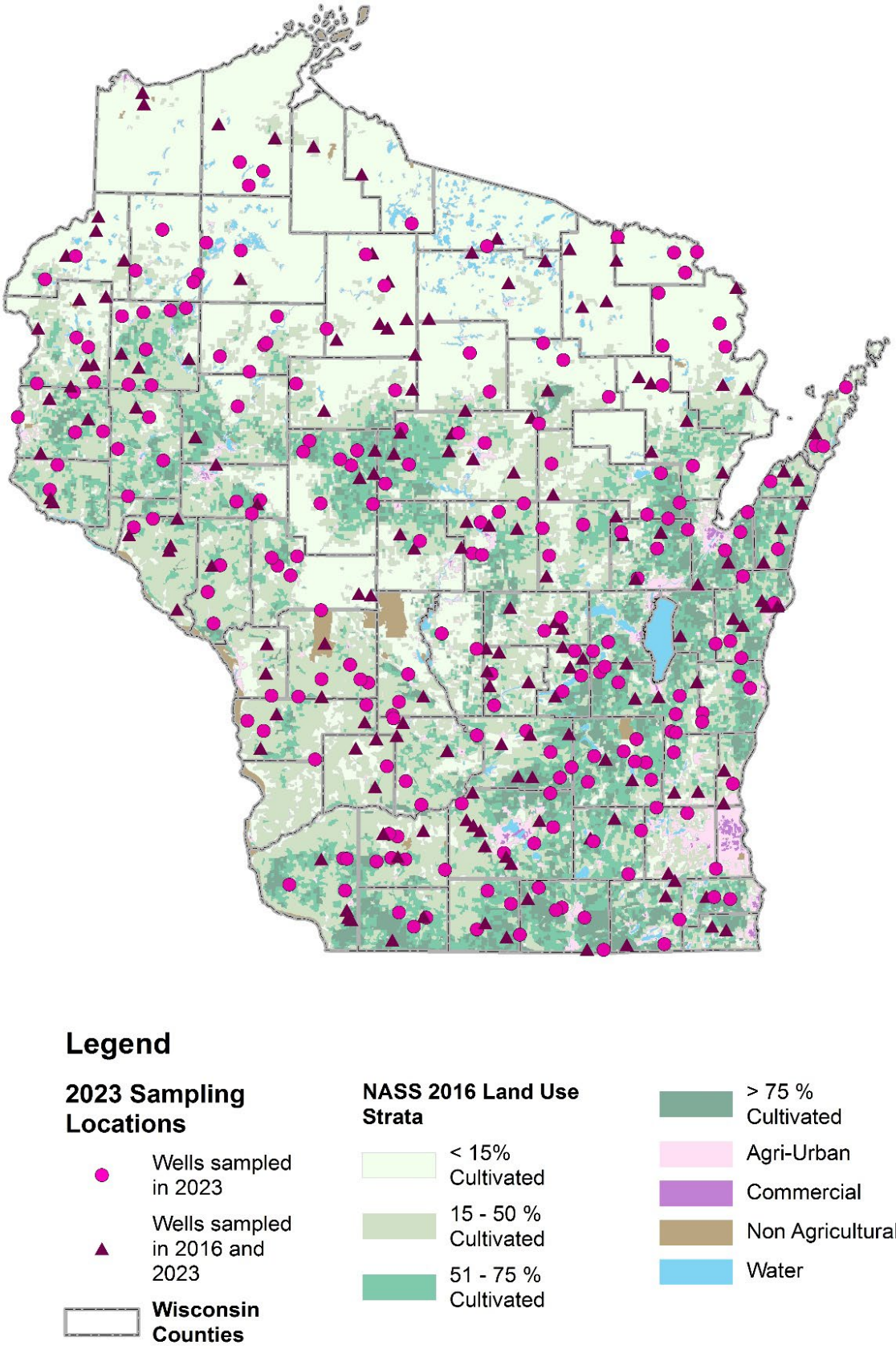
Field-Edge Sampling Program

The Field-Edge Sampling Program utilizes a network of 71 monitoring wells installed across 22 locations. These locations are at the edges of cultivated fields across Wisconsin. Field-Edge wells are typically installed in groups of three to four adjacent wells, each screened at different depth intervals within a common aquifer. Each year, these wells are sampled for a range of pesticides, breakdown products, and nitrogen in order to better understand which agrichemicals are appearing in groundwater after being applied to fields in Wisconsin. This program helps DATCP identify areas where pesticides of potential concern are more likely to be found, which better informs DATCP's other biased sampling programs (Environmental Quality Unit, 2025a).

Statewide Survey of Agricultural Chemicals in Wisconsin Groundwater

The Statewide Survey is a non-biased sampling project that occurs approximately every five to 10 years. Since 2000, these surveys have aimed to establish estimations of detection rates and concentrations of pesticides and nitrate (nitrate plus nitrite as N) in private potable wells across Wisconsin. Six statewide surveys have been completed since 1994, with the latest being in 2023. In the 2023 survey, 380 samples were collected. Figure 3 shows the locations where these 380 samples were collected. Approximately half of these samples were collected from wells that had been previously sampled in the 2016 statewide survey while the other half were collected from new wells chosen via a stratified random sampling system. The strata used for this system were National Agricultural Statistics Service (NASS) agricultural use strata, which classify geographic areas into distinct ranges based on the proportion of land that is used for agriculture. These strata are further subdivided into "area segments" of about one square mile. For each of the NASS strata, a predetermined number of randomly selected samples were collected. Samples in the 2023 survey were tested for 107 compounds, including herbicides, fungicides, insecticides, metabolites of these types of pesticides, and nitrogen (Romano et al., 2024).

Figure 3: 2023 Statewide Survey Sampling Locations and Land Use Categories



2024-25 Atrazine PA Evaluation Project

In 2024, DATCP's EQ Unit initiated a project within the Exceedance Sampling Program to evaluate over 30 years of groundwater quality data from atrazine prohibition areas. The aim of this project was to assess atrazine PAs' effectiveness at reducing atrazine TCR concentrations in groundwater and evaluate whether any PAs were satisfying any of the repealment criteria laid out in ATCP 30.375. The project officially began in June 2024, and over the next six months, all atrazine TCR data within DATCP's groundwater database for wells located within atrazine PAs was examined. From this data, a detailed evaluation was made of each atrazine PA.

First, data from the exceedance well(s)[2] was compiled to determine if there was sufficient data within the atrazine PA to assess a trend in atrazine TCR concentration since the establishment of the PA. Concentration trends were established using the Mann-Kendall trend analysis, as laid out in Wis. Admin. Code ch. NR 746 Appendix A, on data from exceedance wells in atrazine PAs. If at least half of the exceedance wells in an atrazine PA showed a decreasing concentration trend, the atrazine PA was labeled as "appears to be effective." If more than half of the exceedance wells in a PA showed an increasing or non-decreasing trend, the PA was labeled as "does not appear to be effective." If there was insufficient data from the exceedance wells, then the atrazine PA was labeled as "effectiveness unknown."

Next, the same atrazine TCR data from wells within PAs was used to assess the satisfaction of PA repealment criteria 1 and 2. If the three most recent samples from all exceedance wells in a PA were at least six months after the establishment of the atrazine PA, at least six months apart, and less than 50% of the Wis. Admin. Code ch. NR 140 ES, the atrazine PA was deemed to be satisfying criterion 1. If there were no wells in an atrazine PA whose most recent sample was greater than or equal to 50% of the Wis. Admin. Code ch. NR 140 ES, the atrazine PA was deemed to be satisfying criterion 2.

Building off of the analyses of existing data and records from atrazine PAs, a focused effort was made to collect additional groundwater samples from wells within several atrazine PAs. This additional data was used to assemble a more holistic snapshot of groundwater quality in each of these atrazine PAs and potentially close some data gaps identified in the analyses of the existing data. Each of these atrazine PA sampling campaigns began by identifying residential, non-municipal land parcels that were located within the PA using data from Wisconsin's Statewide Parcel Map Initiative (Wisconsin Department of Administration, 2024). These land parcels were assumed to be locations where private potable wells were likely to exist. Letters requesting to sample were then sent to the owners of this subset of land parcels, with the goal of producing a sample size that would yield results at a 95% confidence level with a 5% margin of error. Samples were collected from the wells of those who gave permission for DATCP to test their water. Samples collected as part of each atrazine PA sampling campaign were analyzed for the DATCP Bureau of Laboratory Services' (BLS) full standard range of 100+ agrichemical compounds, including atrazine TCR. Results were mailed to each of the well owners whose wells had been tested.

Results

Targeted Sampling Program

The three most recent targeted sampling programs were carried out in 2021, 2022, and 2024. The 2023 Targeted Sampling Program was suspended to allow more sample capacity for the statewide groundwater survey that occurred during that year. Relevant atrazine TCR detections[3] are summarized in the table below for these three years.

[2] Well(s) where an exceedance of the Wis. Admin. Code ch. NR140 ES for atrazine TCR had been found

[3] Concentrations in excess of laboratory reporting limits for atrazine and its metabolites (0.0500 µg/L)

Table 2: Recent Targeted Sampling Program Results

Year	Counties Sampled	Total Samples Collected	Atrazine TCR Detection Rate	Atrazine TCR Detection Range (µg/L)
2021	Adams, Barron, Chippewa, Columbia, Dane, Dodge, Dunn, Green Lake, Juneau, Langlade, Pepin, Portage, Richland, Sauk, Waupaca, & Waushara	104	47.1%	0.053 – 1.64
2022	Door, Oneida, & Rock	81	53.1%	0.0507 – 1.1349
2024	Dane, Dunn, & Marathon	92	59.8%	0.0516 – 1.4773

Results compiled from (Environmental Quality Unit, 2022); (Environmental Quality Unit, 2023); and (Environmental Quality Unit, 2025b).

As shown in Table 2, there were no Wis. Admin. Code ch. NR 140 ES exceedances for atrazine TCR identified in any of these years of sampling. However, the Wis. Admin. Code ch. NR 140 PAL for atrazine TCR was exceeded in 12 samples in 2021 (11.5%), 14 samples in 2022 (17.3%), and 25 samples in 2024 (27.2%).

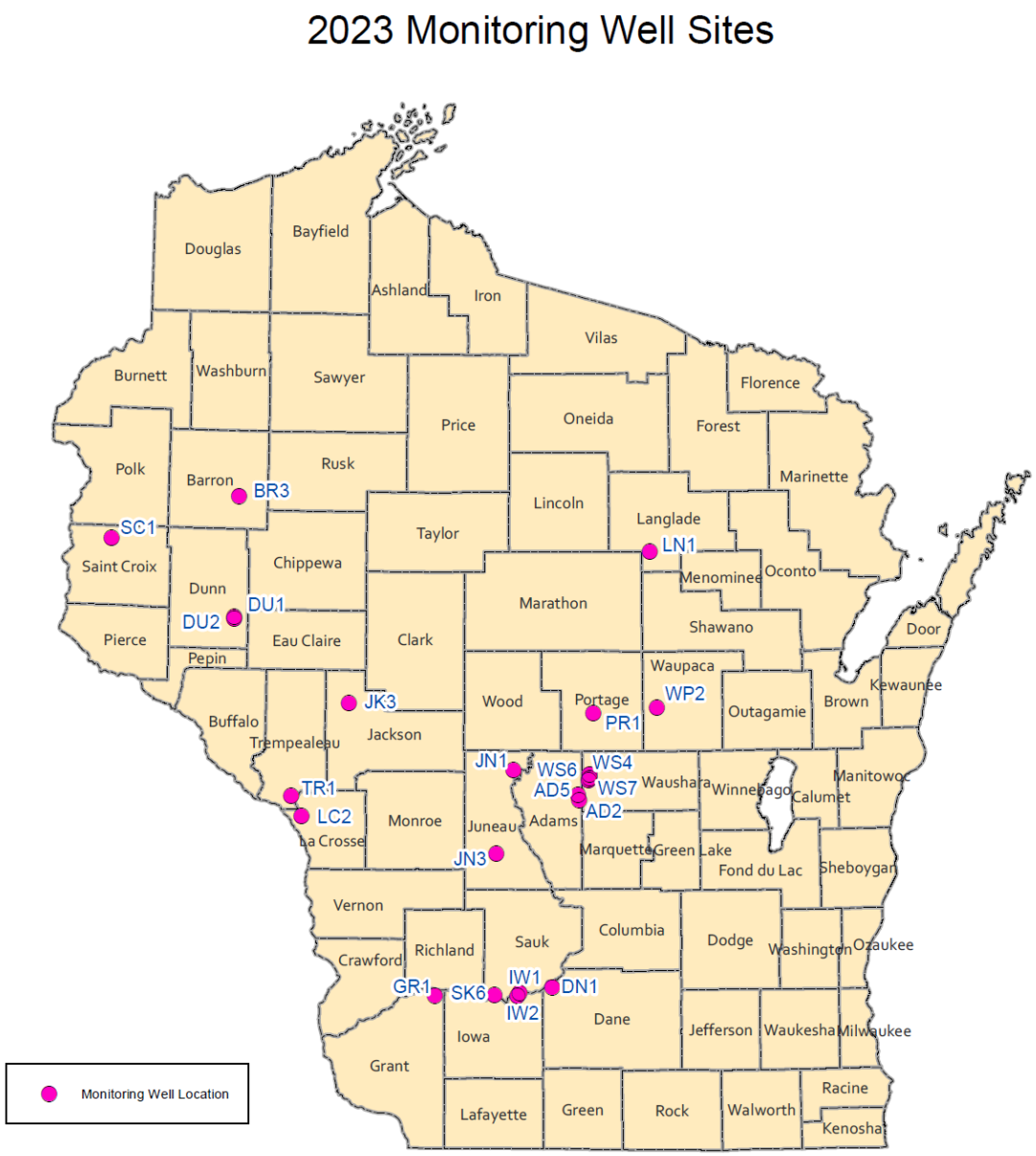
2023 Statewide Groundwater Survey

The most recent Statewide Groundwater Survey was completed in 2023. In this survey, 380 groundwater samples were collected from private wells in a non-biased selection process. Of these 380 samples, atrazine TCR was detected in excess of laboratory reporting limits in 95 groundwater samples. These detections ranged in concentration from 0.05 µg/L to 2.71 µg/L. No Wis. Admin. Code ch. NR 140 ES exceedances were detected for atrazine TCR. The estimated statewide detection rate for atrazine TCR from this survey was 19.9% (+/- 3.9%), and the estimated statewide mean atrazine TCR concentration was 0.2 µg/L (+/- 0.04 µg/L). Additionally, 173 of the 380 wells sampled in the 2023 statewide survey had also been sampled in the 2016 statewide survey. Of these 173 wells, 17% saw a decrease in atrazine TCR concentration from 2016 to 2023, 75% saw no change in concentration, and 8% saw an increase in concentration (Romano et al., 2024).

Field-Edge Sampling Program

The most recent report on DATCP's Field-Edge Sampling Program was compiled from data collected in 2023. In all, 80 samples were collected from field-edge monitoring wells at 22 locations. The overall atrazine TCR detection rate was 46.9%, and detections ranged in concentration from 0.0505 to 1.22 µg/L. No atrazine TCR concentrations exceeded the Wis. Admin. Code ch. NR 140 ES, although there were 24 Wis. Admin. Code ch. NR 140 PAL exceedances (30.0% of samples) by atrazine TCR. This report noted that atrazine TCR concentrations tended to increase with increasing depth of well screens (Environmental Quality Unit, 2025a). Figure 4 shows the locations of all field-edge monitoring wells sampled as part of the 2023 Field-Edge Sampling Program.

Figure 4: Locations of Monitoring Wells Sampled in the 2023 Field-Edge Program



2024-25 Atrazine PA Evaluation Project

The review and analysis of existing atrazine TCR data from private drinking water wells located within atrazine PAs was used to evaluate two statuses; 1) the effectiveness of the PA at reducing atrazine TCR concentrations, and 2) the state of its satisfaction of the PA repealment criteria laid out in Wis. Admin. Code ch. ATCP 30.375. Table 3 summarizes the results of the analysis of atrazine PA effectiveness at reducing atrazine TCR concentrations in private drinking water wells.

Table 3: Analysis of Atrazine Prohibition Area Effectiveness

Category	Number of PA's	Percentage of all PA's
PAs that appear to be effective	60	59.4%
PAs whose effectiveness is unknown	39	38.6%
PAs that do not appear to be effective	2	2.0%

Table 4 summarizes the results of the analysis of atrazine PA satisfaction of repealment criteria of Wis. Admin. Code ch. ATCP 30.375 (1) & (2). The requirements of Wis. Admin. Code ch. ATCP 30.375 (3) have yet to be satisfied for any of the 101 atrazine PAs in Wisconsin.

Table 4: Analysis of Atrazine Prohibition Area Repealment Criteria Satisfaction

Category	Number of PA's	Percentage of all PA's
PAs with Wis. Admin. Code ch. ATCP 30.375 (1) & (2) already satisfied	39	38.6%
PAs with Wis. Admin. Code ch. ATCP 30.375 (1) & (2) satisfaction possible within 1 year*	22	21.8%
PAs with Wis. Admin. Code ch. ATCP 30.375 (1) & (2) satisfaction possible beyond 1 year*	40	39.6%

* Satisfaction is contingent upon receiving permission to sample from each necessary well AND test results indicating atrazine TCR concentrations less than 1.5 µg/L for each necessary sample.

Table 5 summarizes results of focused sampling campaigns completed in 2024 and 2025 for 12 atrazine PAs. No samples found to be in exceedance of the Wis. Admin. Code ch. NR 140 ES for atrazine TCR, but seven samples did exceed the Wis. Admin. Code ch. NR 140 PAL for atrazine TCR. Appendix B shows maps of each of the atrazine prohibition areas where a sampling campaign was carried out, along with general atrazine TCR results at each well sampled.

Table 5: Results of 2024-25 Atrazine Prohibition Area Sampling Campaigns

County	PA Number	Samples Collected	Atrazine TCR Detections (and Rate)	Atrazine TCR Detection Range (µg/L)
Brown	930501	2	0 (0.0%)	N/A
Brown	950501	39	2 (5.1%)	0.191 – 0.873
Eau Claire	931801	15	8 (53.3%)	0.0536 – 0.319
Eau Claire	961801	4	0 (0.0%)	N/A
Grant	932201	4	2 (50.0%)	0.154 – 0.6352
Grant	942201	3	1 (33.3%)	0.4425
Manitowoc/Brown/Calumet	973601	13	3 (23.1%)	0.0611 – 0.172
Marinette	953801	20	3 (15.0%)	0.0538 – 0.6736
Pierce	934801	13	10 (76.9%)	0.0521 – 0.1502
Rock	935401	13	6 (46.2%)	0.0503 – 0.691
Trempealeau	936201	21	3 (14.3%)	0.0598 – 0.0986
Wood	947201	6	0 (0.0%)	N/A

Discussion and Recommendations

Several promising observations can be made about the state of atrazine in Wisconsin's groundwater from the results of recent DATCP sampling efforts. First, it is noteworthy that none of the recent Statewide, Targeted, or Field-Edge Sampling programs has identified any new Wis. Admin. Code ch. NR 140 ES exceedances by atrazine TCR. Atrazine TCR detection rates tend to be higher for biased sampling programs than for the unbiased statewide survey. This indicates that these biased approaches are functioning properly, since the purpose of these sampling programs is to target geographical areas that are more likely to have groundwater contamination by agrichemicals.

Looking at atrazine PAs specifically, the findings of the 2024-25 Atrazine PA Evaluation Project suggest that the vast majority of PAs, where reasonable data resolution exists, have been effective at reducing the concentration of atrazine TCR in groundwater. Interestingly, the atrazine TCR detection rates for most of the atrazine PAs where focused sampling was performed in 2024 and 2025 have been significantly lower than other sampling programs. In most cases, the rates are lower than the estimated statewide detection rate of atrazine TCR from the 2023 Statewide Survey[4]. The notable exception to this is PA 934801 in Pierce County, with an atrazine TCR detection rate of 72.7%. This detection rate is considerably higher than any other sampling area/program. However, the concentration range for its detections was relatively low, with all concentrations being well below the Wis. Admin. Code ch. NR 140 PAL for atrazine TCR.

Nevertheless, additional data from a large percentage of atrazine PAs is needed to establish a clear picture of atrazine TCR concentration trends within the groundwater of these areas. Over 6,000 additional samples are needed to gather enough data from all remaining atrazine PAs to yield results at the desired statistical significance level and margin of error. With current resources and prioritization, this undertaking will take several decades to complete.

Acknowledgements

The making of this report was possible thanks to a partnership between the DATCP ACM Bureau and the University of Wisconsin-Madison Aquatic Sciences Center. In particular, ACM would like to acknowledge the work and assistance of Dr. Jennifer Hauxwell and Dr. Gavin Dehnert of the Aquatic Sciences Center.

The DATCP ACM Bureau's financial information includes the state fiscal year 2025 from July 1, 2024 through June 30, 2025. The primary sources of revenue for ACM are industry fees for licenses, permits, registrations, and tonnage under the feed, fertilizer, soil & plant additive, lime, and pesticide programs. In addition, a federal grant provides some funding to cover annual pesticide program expenses. ACM recognizes these important partnerships with the industry and the federal government and works hard to maximize the use of this funding for the benefit of the industry, consumers, and the environment.

For any questions and clarifications, or to request data summarized in this report, please do not hesitate to reach out to us at DATCPGW@wisconsin.gov.

[4] These detection rates may not be of the same high level of statistical significance that was achieved with the 2023 Statewide Survey.

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Appendix A – Acronyms and Definitions

The acronyms and terminology included on this list are generic definitions intended to help understand this report. Some of these terms are more specifically defined in various regulations.

Acronyms

µg/L _____ Micrograms per liter (a liquid equivalent of parts-per-billion)
ACM _____ Bureau of Agrichemical Management
BLS _____ Bureau of Laboratory Services
DATCP _____ Wisconsin Department of Agriculture, Trade, and Consumer Protection
DHS _____ Wisconsin Department of Health Services
DNR _____ Wisconsin Department of Natural Resources
ES _____ Enforcement Standard
NASS_____National Agricultural Statistics Service
PA _____ Prohibition area
PAL _____ Preventive Action Limit
TCR _____ Total Chlorinated Residues
Wis. Admin. Code _____ Wisconsin Administrative Code

Definitions

Analyte – A chemical substance that has a defined Chemical Abstract Service (CAS) number.

ATCP 30 – Wisconsin administrative code that defines restrictions on certain pesticide products, including atrazine use restrictions and atrazine prohibition areas.

Atrazine Prohibition Area – An area where atrazine use is currently prohibited under Wis. Admin. Code ch. ATCP 30.

Compound – A substance formed by the chemical union of two or more ingredients.

Detection – When an analyte has a concentration that can be quantified (i.e. a concentration greater than the laboratory reporting limit).

Enforcement Standard (ES) – An Enforcement Standard (ES) is set to ensure that the concentration of a compound in groundwater does not exceed a specific level that could harm human health or the environment. If the ES for a certain compound in groundwater is exceeded, intervention from the appropriate authority is required.

Herbicide – A pesticide used to kill or inhibit the growth of undesired plants.

Metabolite or Breakdown Product – A chemical substance left behind by a parent compound that has degraded through natural chemical breakdown and/or been metabolized by bacteria.

NR 140 – Wisconsin administrative code that establishes groundwater quality standards and required responses when the standards are exceeded.

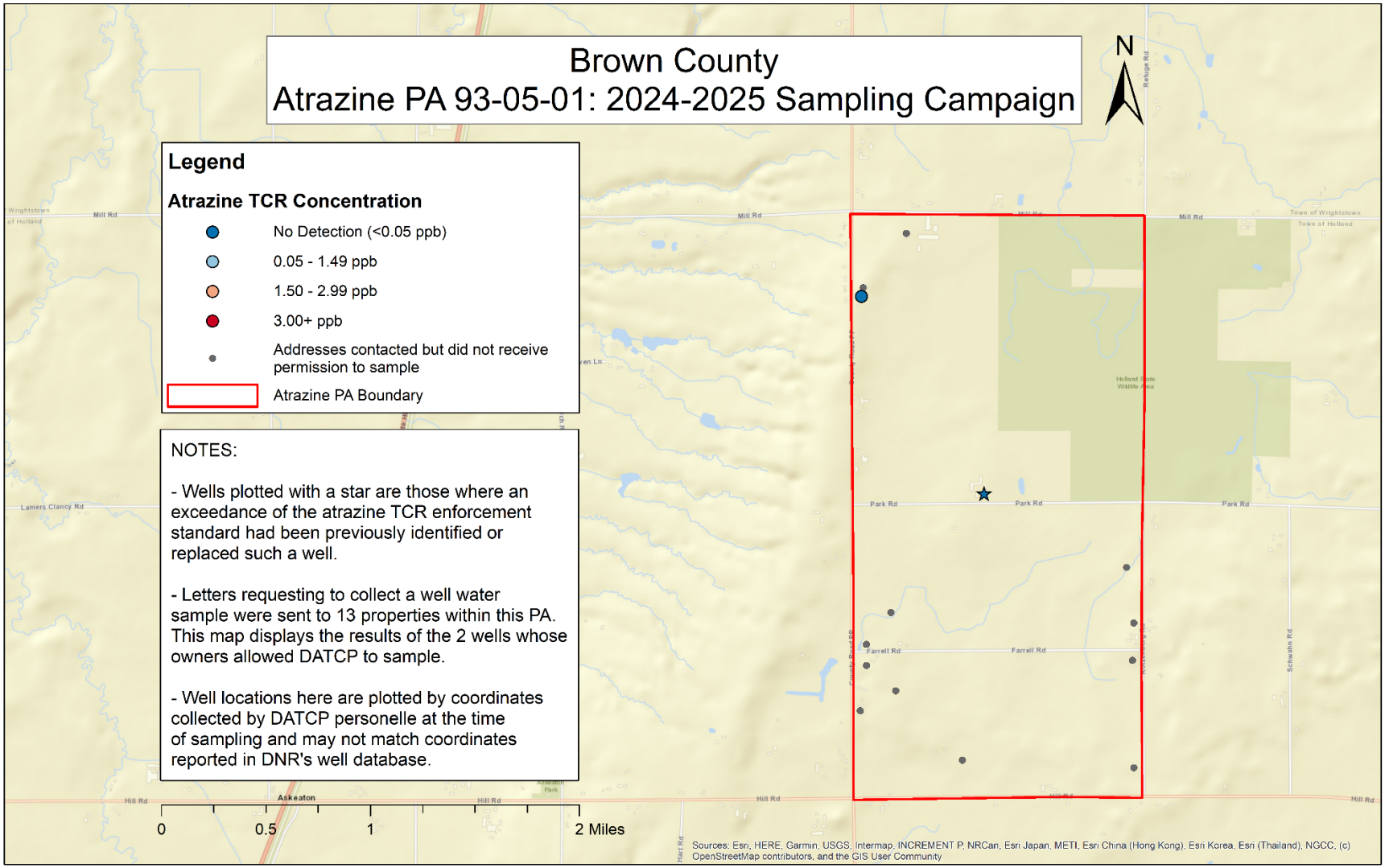
Pesticide – Substance used to kill, repel, or control certain forms of plant, animal, or fungal life that are considered to be pests. The pesticide category includes herbicides, insecticides, rodenticides, fungicides, and bactericides.

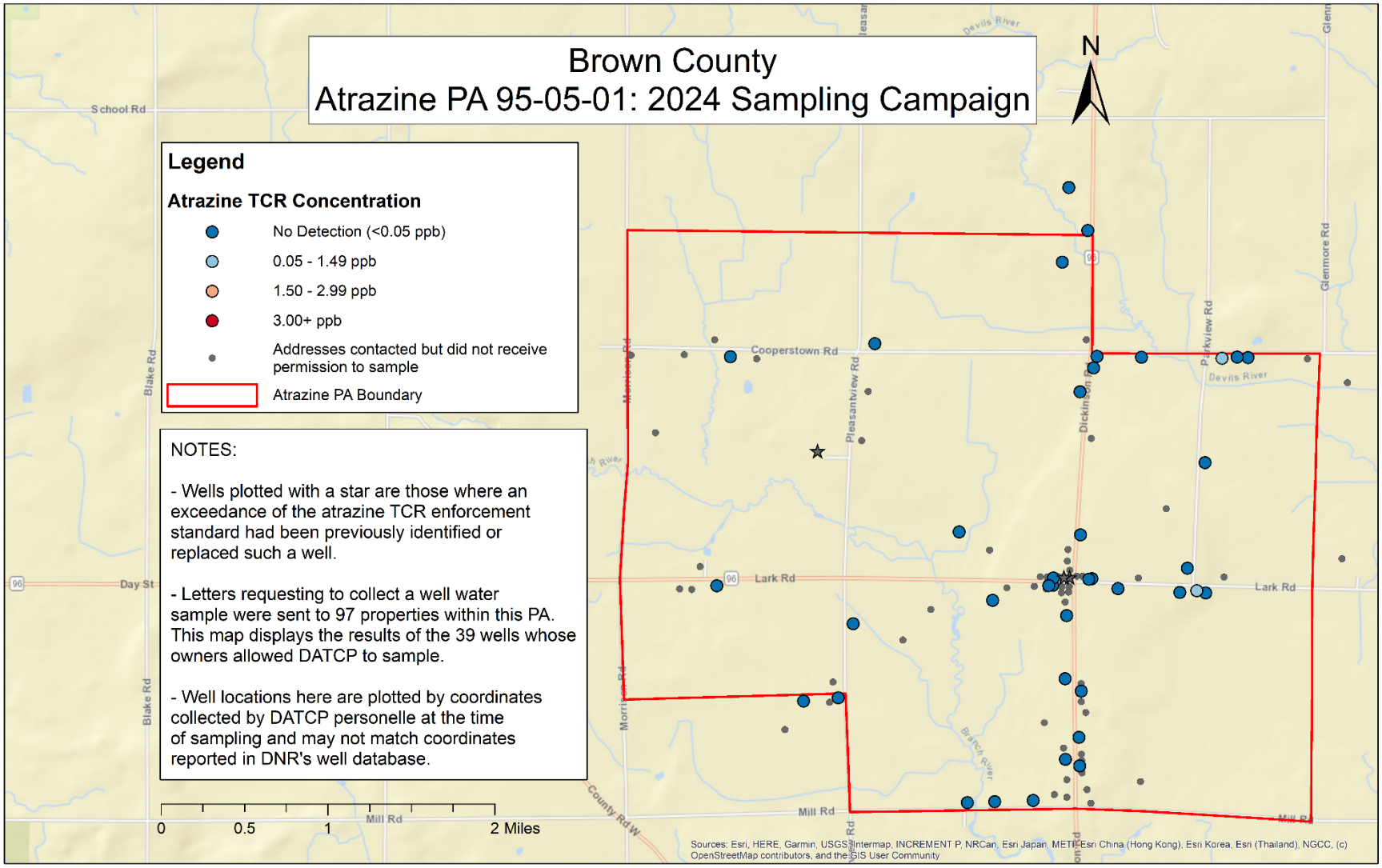
Preventive Action Limit (PAL) – A Preventive Action Limit (PAL) is a percentage of the Enforcement Standard (ES); 10% of a corresponding ES for carcinogenic, mutagenic, or teratogenic properties, and 20% of the ES for the remaining substances. The intention of the PAL is for it to act as a trigger for intervention before a pollutant becomes a serious risk to public health or the environment.

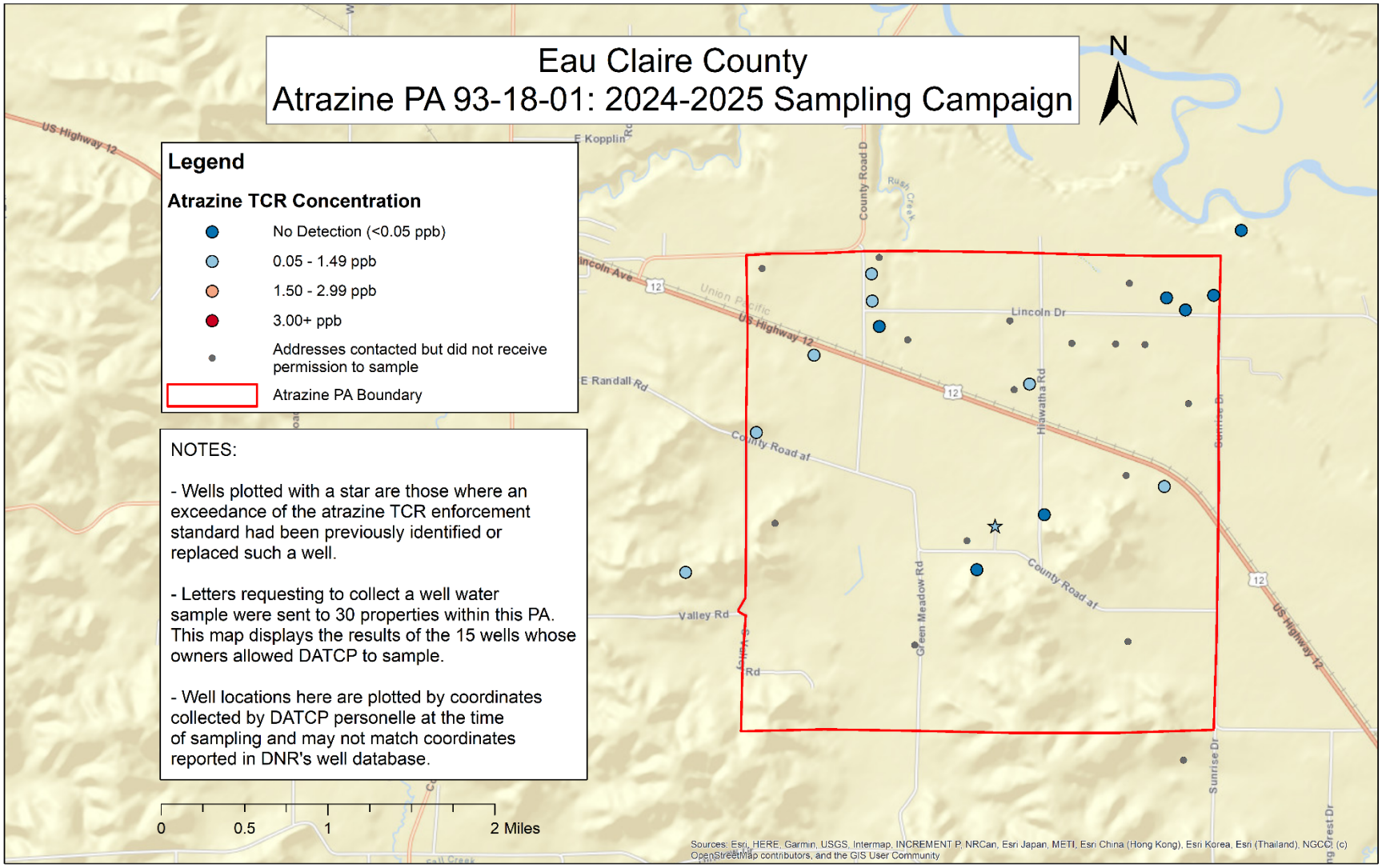
Reporting Limit – The minimum analyte concentration that can be reliably quantified and reported by the laboratory.

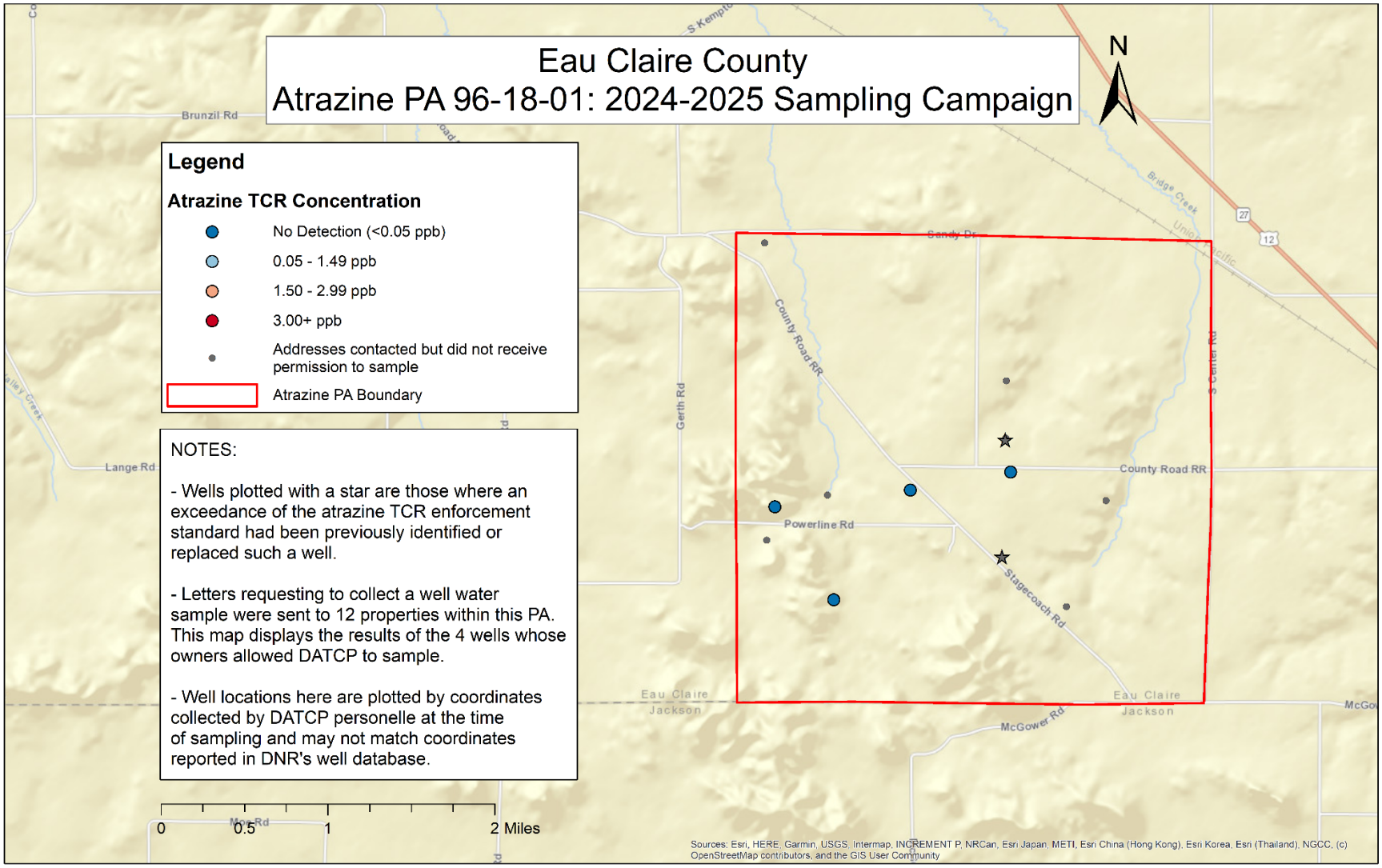
Total Chlorinated Residues (TCR) of Atrazine – The sum of atrazine and three of its metabolites (de-ethyl atrazine, de-isopropyl atrazine, and diamino atrazine).

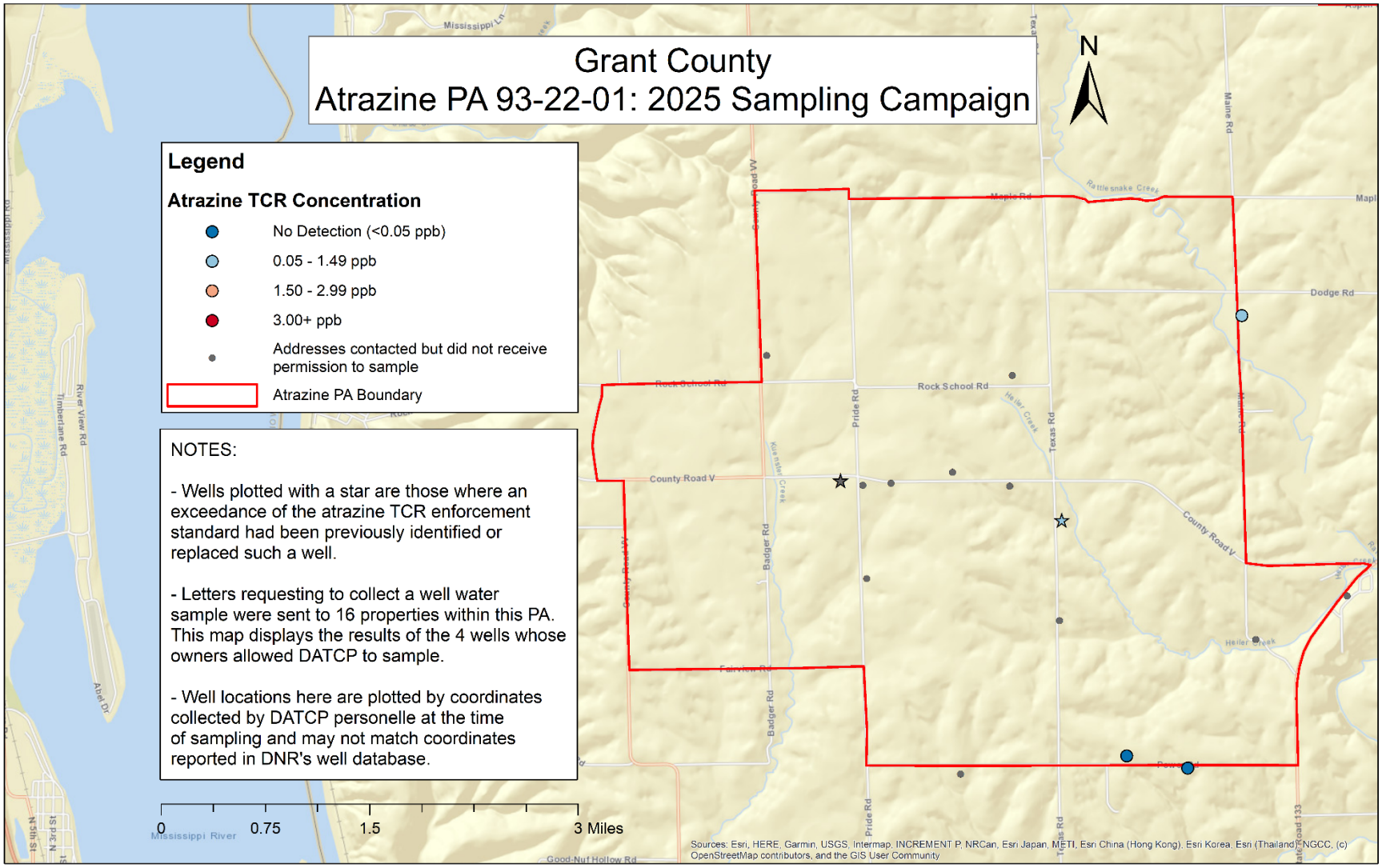
Appendix B – Atrazine Prohibition Area Sampling Campaign Maps

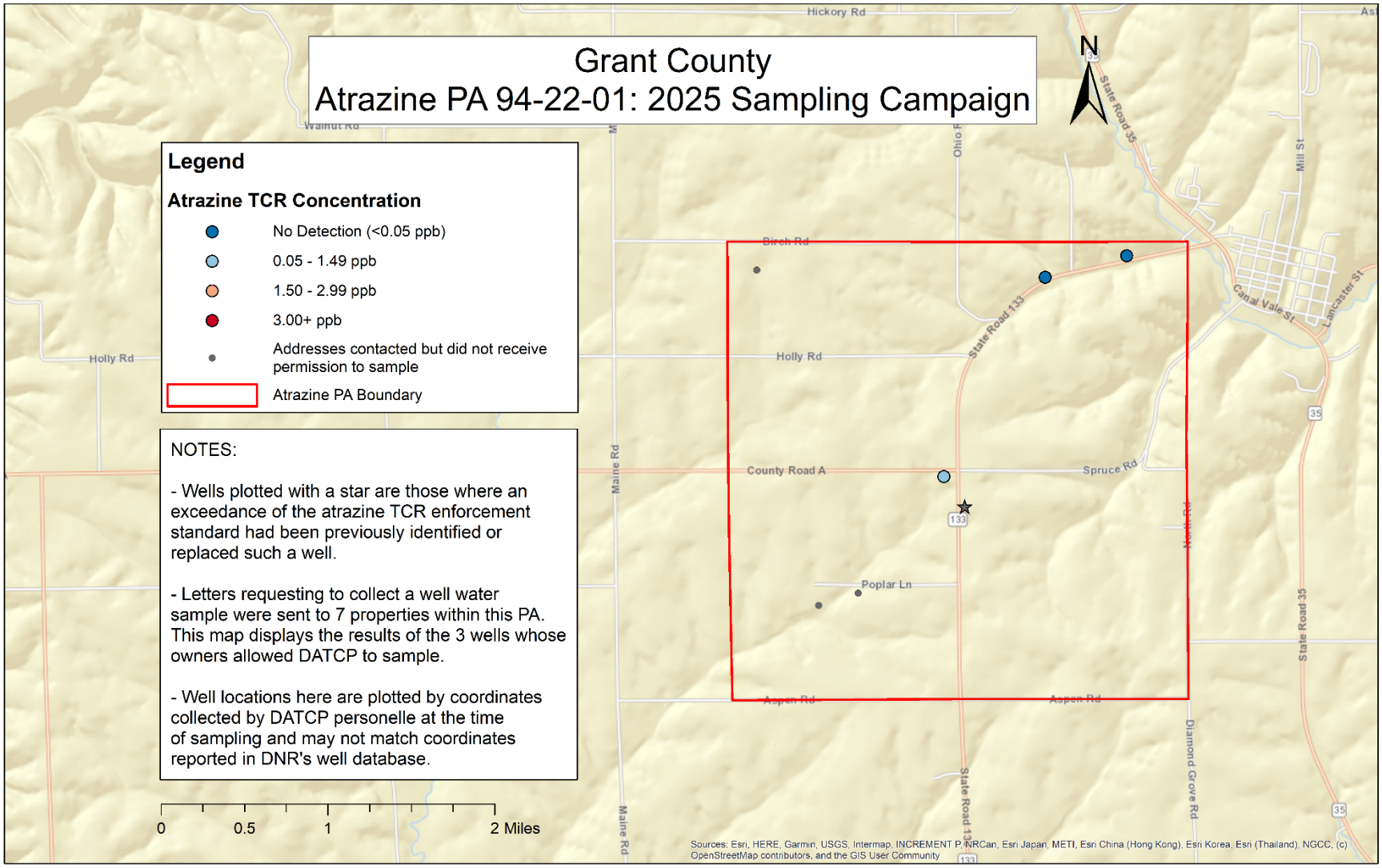


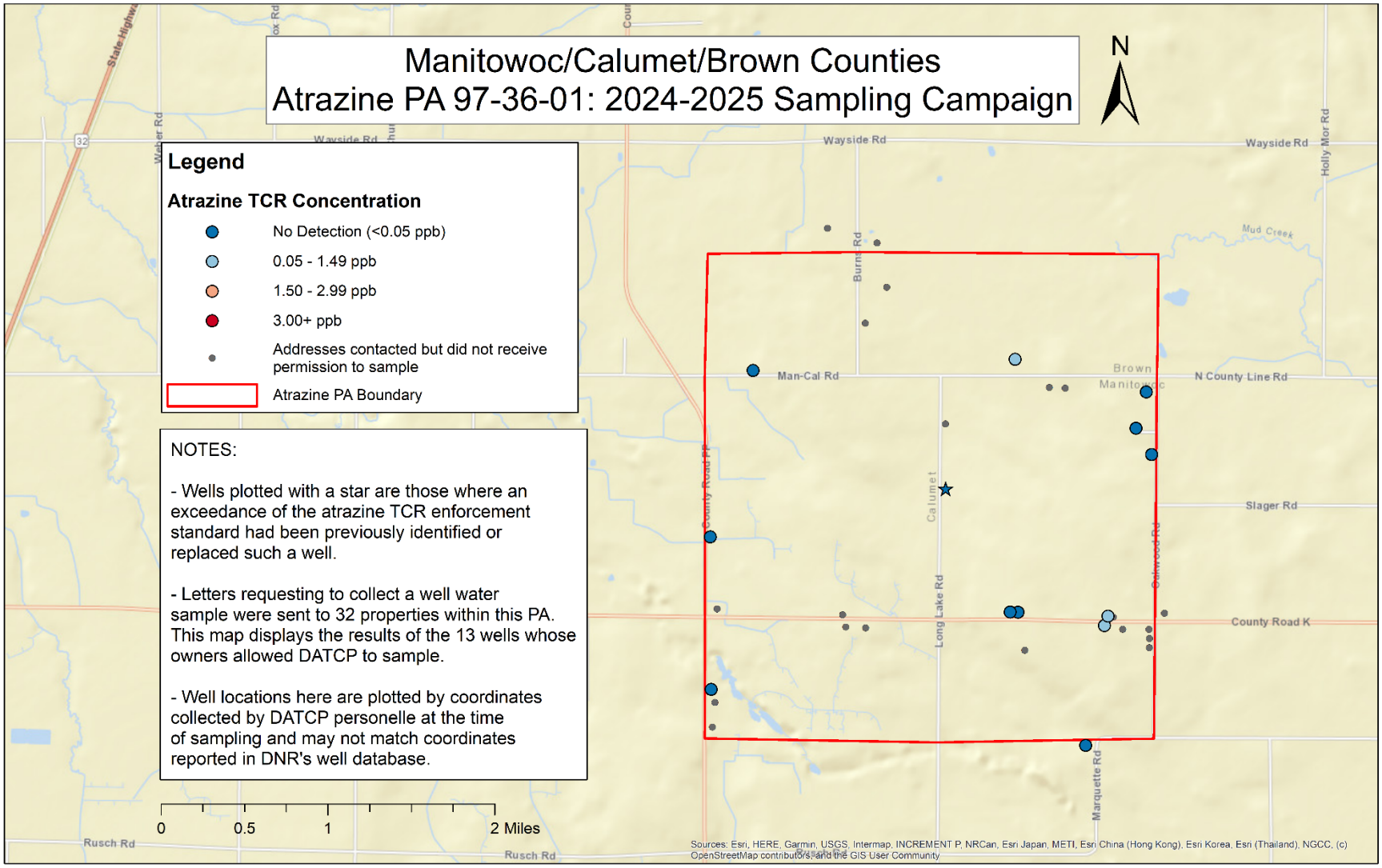

Brown County
Atrazine PA 95-05-01: 2024 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 97 properties within this PA. This map displays the results of the 39 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0 0.5 1 2 Miles
School Rd
Blake Rd
Day St
Cooperstown Rd
Pleasantview Rd
Lark Rd
Mill Rd
Devils River
Glenmore Rd
Parkview Rd
Branch River
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

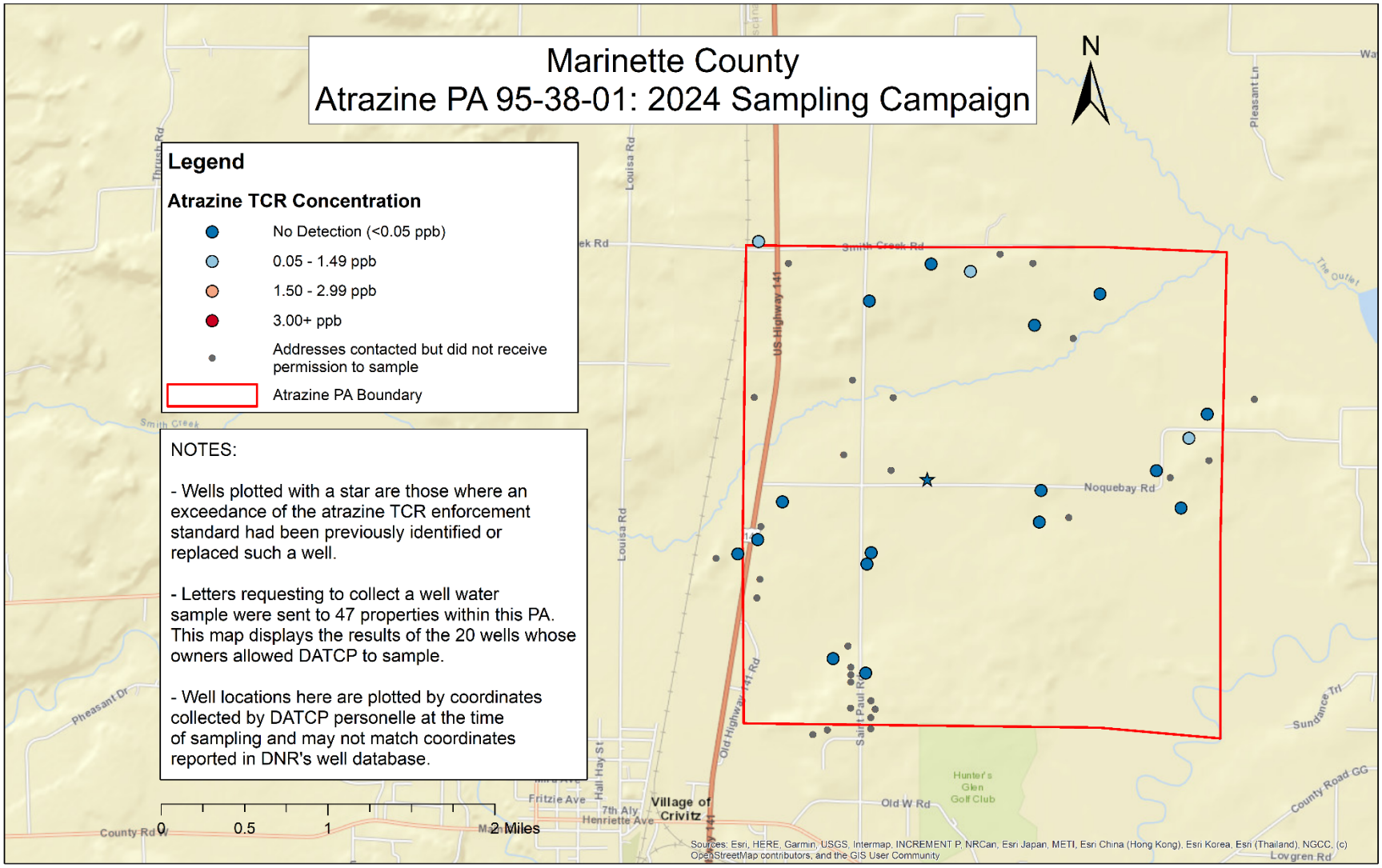

Eau Claire County
Atrazine PA 93-18-01: 2024-2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 30 properties within this PA. This map displays the results of the 15 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
US Highway 12
E Kopplin Rd
County Road D
Rush Creek
Lincoln Ave
Union Pacific
Lincoln Dr
E Randall Rd
Hiawatha Rd
Sunrise Dr
County Road af
Valley Rd
Green Meadow Rd
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

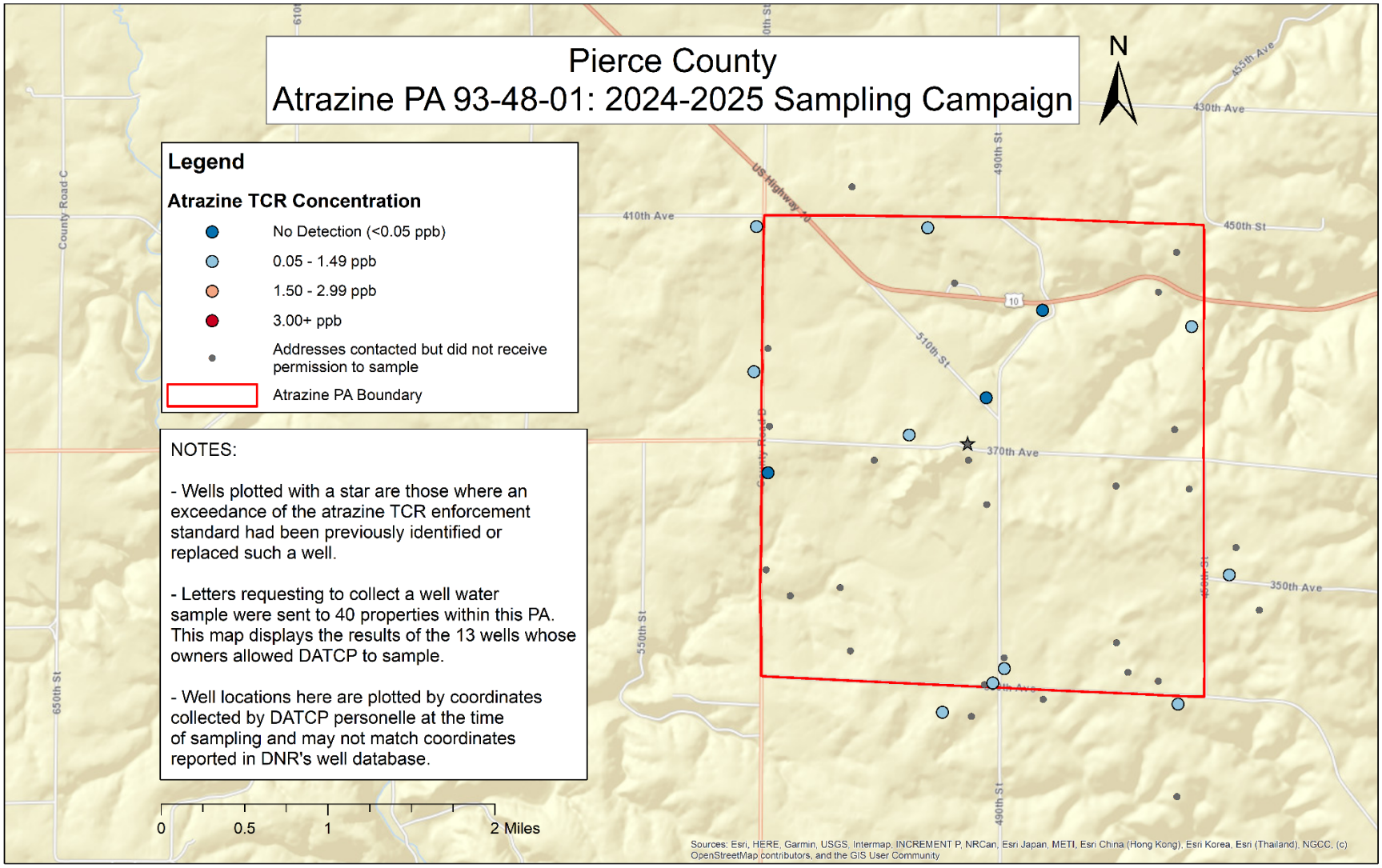

Eau Claire County
Atrazine PA 96-18-01: 2024-2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 12 properties within this PA. This map displays the results of the 4 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
Brunzil Rd
Sandy Dr
County Road RR
Powerline Rd
Stagecoach Rd
Gerth Rd
S Center Rd
Lange Rd
Eau Claire
Jackson
McGower Rd
Bridge Creek
27
12
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

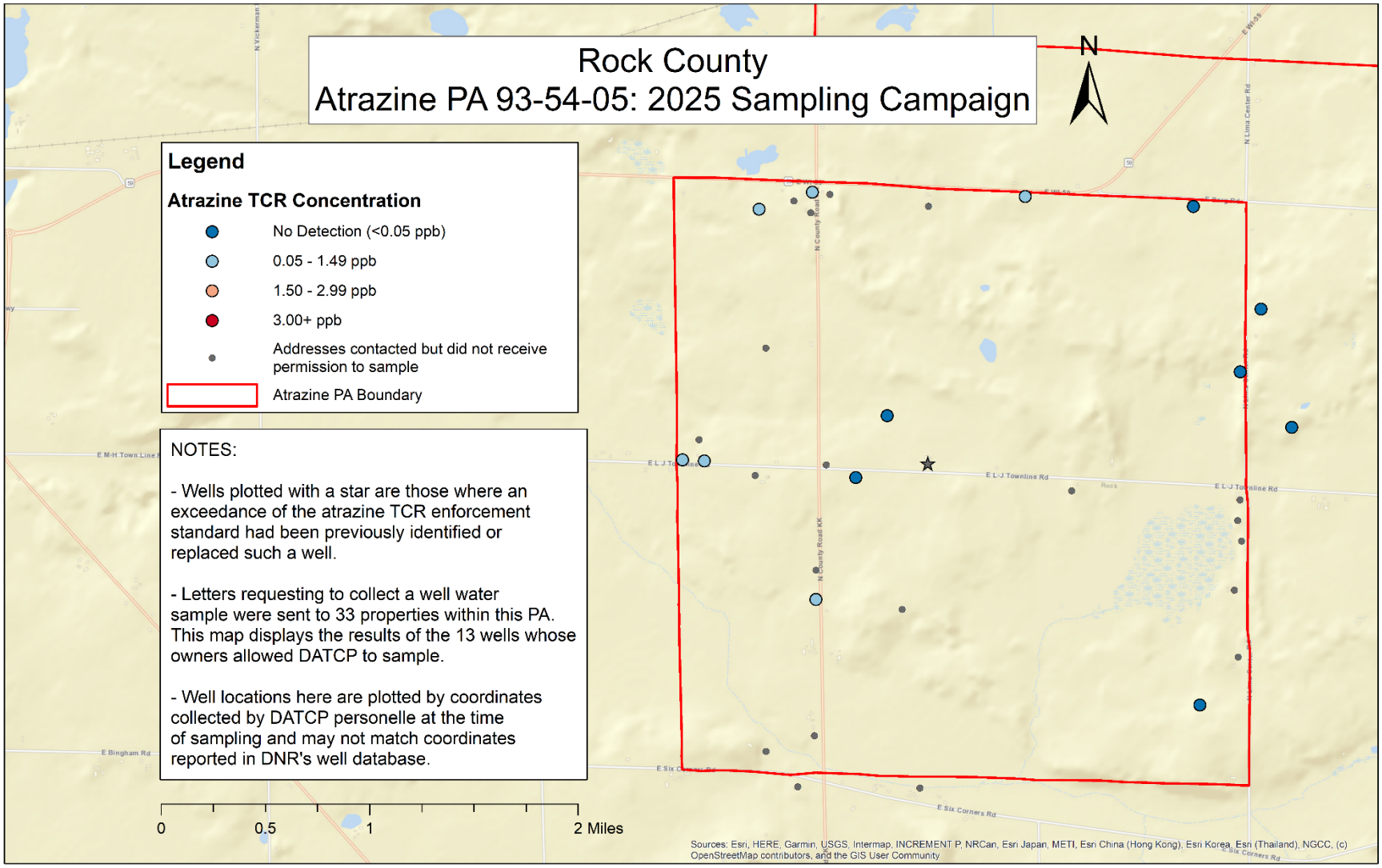

Grant County
Atrazine PA 93-22-01: 2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 16 properties within this PA. This map displays the results of the 4 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.75
1.5
3 Miles
Mississippi River
Rock School Rd
County Road V
Pride Rd
Badger Rd
Texas Rd
Dodge Rd
Maple Rd
Fairview Rd
Good-Nuf Hollow Rd
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

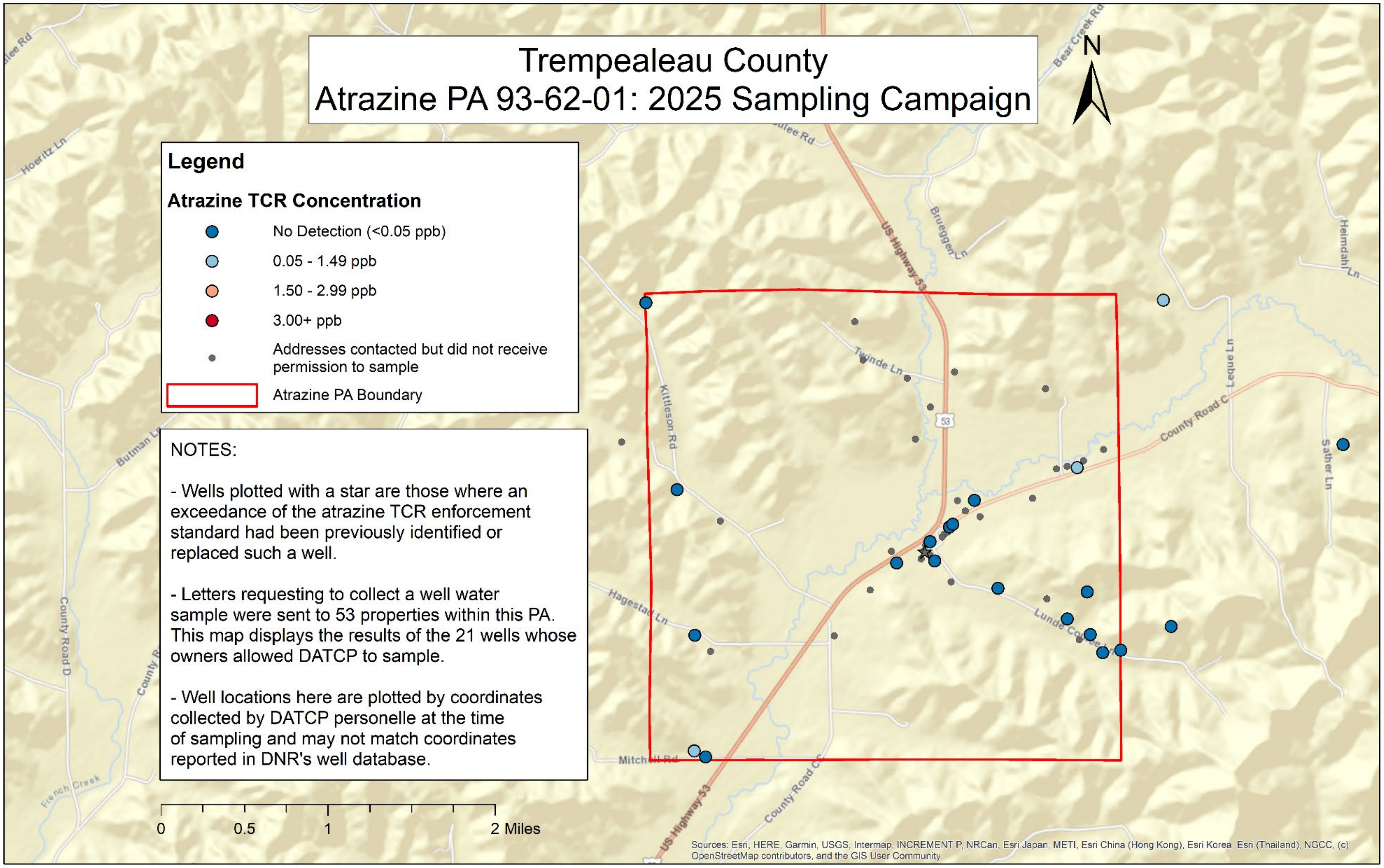

Grant County
Atrazine PA 94-22-01: 2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 7 properties within this PA. This map displays the results of the 3 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
Hickory Rd
Walnut Rd
Birch Rd
Holly Rd
County Road A
Spruce Rd
Poplar Ln
Aspen Rd
Maine Rd
State Road 133
State Road 35
Mill St
Canal Vale St
Lancaster St
Diamond Grove Rd
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

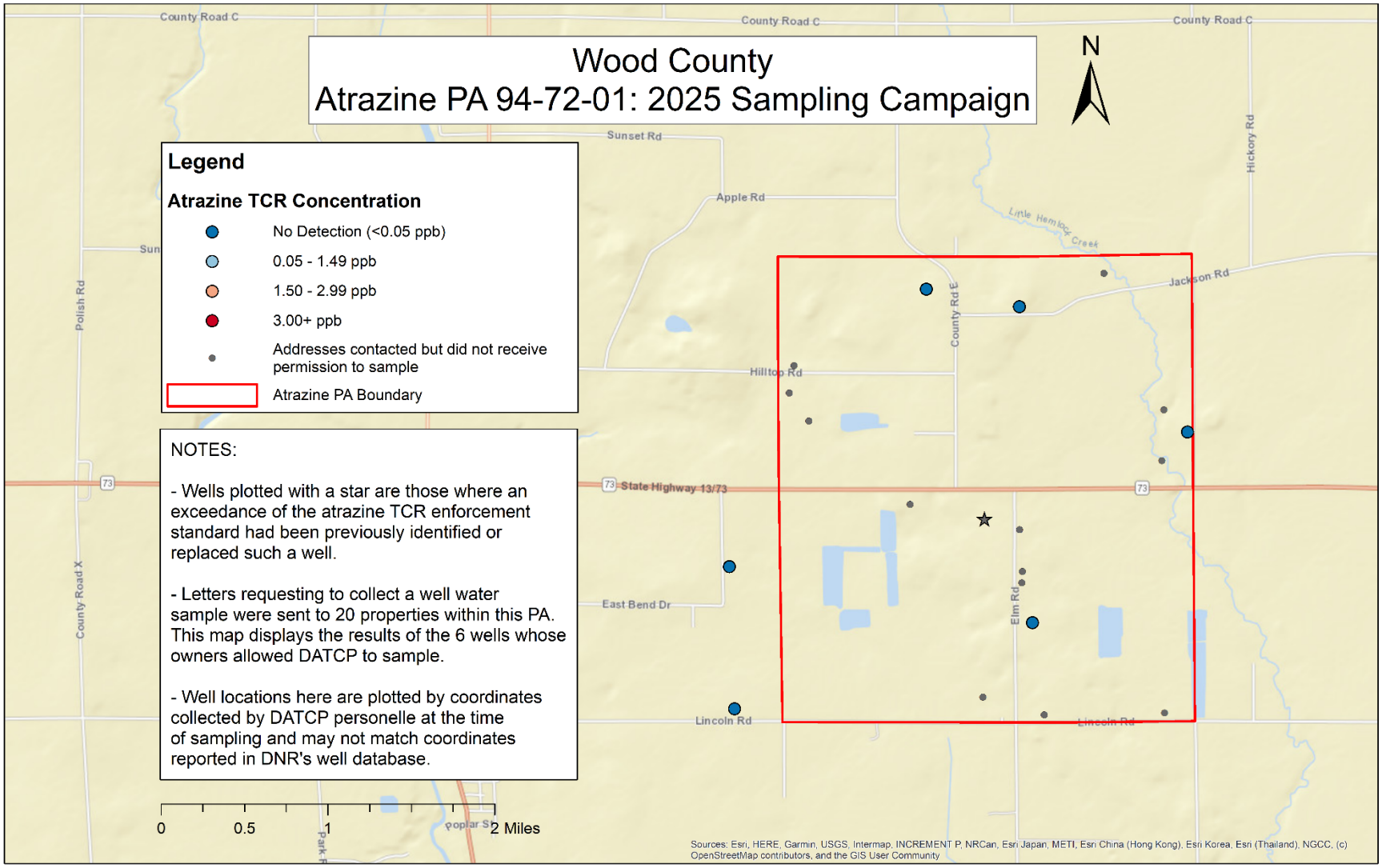

Manitowoc/Calumet/Brown Counties
Atrazine PA 97-36-01: 2024-2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 32 properties within this PA. This map displays the results of the 13 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
Wayside Rd
Man-Cal Rd
N County Line Rd
Slager Rd
County Road K
Rusch Rd
Mud Creek
Burns Rd
Calumet
Long Lake Rd
Oakwood Rd
Marquette Rd
Holly Mor Rd
Brown
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community


Marinette County
Atrazine PA 95-38-01: 2024 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 47 properties within this PA. This map displays the results of the 20 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
Smith Creek Rd
Noquebay Rd
US Highway 141
Louisa Rd
Pleasant Ln
Pleasant Dr
Thrush Rd
Smith Creek
Saint Paul Rd
Old Highway 141 Rd
Village of Crivitz
Fritzie Ave
7th Aly
Henriette Ave
Hall Hay St
Old W Rd
Hunter's Glen Golf Club
Sundance Trl
County Road GG
Lovgren Rd
County Rd W
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community


Pierce County
Atrazine PA 93-48-01: 2024-2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 40 properties within this PA. This map displays the results of the 13 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
US Highway 10
410th Ave
370th Ave
350th Ave
430th Ave
450th St
510th St
490th St
650th St
County Road C
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community


Rock County
Atrazine PA 93-54-05: 2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 33 properties within this PA. This map displays the results of the 13 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community


Trempealeau County
Atrazine PA 93-62-01: 2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 53 properties within this PA. This map displays the results of the 21 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
US Highway 53
Twinde Ln
Kittleson Rd
Hagestad Ln
Mitchell Rd
County Road C
Lunde Coulee Rd
Leque Ln
Sather Ln
Heimdahl Ln
Bruegger Ln
Bear Creek Rd
Hoeritz Ln
Butman Ln
County Road D
French Creek
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community


Wood County
Atrazine PA 94-72-01: 2025 Sampling Campaign
N
Legend
Atrazine TCR Concentration
No Detection (<0.05 ppb)
0.05 - 1.49 ppb
1.50 - 2.99 ppb
3.00+ ppb
Addresses contacted but did not receive permission to sample
Atrazine PA Boundary
NOTES:
- Wells plotted with a star are those where an exceedance of the atrazine TCR enforcement standard had been previously identified or replaced such a well.
- Letters requesting to collect a well water sample were sent to 20 properties within this PA. This map displays the results of the 6 wells whose owners allowed DATCP to sample.
- Well locations here are plotted by coordinates collected by DATCP personelle at the time of sampling and may not match coordinates reported in DNR's well database.
0
0.5
1
2 Miles
County Road C
Sunset Rd
Apple Rd
Little Hemlock Creek
Hickory Rd
Jackson Rd
County Rd E
Hilltop Rd
Polish Rd
County Road X
State Highway 13/73
East Bend Dr
Elm Rd
Lincoln Rd
Poplar St
Park Rd
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community