



2021 Atrazine Use (Legal and Illegal) Inspections Report

Wisconsin Department of Agriculture, Trade and Consumer Protection
Agricultural Resource Management Division
 Environmental Quality Unit
 Final (1-20-2023)

Introduction

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) Agrichemical Management (ACM) Bureau is responsible for assuring compliance with Wis. Admin. Code, ch. ATCP 30 - Pesticide Product Restrictions ([Wis. Admin. Code, ch. ATCP 30](#)). Within that chapter, Subchapter VIII deals specifically with the legal- and illegal-use of any herbicide that contain the active ingredient atrazine. This report documents 2021 DATCP ACM inspections associated with atrazine legal- and illegal-use relative to Wis. Admin. Code, chs. ATCP 30.31-30.37, and provides a summary of the inspection program findings and trends.

Wisconsin's general restrictions and requirements for atrazine use have not changed since 2010. It is illegal in Wisconsin to apply any pesticide containing the active ingredient atrazine within an atrazine Prohibition Area (PA). Outside of a PA, atrazine use is restricted but not prohibited. Currently, there are no PAs under consideration for repeal (Wis. Admin. Code, ch. ATCP 30.375), or any active or under consideration research exemptions (Wis. Admin. Code, ch. ATCP 30.38).

Atrazine in drinking water remains a concern. The 2016 DATCP statewide survey of agricultural chemicals in groundwater indicated atrazine or one of its metabolites was detected in 26.4% of private drinking water wells in Wisconsin¹. Regarding risk to human health, about 0.2% of the wells contained a total atrazine concentration exceeding the 3.0 micrograms per liter ($\mu\text{g}/\text{l}$ or parts per billion [(ppb)] Enforcement Standard (ES) listed within Wis. Admin. Code, ch. NR 140.

Atrazine Prohibition Area (Illegal-Use) Inspections

An atrazine PA restricts the ability to use a pesticide that contains the active ingredient atrazine within the designated boundaries. There are currently 101 atrazine PAs covering approximately 1.2 million acres within the state, of which about 272,000 acres are planted in corn (2020 data²). PAs are established once a groundwater sample collected from a drinking water well is found to contain greater than 3.0 ppb atrazine plus metabolites, and a subsequent investigation reveals that nearby agricultural practices (non-point source) contributed to the atrazine exceedance.

DATCP ACM Environmental Enforcement Specialists (EES) have performed atrazine illegal-use inspections annually since 2008. An inspection is performed on a field in agricultural production to check on compliance with Wis. Admin. Code, ch. ATCP 30.37, which states that “...*no person may apply atrazine in a prohibition area identified under s. ATCP 30.37...*”. The goal for 2021 was to perform at least one atrazine illegal-use

¹ Wisconsin Department of Agriculture, Trade and Consumer Protection, April 2017. Wisconsin Groundwater Quality. ARM-PUB-264 (rev. 03/17)

² United States Department of Agriculture National Agriculture Statistics Service. CropScape - Cropland Data Layer, 2020 Data. nassgeodata.gmu.edu/CropScape

inspection for each EES territory (13 total, one EES territory does not contain any PAs). Typically, inspections are performed during the growing season, before July 31, and on an existing field planted with corn.

PROGRAM APPROACH AND SELECTION CRITERIA

The first step is to select an agriculture field to inspect. Criteria used for field selection are listed below.

- The Environmental Quality (EQ) Unit Program Manager identifies a field within the PA for the EES to inspect based on atrazine concentration trends at nearby private drinking water wells that are not decreasing at an expected or acceptable rate based on a review of data associated with [DATCP's Exceedance Well Sampling Program](#).
- Referral by neighbors that suggests atrazine may have been used on an agricultural field within the PA.
- Review by EES personnel of herbicide sales records where users of atrazine are known to farm within PAs.
- ESS personnel randomly select a field within the PA where corn is currently grown and has not been inspected prior.

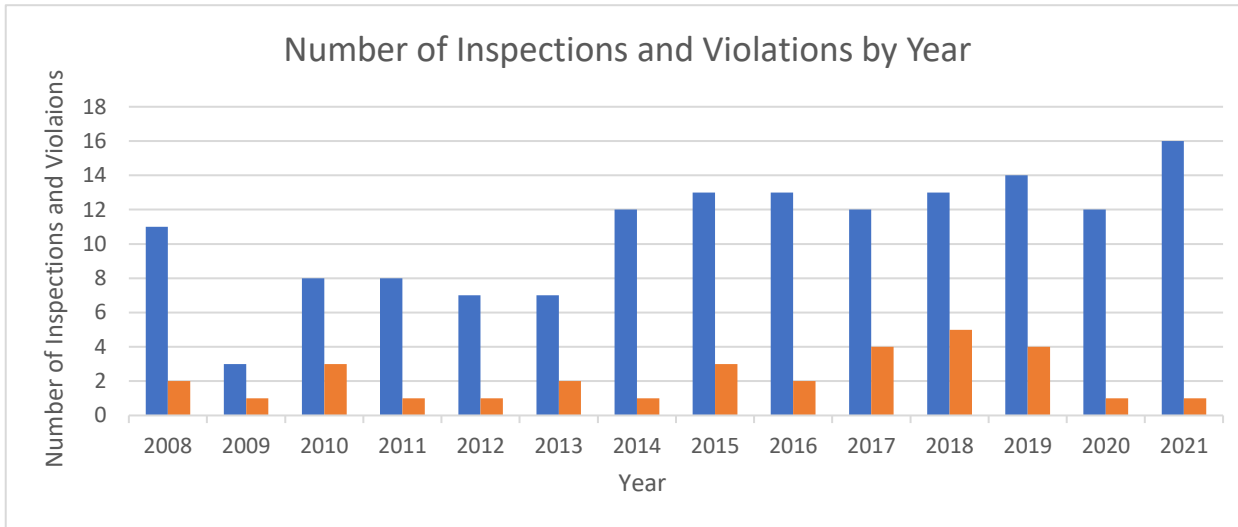
EES personnel meet with the agriculture field operator and/or owner and conducts a records check of the three prior growing seasons (i.e., years); gathers information on the crop(s) grown and the herbicides used on the selected field, and notes whether any herbicide product containing the active ingredient atrazine had been applied. The EES also collects two soil samples from the selected field to check for atrazine residues. These samples are analyzed at DATCP's Bureau of Laboratory Services (BLS) laboratory. The laboratory results are submitted to the EQ Unit Program Manager for evaluation. EES personnel then complete a narrative form (ARM-ACM-453, rev 04/20) with appropriate documentation, and submit to their supervisors and EQ Unit Program Manager for review, analysis, and memorialization.

ILLEGAL-USE INSPECTIONS AND VIOLATIONS

In 2021, 16 inspections were performed in atrazine PAs with one violation recorded involving atrazine application within the PA. This illegal application occurred within Jackson County PA 97-27-01 by a commercial applicator. The owner of the property knew the field was in a PA, but the commercial applicator was unaware of the exact PA boundaries extent. The applicator and his supervisor received written warning notices from DATCP.

Since 2008, 149 inspections were performed in atrazine PAs, yielding an overall violation rate of 20.8% (31 locations). Commercial applicators provided service for 70 (47%) of the fields inspected, yielding a violation rate of 28.6%. Self-applicators accounted for the remaining 79 inspected fields, yielding a violation rate of 13.9%. [Figure 1](#) summarizes violations versus inspections over time. A summary table of the atrazine illegal-use inspections over the years is provided in [Appendix A](#).

Figure 1: Atrazine Illegal-Use Inspections and Violations



Notes: ■ Number of atrazine illegal-use inspections within stated year.
 ■ Number of violations associated with an atrazine illegal-use inspection within the stated year.

The atrazine illegal-use inspection program has encountered violations every year since inspections began in 2008. As indicated, in 2021 a lower percentage of violations were observed in comparison to the previous five years. We do need to recognize that the EES personnel are searching for inspection locations with an increased chance that a violation may occur. Due to this, our selection process introduces a bias regarding the selection of field(s) where an inspection will occur. A random approach in field selection versus the current field selection process would likely lower the number and percent of violations.

ATRAZINE IN SOIL SAMPLES

Overall, atrazine concentrations in excess of laboratory detection limits have been detected in 16.8% (24 out of 143 locations) of soil samples collected from fields associated with atrazine illegal-use inspections. In 2021, of the one violation (a field location where atrazine was illegally applied), the soil samples collected from the field were not chemically analyzed. Over the course of the inspection program, of the 31 sites where atrazine was illegally applied to fields (self-reported by operator or applicator), atrazine was detected in soil samples from ten of the fields. The detected atrazine concentration ranged from 0.0346 to 0.949 parts per million (ppm).

Over the course of the inspection program, the top three compounds that have been detected in soil are metolachlor, atrazine and acetochlor. Overall, 19 different compounds have been detected in soil samples collected during the inspection program at concentrations greater than laboratory reporting limits. [Table 1](#) depicts the compounds detected more than twice and their identified maximum concentration.

Table 1: Soil Sample Results for the Atrazine Illegal-Use Inspection Program

Pesticide Analyte	Count Of Analyte Detects	Maximum Concentration (in ppm)
Metolachlor	87	1.46
Atrazine	37	0.949
Acetochlor	34	2.18
Pendimethalin	11	2.96
Simazine	11	0.587
Boscalid	3	1.11
Tefluthrin	2	0.622
Terbufus	2	3.58
Chlordane	2	0.423
Chlorothalonil	2	1.76
Dimethenamid	2	0.146

Notes: ppm = parts per million

Over the course of the inspection program, atrazine was detected in soil samples collected from ten fields where the operator or applicator either did not admit to using atrazine, or had records indicating atrazine was not applied to the field. Two of these instances occurred in 2021, where atrazine concentrations ranged from 0.0413 to 0.183 ppm. For these ten sites, the detected atrazine concentrations have been very minimal. It is not known whether the atrazine detected is a:

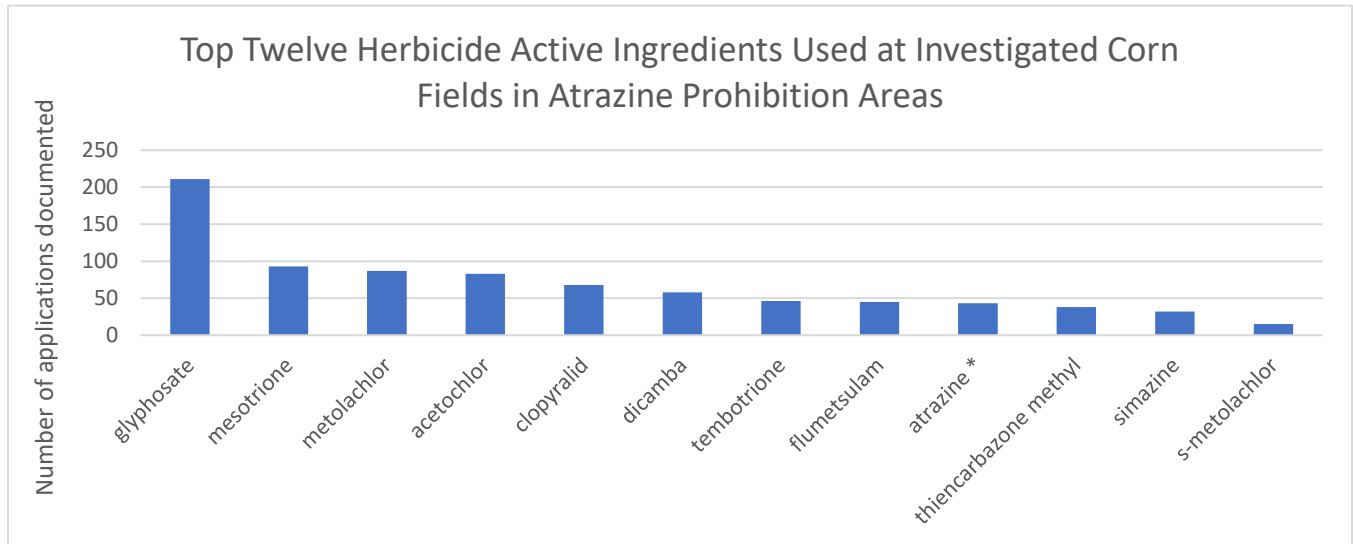
- Carry-over from previous use within the field (prior to the three-year record review conducted during the inspection);
- Atmospheric disposition;
- Carry-over from equipment that was used at a field where atrazine was applied;
- Residue from atrazine applied at adjacent or nearby fields (that may be inside or outside the PA); or
- Illegal use on that field and not having proper paperwork, or the willingness to admit to the violation.

Currently, there is no reliable scientific understanding to explain the atrazine source or time of application in these type of scenarios. It is likely that these low concentrations will not have a detrimental effect on local groundwater quality. However, if the detected atrazine concentrations are a result of illegal use (used prior to the three year inspection window, or falsified records, or lack of cooperation by violator), the protocol of following up with the field operator and/or applicator would be implemented. Current DATCP protocol is to perform follow-up inspections if an atrazine concentrations in a soil sample exceeds 0.25 ppm. The threshold for follow-up inspections has only been met once (2010) for any soil samples collected to date.

HERBICIDES USED IN PAS

As part of the atrazine illegal-use inspection in a PA, EES staff also collect crop and herbicide information for the current year and previous two years. A compilation of this information indicates that over 55 different active agrichemicals have been applied on the investigated corn fields within PAs inspected. By far the most commonly used herbicide active ingredient is glyphosate. Figure 2 shows the top twelve herbicides used on the cornfields inspected within PAs. Based on the biased approach for field selection and the inspection information collected, atrazine is the ninth most common active ingredient used on fields within the PAs.

Figure 2: Herbicide Use Recorded During Atrazine Illegal-Use Inspection Program



Notes: *Illegal use of atrazine

■ Number of times agrichemical was reportedly applied to inspected fields.

Note, glyphosate has not been analyzed as part of the inspection program’s soil sampling. Based on chemical composition, it is unlikely that glyphosate will migrate from soil and affect groundwater quality. Because glyphosate is so widely used, DATCP requested that BLS develop an acceptable protocol and method to reliably determine for the presence and concentration of glyphosate, AMPA metabolite and glufosinate ammonium. In 2019, a successful pilot testing program was implemented to determine the validity of testing for glyphosate in water. However, limited laboratory capacity in 2021 prevented analyses of glyphosate and metabolic breakdown products for soil. If laboratory capacity is available, the future soil sampling associated with the atrazine illegal-use inspections program will also include glyphosate, AMPA metabolite and glufosinate ammonium analysis.

Atrazine Legal-Use Inspections

An atrazine legal-use inspection is completed on a field with agricultural crops to verify compliance with Wis. Admin. Code, chs. ATCP 30.31 and ATCP 30.32. The goal for 2021 was for each EES person (14 total) to complete at least one atrazine legal-use inspection within their territory. Typically, inspections are performed during the growing season on an existing field planted with corn. Records for the current season and the two prior years are reviewed as part of the inspection.

PROGRAM APPROACH AND SELECTION CRITERIA

The first step is to select an agriculture field to inspect. Criteria used for field selection are listed below.

- The EQ Unit Program Manager identifies a field outside of a PA for the EES to inspect either because of an on-going investigation or atrazine concentrations were detected in nearby private drinking water wells.
- Referral by neighbors that suggest potential atrazine use on the agricultural fields at excessive application rates.
- Review by EES personnel of herbicide sales records indicative of atrazine sales.
- ESS personnel randomly select a field outside of a PA that has not been inspected and corn is currently being grown.

EES staff meet with the agriculture field operator and/or owner and conducts a records check, gathers information on the crops grown and the herbicides used on the selected field, and notes whether any herbicide product containing atrazine has been applied. If atrazine is applied, the inspector questions the rate of application and how the applicator determined that use rate (e.g. soil texture). EES staff then completes a narrative form (ARM-ACM-535, rev 04/20) with figures and appropriate documentation, and submits the form to their supervisors and the EQ Unit Program Manager for review, analysis, and memorialization.

If a field selected for inspection has the infrastructure for an irrigation system, additional information is obtained to ensure compliance with Wis. Admin. Code, ch. ATCP 30.31(3). Wis. Admin. Code, ch. ATCP 30.31(3)(b) states, “...no person may apply irrigation water to any site to which atrazine product has been applied for a 2-year period following the application of atrazine product, unless the application of irrigation water is conducted in accordance with an irrigation management program that does not cause the field moisture capacity in the root zone of the soil being irrigated to be exceeded.”

If applicable, EES staff then discuss or review the Irrigation Management Program. The Irrigation Management Program must demonstrate procedures that ensure irrigation will not cause field moisture capacity in the soil’s root zone to be exceeded.

No soil samples are collected as part of the atrazine legal-use inspection.

LEGAL-USE INSPECTIONS AND VIOLATIONS

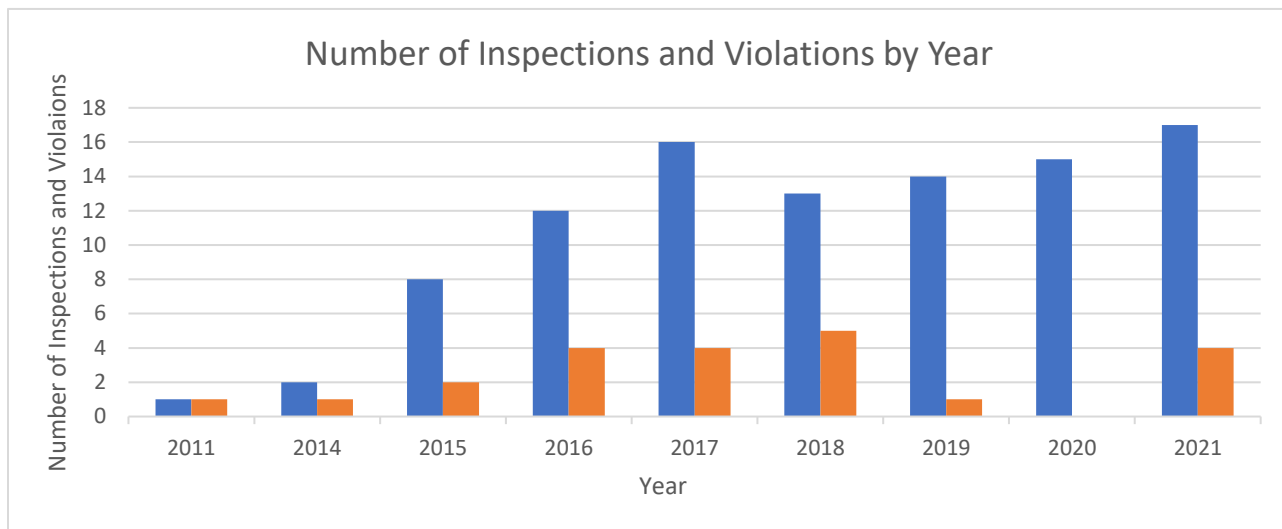
In 2021, 17 inspections were completed for atrazine legal-use outside PAs with four violations recorded. Each of the violations were associated with improper or incomplete recordkeeping; no violation resulting from improper application rates were observed.

Since 2014, there have been 98 legal-use inspections completed, with a violation rate of 22.4% (22 locations). [Figure 3](#) provides a summary of violations versus inspections by year. Commercial applicators provided service at 48 of the 98 (49%) fields inspected with a violation rate of 14.6%. Self-applicators accounted for the remaining 49 fields with a violation rate of 31.3%. Recorded violations can be separated into three categories described below:

- 68% of the violations (15 fields) are due to incomplete or improper recordkeeping;
- 23% of the violations (5 of the fields) are due to atrazine over application (i.e. applying at rates for fine or medium soil texture on coarse soil fields); and
- 9% of the violations (2 fields) were for no or poorly developed/executed Irrigation Management Plans.

A summary table of the atrazine legal use inspections over the years is provided in [Appendix B](#).

Figure 3: Atrazine Legal-Use Inspections and Violations



Notes: ■ Atrazine legal-use inspections
■ Violations determined

With the exception of 2020, violations have been recorded in every year of the program. For legal-use inspections, the violation rate for self-applicators (31.3%) is greater than commercial applicators (14.6%). The opposite trend was observed for illegal-use inspections. The greater violation rate for self-applicators outside of PAs is likely related to familiarity with the rules. Commercial applicators are more familiar with atrazine illegal-use rules, and more aware of the requirements because they work both within and outside of PAs. Because self-applicators work mostly outside of PAs, they may not be as familiar with the applicator rate rules.

IRRIGATION MANAGEMENT PLANS

Since EES staff started conducting atrazine legal-use inspections, 12 inspections were completed at fields that required an Irrigation Management Plan. In prior years, it was noted that the reviewed plans were inconsistent with varying levels of detail, and little to no description of processes. Only two of the sites were issued warnings due to an absence of a plan, and a poorly developed and executed plan. However, EES staff reported that over 58% of existing plans could use improvements. For the Eau Claire County site inspected in 2021, an acceptable Irrigation Management Plan was not provided for review. The operator indicated that he assessed the need for irrigation based on tracking precipitation, consulting the forecast, and periodically visually inspecting soil moisture and crop conditions.

2022 Program Goals and Objectives

In 2022, the atrazine illegal- and legal-use inspection program will continue. Program goals are listed below.

- At least one atrazine illegal-use inspection will be completed inside a PA for 13 of the 14 EES territories (one EES territory does not contain any PAs).
- Two additional atrazine illegal-use inspections will be completed inside PAs in Portage and Columbia Counties to further evaluate atrazine concentrations observed in local groundwater samples.
- At least one atrazine legal-use inspection will be completed for each EES territory.
- A 2022 Summary Report will be completed at the end of the inspection season.

The EQ Unit has provided a number of recommended fields for both atrazine illegal- and legal-use inspections for 2022 field selection. For 2022, a greater focus will be placed on fields within PAs where commercial applicators are used and where irrigation is used.

ADDITION PROGRAM ACTIVITIES

In 2022, there will be some additional effort and focus beyond just the inspection-related work.

- Continue to seek outreach opportunities with the agriculture community to educate and discuss atrazine use rules and regulations.
- Further define what is included in an acceptable Irrigation Management Plan.
- EES training focused on setback regulations for atrazine applications near water bodies and drainage structures.

The proposed activities have been incorporated into the 2022 Pesticide Product Restrictions (Atrazine) Program Work Plan.

Additional outreach regarding the atrazine program that target the agricultural communities will continue to be implemented in 2022. The goal is to reaffirm the rules and regulations, and provide a resource to address concerns and provide clarification. This outreach is intended to establish a process to discuss rules and educate applicators to improve atrazine use and non-use compliance.

An important component of atrazine use at irrigated fields is the Irrigation Management Plan. Based on EES observations to date, reviewed plans are inconsistent and documentation of site-specific irrigation plans or best management practices could be improved. In 2022, the EQ Unit will look into developing better criteria around an acceptable Irrigation Management Plan. Subsequently, they will work with other DATCP personnel to develop some sort of outreach tool (flyer or presentation) that can be used to aid growers with improved plans and documentation requirement following plan implementation.

APPENDIX A

TABLE OF ATRAZINE ILLEGAL-USE INSPECTIONS

updated January 28, 2021

Year	Inspections			Violations			Atrazine Detects in Soil	Year Notes
	Total	Private App	Commercial App	Total	Private App	Commercial App		
2008	11	11	0	2	2	0	1	Atrazine detect in soil at farm in PA 93-65-02; Walworth County. Letter of concern submitted. Other violation was improper records
2009	3	3	0	1	1	0	1	Atrazine illegally used by unlicensed applicator in PA 96-33-01, Lafayette County, and soil detects. Letter warning issued.
2010	8	6	2	3	2	1	2	Atrazine illegally used in PA 00-56-01 in St. Croix County (private applicator). No paperwork. No soil detects. Letter warning issued. Non-violation with soil detect associated with equipment carry-over. Second was record-keeping issue. Atrazine illegally used in PA93-65-01 in Walworth County (commercial applicator, Conserv FS-Zenda. No soil detects.
2011	8	6	2	1	1	0	1	Atrazine illegally used in PA 93-22-01 in Grant County (private applicator). Soil detects. Letter warning issued.
2012	7	0	7	1	0	1	1	Atrazine illegally used in PA 98-37-01 in Marathon County (commercial applicator, Central Wisconsin Cooperative). Soil detects. Letter warning issued.
2013	7	5	2	2	1	1	1	Atrazine illegally used in PA 93-48-01 in Pierce County (private applicator). Letter warning issued. Atrazine illegally used in PA 93-09-02 in Chippewa County (commercial applicator, Asgrow Services). No soil detects. Atrazine detect in soil collected within PA 93-57-04, which was not further investigated. Note; this does not include the seven United Coop locations where they self-identified in violation for atrazine application.
2014	12	5	7	1	0	1	2	Atrazine illegally used in PA 94-56-02 in St. Croix (commercial applicator, Countryside Cooperative). Soil detects. Atrazine detect in soil collected within PA 93-54-05, which was not further investigated.
2015	13	6	7	3	0	3	4	Atrazine illegally used in PA 93-09-01 in Chippewa County (commercial applicator, River Country Coop). Soil detects. Verbal warning issued. A second, atrazine illegally used in PA 93-09-01 in Chippewa County (commercial applicator, River Country Coop). Soil detects. Verbal warning issued. Atrazine illegally used in PA 93-09-02 in Chippewa County (commercial applicator, River Country Cooperative). No soil detects. Verbal warning issued. Atrazine detect in soil collected within PA 95-25-01, which was not further investigated. Atrazine detect in soil collected within PA 93-65-02, which was not further investigated.
2016	13	8	5	2	1	1	1	Atrazine detect in soil collected within PA 98-63-01, which was not further investigated. First and second violations were associated with improper records. Verbal guidance provided in both instances.
2017	12	3	9	4	0	4	3	Atrazine illegally used in PA 93-25-01 in Iowa County (commercial applicator, Premier Cooperative). Soil detects. Written warning issued. Atrazine illegally used in PA 93-45-02 in Outagamie County (commercial applicator, Greenville Coop [which was taken over by United Cooperative in 2017]). No soil detects. Written warning issued and case developed. Atrazine illegally used in PA 02-29-01 in Juneau County (commercial applicator, Allied Cooperative). Soil detects. Written warning issued. Atrazine detect in soil collected within PA 94-56-02, which was not further investigated. Atrazine illegally used in PA 93-62-01 in Trempealeau County (commercial applicator, Countryside Cooperative). No soil detects. Written warning issued.
2018	13	5	8	5	2	3	2	Atrazine illegally used in PA 97-50-01 in Portage County (commercial applicator, Provision Partners Coop). No soil detects. Atrazine illegally used in PA 93-09-02 in Chippewa County (self applicator). Soil detects. Written warning issued. Atrazine illegally used in PA 94-56-02 in St. Croix County (commercial applicator, Federated Coop Inc.). No soil detects. Written warning issued. Atrazine illegally used in PA 11-11-01 in Columbia County (self applicator). No soil detects. Written warning issued. Atrazine illegally used in PA 98-63-01 in Vernon County (commercial applicator, Ag Consulting and Products). Soil detects. Written warning issued.
2019	14	4	10	4	1	3	2	Atrazine illegally used in PA 94-42-01 in Monroe County (commercial applicator, Allied Cooperative). One soil sample had atrazine detect (0.0366 ppm). Financial penalty imposed for two instances. Atrazine illegally used in PA 96-54-01 in Rock County (commercial applicator, Landmark Services Coop.). No soil detects. Financial penalty imposed for one instance. Atrazine illegally used in PA 98-37-01 in Marathon County (commercial applicator, Provision Partners). No soil detects. Financial penalty imposed for three instances. Atrazine illegally used in PA 93-09-02 in Chippewa County (self applicator). No soil detects. Financial penalty imposed for one instance.
2020	12	9	3	1	0	1	1	Atrazine illegally used in PA 93-09-02 in Chippewa County (commercial applicator, River Country Coop). No soil detects. Financial penalty imposed for one instance. Atrazine detect in soil sample collected from PA 97-50-03, which was not further investigated.
2021	16	8	8	1	0	1	2	Atrazine illegally used in PA 97-27-01 in Jackson County (commercial applicator, Melrose Farm Supply). No soil samples were chemically analyzed. Official warning imposed for one instance. Atrazine detect in soil samples collected from PAs 93-56-01 and 93-09-02, which were not further investigated.
	149	79	70	31	11	20	24	
		53.0%	47.0%	20.8%	13.9%	28.6%	16.1%	

APPENDIX B

TABLE OF ATRAZINE LEGAL-USE INSPECTIONS

updated March 9, 2022

Year	Inspections			Violations			Inspection Notes	Irrigation	Method	In Compliance	Irrigation Notes
	Total	Private App	Commercial App	Total	Private App	Commercial App					
2011	1	1	0	1	1	0	Applied rate of 1 lb/acre in a coarse soil texture field in Jackson County. Letter warning issued.	0			
2014	2	0	2	1	0	1	no written Irrigation plan for field in Chippewa County	1	none	0	Did not have a written Irrigation Management Plan.
2015	8	2	6	2	1	1	two violations due to improper record paperwork (Waushara [Heartland Farms] and Marathon [Amish] Counties). Verbal warning issued.	2	soil probes (commercial)	0	Did not inspect written plan, suspect one does not exist
2016	12	7	5	4	3	1	four violations due to improper record paperwork (Dodge, Eau Claire, Waushara [Insight FS] and Juneau Counties). Verbal warning for three and also written warning for lack of Irrigation Management Plan in Juneau County.	1	none	0	Written warning issued due to lack of Irrigation Management Plan
2017	16	10	6	4	3	1	three violations due to improper paperwork (Lincoln, Winnebago and Walworth Counties). Verbal warnings issued. Applied rate of 0.8 lb/acre in a coarse soil texture field in Columbia County. Verbal warning issued.	5	one hand textured (commercial in Chippewa County) and one soil probes	5	two of the five could use improvements
2018	13	7	6	5	3	2	three violations due to improper paperwork (St. Croix, Columbia and Juneau Counties). Verbal and written warnings issued. Both commercial violations were over application, 1.0 lb/acre (Rusk County Farm Supply) and 0.78 lb/acre (Allied Cooperative) in a coarse soil texture field in Rusk and Adams Counties, respectively. Written warnings issued.	1		1	
2019	14	6	8	1	1	0	the one violation is due to improper paperwork (Iowa County). Verbal warning issued.	0			
2020	15	6	8	0	0	0	No violations. However, a 2018 field with fine soils received a 1.5 lbs/acre. But no information on 2017 application.	1	probes in field and hand checked	1	
2021	17	10	7	4	3	1	All four violations were associated with improper documentation.	1		0	Did not have a written Irrigation Management Plan. Operator assessed the need through tracking precipitation, consulting the forecast, and periodically visually inspecting soil moisture and crop conditions.
TOTALS	98	49	48	22	15	7		12		7	
		50.0%	49.0%	22.4%	31.3%	14.6%		12.2%		58.3%	