Pesticide Education & Promotion Team 2025 Meeting

November 20, 2025

Welcome!

Please introduce yourself in the chat including your

- Name
- Affiliation
- Favorite candy

Indigenous Land Acknowledgement

The Minnesota Department of Agriculture recognizes that Minnesota's vibrant food system is built on land which is crucial to Indigenous cultural identity. While this land acknowledgment doesn't rectify the significant cultural, physical, and emotional losses of Indigenous people due to the loss of land and connection with it, the Department hopes it is a good starting point to move forward together to both fulfill the agency's mission to enhance all Minnesotans' quality of life by equitably ensuring the integrity of our food supply, the health of our environment, and the strength and resilience of our agricultural economy, and to support current Indigenous efforts to use food as a means of reaffirming their treaty rights and regaining culture, sovereignty and self-sufficiency for all tribes in Minnesota.

Cont.

The name Minnesota comes from the Daḳota name for this region, Mni Sota Maḳoce — "the land where the waters reflect the clouds." The Daḳota and numerous other Indigenous peoples, whose cultural, spiritual, and economic practices are intrinsically woven to this landscape, hold this land sacred. We, the Minnesota Department of Agriculture, recognize them as original stewards of this land and all the relatives within it, who had thriving and vibrant communities prior to disruption by settlers. Today, the State of Minnesota shares geography with eleven Tribal Nations, in addition to the Ho-Chunk, Cheyenne, Oto, Iowa, Hidatsa, Arikara, A'aninin, Cree, Blackfeet, Assiniboine, and the Sac and Fox tribes all who also acknowledge Minnesota as important to their tribal histories. By offering this land acknowledgement, we affirm tribal sovereignty and hold ourselves accountable to recognize and counter the historical and contemporary injustices that continue to impact Indigenous people, through mutually beneficial partnerships, research, policies, and practices that respect Indigeneity.

Meeting Agenda

1:00 pm – 4:00 pm

- **EPT Purpose and Meeting Goals –** Naworaj Acharya, MDA
- **MDA Pesticide Water Quality Monitoring Update –** Dave Tollefson, MDA
- **MDA Education and Outreach Update –** Naworaj Acharya, MDA
- **Discussion**

---------- **B R E A K** ----------

- **ESA Strategies Benefitting Minnesota Water Quality –** Neal Kittelson, MDA
- **4-Hydroxychlorothalonil in Groundwater –** Eric Burkness & Kim Kaiser, MDA
- **Regulatory Updates –** Haley Johnson, MDA
- **Discussion**

Poll Question

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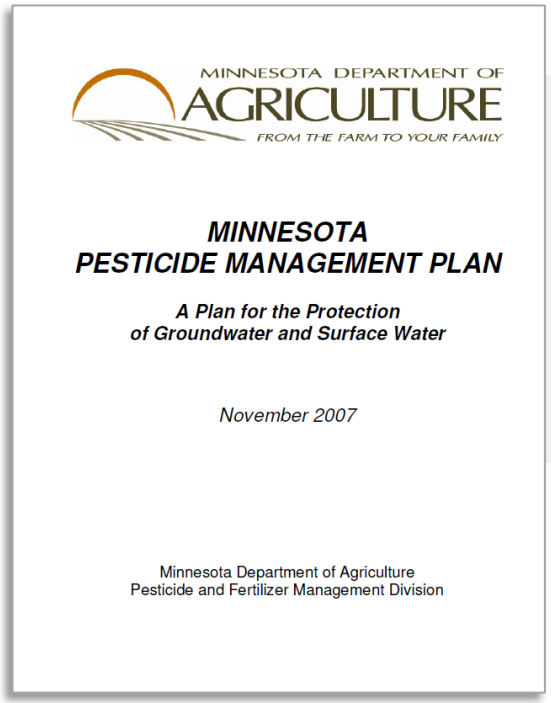
EPT Purpose and Meeting Goals

Naworaj Acharya, Research Scientist

Pesticide Management Plan (PMP)



Guidance document to coordinate the protection of Minnesota's groundwater and surface water resources from pesticide contamination

Prevention | **Evaluation** | **Mitigation**

www.mda.state.mn.us/protecting/waterprotection/pmp

PMPC | Pesticide Management Plan Committee

PURPOSE:

- Provide comment on water quality evaluation activities and decisions
- Help guide focus for EPT efforts

Members are appointed (15)

EPT | Education & Promotion Team

PURPOSE:

- Assist the MDA in coordinating education and outreach to protect water quality

Open to all interested

EPT Activities

Assist with the review and design of educational and promotional activities

Promote best management practices (BMPs) and provide education

Identify opportunities for cooperation

Meeting Goals

- Provide an update on 2024 water quality monitoring results and pesticide outreach efforts
- Discuss **education and outreach ideas**, including **collaboration opportunities** for water quality protection

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Education and Outreach Updates

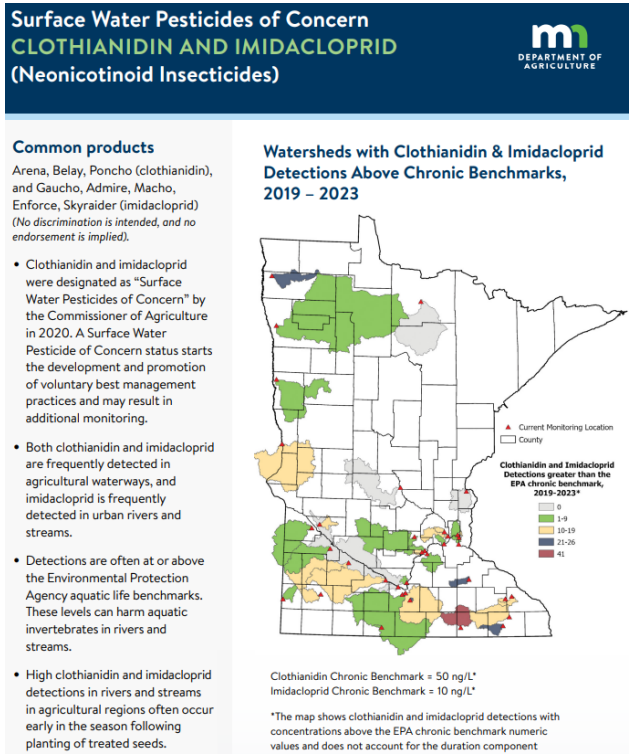
Naworaj Acharya, Research Scientist

New Water Quality Documents: Pesticide BMPs Handouts

Five (5) Pesticide BMPs Handouts with Detection Maps

- Acetochlor
- Acetochlor impairment in Silver Creek
- Atrazine
- Chlorpyrifos
- Clothianidin and imidacloprid

- **BMPs Handout on Pesticide Treated Seed**



Surface Water Pesticides of Concern
CLOTHIANIDIN AND IMIDACLOPRID
(Neonicotinoid Insecticides)

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Common products

Arena, Belay, Poncho (clothianidin), and Gaucho, Admire, Macho, Enforce, Skyraider (imidacloprid)
(No discrimination is intended, and no endorsement is implied).

- Clothianidin and imidacloprid were designated as "Surface Water Pesticides of Concern" by the Commissioner of Agriculture in 2020. A Surface Water Pesticide of Concern status starts the development and promotion of voluntary best management practices and may result in additional monitoring.
- Both clothianidin and imidacloprid are frequently detected in agricultural waterways, and imidacloprid is frequently detected in urban rivers and streams.
- Detections are often at or above the Environmental Protection Agency aquatic life benchmarks. These levels can harm aquatic invertebrates in rivers and streams.
- High clothianidin and imidacloprid detections in rivers and streams in agricultural regions often occur early in the season following planting of treated seeds.

Watersheds with Clothianidin & Imidacloprid Detections Above Chronic Benchmarks, 2019 – 2023

Clothianidin Chronic Benchmark = 50 ng/L*
Imidacloprid Chronic Benchmark = 10 ng/L*

*The map shows clothianidin and imidacloprid detections with concentrations above the EPA chronic benchmark numeric values and does not account for the duration component

Key Water Quality Best Management Practices (BMPs) for Clothianidin and Imidacloprid

Base seed treatment decisions on field risk, including past pest issues and weather. Consider using untreated seed if pest risk is low.

Scout fields regularly and use economic thresholds to guide neonicotinoid use. Use multiple pest control tools within an integrated pest management strategy.

Follow label-recommended application rates, including per acre, per application, per season, and per year limits to minimize resistance.

Do not apply during rain or on saturated soil. Avoid foliar applications when rain is forecast within 24 – 48 hours.

Follow label-recommended nozzle type, boom height, spray buffer zone, and wind speed restrictions to minimize spray drift.

Maintain vegetative filter strips between the field edge and aquatic habitats, including vegetative buffers near tile outlets, drainage ways, and field boundaries.

Adopt practices like conservation tillage and cover crops to reduce soil erosion and surface runoff.

Rotate neonicotinoids with insecticides that have different modes of action (e.g., pyrethroids, insect growth regulators) both year-to-year and within the season.

Minimize seed dust and drift by properly handling treated seed and avoiding planting in windy conditions (>15 mph) or when the wind blows toward nearby waterbodies.

Prevent spills and properly dispose of unused pesticides through the MDA's Waste Pesticide Collection Program. For guidance on disposing of treated seed, consult your local landfill or the Minnesota Pollution Control Agency.

Scan to see the full list of imidacloprid and clothianidin BMPs.

For more information, contact the Minnesota Department of Agriculture (MDA) at ptu.mda@state.mn.us

Available on the MDA website:
www.mda.state.mn.us/pesticide-fertilizer/pesticide-best-management-practices

New Water Quality Documents Being Developed

Water Quality BMPs for Chlorothalonil

- Reviewing public comments received from Sep 22 - Oct 22, 2025

- **Chlorothalonil**
  - Fungicide used on crops (e.g., potatoes) and turfgrass
  - Chlorothalonil is rarely detected, but its breakdown product (**4-hydroxychlorothalonil**) is often detected in groundwater in the Central Sands region

Water Quality Best Management Practices for
Chlorothalonil

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June 2025

The Minnesota Department of Agriculture (MDA), along with University of Minnesota Extension and other interested parties, have developed the following best management practices (BMPs) to minimize the risk of the fungicide chlorothalonil and its breakdown products from entering surface water and groundwater from normal use. The BMPs may refer to mandatory label use requirements as well as voluntary practices. In addition to implementing BMPs, always read and follow product labels.

Below are example trade names for products and package mixtures registered in Minnesota that contain chlorothalonil. Always check that pesticide products are registered in Minnesota prior to use.

Chlorothalonil* is an Active Ingredient in:	
Andiamo Advance	Initiate ZN
Bravo Weather Stik	Quadris Opti
Daconil Weather Stik	Ridomil Gold Bravo SC
Echo ZN	Zing!

*This list is not all-inclusive and is subject to change. Reference to commercial products or trade names is made with the understanding that no discrimination is intended, and no endorsement is implied.

Numerous agricultural (e.g., corn, soybean, dry bean, potato) and non-agricultural (e.g., turf, ornamentals) crops can be affected by a wide range of fungal diseases, which can be controlled or prevented by chlorothalonil. Diseases such as late blight (*Phytophthora infestans*) in potato and dollar spot (*Clarireedia jacksonii*) in turfgrass are common in Minnesota and can greatly impact yield and plant health. While cultural practices can be used to reduce the risk and severity of these diseases, fungicides like chlorothalonil are often used as a part of an integrated management plan to prevent and control disease.

Chlorothalonil is a broad spectrum contact fungicide that was first registered in 1966 and provides a high level of efficacy on a wide range of diseases and crops. The chemical has a multi-site mode of action (group M 05) with a low risk of resistance development. It is used as a foliar treatment that can be applied by ground, air, or chemigation.

Even with normal use, fungicides have the potential to move offsite through leaching and runoff to reach groundwater and surface water, respectively. Some fungicides can also move off-target via spray drift and volatilization, which can lead to contamination of nearby surface waters. Chlorothalonil has rarely been found in Minnesota surface water, such as streams, rivers, or lakes, or groundwater. However, a breakdown product of chlorothalonil called 4-hydroxychlorothalonil (4-HDC) has been detected in groundwater, specifically in Minnesota's Central Sands region. BMPs encourage adoption of an Integrated Pest Management (IPM) program to utilize cultural and biological control practices, optimize fungicide use by reducing the number of and increasing the interval between applications, reduce costs, and prevent development of fungicide resistance.

State law allows the MDA to regulate pesticides to address unreasonable adverse impacts on human health or the environment. Adopting these chlorothalonil BMPs may help growers maintain access to important and diverse fungicide options for disease management while minimizing the need for increased regulation.

For information on pesticide monitoring results in Minnesota's water resources, refer to the MDA Pesticide Water Quality Monitoring StoryMaps or MDA Water Monitoring Reports and Resources.

Best Management Practices for Chlorothalonil Use

- Voluntary BMPs are designed to prevent and minimize the degradation of Minnesota's water resources while considering economic factors, availability, technical feasibility, ease of implementation, efficacy, and environmental impacts.
- Specifically, these BMPs are intended to reduce off-target movement of chlorothalonil and to encourage the efficient use of fungicides, resistance management, and when available, use of non-chemical approaches to disease control.
- For plant diseases to develop, a pathogen, a susceptible host, and favorable environmental conditions must be present simultaneously.

Environment
Disease
Pathogen
Host Plant

In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711. The MDA is an equal opportunity employer and provider.

Major Outreach Outlets

- **Mass Mailings**

  Acetochlor in surface water

- **Newsletter Articles**

  ESA, pesticides in surface water and groundwater

- **Recertification Workshops**

  Treated seed, Endangered Species Act (ESA)

- **Presentations at Stakeholders' Meetings**

  Acetochlor in surface water, ESA

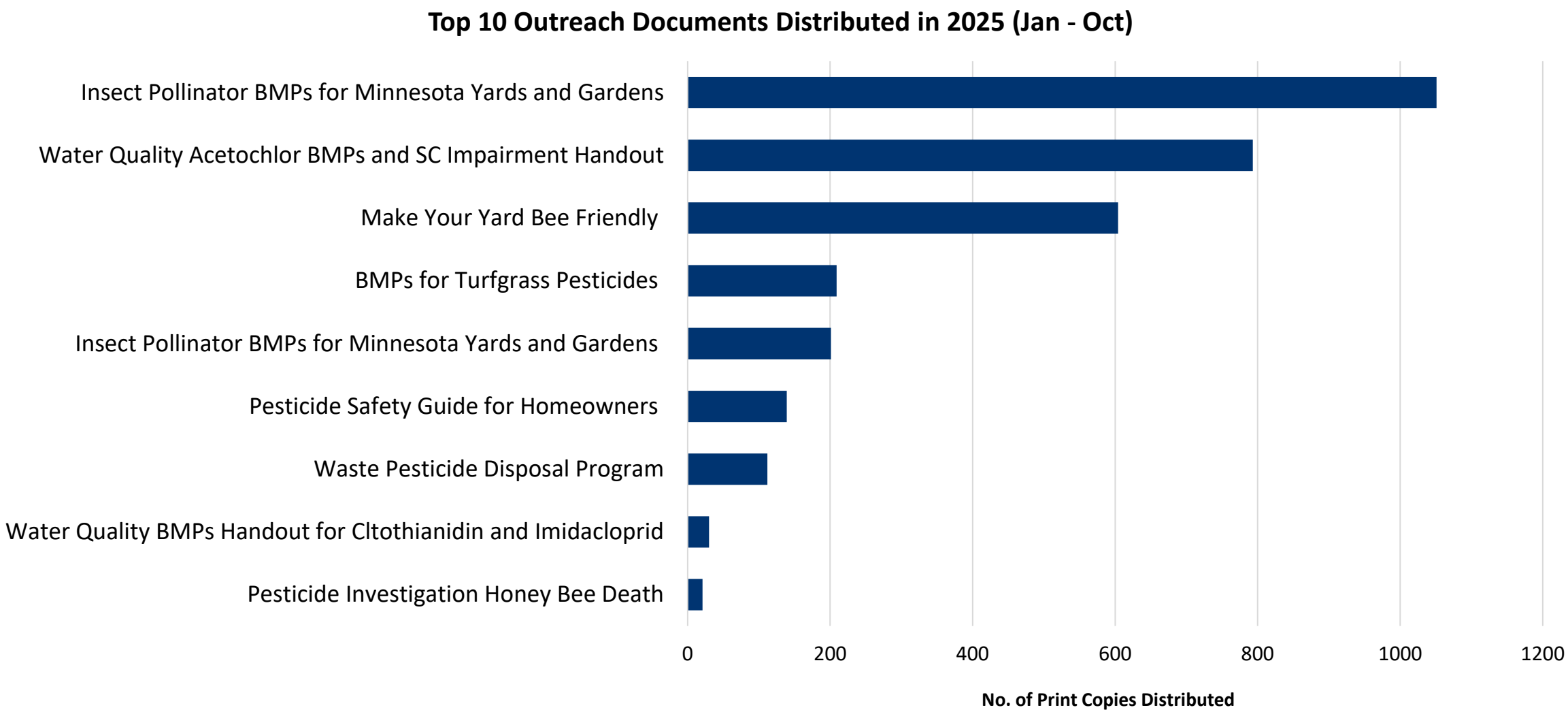
- **Outreach/Display at Ag Events/Fairs**

  Acetochlor BMPs, Neonics BMPs, treated seeds

- **Social Media** (Twitter, Facebook, Thread)

  Water quality BMPs, treated seeds

Distribution of Outreach Documents

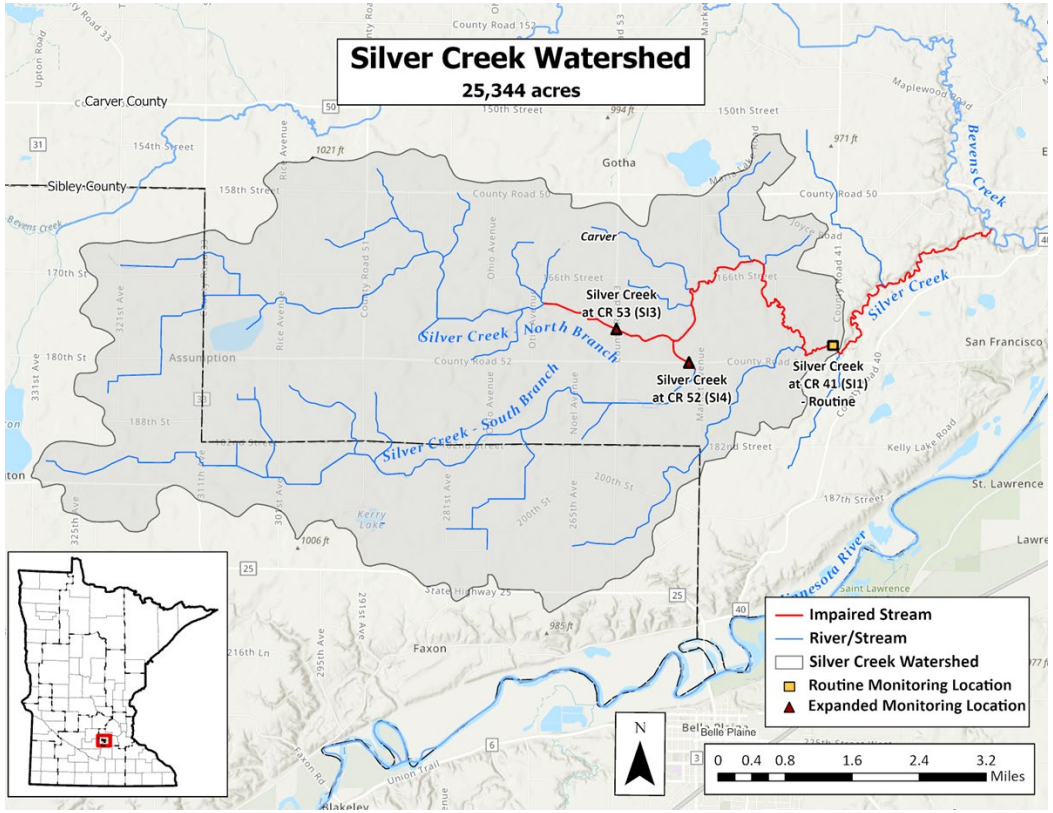


Additional Outreach Projects

Acetochlor Outreach in Silver Creek Watershed

(Carver County)

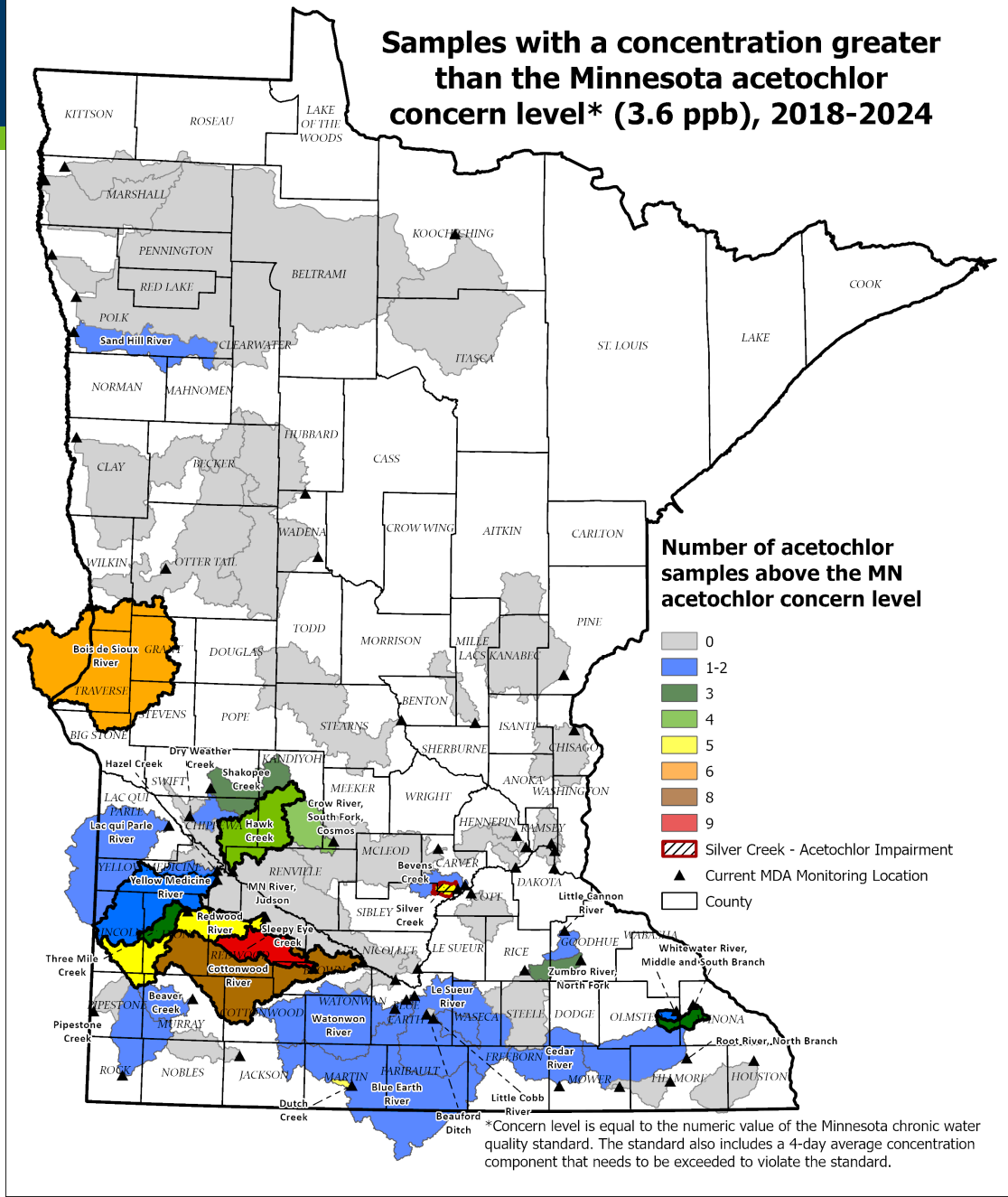
- Implementing response plan
- Working with local partners to raise awareness and promote BMPs through multiple channels
  - Mass mailings
  - Articles
  - Field days
  - Social media



Additional Outreach Projects

Acetochlor Outreach in Southern Minnesota

- Building collaboration with stakeholders (i.e., coops, dealers, crop consultants)
- Creating awareness on high detections
- Promoting BMPs through multiple channels
  - Mass e-mailings
  - Virtual/in-person meetings
  - Presentations at partners meetings
  - Local events
  - Newsletter articles
  - Social media
  - Radio message



Additional Outreach Projects

Evaluating Acetochlor Alternatives for Water Quality Protection

(In collaboration with Dr. Debalin Sarangi & Team, U of MN Extension)

- Evaluate the weed control efficacy and persistence of acetochlor alternatives in corn and soybean
- Compare environmental risks of these alternatives in Minnesota
- Assess the effectiveness of cover cropping and micro-encapsulation in mitigating acetochlor contamination

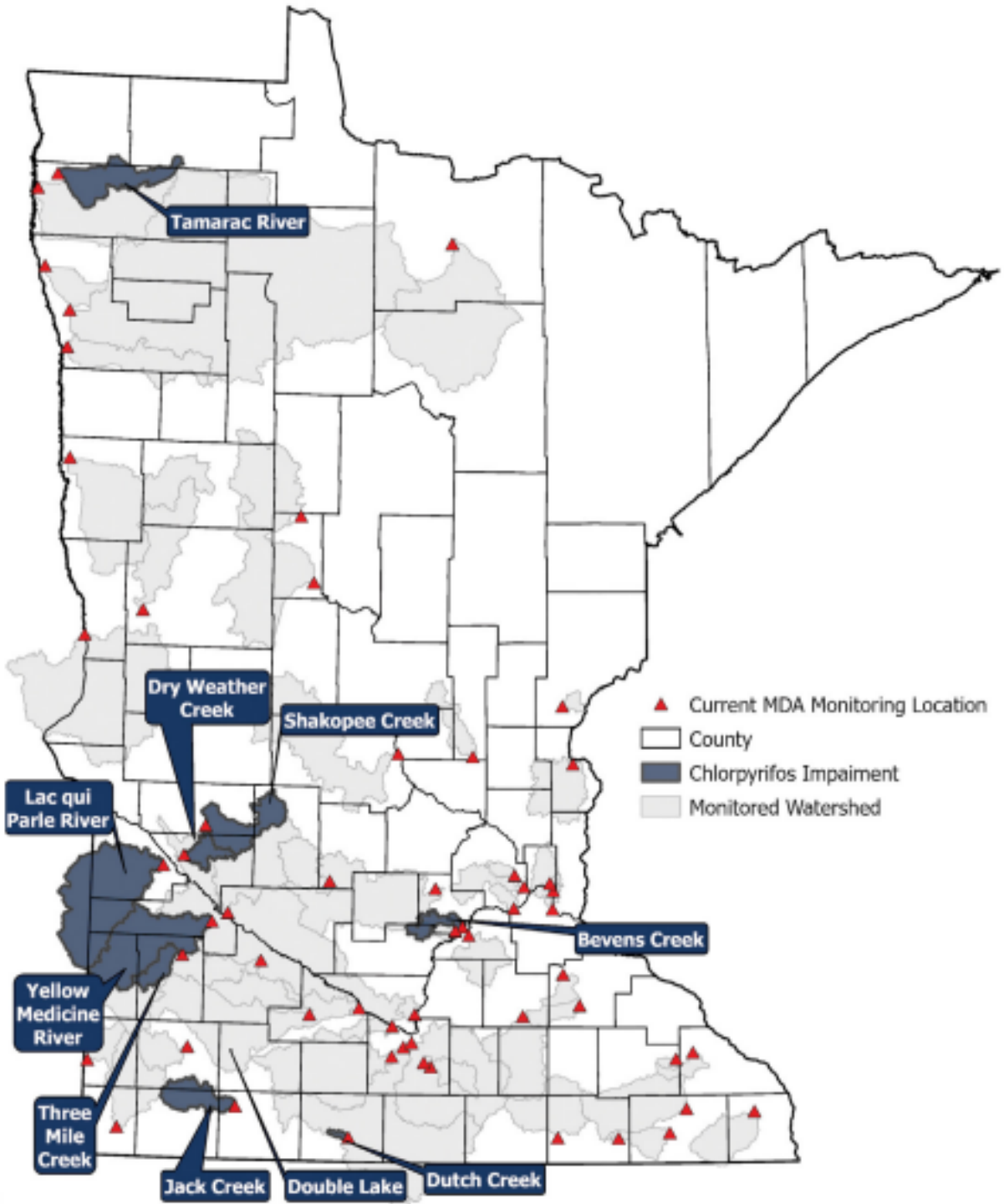
Source: https://www.mda.state.mn.us/sites/default/files/inline-files/acetochlorimprem13.pdf

Poll Question

Additional Outreach Projects

Chlorpyrifos Outreach

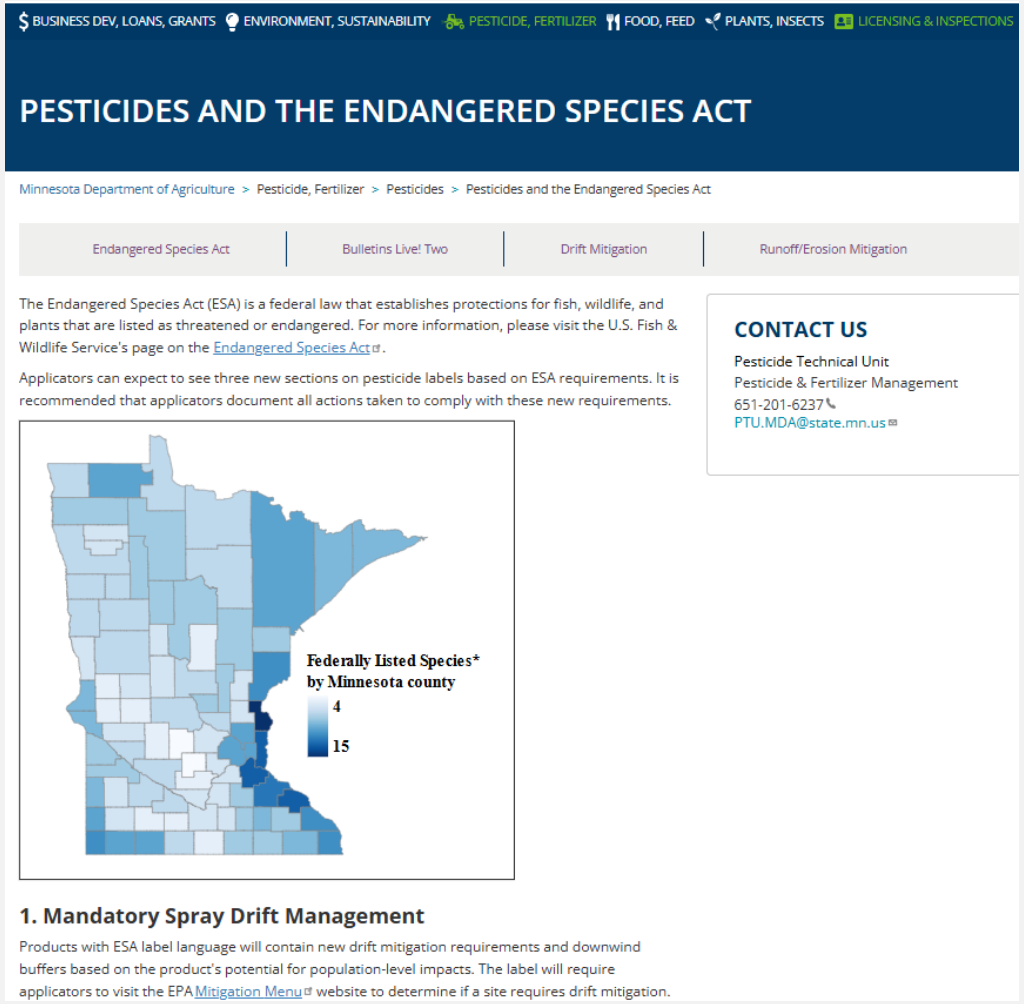
- Updated chlorpyrifos BMPs
- Created chlorpyrifos BMPs handout with a detection map
- Shared newsletter articles to raise awareness and promote BMPs
- Conditional registration in 2025
    - Each chlorpyrifos sale must include a copy of the BMPs



Endangered Species Act (ESA) Webpages

- Webpages covering information about the ESA including mitigation measures
  - Drift management
  - Runoff/erosion mitigation
  - Bulletins Live! Two
  - Resources

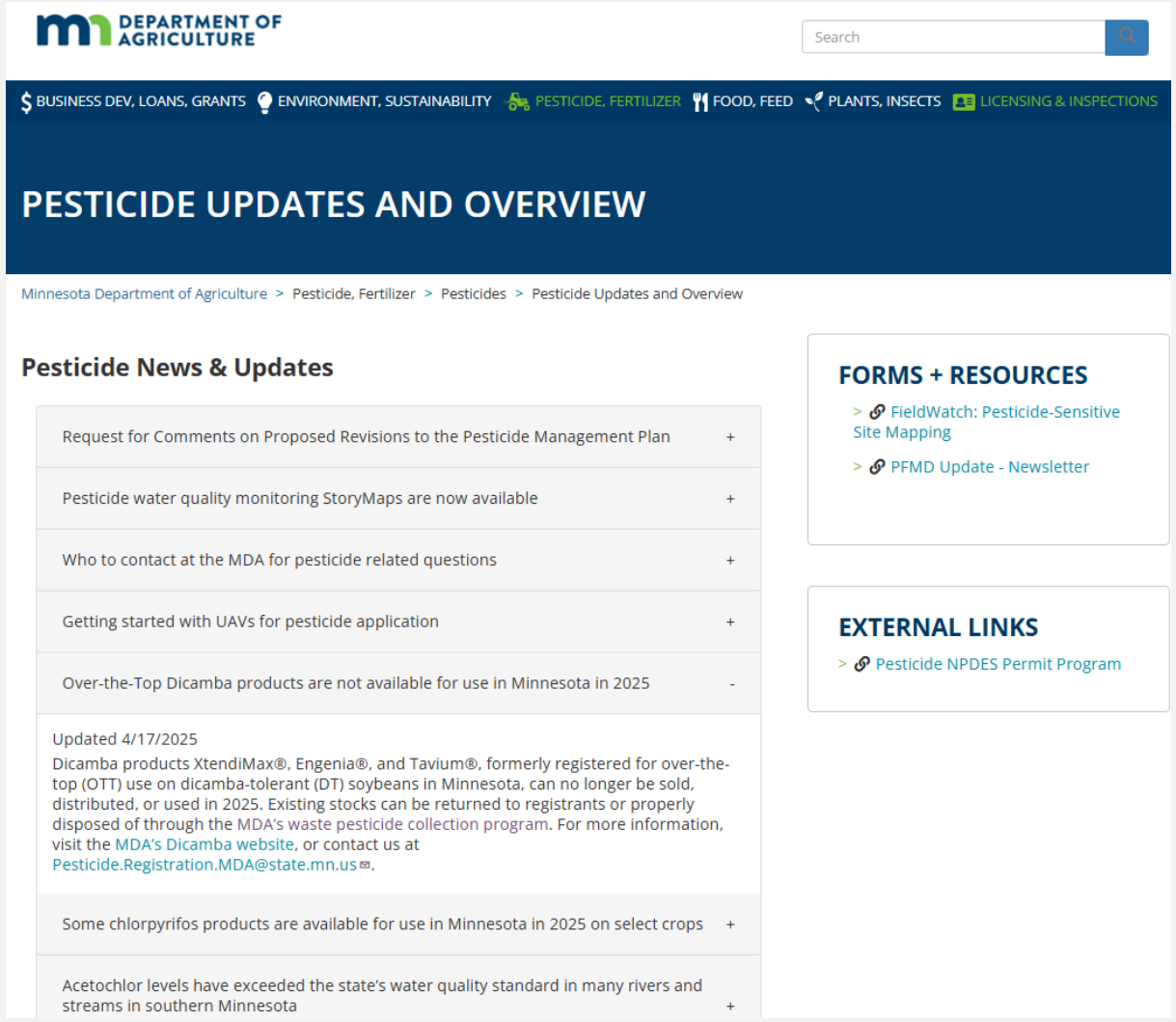
www.mda.state.mn.us/pesticide-fertilizer/pesticides-endangered-species-act



Pesticide News/Update Webpage

- Provides timely updates on pesticide regulations, news, and resources.
- Serves as a central hub for quick and easy access to information
- Enhances communication by complementing the PFMD's existing channels

https://www.mda.state.mn.us/pesticide-fertilizer/pesticide-updates-overview



Pesticide Water Quality Monitoring StoryMaps

- 30+ years of water quality data in an accessible and interactive format
  - Visualize statewide pesticide detections
  - Identify specific pesticides and concentrations at individual monitoring sites
  - Compare monitoring data against water quality standards
  - Track pesticide detection trends over time

StoryMaps direct link: https://arcg.is/1On59S0

Recommendations from 2024 EPT Meeting

- Develop educator tools, resources and ESA working group for outreach
  - Created webpages covering ESA information and resources
  - Established an ESA working group
- Provide ESA training to crop consultants & agronomists
  - Delivered multiple ESA presentations including for MCPR and MNICCA
- Develop user guide for interactive maps (StoryMaps)
  - Updated StoryMaps with 2024 data

- Collaborate with PSEE for pesticide outreach and sharing regulatory updates
  - Shared several articles/updates through MN Crop News and PSEE newsletter/workshops
- Develop more visual materials with simplified charts and graphs for outreach
  - Developed pesticide BMPs pictorial handouts with detection maps
- Increase in-person presentations at workshops, conferences, grower events
  - Delivered several in-person/virtual talks including partners meetings

Available MDA Resources

Best Management Practices (BMPs)

DEPARTMENT OF AGRICULTURE

DECEMBER 2018

Water Quality Best Management Practices for All Agricultural Herbicides

In order to protect Minnesota's water resources, the Minnesota Department of Agriculture (MDA), along with University of Minnesota Extension and other interested parties, has developed a set of core voluntary Best Management Practices (BMPs). The core voluntary BMPs are provided on the opposite side of this page and should be adopted when applying all agricultural herbicides in Minnesota. The BMPs may also refer to mandatory label use requirements. Always read product labels. Additional information and references accompany the BMPs.

The MDA has also developed unique voluntary BMPs (on separate pages) for the use of specific herbicides due to their presence in Minnesota's groundwater or surface water from normal agricultural use. The herbicide-specific BMPs should be adopted when using herbicides that have been, or whose breakdown
atrazine, metolachlor and metribuzin) or those detect
if the BMPs are proven ineffective, mandatory restrict
monitoring results for herbicides in Minnesota's wate
www.mda.state.mn.us/monitoring.

Careful planning in the use of herbicides – as part of a
from future contamination and help reduce the levels
different sites-of-action and use full label rates of her
economical use of herbicides.

State and federal law can require that the use of a pes
humans or the environment. The Minnesota Pesticide
these impacts. The Minnesota Groundwater Protectio
herbicides frequently detected in groundwater. In add
the use of herbicides contributing to surface water im
proper use of herbicides, will help growers to maintai
control weeds and protect water resources.

Best Management Practices (BMPs) for Herb

- Voluntary BMPs are designed to prevent and min
Minnesota's water resources while considering e
technical feasibility, implementability, effectivene
- From a practical standpoint, these BMPs are inter
movement of herbicides to the environment and
use of herbicides, chemistry-rotation, and non-ch
control. These practices should be part of an Inte
program to reduce development of herbicide res
and increase profitability.

The BMPs are provided as a series of options. Producers, agronomists, and educators should select those options that are the most appropriate for a given farming operation, soil types and geography, tillage and cultivation practices, and irrigation and runoff management. The MDA encourages development of Integrated Weed Management Plans for every Minnesota farm (see "Additional Information and References" for more information).
Always read the product label. Label use requirements and application setbacks are legally enforceable.

Water Quality Best Management Practices for All Agricultural Herbicides

Core Practice*	Description	Benefit
1. Scout fields for weeds and match the management approach to the weed problem.	Scout for weeds, then map infestations throughout the year. Determine whether weed control will result in significant crop yield benefits. Carefully match weed control options – including non-chemical control – to weed pressures. Use herbicides only in situations where they are necessary and will be cost-effective. Use herbicides with long-lasting effect ("residual control") only in fields that have high densities of target weeds, weeds with extended emergence periods, or in fields where weed information is lacking (e.g., newly rented or purchased acres), or in fields infested with resistant weeds. Consider post-emergent weed control alternatives (e.g., tillage). Zero tolerance for seed production of certain invasive and herbicide resistant weeds is advised.	Responding accurately to specific weed pressures, using post-emergent control and using alternative chemical and non-chemical (e.g., cultivation) controls can prevent water resource impacts.
2. Consider split or sequential application of herbicides.	Use split or sequential applications as recommended on the label. Farms having herbicide resistant weeds should consider using split-application rates in conjunction either with different site of action herbicides or with non-chemical weed control measures. Scout fields for weed escapes and be prepared for follow-up weed management including post-emergent herbicide application or inter-row cultivation.	In many cases, a carefully planned herbicide program can result in effective weed control and a reduction in herbicide loss to the environment.
3. For Surface Water protection: Soil-incorporate herbicides.	Evenly incorporate herbicides to the depth recommended on the product label. Improper incorporation, excessive crop residues, or poor soil tilth may result in erratic, streaked or otherwise unsatisfactory weed control. Combine soil incorporation of herbicides with another tillage operation to avoid additional field passes and loss of crop residue.	Research indicates incorporation of herbicides make them less vulnerable to being lost in runoff and reaching nearby streams, lakes, and surface tile inlets.
4. For Surface Water protection: Evaluate surface drainage patterns in your field and install filter strips and establish buffer zones for streams, sinkholes, and tile inlets.	Consult with an Ag Consultant/Extension Educator/Local Soil & Water Conservation District/Natural Resources Conservation Service to determine strategies to reduce herbicide loss to surface water. In addition to required label setbacks or buffers, install vegetative filter strips and establish buffers along vulnerable surface waters, karst features, tile inlets, and sinkholes. Consider using herbicides with low risk of runoff or consider non-chemical weed control methods in sensitive areas. The "Herbicide Properties Tool" provides information about an herbicide's potential to move off-target by runoff, leaching, and volatilization, http://npic.orst.edu/HPT/. This program considers factors like water solubility, soil half-life, and groundwater ubiquity score (leaching potential) to determine herbicide movement from application site.	Filters and buffers reduce field runoff and setbacks eliminate applications where losses are most likely. Reducing use of herbicides known to move to surface water reduces the potential for surface water contamination.
5. For Ground Water protection: Determine the depth to groundwater in your fields and consider protective practices in vulnerable areas.	Consult with an Ag Consultant/Extension Educator/Local Soil & Water Conservation District/Natural Resources Conservation Service to identify areas vulnerable to groundwater contamination, such as, shallow water table, permeable soils, karst soils, sinkholes, and areas near wells (including active, abandoned, drainage wells). Maintain label required setbacks/restrictions from sensitive areas. Consider using herbicides with low leaching potential, http://npic.orst.edu/HPT/, or consider non-chemical weed control methods in sensitive areas. Seal abandoned wells.	Reducing herbicide use in sensitive areas reduces the potential for groundwater contamination. Adhering to label groundwater advisories and exclusions reduces aquifer pollution.
6. Rotate herbicide sites-of-action (chemistry).	Rotate or combine herbicides with different sites-of-action yet with equivalent activity on target weeds. Evaluate this practice in the context of other effective weed control practices, such as field scouting, crop rotation (including rotation of herbicide-tolerant crops), and mechanical weed control.	In the long term, this practice can reduce the total annual loss of particular herbicides to water resources and the environment. It can also slow the development of herbicide resistance in weeds or weed species shifts.
7. Use proper application methods.	Calibrate and inspect spray equipment regularly. Do not calibrate spray equipment near water bodies. To reduce spray drift, review herbicide labels for specific requirements/recommendations on use of nozzles, spray boom height, wind speed, buffer width etc. Precision application of herbicides includes auto-steer, auto-boom shutoff, and variable application rate technology, can reduce unnecessary herbicide use resulting from overspray, spray overlap, and higher than recommended application rates.	Proper calibration and precision application ensures the correct application rate is delivered which can reduce potential loss to the environment and reduce costs.
8. For Ground Water protection: Develop an Irrigation Water Management Plan.	If you irrigate, implement a water management scheduling plan that uses a soil probe, rain gauge, daily crop water use estimations, and a soil water balance technique.	Effective irrigation management reduces leaching of chemicals to groundwater.

*For practices related to the use of specific herbicides refer to MDA's herbicides-specific Best Management Practices. All BMPs are available on the www.mda.state.mn.us/herbicidebmps. See "Additional Information & References" for access to detailed guidance on all recommended practices.

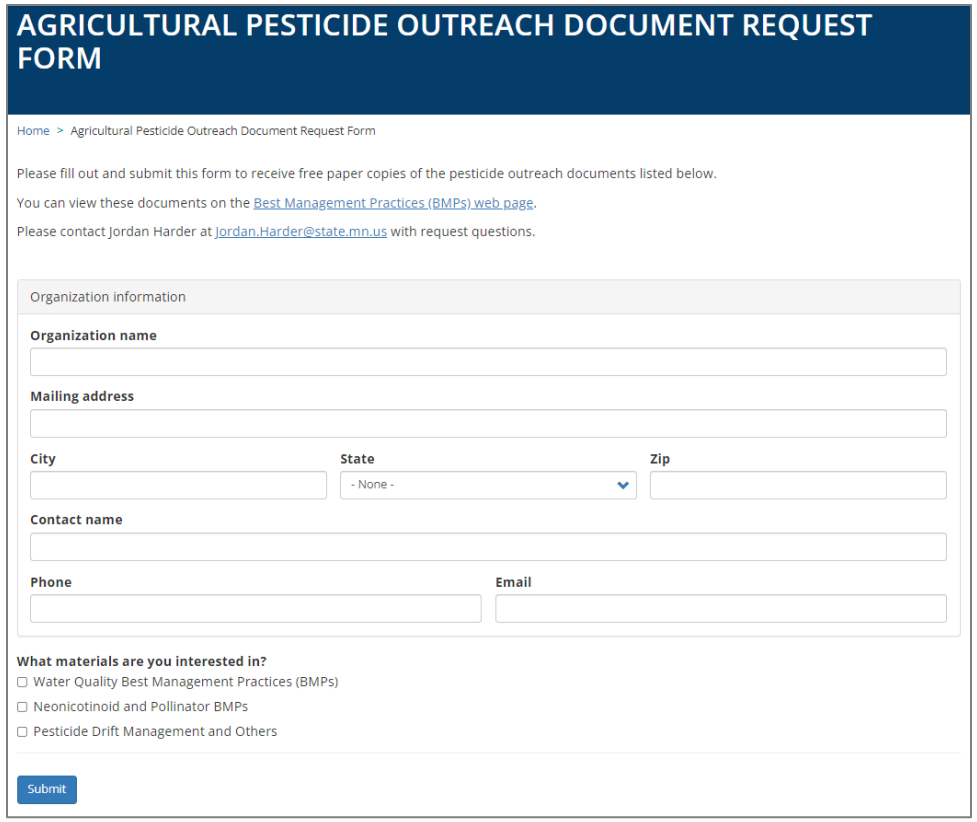
- Water Quality BMPs for All Agricultural Herbicides & All Agricultural Insecticides
- Pesticide-Specific Water Quality BMPs for:

  Acetochlor **Metolachlor** **Imidacloprid &**
  Atrazine **Metribuzin** **Clothianidin**

- Pollinator BMPs for Neonicotinoids
- Potato Fungicide BMPs for drift and volatilization
- BMPs for Turfgrass Pesticides
- Pesticide BMPs handouts with detection maps
- Cue cards and more!

All BMPs are available on the MDA website:
www.mda.state.mn.us/pesticide-fertilizer/pesticide-best-management-practices

Document Request Forms



AGRICULTURAL PESTICIDE OUTREACH DOCUMENT REQUEST FORM

Home > Agricultural Pesticide Outreach Document Request Form

Please fill out and submit this form to receive free paper copies of the pesticide outreach documents listed below.

You can view these documents on the Best Management Practices (BMPs) web page.

Please contact Jordan Harder at Jordan.Harder@state.mn.us with request questions.

Organization information

Organization name

Mailing address

City **State** **Zip**

- None -

Contact name

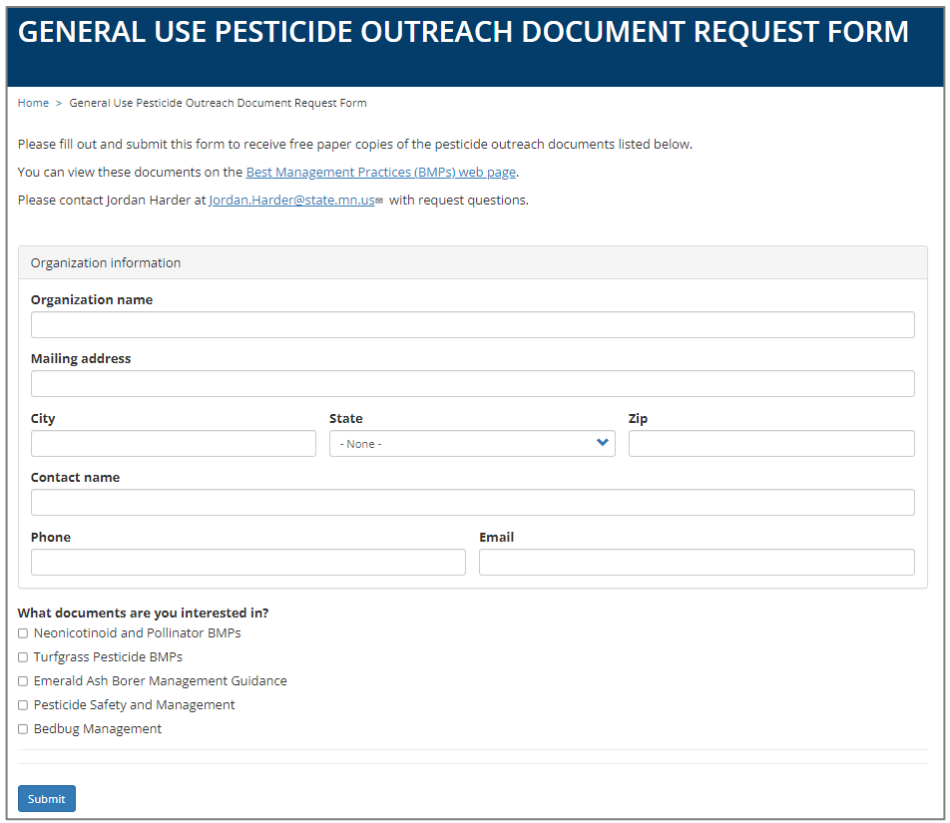
Phone **Email**

What materials are you interested in?

- ☐ Water Quality Best Management Practices (BMPs)
- ☐ Neonicotinoid and Pollinator BMPs
- ☐ Pesticide Drift Management and Others

Submit

www.mda.state.mn.us/pesticides/agpestdocs



GENERAL USE PESTICIDE OUTREACH DOCUMENT REQUEST FORM

Home > General Use Pesticide Outreach Document Request Form

Please fill out and submit this form to receive free paper copies of the pesticide outreach documents listed below.

You can view these documents on the Best Management Practices (BMPs) web page.

Please contact Jordan Harder at Jordan.Harder@state.mn.us with request questions.

Organization information

Organization name

Mailing address

City **State** **Zip**

- None -

Contact name

Phone **Email**

What documents are you interested in?

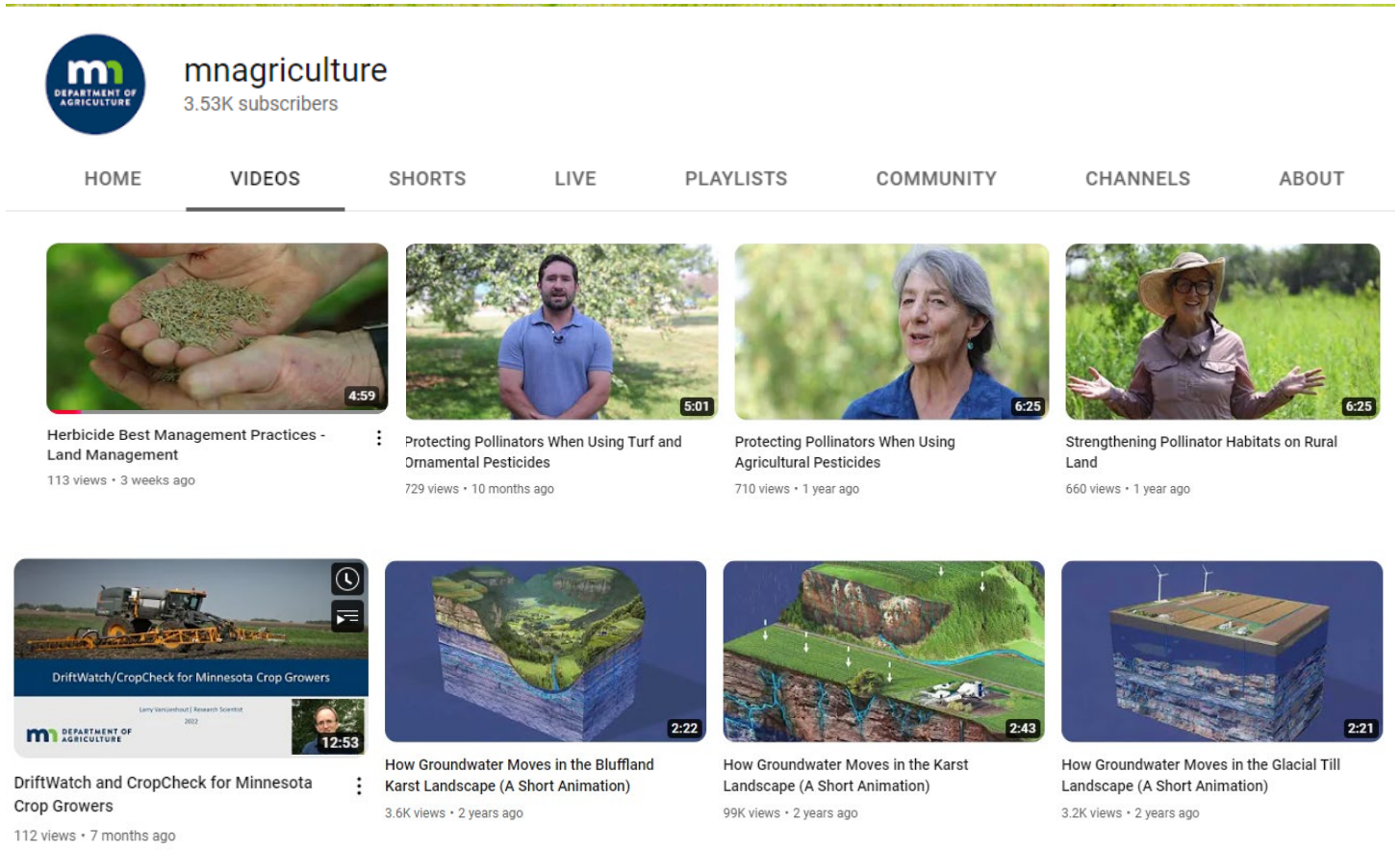
- ☐ Neonicotinoid and Pollinator BMPs
- ☐ Turfgrass Pesticide BMPs
- ☐ Emerald Ash Borer Management Guidance
- ☐ Pesticide Safety and Management
- ☐ Bedbug Management

Submit

www.mda.state.mn.us/pesticides/genusedocs

NOTE: Download outreach documents directly from the MDA's website to ensure you have the most up-to-date version. Searching through Google may link to outdated documents.

Video resources



www.youtube.com/user/mnagriculture

- General Herbicide BMPs
- Regulatory update
- Pollinator protection
- DriftWatch and BeeCheck
- Groundwater movements in different landscapes
- And more!

Thank You!

Naworaj Acharya
☎ 651-201-6029
✉ naworaj.acharya@state.mn.us

Pesticide Water Quality Monitoring Update

Dave Tollefson

David.Tollefson@state.mn.us

Monitoring Section Manager

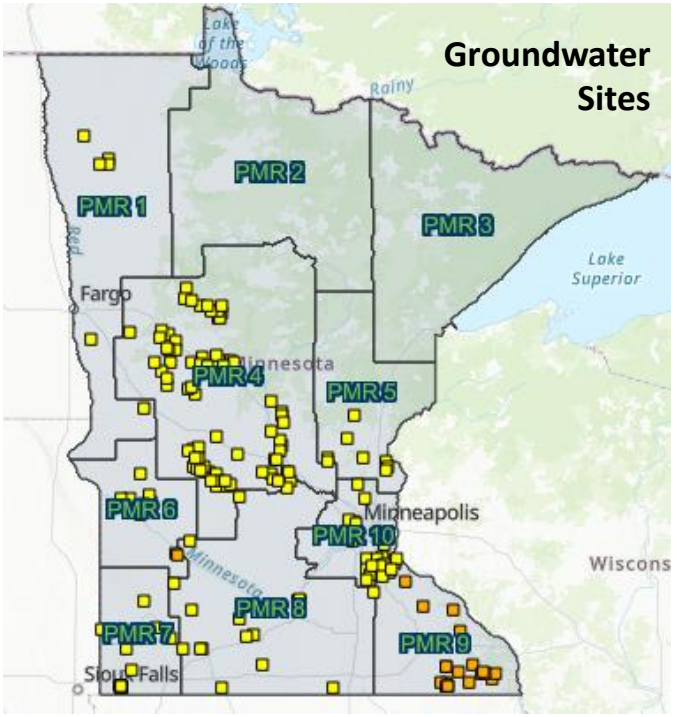
EPT Meeting | November 20, 2025

DEPARTMENT OF AGRICULTURE

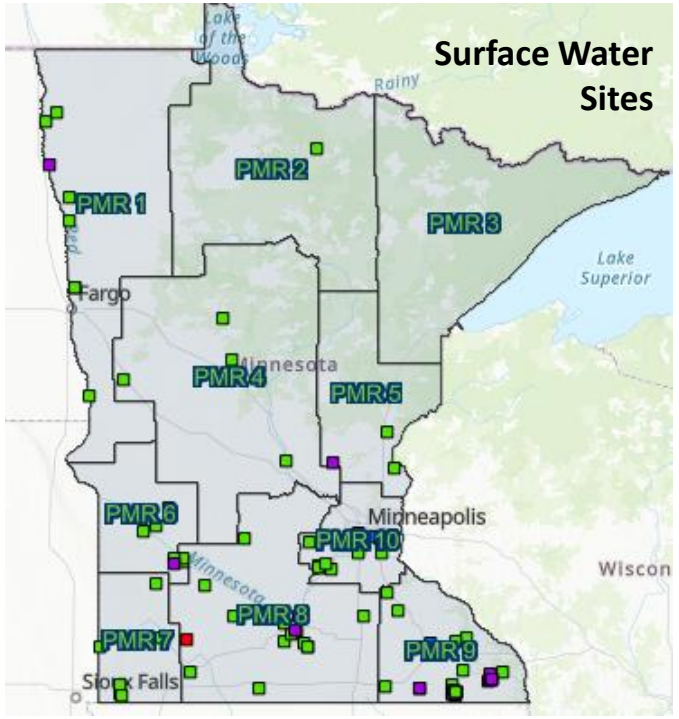
CLEAN WATER LAND & LEGACY AMENDMENT

2024 Monitoring Overview

185 pesticide compounds tested



521 groundwater samples from 168 locations



1,080 river & stream samples from 56 locations

Groundwater “Common Detection” Pesticides

Acetochlor (Harness, Confidence)

Alachlor (Lasso, Intrro)

Atrazine (Aatrex, Brawl II)

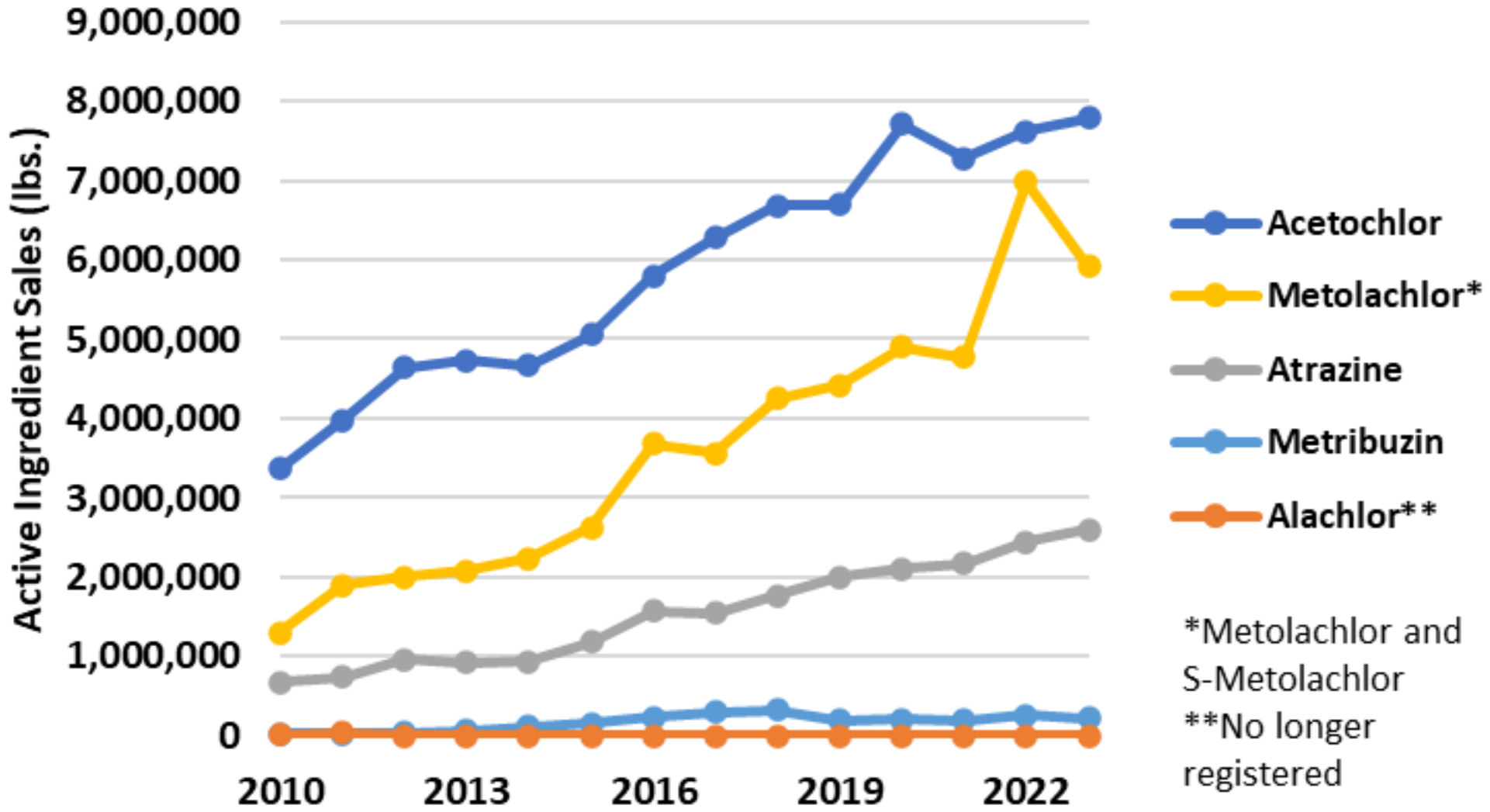
Metolachlor (Dual, Magnum)

Metribuzin (Sencor, Axiom)

parent and breakdown product

- Designation requires long-term data collection and assessment
- Designation initiates EPT activities including BMP development, expanded outreach and monitoring

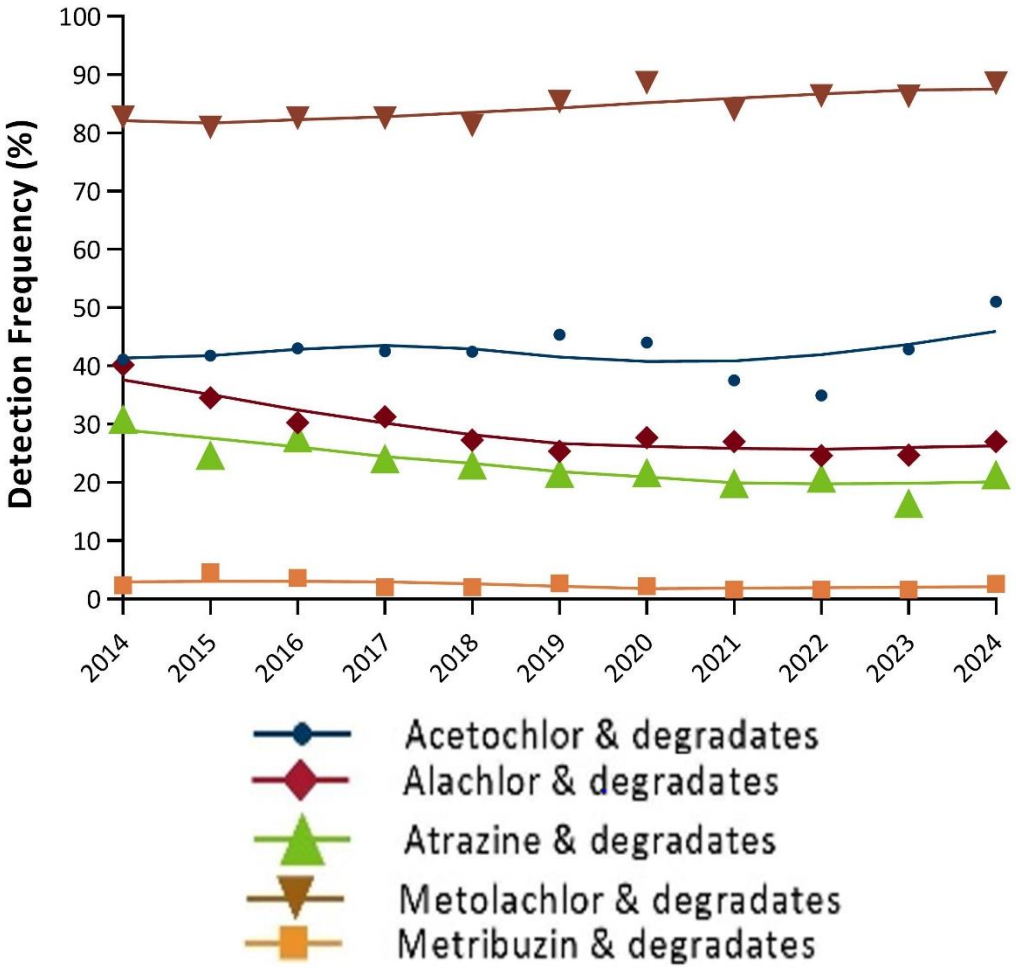
Groundwater “Common Detection” Pesticides | MN Sales (2010-23)



Groundwater Common Detection Pesticides – Monitoring Data

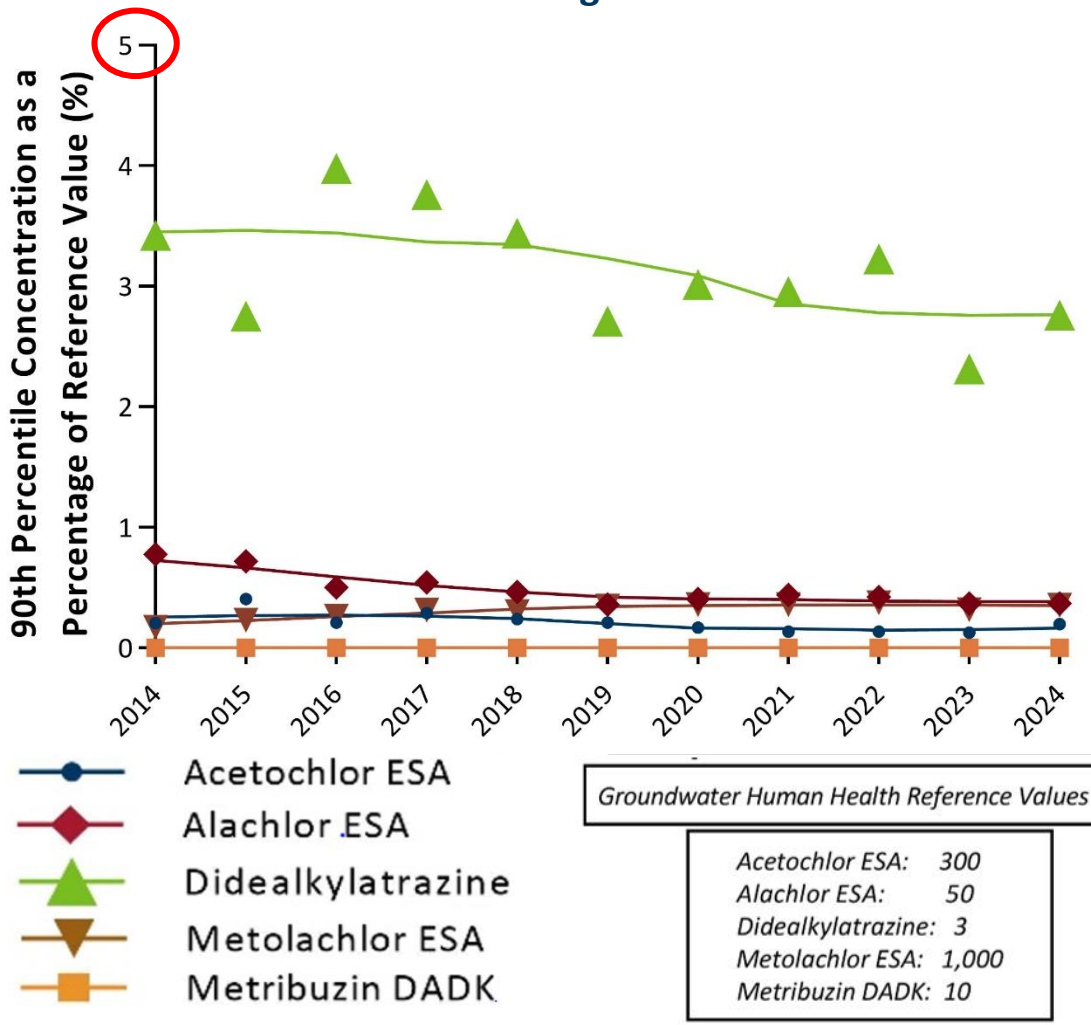
Detection Frequency

Parent and/or degradate



90th Percentile Concentration

Select degradates



Groundwater Human Health Reference Values (µg/L)

Acetochlor ESA:	*300*
Alachlor ESA:	*50*
Didealkylatrazine:	*3*
Metolachlor ESA:	*1,000*
Metribuzin DADK:	*10*

Additional 2024 Groundwater Highlights

185 pesticide compounds analyzed → 55 detected in groundwater

4-Hydroxychlorothalonil

- Degradate of chlorothalonil
- 10 detections greater than the human health reference value in central Minnesota

Cyanazine

- Herbicide no longer registered for use
- 1 sample with Total cyanazine (parent + degradates) above the human health reference value in Dakota County

“Surface Water Pesticides of Concern”

Acetochlor (Harness, Confidence)

Atrazine (Aatrex, Brawl II)

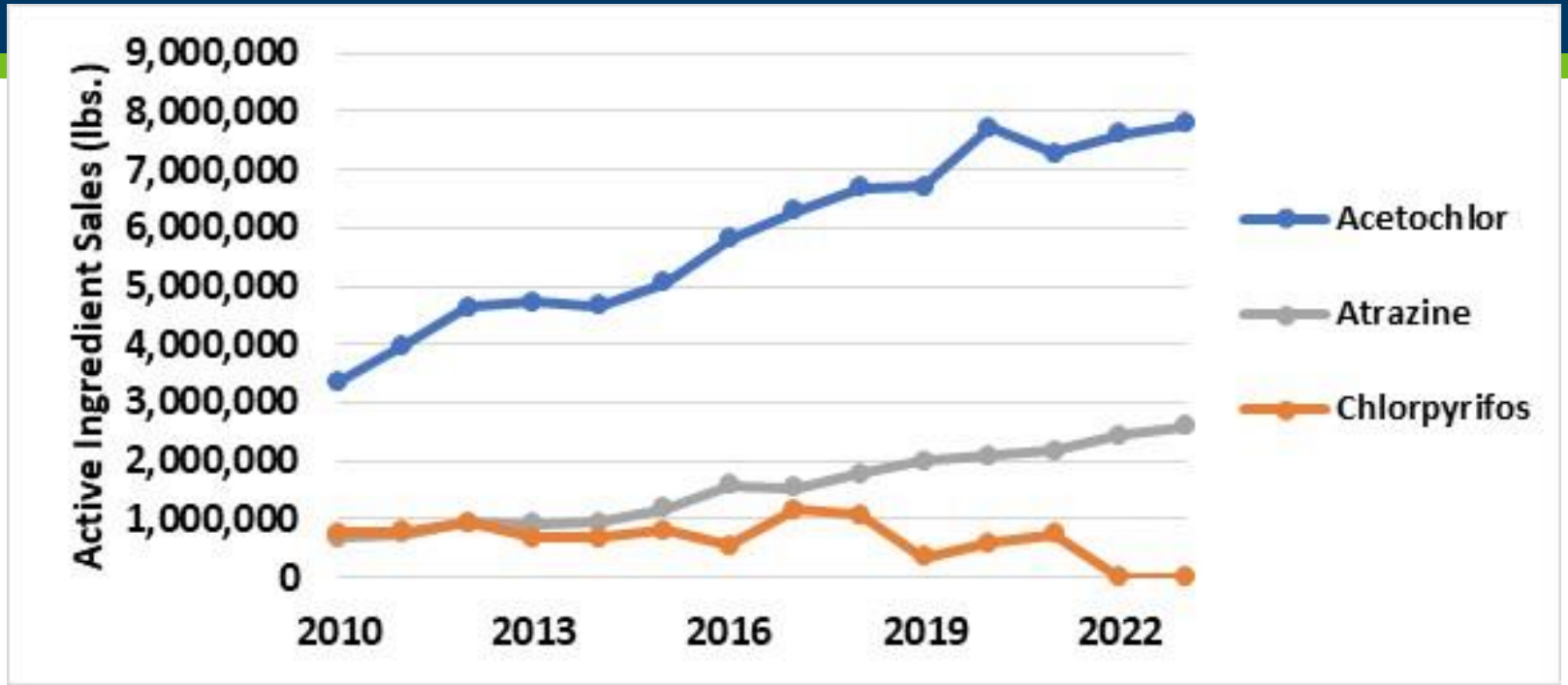
Chlorpyrifos (Lorsban, Dursban)

Clothianidin (Belay, Poncho)

Imidacloprid (Enforce, Gaucho)

- Designation requires long-term data collection and assessment
- Designation initiates EPT activities including BMP development, expanded outreach and monitoring

Surface Water Pesticides of Concern - MN Sales (2010-2023)

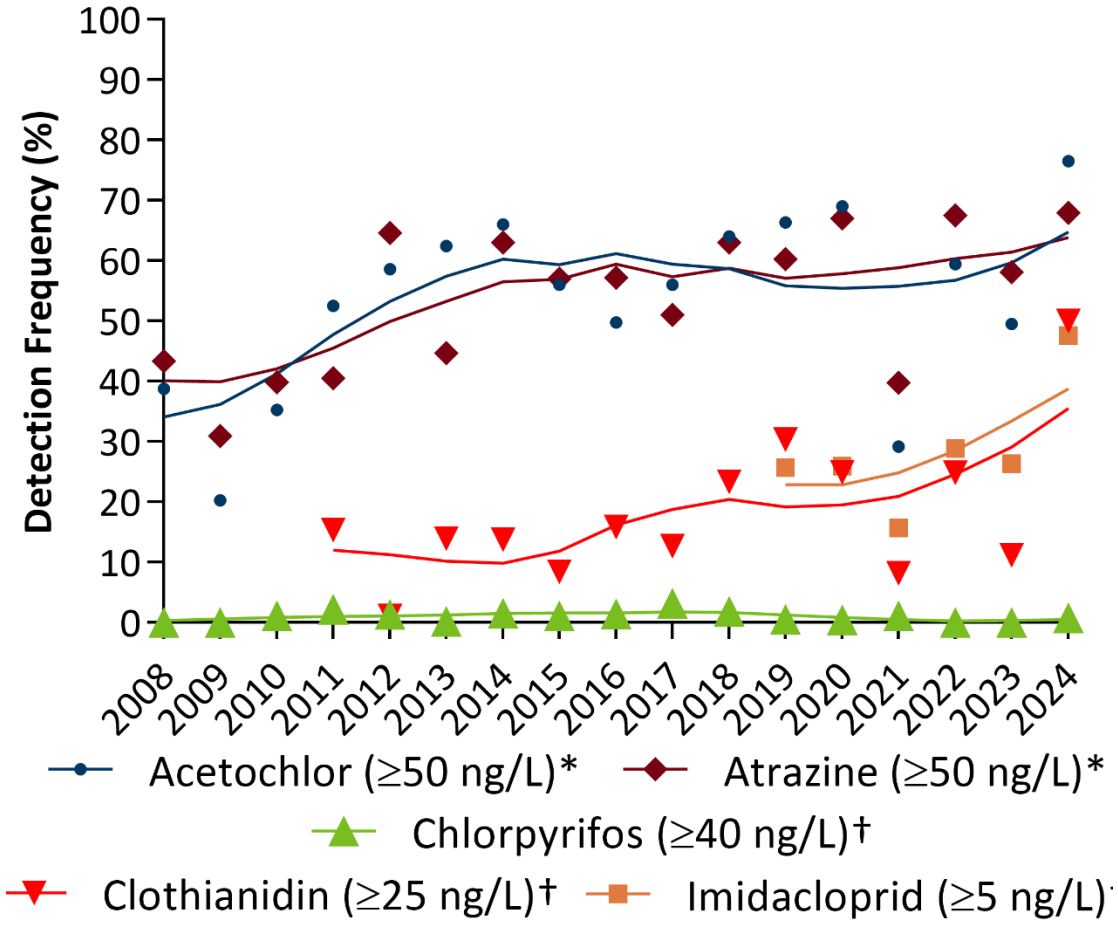


NOTE: Reported clothianidin and imidacloprid sales do not reflect total use in Minnesota. Seeds treated outside of Minnesota, and later planted are not reflected in MDA sales data.

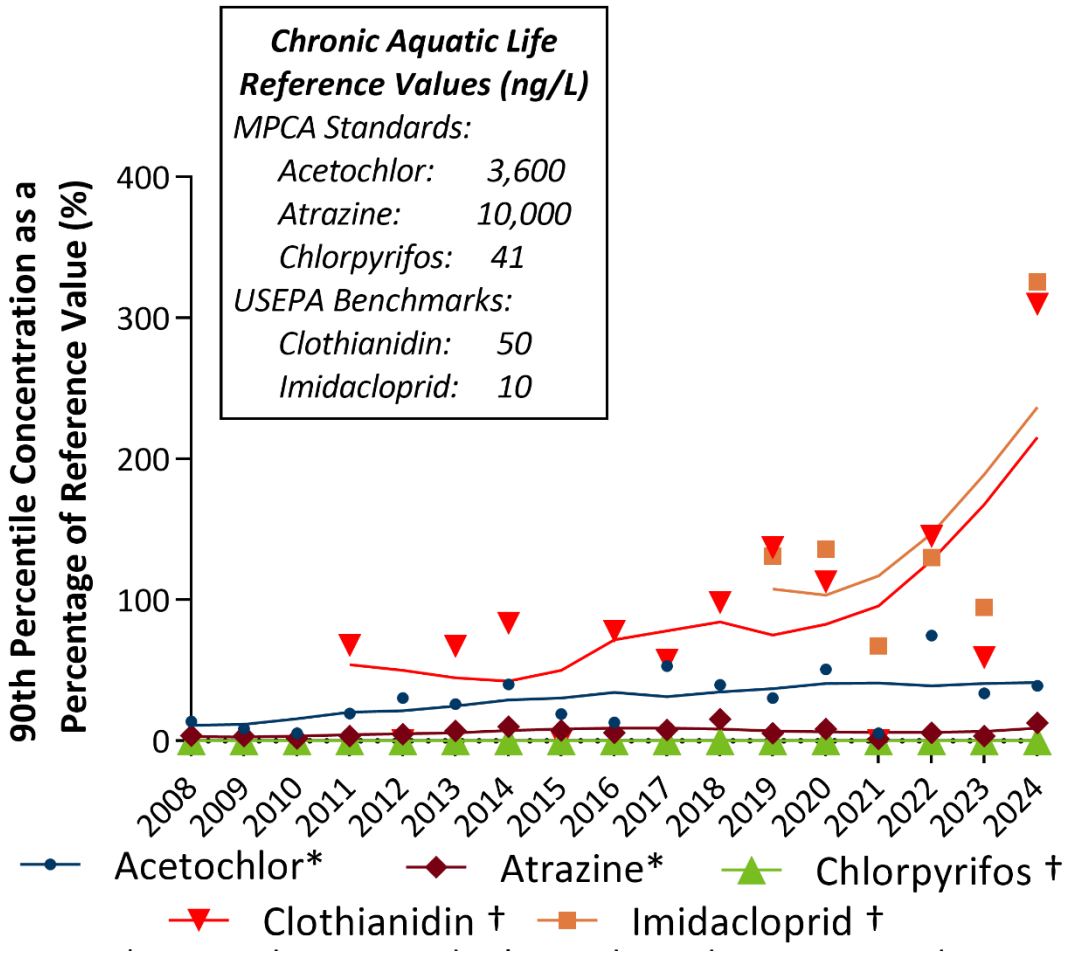
Average annual sales of active ingredient, 2010 through 2023:
Clothianidin = ~28,200 pounds
Imidacloprid = ~43,300 pounds

Surface Water Pesticides of Concern – Statewide River Monitoring Data

Detection Frequency



90th Percentile Concentration

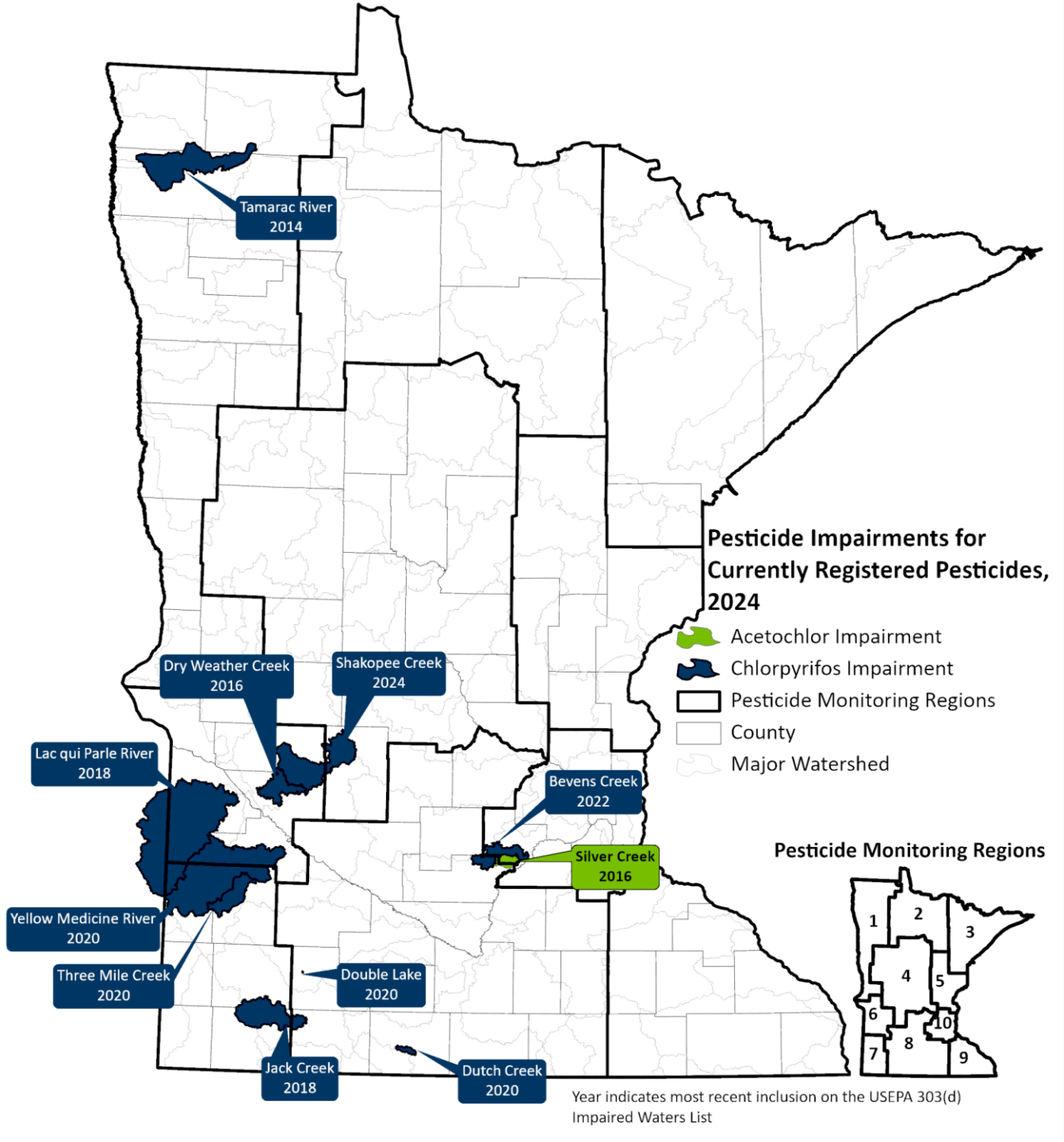


Surface Water Pesticide Water Quality Impairments

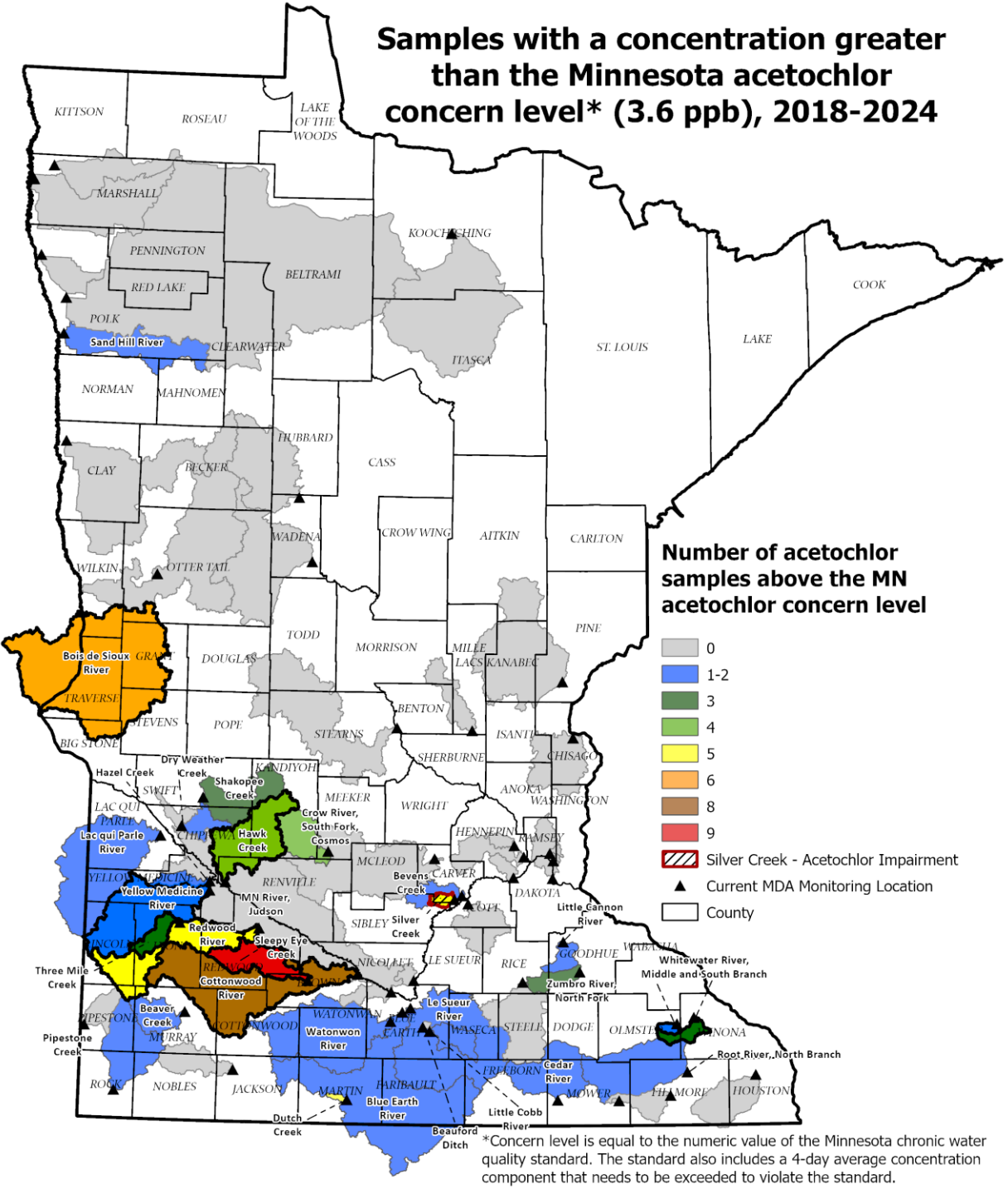
Current or Proposed Impairments

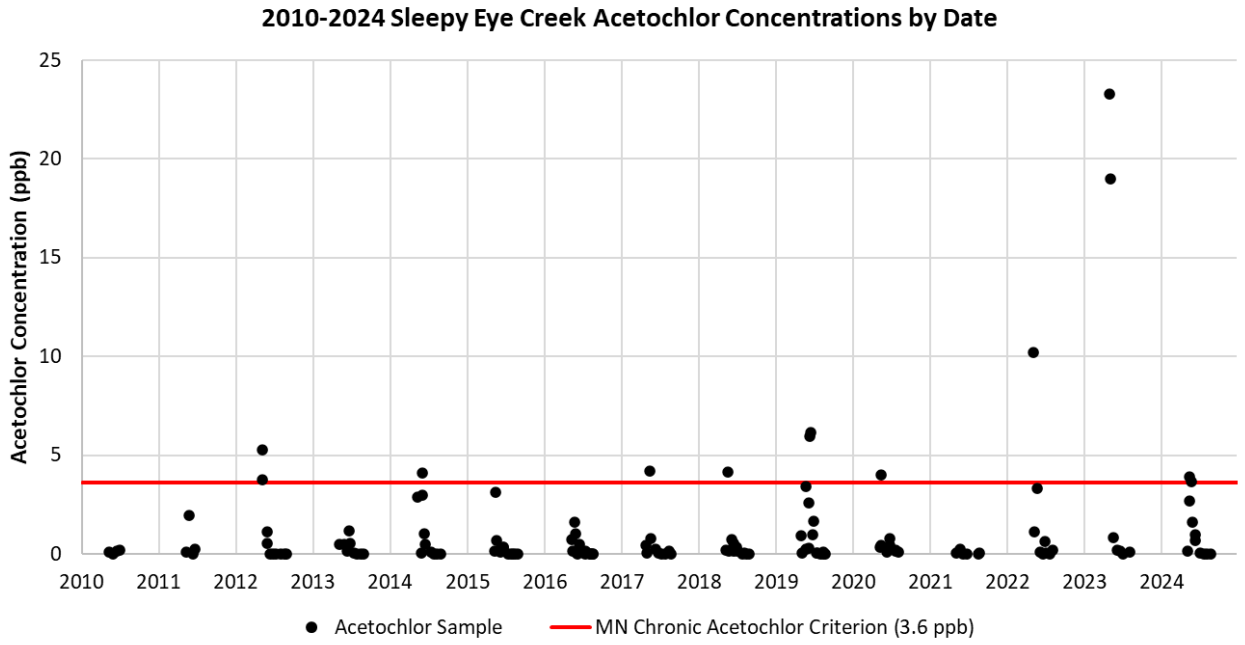
- 1 acetochlor
- 10 chlorpyrifos

- Impairments are proposed by MPCA and approved by EPA
- MN water quality standards are necessary for impairment
- 2026 Impaired Water List (fall of 2025)



Elevated acetochlor levels are detected in many Southern MN rivers & streams

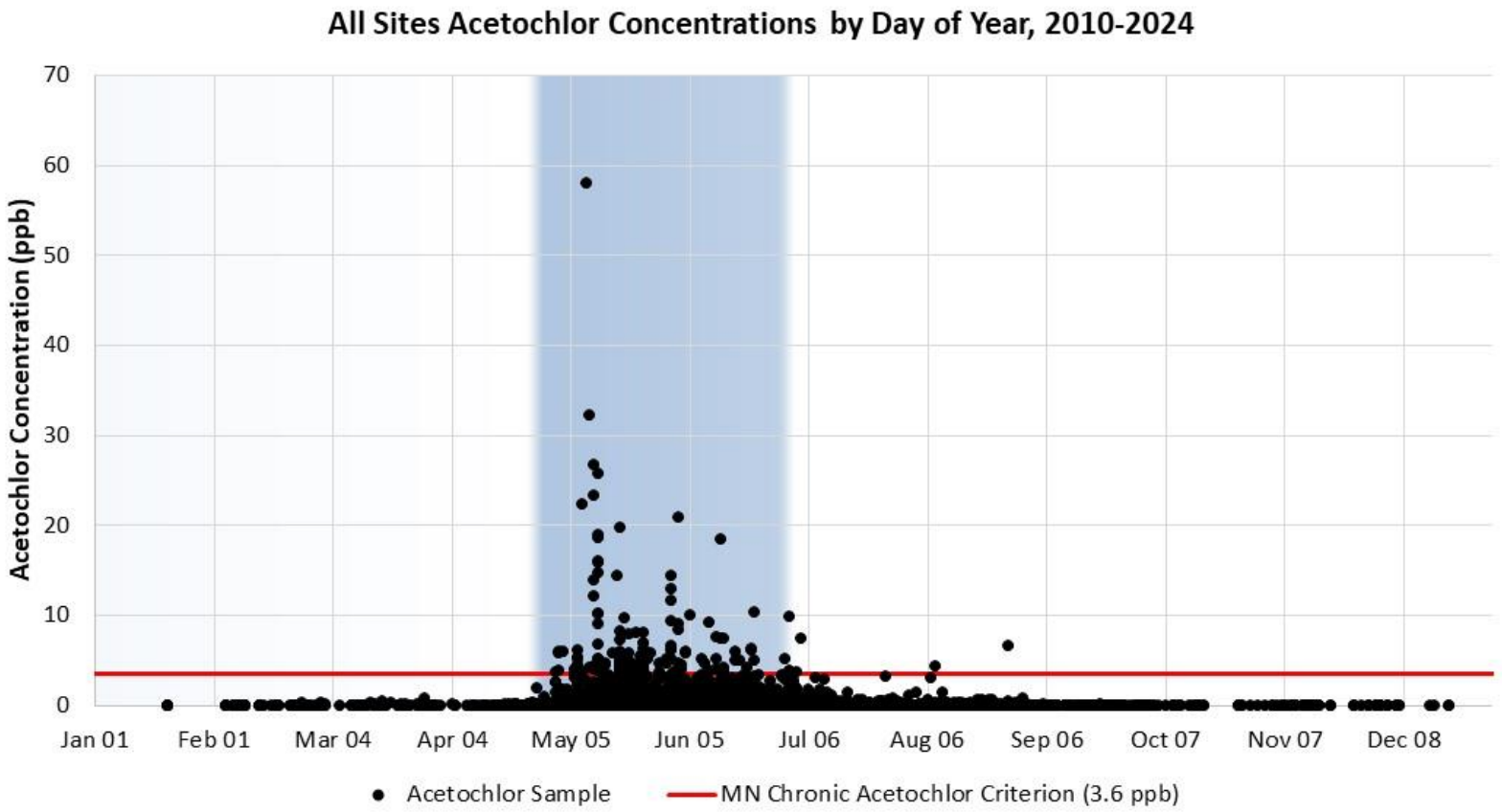




Elevated acetochlor levels in rivers and streams are a concern because they can harm aquatic organisms, including aquatic plants.

Elevated acetochlor levels are mainly detected in May and June, often from early season applications

- >95% of elevated acetochlor detections in May and June
  - Low concentrations the rest of the year
    - Recent applications
    - Risk to water quality is a few critical weeks after application with runoff

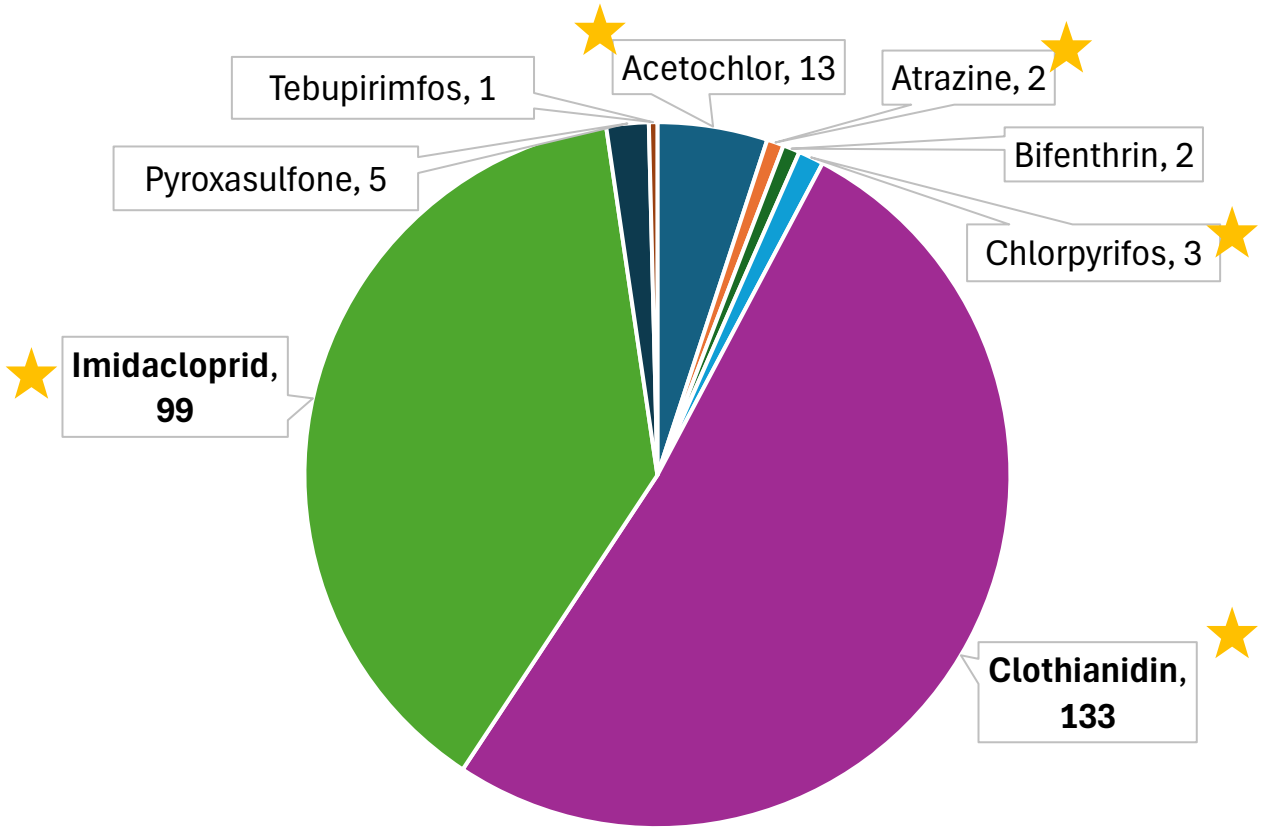


Additional 2024 Surface Water Highlights

185 pesticide compounds analyzed → 81 detected in surface water

258 detections ≥ numeric reference value

- Surface water pesticides of concern make up 97% of detections
- Clothianidin + imidacloprid make up 90% of detections



★ *Surface water pesticide of concern*

Key Points for Monitoring Update

Pesticide sales have increased for many groundwater common detection pesticides and surface water pesticides of concern.

GROUNDWATER

- Detection frequencies of “common detection” pesticides show stable trends in last 5 years
- 90th %-tile concentrations are low (<5%) of the drinking water reference values
- 10 detections of 4-hydroxychlorothalonil in central Minnesota and 1 total cyanazine detection in Dakota County greater than the human health reference values

SURFACE WATER

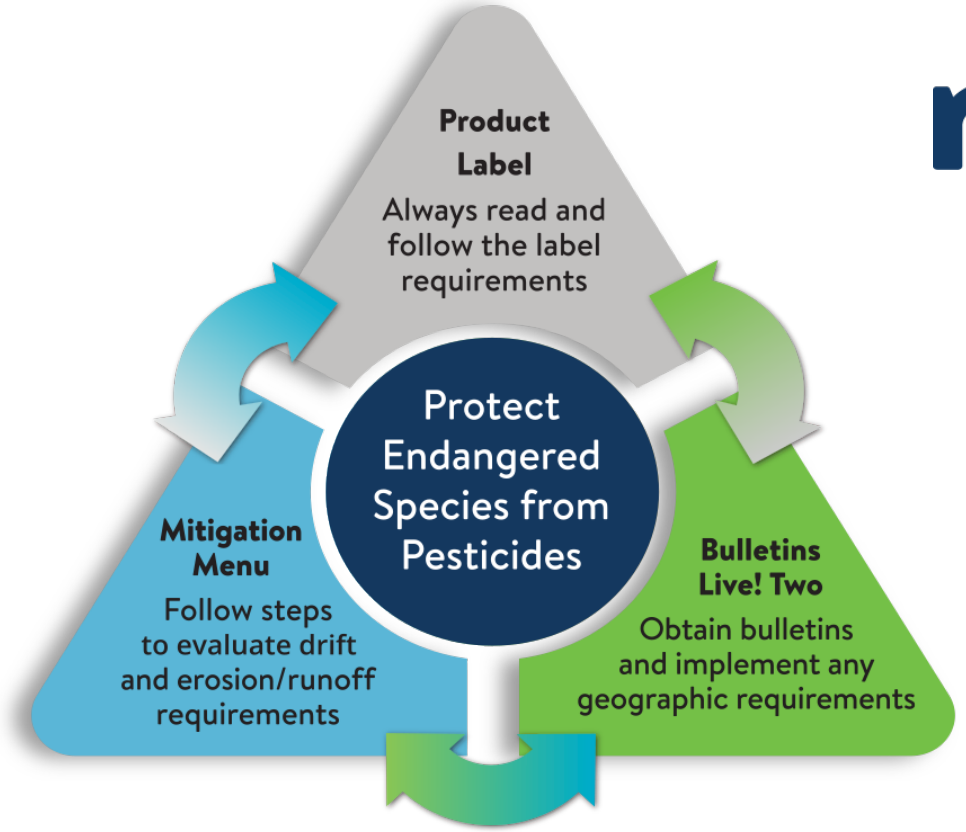
- 2024 was a very wet growing year, and more pesticide detections occurred.
- Clothianidin and imidacloprid detection frequency and concentrations rose in 2024.
- Acetochlor detections over the chronic standard may lead to more impaired water designations.
- Chlorpyrifos detections returned to similar frequency when use returned after 2 years without ag use.
- Surface water pesticides of concern made up 97% of detections over a reference value in 2024.

Questions?

MDA Water Monitoring Reports

Water Quality Data

MDA Pesticide Water Quality Interactive Map/Data Viewer:



DEPARTMENT OF AGRICULTURE

Endangered Species Act (ESA) Strategies Benefitting Minnesota Water Quality

Neal Kittelson |MDA - Research Scientist
Jamison Scholer |MDA - Research Scientist
Theresa Cira |MDA - PTU Supervisor

11/20/2025

What is the Endangered Species Act?

The Endangered Species Act (ESA) is a law that protects endangered and threatened species and their habitats.

Enacted in 1973.

US Fish and Wildlife
MN ESA Listed
Species

Piping plover

MN dwarf trout lily

Dakota skipper

EPAs ESA Responsibilities

- EPA has responsibility under FIFRA and ESA to ensure that a pesticide registration is not likely to jeopardize the existence of a listed species.
  - 10’s of thousands of pesticide registrations
  - ~1700 listed species

EPA Endangered Species Protection Program

Rusty patched bumblebee

Freshwater mussels

New ESA strategies

To meet its obligations, the EPA is creating a Strategy for each pesticide class (Herbicide, Rodenticide, Insecticide, Fungicide, etc.)

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- Identify type and levels of mitigation, including geographically specific areas, and provide flexible ways for applicators to comply with requirements
- Introduce land management activities to pesticide labels
- Expand the use of “online” label requirements
- **Continue to provide pesticides that otherwise might not be available.**

ESA and Water Quality

ESA strategies address both aquatic and terrestrial habitats, recognizing the importance of clean water for species survival.

Erosion and runoff mitigation efforts focus on reducing pesticide movement into rivers, lakes, and wetlands thereby protecting water quality and sensitive species.

Many of these EPA practices are already part of the MDA's Best Management Practices (BMPs), supporting both compliance and conservation.

Drift reduction strategies help prevent pesticides from reaching non-target areas, including nearby aquatic habitats critical to listed species.

Pesticide label requirements include mandatory mitigation measures; ensuring all users help protect water resources and listed species.

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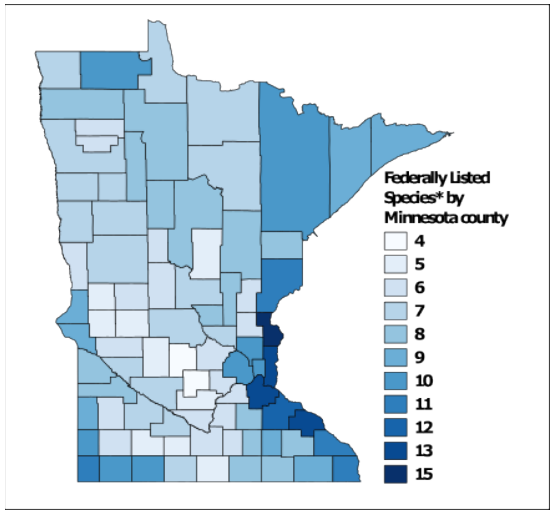
Poll Question

MDA Resources

PESTICIDES AND THE ENDANGERED SPECIES ACT

Minnesota Department of Agriculture > Pesticide, Fertilizer > Pesticides > Pesticides and the Endangered Species Act

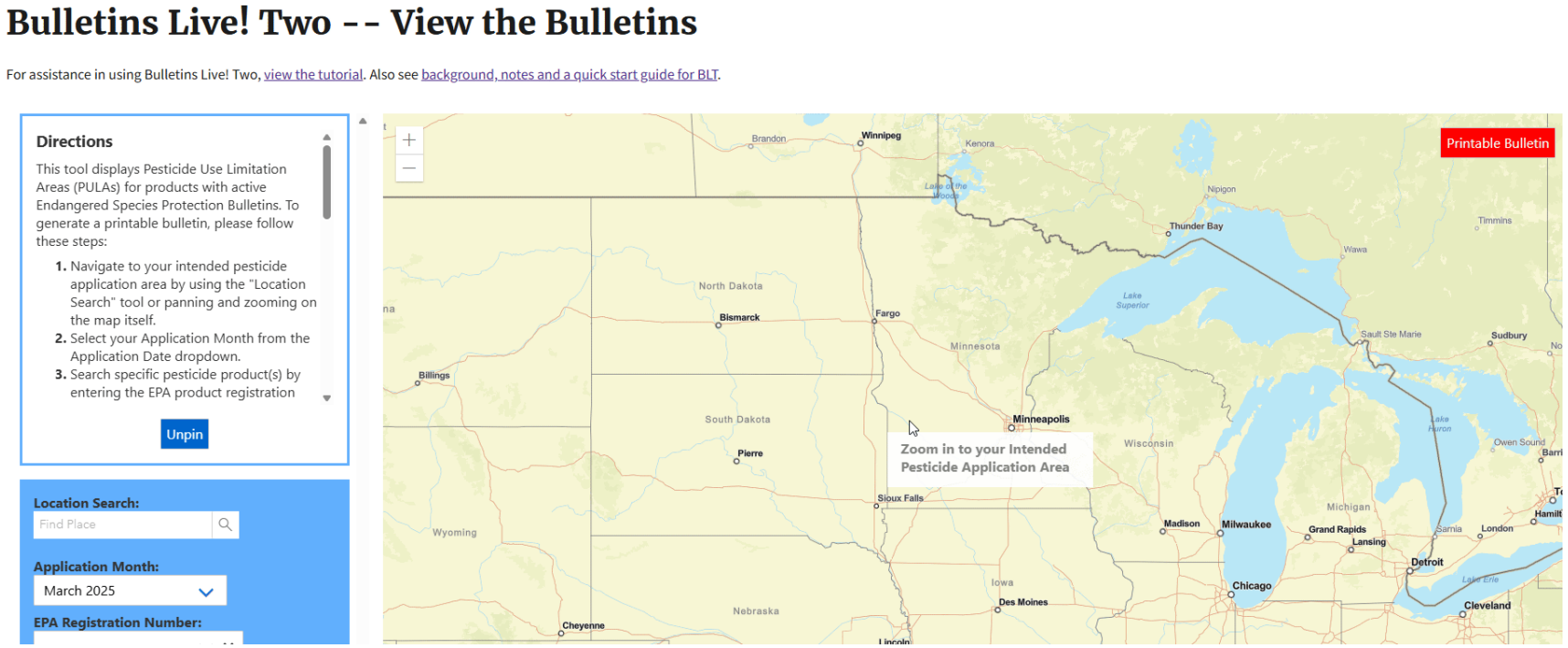
Endangered Species Act | Bulletins Live! Two | Drift Mitigation | Runoff/Erosion Mitigation



Series of web pages focused on:

- How to use compliance tools
- Where to find the tools
- Background Information

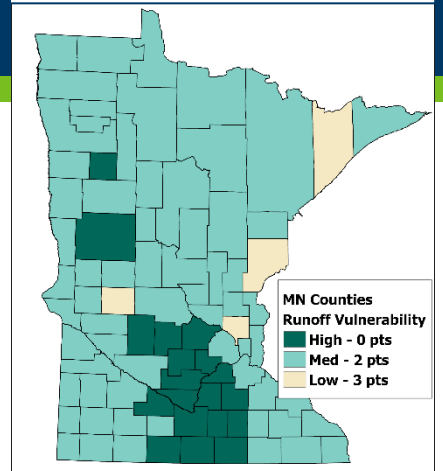
Bulletins Live! Two webpage



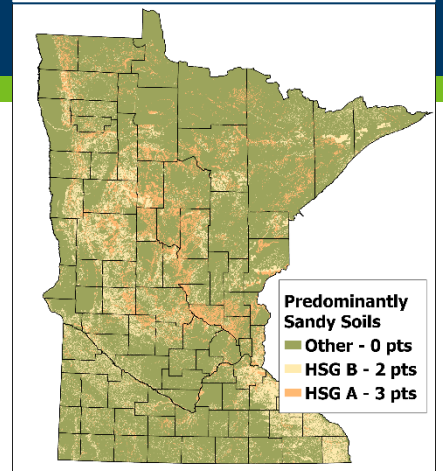
- Animated GIFs to demonstrate how to use BLT

Erosion/Runoff webpage

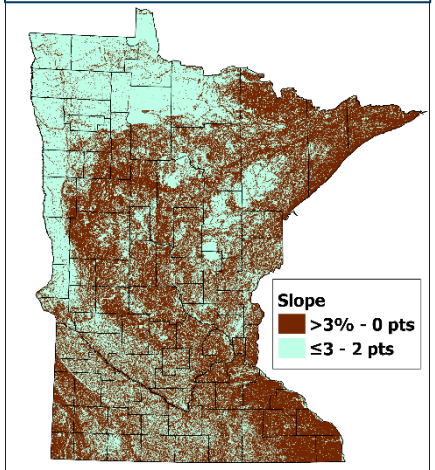
Runoff Vulnerability



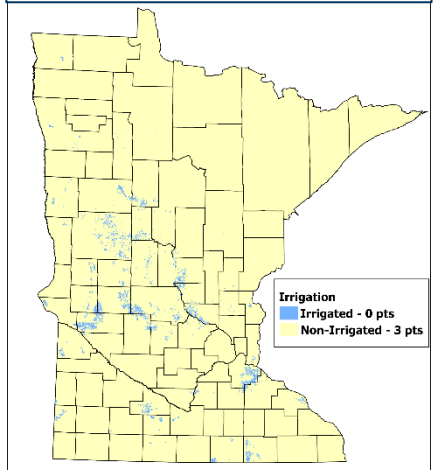
Predominately Sandy Soils



Field Slope



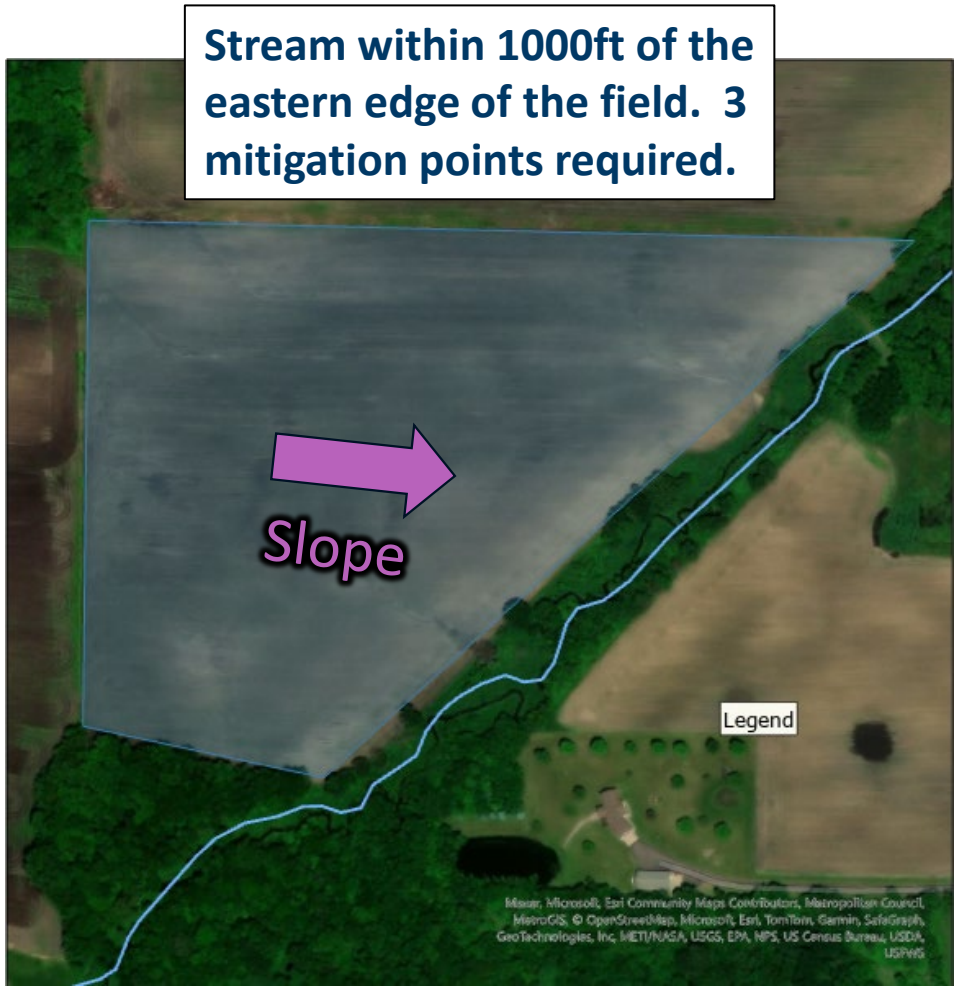
Irrigation



- Maps to visualize some of the field characteristics the EPA uses
- Links to data sources
- Conceptualizing ‘Relief’ Points

Website Future Additions

- FAQs
  - Address common questions
  - Aid in compliance
- Scenarios
  - Walkthrough basic scenario
- Resources
  - Learning series



Minnesota's Endangered Species and Pesticide Labels

Module1: Why Endangered Species Mitigation is Now Part of Your Pesticide Label

Module 2: How do ESA changes effect pesticide product labels?

Module 3: Using Bulletin's Live! Two

Module 4: Following EPA's Mitigation Menu steps for runoff/erosion

Module 5: Following EPA's Mitigation Menu steps for spray drift

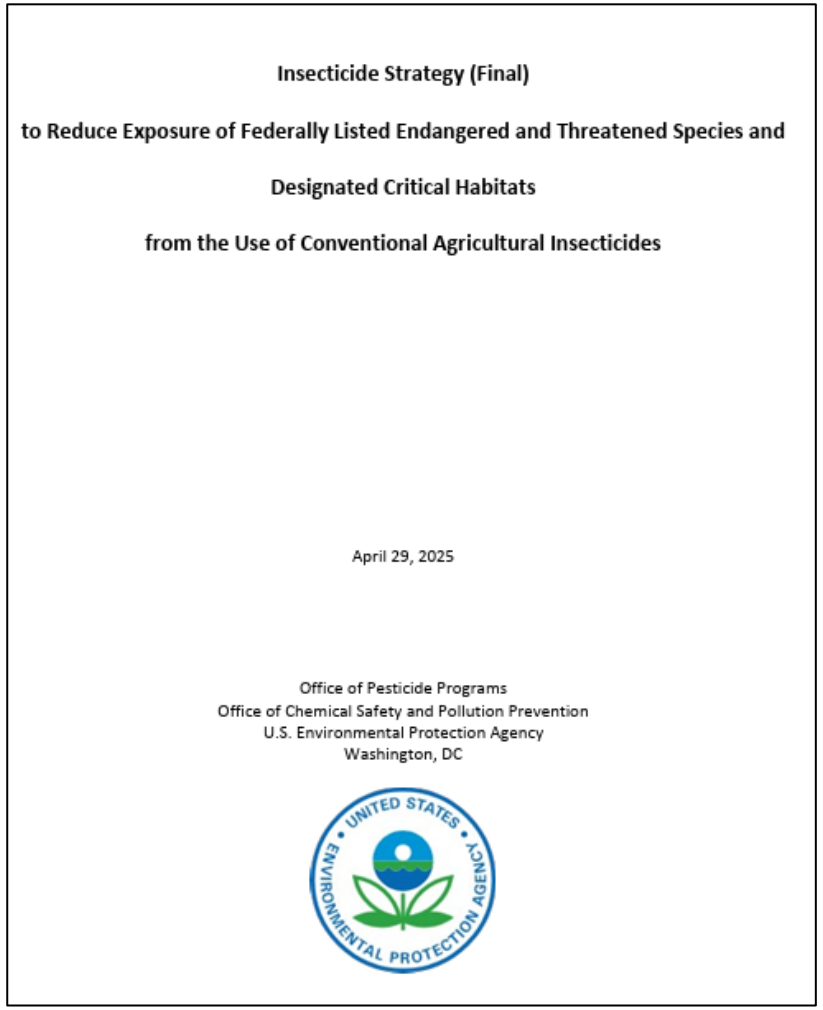
Module 6: What You Need to Know for trainers

-Expected release Jan 2026

EPA Updates

- Herbicide Strategy Released August 2024
- Insecticide Strategy Released April 2025

  With the release of the insecticide strategy EPA implemented some notable changes.



Insecticide Strategy (Final)

to Reduce Exposure of Federally Listed Endangered and Threatened Species and Designated Critical Habitats from the Use of Conventional Agricultural Insecticides

April 29, 2025

Office of Pesticide Programs
Office of Chemical Safety and Pollution Prevention
U.S. Environmental Protection Agency
Washington, DC

EPA Updates

- Updated Mitigation Menu to reflect changes/additions from the insecticide strategy
  - Added/update/clarified mitigations
- Archive versions of Mitigation Menu
  - https://www.epa.gov/pesticides/mitigation-menu-archived-versions

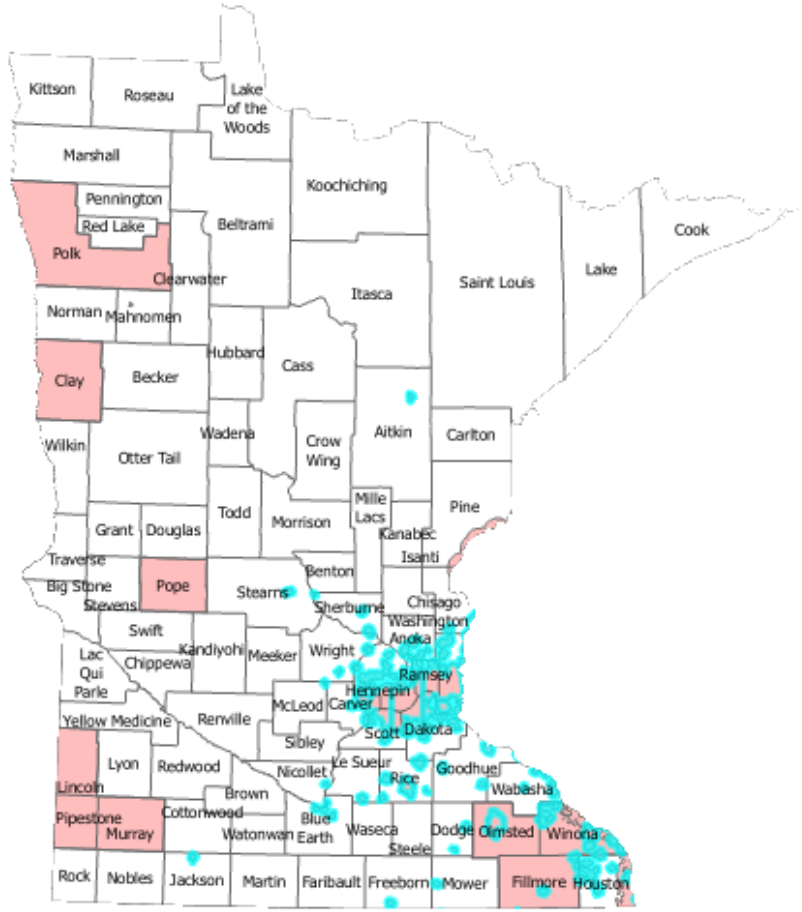
Predominantly sandy soils ***This option can only be used if the product label does not prohibit application on sandy soils***	Fields with 10-20% clay and 50-90% sand (includes loam, silt loam, or silt soil) without a restrictive layer that impedes the movement of water through the soil (also described as Hydrologic Soil Group B)	2
	Fields with ≤10% clay and ≥90% sand (includes sand, loamy sand, or sandy loam soil) without a restrictive layer that impedes the movement of water through the soil (also described as Hydrologic Soil Group A)	3

EPA Updates

- Mitigation Menu now includes Drift reductions

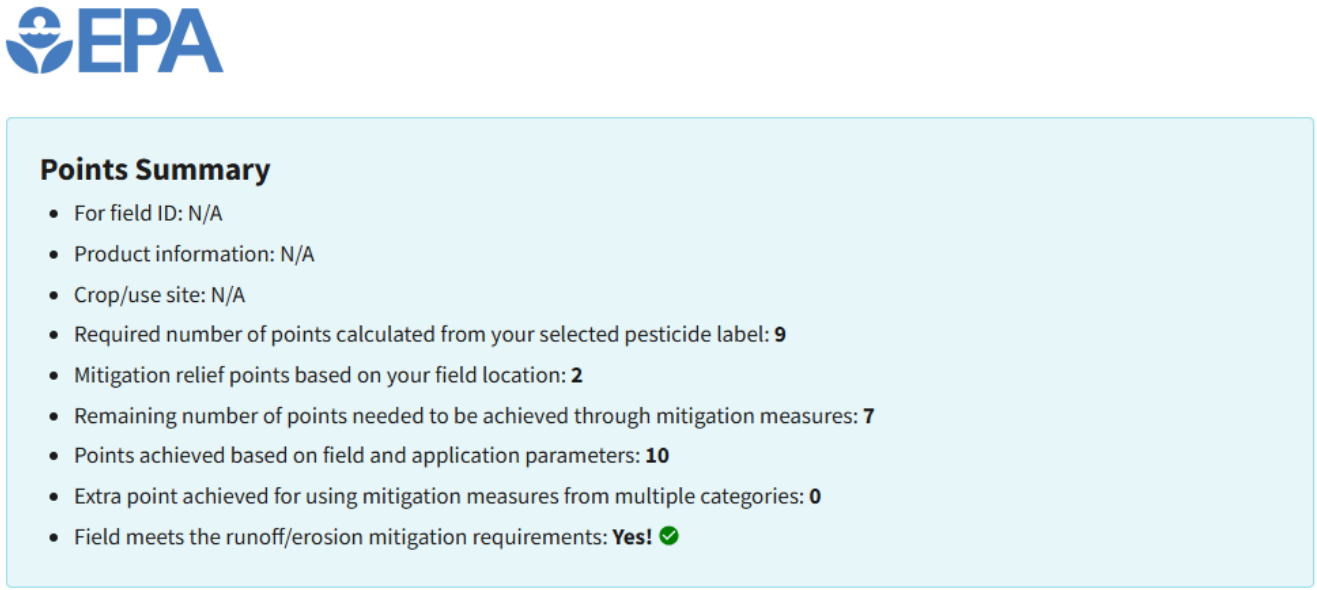
EPA Updates

- Released **Advanced Resources for Bulletins Live! Two**
  - 3rd party integration
  - Ability to map and query PULA's outside of the BLT system (GIS)
- Update PULA's
  - Rusty Patch Bumble Bee PULA in MN



EPA Updates

- Released **Pesticide App for Label Mitigations (PALM).** Mobile friendly web version of the xlsx calculator
  - Includes Runoff/Erosion and Drift calculators



EPA Updates

- Proposed a path to certify conservation programs for 9 mitigation points
  - MAWQCP has expressed interest in exploring qualifications when fully implemented

EPA is developing a process to qualify individual conservation programs that could achieve 9 mitigation points. Additionally, EPA is developing a process to qualify external parties that would assess a grower's farm and determine the existing mitigation points that could be achieved during the growing season. EPA is continuing to develop this new approach to qualify programs and parties. This approach will be shared with stakeholders before it is implemented by EPA. EPA will also continue discussions with federal partners and other stakeholders concerning these efforts and will also seek comment, through our Paperwork Reduction Act (PRA) obligations, on any necessary information collections.

Resources

- The MDA's Pesticides and the Endangered Species Act web pages:
  - https://www.mda.state.mn.us/pesticide-fertilizer/pesticides-endangered-species-act
- EPA's Pesticides and Endangered Species Educational Resources Toolbox
  - https://www.epa.gov/endangered-species/pesticides-and-endangered-species-educational-resources-toolbox
- EPA's Mitigation Menu website:
  - https://www.epa.gov/pesticides/mitigation-menu

Poll Question

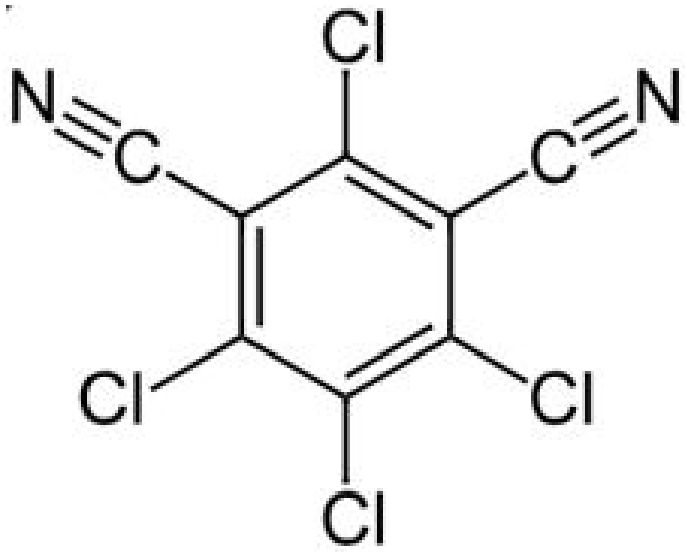
Questions?

Neal.kittelson@state.mn.us

4-hydroxychlorothalonil in Groundwater

Kimberly Kaiser
Groundwater Monitoring Unit Supervisor

Chlorothalonil



Chlorothalonil

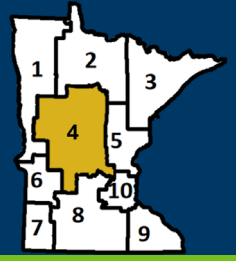
- Pesticide Type: Fungicide (Group M05)
- Registration Status: Registered since 1966 with EPA and MN
- Mn Crop use: potatoes, turf grass, sod and ornamentals
- Common Trade Names*: Bravo®, Daconil®, Echo®, Initiate®
- Half-life = 1-3.5 days in soil (rapid breakdown)
- Moderate to high mobility in sandy soil
- The human health reference value is 1,000 ng/L

*No endorsement is implied in the referencing of trade names.

Chlorothalonil Background

Chlorothalonil

- Chlorothalonil rarely detected in groundwater or surface water
- Main breakdown product is 4-hydroxychlorothalonil (4-HDC)
  - Breaks down quickly in water and sunlight (photolysis), half-life of 35 minutes
    - Which is why it is rarely detected in surface water
  - In soils it has a longer half-life than the parent (10-22 days) and is also more water soluble making it more mobile than the parent
  - 4-HDC may slow chlorothalonil breakdown by reducing microbial activity and lead to accumulation in the soil
  - The reference value for 4-HDC is 2,000 ng/L

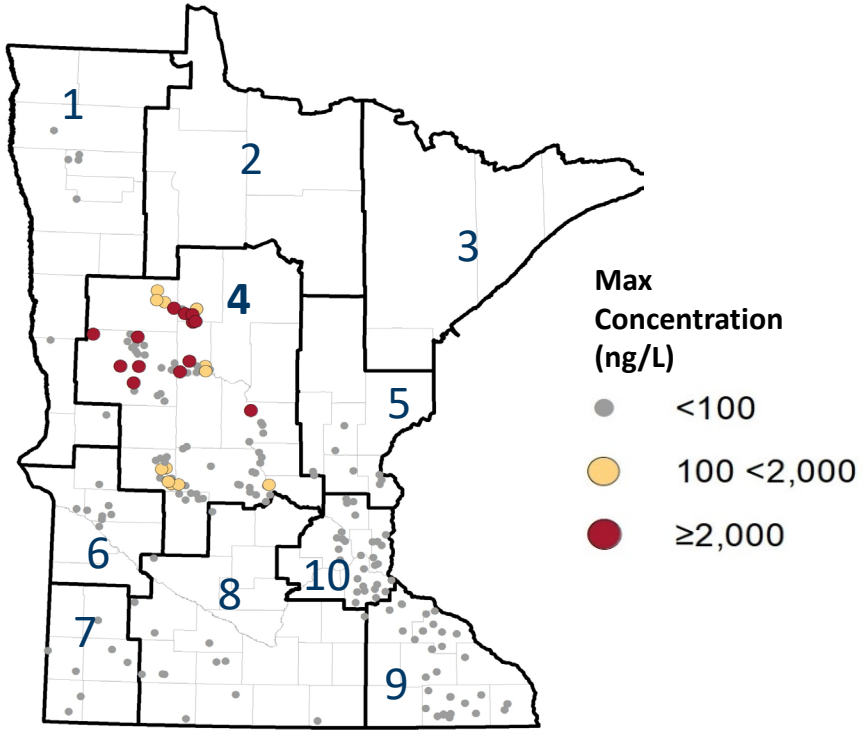


4-Hydroxychlorothalonil
Ambient Groundwater Monitoring

DEPARTMENT OF AGRICULTURE

Ambient Results Summary

- Since 2020, 4-HDC only detected in PMR 4 from monitoring wells in shallow water table aquifers
- Detected in 25% to 32% of samples in PMR 4
- Number of samples above the reference value (2,000 ng/L) has ranged from 7 to 12 per year.
- Maximum concentration detected in 2024 was 16,300 ng/L – over 8x higher than the reference value.



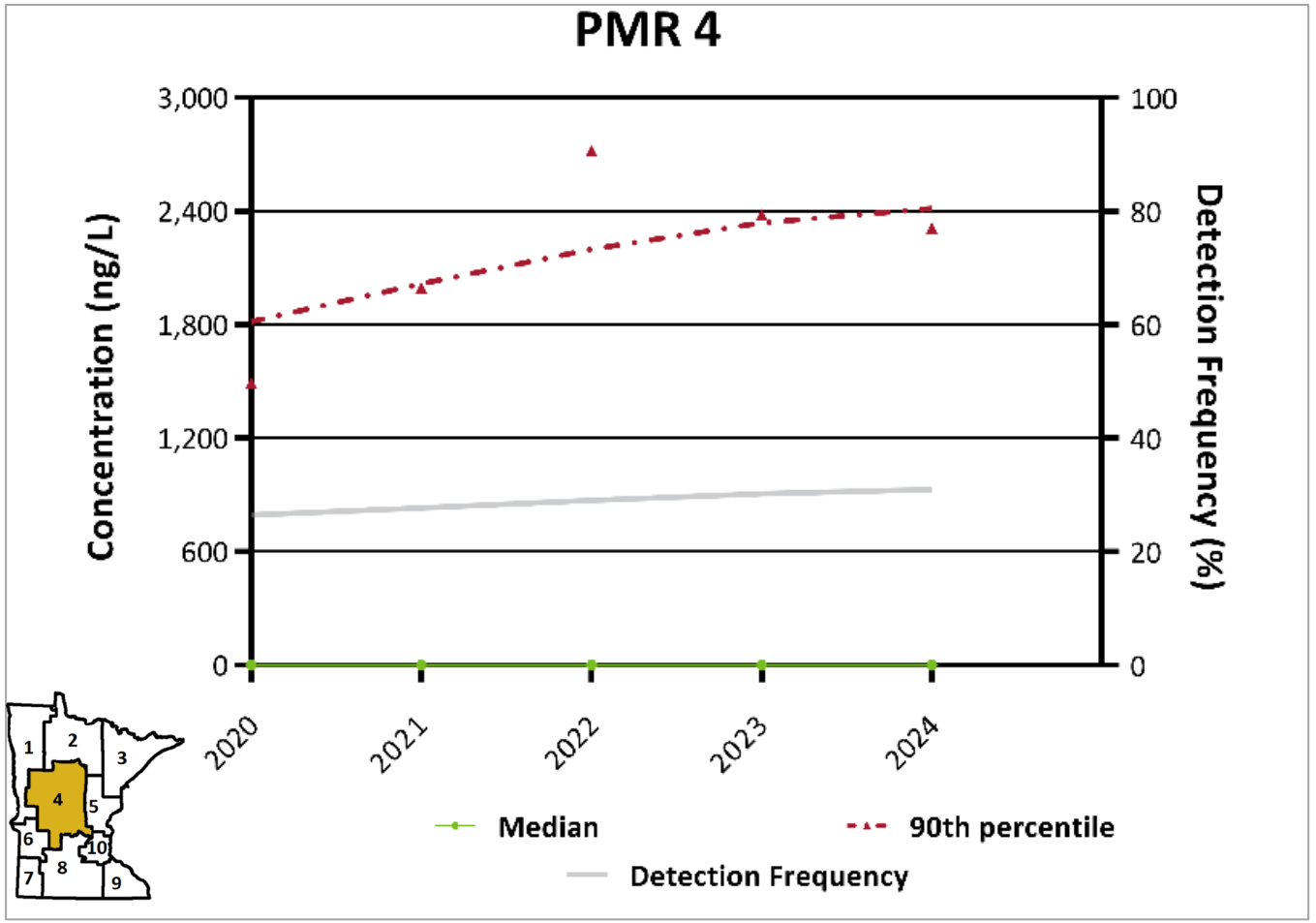
Year	Number of Samples (PMR 4)	Detections	Detection Frequency % (PMR 4)	Detections above 2,000 ng/L	Maximum Concentration (ng/L)
2020	77	19	25	7	4,040
2021	74	21	28	8	4,630
2022	77	22	29	11	11,000
2023	76	24	32	12	12,700
2024	77	24	31	9	16,300

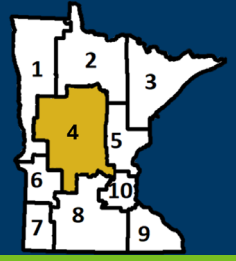
4-hydroxychlorothalonil Ambient Monitoring Results

4-HDC Trend analysis

- 2024 was the first year for analyzing trends
- There are no statistically significant trends in the median concentration or 90th percentile ➡
- There is a significant increasing trend in the detection frequency ⬆

4-HDC Trend Analysis





4-Hydroxychlorothalonil
Private Well Pesticide Sampling

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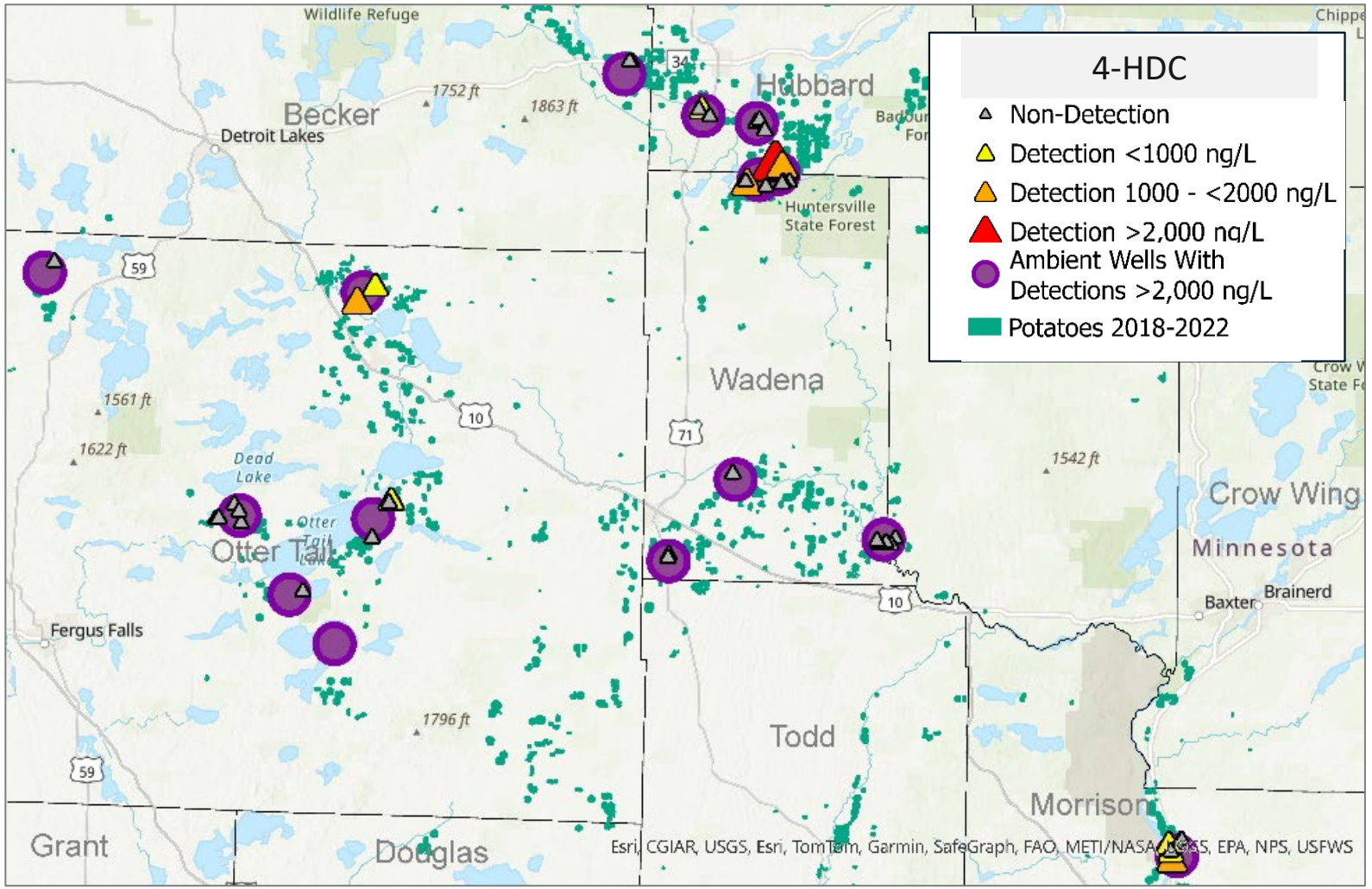


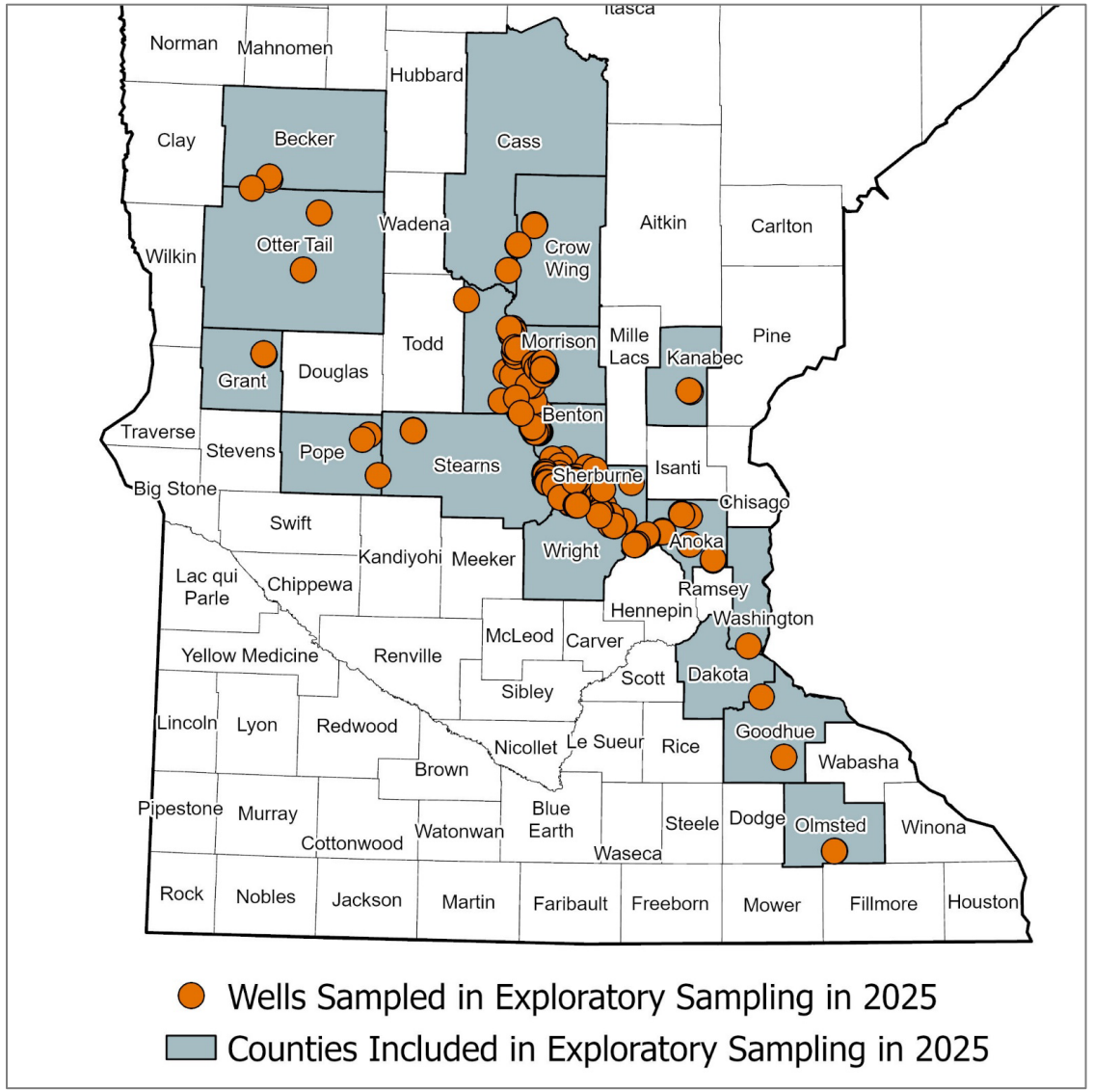
2023-2024 Results

- 45 private wells sampled; 10 had detectable 4-HDC (22%)
- Maximum concentration = 5,840 ng/L
  - 1 sample exceeded the reference value of 2,000 ng/L
  - 2 samples exceeded 50% of the reference value.

4-Hydroxychlorothalonil
Private Well Pesticide Sampling

2025 Sampling

- Approximately 200 private wells
  - Private well testing in 2025 has focused on 2 land uses: areas with nearby potato fields or golf courses.
  - Results will be available in 2026.



Chlorothalonil: Proposed Label Changes and BMPs

Eric Burkness | Research Scientist

Chlorothalonil Registration Review

- Registration review – EPA required to review registered pesticides at least every 15 years (FIFRA)
- EPA identified human health risks of concern from dietary (food + drinking water) exposure related to 4-hydroxychlorothalonil and ecological risks of concern
- Drinking water via groundwater exposure was the major contributor to dietary exposure
- EPA proposes mitigation measures including,
  - **Reduction to max annual rates on vulnerable and non-vulnerable soils**
  - Buffers to all aquatic areas
  - Spray drift mitigation and wind-directional buffers
- Proposed mitigations would resolve the dietary risks of concern

EPA Registration Review Interim Decision

- To address potential groundwater contamination and drinking water risks on **vulnerable soils**:
  - EPA is proposing maximum annual application rate restrictions for all outdoor use sites where plants are grown on vulnerable soils to:
    - 6.5 lbs ai/ac/yr or less for ag crops; 6.2 lbs ai/ac/yr or less for non-ag crops
  - These restrictions are based on groundwater modeling
  - EPA expects that rate reductions for vulnerable soils will reduce the potential for dietary exposure
- Vulnerable soils are classified as follows (must meet all three criteria):
  - soil texture in application area is over 50% sand, loamy sand, or sandy loam **and**
  - less than 2% organic matter **and**
  - water table depth of 30 feet or less from surface

Proposed Label Rate Changes for vulnerable and non-vulnerable soils for select use sites

	All Soils	Vulnerable Soil	Non-Vulnerable Soil
Use Site (Crop)	**Current Rate Max lbs ai/ac/yr**	**Proposed Rate Max lbs ai/ac/yr**	**Proposed Rate Max lbs ai/ac/yr**
Corn	9.0	**3.0**	3.0
Dry Bean*	6.0	**6.0**	6.0
Potato	11.25	**6.5**	8.0
Soybean*	4.5	**4.5**	4.5
Turf – Golf Course Fairway	26.0	**6.2**	22.6
Turf – Golf Course Tees	52.0	**6.2**	33.9
Turf – Golf Course Greens	73.0	**6.2**	45.2

*Current use rates under 6.5 lbs ai / ac / yr were left unchanged for agricultural uses

EPA Identified Potential Grower / Manager Impacts

- Areas most likely to be affected are located where disease pressure is high and those on vulnerable soils
- Potential yield and quality losses from reductions in disease management
- Increased risk of fungicide resistance if more single-site fungicides are used to maintain disease control
- Potential rate reductions for crops on non-vulnerable soils will have little to no impacts, depending on the use site
- Based on proposed mitigations, dietary risks of concern would be resolved

Potential Management Options to Reduce Load – Voluntary BMPs in Development

- Potential BMPs that may reduce use and maintain water quality
  - Integrated pest management plan
  - Crop Rotation / Cover Crops (Ag only)
  - Scouting / Record keeping
  - Use of thresholds or degree day models if available
  - Rotate mode of action groups
  - Maintain plant health – weeds, insects, diseases, fertility, irrigation, mowing height (turf)
  - Use of ag weather networks and disease prediction models

Water Quality Best Management Practices for
Chlorothalonil

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June 2025

The Minnesota Department of Agriculture (MDA), along with University of Minnesota Extension and other interested parties, have developed the following best management practices (BMPs) to minimize the risk of the fungicide chlorothalonil and its breakdown products from entering surface water and groundwater from normal use. The BMPs may refer to mandatory label use requirements as well as voluntary practices. In addition to implementing BMPs, always read and follow product labels.

Below are example trade names for products and package mixtures registered in Minnesota that contain chlorothalonil. Always check that pesticide products are registered in Minnesota prior to use.

Chlorothalonil* is an Active Ingredient in:	
Andiamo Advance	Initiate ZN
Bravo Weather Stik	Quadris Opti
Daconil Weather Stik	Ridomil Gold Bravo SC
Echo ZN	Zing!

*This list is not all-inclusive and is subject to change. Reference to commercial products or trade names is made with the understanding that no discrimination is intended, and no endorsement is implied.

Numerous agricultural (e.g., corn, soybean, dry bean, potato) and non-agricultural (e.g., turf, ornamentals) crops can be affected by a wide range of fungal diseases, which can be controlled or prevented by chlorothalonil. Diseases such as late blight (*Phytophthora infestans*) in potato and dollar spot (*Clarireedia jacksonii*) in turfgrass are common in Minnesota and can greatly impact yield and plant health. While cultural practices can be used to reduce the risk and severity of these diseases, fungicides like chlorothalonil are often used as a part of an integrated management plan to prevent and control disease.

Chlorothalonil is a broad spectrum contact fungicide that was first registered in 1966 and provides a high level of efficacy on a wide range of diseases and crops. The chemical has a multi-site mode of action (group M05) with a low risk of resistance development. It is used as a foliar treatment that can be applied by ground, air, or chemigation.

Even with normal use, fungicides have the potential to move offsite through leaching and runoff to reach groundwater and surface water, respectively. Some fungicides can also move off-target via spray drift and volatilization, which can lead to contamination of nearby surface waters. Chlorothalonil has rarely been found in Minnesota surface water, such as streams, rivers, or lakes, or groundwater. However, a breakdown product of chlorothalonil called 4-hydroxychlorothalonil (4-HDC) has been detected in groundwater, specifically in Minnesota's Central Sands region. BMPs encourage adoption of an Integrated Pest Management (IPM) program to utilize cultural and biological control practices, optimize fungicide use by reducing the number of and increasing the interval between applications, reduce costs, and prevent development of fungicide resistance.

State law allows the MDA to regulate pesticides to address unreasonable adverse impacts on human health or the environment. Adopting these chlorothalonil BMPs may help growers maintain access to important and diverse fungicide options for disease management while minimizing the need for increased regulation.

For information on pesticide monitoring results in Minnesota's water resources, refer to the MDA Pesticide Water Quality Monitoring StoryMaps or MDA Water Monitoring Reports and Resources.

Best Management Practices for Chlorothalonil Use

- Voluntary BMPs are designed to prevent and minimize the degradation of Minnesota's water resources while considering economic factors, availability, technical feasibility, ease of implementation, efficacy, and environmental impacts.
- Specifically, these BMPs are intended to reduce off-target movement of chlorothalonil and to encourage the efficient use of fungicides, resistance management, and when available, use of non-chemical approaches to disease control.
- For plant diseases to develop, a pathogen, a susceptible host, and favorable environmental conditions must be present simultaneously.

Environment
Disease
Pathogen
Host Plant

In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711. The MDA is an equal opportunity employer and provider.

Thank you!

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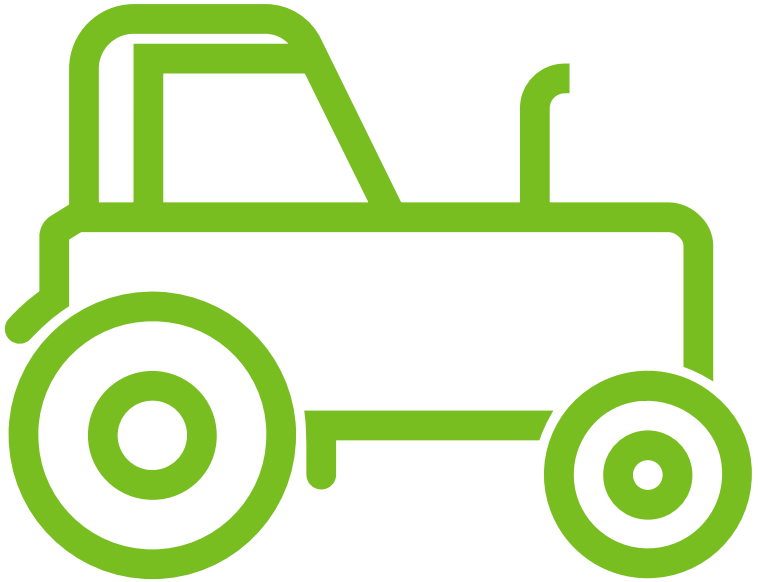
Pesticide Regulatory Updates

Haley Johnson | Pesticide Management Unit Supervisor

Topics for Today

- Chlorpyrifos status
- Dicamba products for 2026
- PFAS Regulations and Anticipated Impacts

Chlorpyrifos Products



All product labels in distribution will now reflect previously implemented restrictions.

Crops listed for use in MN:

- Alfalfa, soybean, sugarbeet, winter wheat.

*Applicators should be sure to have the updated label on hand when making applications to food or feed.

Dicamba Product Availability for 2026

- Dicamba products expected to be available for 2026 season
- Pending final confirmation from EPA
- Working with registrants and EPA to enact similar state specific restrictions as previous years:
  - Cutoff dates for use
  - Temperature cutoff

PFAS Regulations in Minnesota

2023

Laws passed requiring submission of data and prohibiting sale of products with intentionally added PFAS

1 Jan. 2026

Products from select categories (such as cleaning and fabric treatment products) will be prohibited from registration unless they obtain a Currently Unavoidable Use exemption

1 Jan. 2032

All products registration prohibition unless granted a Currently Unavoidable Use exemption

Looking Ahead – What to Expect

- Monitor EPA and MDA updates regularly
  - Chlorpyrifos and Dicamba
- Ensure label compliance before each application
- Potential product availability changes due to PFAS in 2032

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Thank you!

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