DEPARTMENT-WIDE NEONICOTINOID PESTICIDE POLICY

DNR Division of Fish, Wildlife and Parks Public Lands Team

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Overview

In July 2020, Drew Feldkirchner, Bureau Director for NHC, requested and received approval from the Division of Fish, Wildlife and Parks (FWP) Leadership Team to charge the FWP Public Lands Team with devising a strategy to phase out neonicotinoid use on DNR managed lands. The team charge is as follows:

1) Confirm that neonicotinoids are being used on department lands currently and provide a general scope of to what scale.
2) Evaluate phase out options and potential costs. The timeline for implementation should be fully vetted and recommended to leadership.
   a) Existing farming contracts can be honored, focus of implementation should be on future contracts.
   b) Document any concerns, pitfalls and unanticipated consequences to ag producers, customers, and internal operations.
   c) Consult with DATCP regarding policy impacts of this decision and communication considerations.
   d) Consult with Legal Services on proposed implications of recommended phased approach.
3) Evaluate any additions, edits or deletion to existing administrative rule, manual code or handbooks as part of the recommendation.

The responses to the charge are in the following document and include the final neonicotinoid (neonic) pesticide policy. In the future, the Pesticide Use Team will update the neonic policy and will provide guidance on the Pesticide intranet site.

Contacts

Wildlife Management	**Fisheries Management**
Anne Reis-Boyle, Public Lands Specialist	Paul Cunningham, Fisheries Ecologist
Mary C. Anderson, Conservation Ag and Grazing Specialist	**Forestry**
Natural Heritage Conservation	Teague Prichard, State Lands Specialist
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Craig Anderson, Parks Ecologist	

Neonicotinoid Policy (January 2021)

There are two ways in which neonicotinoid insecticides are applied on DNR lands: DNR Staff Application and Farming Agreement Application. These two tracks have different guidance.

DNR Staff Application

DNR staff may apply neonicotinoid pesticides for habitat management work or in places where insecticide use is exempt from manual code specifications (Established Facilities such as the Peninsula Golf Course, State Nurseries, Game Farm and buildings/structures) and Forest Certification practices. To be clear, pesticide use approval is not needed for recurring treatments at Established Facilities.

The Pesticide Use Team is currently undergoing revisions of manual code 4230.1 (Pesticide Use) and will have a discussion during the January/February 2021 biannual meeting about a neonic prohibition on all State land outside of current Forest Certification exemptions - e.g., State Nurseries, Golf Course, Buildings/Structure, Game Farm). In the meantime, a page on the current Pesticide Use Intranet page will be created that details the following:

- strongly encourages alternatives to neonic pesticides (these are generally not needed in the course of regular habitat management activities)
- shares the EPA interim decisions regarding the active registrations for 5 neonic pesticides,
- reminds staff to align insecticide use to target species,
- directs staff that all insecticides must be submitted for individual approval in WisFIRS, except when:
    - part of the general approval for ground nesting bees and wasps,
    - on or inside of structures, and
    - applied as recurring treatments at Established Facilities (as delineated in the pesticide use manual).
- allows for emergency use of neonicotinoids in case of forest health pest infestations through the Individual Approval process.

Farming Agreement Application

It is highly likely that neonicotinoid pesticides are used in some form on DNR farmland as a part of agricultural practices. Below is the guidance for existing farming agreements as well as new farming agreements.

For 2021 Transition Year Only

Existing Farming Agreements

- If farmland is not within Karner blue butterfly HPR/rusty patched bumble bee HPZ, nothing changes - neonic seeds are allowed until the current agreement expires.
- If farmland is within Karner blue butterfly HPR/rusty patched bumble bee HPZ, staff should discuss the issue with cooperators and make attempts to avoid use of neonic seed per the policy; this is especially important for sunflowers. Those who have been contacted directly to-date have reportedly been cooperative. Where absolutely necessary, the use of neonic seeds could be allowed to continue for the 2021 growing season.

New Farming agreements

- Staff should discuss the plan to eliminate neonics with their cooperators, so their cooperators can check with seed dealers regarding options. DNR staff can help locate viable seed sources if necessary. Where needed, rental payments could be adjusted to accommodate purchase of non-neonic seed.
- Where necessary because of timing (see staff concerns in Background section), a new contract or renewal of a previous contract could be established allowing neonics for the 2021 growing season but require non-neonic treated seed in 2022 and future years of the contract. Every attempt should be made to avoid use of neonics within HPR/HPZ areas.

For 2022 and beyond

Existing Farming Agreements

1) No neonic use if farmland is within a high potential range or zone (HPR/HPZ) of federally listed species, or coincident/adjacent to a state listed pollinator element occurrence.
   a) Staff will need to run through farming agreement stands/fields through the NHI Portal and Review process to determine if they fall within the HPR/HPZ of Federally listed, or other state listed, pollinator species.
   b) This new policy will require an amendment to existing contracts in the form of a memo that is signed by the cooperator and staff person implementing farming agreement (as per the farming agreement contract).
      i) Cooperators must proceed with an amendment or the farming agreement could be terminated if non-neonic seed sources cannot be procured.
      ii) The staff person administering the farming agreement can help cooperator find alternative sources of seed, if needed. Reach out to the Conservation Ag & Grazing Specialist for more guidance.
   c) Seed labels are required to be submitted to farming agreement staff administrator prior to planting every year.
   d) No emergency use of insecticides will be allowed in areas with federal or state listed pollinator species.

2) If farmland is not within a HPR/HPZ of a federally listed species, or coincident/adjacent to a state listed pollinator element occurrence, neonic treated seeds are allowed until agreement expiration.
   a) Cooperators should be encouraged to create an amendment to the agreement that prohibits neonic pesticides prior to their expiration date. This can be in the form of a memo that is signed by the Cooperator and the staff person implementing the farming agreement.
   b) Cooperators should reach out to their seed dealer in August or September ahead of the next year's growing season to procure seeds that are not treated with neonic pesticides.
   c) Any new contracts (renewals) with the same Cooperator will require non-neonic treated seeds and reactive neonic use must be approved by the Pesticide Use Approver (see "Emergency reactive use" below for details).
   d) Cooperators are encouraged to reach out to staff at the UW-Madison Integrated Pest and Crop Management Department for guidance on IPM practices and thresholds. See notes below regarding conversation with IPCM Department on page 21.

New Farming Agreements

1) No Neonic use (treated seeds or other application methods) for *any new* farming agreements.
    a. Seed labels must be submitted to the staff person administering the Farming Agreement every year prior to planting.
    b. Emergency reactive use (foliar spray, soil drench) may be allowed, if:
        i. IPM guidelines/thresholds have been met for insect infestation (see UW-Madison IPCM Guidance),
        ii. Cooperator/Farmer must obtain approval from the staff administering the Agreement and Pesticide Use Approver (PUA) based on IPM thresholds before using insecticides. Non-neonicotinoid pesticides are encouraged over neonics, but neonics are allowed for emergency reactive use if there are no alternatives.
            1. If approved, an amendment in the form of a memo is to be signed by cooperator and PUA,
            2. Amendment uploaded to LMS as documentation, and
            3. As with other pesticides applied under a farming agreement, enter information of neonicotinoid use into WisFIRS annually, including uploading the pesticide label and safety data sheet (SDS).

The goal is to be neonicotinoid free by 2025, which aligns with current expirations within LMS. Over the course of the next 5 years, staff should encourage non-neonic treated seed for existing contracts for earlier compliance to policy. We strongly support neonic-free amendments on farming agreements that go beyond 2022.

As a part of the new Farming Agreement training that will begin in January 2021, we will provide a separate presentation on neonicotinoid pesticides, as well as a 2-page handout for farming agreement cooperators and a 1-page handout for property/habitat managers. Please see the spreadsheet of WisFIRS farmland stands that fall within the high potential range/zone of Karner blue butterfly and rusty patched bumble bee.

FWP Division Leadership Team request for Neonicotinoid Policy

1) **Confirm that neonicotinoids are being used on department lands currently and provide a general scope of to what scale.**

    - See Current Department Use and Status Section below. In summary, while DNR staff do not use these pesticides widely or frequently, it is highly likely that neonicotinoid treated seeds are planted as a part of 250 row crop farming agreements, representing 5000+ acres across the state. Other applications of neonicotinoids may have also occurred on row crop farming agreements, but there is no historical evidence of this use.

2) **Evaluate phase out options and potential costs. The timeline for implementation should be fully vetted and recommended to leadership.**

    - **Existing farming contracts can be honored, focus of implementation should be on future contracts.**

        - This can be implemented with one significant caveat. There is DNR farmland that is within or adjacent to the high potential range/zone (HPR/HPZ) of rusty patch bumble bee and Karner blue butterfly, both federally listed pollinators/invertebrates – see map and list of farmland stands below.

        - We must discontinue use of neonics in these areas immediately to avoid unauthorized take of these species, and staff will need to conduct an NHI review for existing agreements so that any other element occurrences can be found and appropriate actions taken to mitigate and avoid take. While all staff must follow the ER Review manual code (1753.1), this step is often overlooked if the check is not built into the systems that manage that data associated with habitat management. In the 2021 version of LMS Farming Agreements module, the ER Review step is required in the field review section prior to activating a farming agreement.

    - **Document any concerns, pitfalls and unanticipated consequences to ag producers, customers, and internal operations.**

        - The main concern is the ability to source seeds that are not treated with neonics. We have heard from USFWS and other state Natural Resource agencies that their cooperators *have* been able to find seed, but the farmers need to coordinate with their seed vendors prior to August of the previous growing season.

        - DNR staff will need to add a seed label to the list of documents they collect from the cooperator/farmer.

- **Consult with DATCP regarding policy impacts of this decision and communication considerations.**

    - There is nothing preventing DNR from discontinuing use of neonicotinoids on DNR managed land as it relates to DATCP regulations. Greg Helmbrecht**,** DATCP Treated Seed/Seed Labeling expert, indicated there could be some concerns for farmers including decreased yield or pest infestations. DATCP and DNR will soon be reviewing and updating Wisconsin Natural Resources statewide water quality standards via a mandated triennial review process, and neonicotinoid standards will be considered (see Future Work section below).

    - DATCP and DNR agree that neonicotinoids pose significant threats to aquatic and terrestrial systems. Meghan Williams, Bureau of Water Quality, will be coordinating with DATCP on the triennial review process.

    - Depending on the scale at and extent to which cooperators practice Integrated Pest Management (IPM), there could be yield impacts; however, recent literature opposes this view (UW-Extension Professor Shawn Conley pers. comm; Krupke webinar 2017; Mourtzinis et al. 2019; Krupke et al. 2017). Our approach is to be reactive with pesticides when an already well-established IPM threshold of infestation has been met rather than using a prophylactic treatment that may not be necessary. UW-Extension Integrated Pest and Crop Management provides comprehensive documentation and consultation for farmers on these practices.

- **Consult with Legal Services on proposed implications of recommended phased approach.**

    - Legal Services staff state that nothing legally prevents us from implementing this policy. There is no state law that would require us to continue to use or discontinue use of neonicotinoids. Therefore, the department may institute this policy through our farming agreements, which are effectively contracts with another entity. A potential consequence is that non-compliance with this policy is then only considered a breach of contract rather than a breach of state law.

    - We are allowed to terminate farming agreements at any time, though we would want to work with the farmer to create an amendment when an agreement includes land with federal or state listed element occurrences. In those situations, we can consider revising the payment rate if necessary, though we are under no obligation to do so.

3) **Evaluate any additions, edits or deletion to existing administrative rule, manual code or handbooks as part of the recommendation.**
    - Manual code 4320.1 will need to be updated with new language.
    - A section on neonicotinoids will be added to the pesticide Sharepoint site.
    - Farming agreement policy and documentation will need to be updated to provide guidance to staff on neonicotinoid policy.

Background and Context

Background

Neonicotinoids (neonics) are a class of insecticides used in many agricultural seed coatings, and soil, foliar and bark treatments, to control sucking, piercing and chewing insects like aphids, thrips, fleabeetles, cockroaches, whiteflies, white grubs, tree fruit pests and more. These chemicals are broad-spectrum neurotoxicants that kill insects by affecting their central nervous system through the nicotinic acetylcholine receptor, causing paralysis and death. When used in seed coat treatments, the residue is incorporated into all parts of the plant, including pollen and nectar. While these pesticides are less toxic to mammals (but note recent research on neonics and WTD), the disadvantage is that they are extremely effective at killing insects at low dose rates, including beneficial insects like pollinators. There is some evidence that birds and fish are also adversely affected (see reference list at the bottom of this memo). Recently, DATCP conducted a review of these chemicals in surface and groundwater in order to set limits on allowable concentrations, and there are other inter-department and agency research efforts ongoing in this area. While not a part of this Charter, there are other classes of insecticides that are also detrimental to pollinators, including sulfoxaflor, pyrethroids, and organophosphates (Beyond Pesticides), and thus, there is a need to conduct a separate review of these additional groups of insecticides to best protect pollinators.

Current Legal Status (Federal and State) and Forest Certification Policy

There are seven neonicotinoids commonly used in agriculture. These include acetamiprid, clothianidin, dinotefuran, imidacloprid, nitenpyram, thiacloprid and thiamethoxam. DATCP (2019) has not registered any pesticides containing nitenpyram and thiacloprid for use in Wisconsin. One product containing thiacloprid was registered, but the registrant voluntarily canceled the registration in 2016. The EPA has approved interim guidelines for pesticide registrations that contain the following five neonicotinoid insecticides: acetamiprid, clothianidin, dinotefuran, imidacloprid, and thiamethoxam.

The interim decisions/guidelines are as follows:

- management measures to help keep pesticides on the intended target and reduce the amount used on crops associated with potential ecological risks;
- requiring the use of additional personal protective equipment to address potential occupational risks;
- restrictions on when pesticides can be applied to blooming crops in order to limit exposure to bees;
- language on the label that advises homeowners not to use neonicotinoid products; and
- cancelling spray uses of imidacloprid on residential turf under the Food Quality Protection Act (FQPA) due to health concerns.

In addition to the EPA status, the department also follows the pesticide use guidelines for forest certification for two organizations. The Forest Stewardship Council® (FSC®) maintains a list of highly hazardous pesticides (HHP) as part of their pesticide policy. This list has three categories: prohibited, highly restricted and restricted. At this time, thiacloprid is the only *prohibited* neonicotinoid on the list, but as noted above, it is not currently registered for use in Wisconsin. Acetamiprid and imidacloprid are both FSC® *restricted* pesticides, and thus, require an individual approval for pesticide use under DNR manual code (see DNR Pesticide intranet page). Note that clothianidin, imidacloprid and thiamethoxam are used in seed coats for agricultural purposes, the most likely use of neonics on farmlands. Also note that all pyrethroids and organophosphates are listed as highly restricted on the FSC HHP. Table 1 below contains information for 6 neonicotinoids, example trade names, targets, application methods and status with various regulatory agencies.

Table 1. Registered neonicotinoids, trade names, approved application on, application method and legal statuses for FSC, EPA and European Union (EU).

Pesticide	**Example Trade Name(s)**	**Application on**	**Application Method**	**FSC List**	**EPA Status**	**EU Status**
Acetamiprid (CAS # 135410-20-7)	Assail, Chipco, Pristine	fruit, leafy vegetables, cole crops, sweet corn, beans, ornamentals, cotton, turf, greenhouse	Foliar and soil	Restricted	Interim Decisions	Banned (France)
Clothianidin (CAS # 210880-95-5)	Poncho 600, Belay	Corn, soybean, canola; fruiting and leafy vegetables, snap beans, potatoes	Foliar, seed and soil	N/A	Interim Decisions	Banned
Dinotefuran (CAS # 165252-70-0)	Safari, Venom	Fruiting & Leafy vegetables; used in Vet Medicine, turf, greenhouse	Foliar and soil	N/A	Interim Decisions	

Pesticide	Example Trade Name(s)	Application on	Application Method	FSC List	EPA Status	EU Status
Imidacloprid (CAS # 138261-41-3)	Admire, AmTide, Gaucho, Imicide Tempest	Corn, soybean, root, leaf & fruiting vegetables, legumes, herbs, fruits	Foliar, seed, and soil Vet medicine, Tree diseases, pests	Restricted	Interim Decisions	Banned
Thiacloprid CAS # 111988-49-9		Cotton, pome fruits	Soil, foliar	Prohibited	Inactive (8/6/14)	Banned
Thiamethoxam CAS # 153719-23-4	Actara, Adage, Calypso, Centric, Cruiser, Cruiser Maxx, Endigo, Meridian	Corn, soybean, snap beans, Fruiting & leafy vegetables, cucurbits, herbs, brassicas, roots and tubers, turfgrass and ornamentals	Foliar, seed, and soil; Wood Treatment	N/A	Interim Decisions	Banned

Previous DNR Neonicotinoid Policy

Current DNR manual code or farming agreement policy makes no mention of neonicotinoids. The pesticide manual code 4230.1 is currently being revised and is slated for approval in 2021. Current pesticide policy only limits neonicotinoid use through the FSC HHP list. Those pesticides that are *prohibited* cannot be used anywhere by anyone; those that are *highly restricted* or *restricted* can be used through an individual approval process if staff are applying the pesticide or under a farming agreement with no pre-approval. The farming agreement administrator (i.e., property manager or habitat manager) should work with farmer on pesticide choice/decisions before the planting season so that prohibited pesticides are not bought/used. Current policy references using alternatives to highly restricted and restricted pesticides, though there is not a dynamic tool that helps staff find less toxic pesticides. The farming agreement policy does not reference specific insecticides and the current dove plot policy encourages the use of the Clearfield Sunflower system in which the sunflower seeds are treated with thiamethoxam and three fungicides.

Timeline of effort to discontinue neonicotinoid use at Wisconsin DNR

In 2016 the Midwest Association of Fish and Wildlife Agencies (MAFWA) passed a resolution to *"encourage additional evaluation about discontinuing the use of neonicotinoids on those State managed lands under their authority, while concurrently pursuing and investigating wildlife-friendly alternatives as available and practical."* The state directors recognized that a sudden ban on neonic use would cause a disruption in established land management practices and advocated a phased in approach to reducing the use of neonics on state lands.

MAFWAJoint Neonic Resolution 2

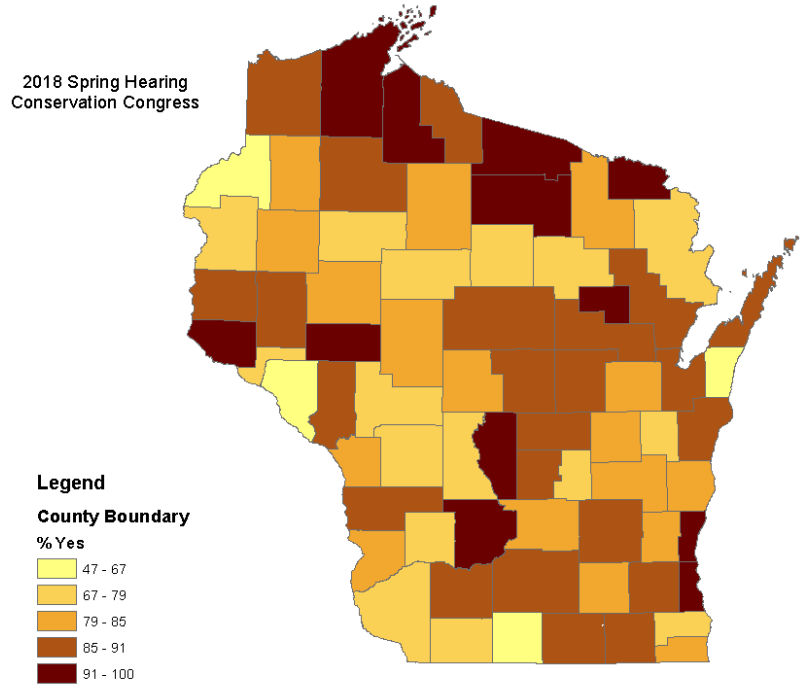
A department ad hoc team was formed in August of 2016 that included Tami Ryan, Mark Witecha, Sean Strom and Jay Watson, to develop a phased out approach to discontinuing neonicotinoid use on DNR managed land. Due to staff turnover and the strategic alignment process, this effort did not go beyond on initial scoping phase. An email containing an outline of those efforts is embedded here.

RE_ Neonics.msg

In 2018, the Conservation Congress voted on Spring Hearing questionnaire Question 45. ***"****Should the Conservation Congress work with the DNR, NRB and Wisconsin Legislature to take up the "Saving Wisconsin Pollinators Act," and include specific language to ban the use of neonicotinoid insecticides (dinotefuran, clothianidin, imidacloprid and thiamethoxam) regardless of application method on all state owned agricultural and forest lands, and establish limited use guidelines for continued use on commercial and private agricultural lands?*

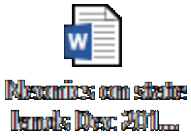
The statewide results show that the majority in 71 counties, and 85% of respondents statewide, said yes to the question (Figure 1). The only county in which the majority voted no was Buffalo County.

Figure 1. Percent of conservation congress members voting yes in response to Question 45 on the 2018 Spring Hearing Questionnaire.



In September 2019, State Representative Dianne Hesselbein, 79th Assembly District, asked for comment on three bills that would 1) eliminate use of neonicotinoids on state lands; 2) prohibit the sale of neonics; and, 3) support pollinator protection on roadsides. Forestry had the opportunity to comment and stated that certain neonicotinoids (i.e., imidacloprid) would need an exemption for controlling forest pests (specifically hemlock wooly adelgid). After DNR comments, there has been no further communication. The legislation has apparently not advanced in the legislature. Representative Hesselbein's recent legislative proposals do not have any reference to neonicotinoids: https://docs.legis.wisconsin.gov/2019/legislators/assembly/1873.

Kent Van Horn, Wildlife Management Chief for the Birds and Habitat Section, compiled information regarding neonicotinoid pesticides in response to Representative Hesselbein's effort to apprise FWP Division Leadership of the concerns regarding discontinuing neonicotinoid use on department lands. The summary of Kent's information is attached below.



During the 2019 in-person and virtual 2020 meetings of the Midwest Association of Fish and Wildlife Agencies (MAFWA) public land working group, the members addressed neonicotinoid prohibition on state managed lands in their report to the MAFWA Directors. Since that time, Indiana, Nebraska, Missouri and Minnesota have banned neonicotinoid pesticides on their state managed land, including for farming agreements with private producers. Other states are in the process of discontinuing neonic use (Table 2). During an October 15, 2020 virtual MAFWA Public/Private Lands Working Group meeting on neonics, Wisconsin learned the following:

- MN is prohibiting all insecticides on state owned lands (wildlife areas and others), not just neonicotinoid insecticides. We recommend this approach in future years due to the severity of pollinator impacts with all insecticides.
- NE banned use of neonic treated seed. This was a three-year phase out period starting in 2016. Farmers are not allowed to use them in agricultural farming agreements. Farmers have had no problems finding the seed. NE DNR receives seed donations from White Tails Unlimited and requires seed to be untreated. NE didn't lose a single cooperator with the neonicotinoid prohibition. One tenant voiced concern. They sent a letter to every tenant--explained the importance and negatives of neonics. NE DNR took active role in helping source seed and sometimes purchased the seed. Biologists would do spot checks.
- IN stopped using neonics 3 or 4 years ago. It was a phased approach. They started with no neonic treated soybeans. Now they are neonic free across the board. Most farm contracts are four years; started with the neonic-free policy when new contracts took effect. Not too hard to find the seed, but farmers do have to get started on it earlier. No tenant farmers lost. Issue--not out monitoring every farmer; there is a little enforcement. Need to have enforcement, seed receipts. No way to guarantee at this point.

Table 2. MAFWA States' Progress on Discontinuing Use of Neonicotinoid Insecticides

State	**Wildlife Areas/Farmland**
Illinois	Soybeans only, still working on corn
Indiana	**Prohibited neonics**
Iowa	No prohibition
Kansas	No prohibition
Kentucky	No prohibition
Michigan	No prohibition
Minnesota	**Prohibited All Insecticides**
Missouri	**Prohibited neonics (3rd hand)**
Nebraska	**Prohibited neonics, 3 year phase out**
North Dakota	In process
Ohio	Prohibited neonics in 2021
South Dakota	In process (by 2021)

The states that have prohibited neonicotinoid insecticides have indicated that it is not difficult to source non-neonic treated seeds if the cooperator reaches out to seed vendors in August or November of the previous growing year. While some states lost at most a handful of cooperators, others found that this did not inhibit the ability to bid out or find cooperators to farm state land.

Other Agency Neonicotinoid Policies

We also reached out to the U.S. Fish and Wildlife Service to ascertain the use of neonics on National Wildlife Refuges (NWR). We spoke to Cathy Nigg, Supervisor for Region 3 who shared neonicotinoid policy for NWRs. Neonicotinoid pesticides are prohibited in the farming contracts for these NWRs. Cathy provided the requirements for pesticide use related to neonicotinoids on NWR lands:

> *8. Neonicotinoid treated seed guidance:*
>
> *A. Refuge Managers will exhaust all alternatives before allowing the use of neonicotinoid treated seeds on National Wildlife Refuge System Lands in 2014 and 2015.*
>
> *B. Refuge managers need to eliminate the use of neonicotinoid treated seed on National Wildlife Refuge System Lands in Region 3. The strategy is to start the transition in calendar year 2014 and be "neonicotinoid seed free" in calendar year 2016. In 2014 and 2015 there will be some flexibility for the transition and take in to account the availability of non-treated seed. During the two transition years refuge managers will need to have an approved pesticide use policy (PUP) before allowing the planting of neonicotinoid treated seed on refuge lands under their management. Please give special attention to the "justification" section of the PUP. The PUP will become part of the official record and should clearly state the need to use treated seed during this transition period. Refuge Managers must provide justification to the Area Supervisor and receive written concurrence prior to initiating a PUP for the use of neonicotinoid treated seeds.*
>
> *C. All crop seeds treated with neonicotinoid chemicals must be planted (incorporated) beneath the soil surface due to having a high toxicity to birds. No residue seeds can be left above ground. Any treated seeds that are spilled and/or left above ground at the time of planting must be picked-up and removed or replanted underground immediately. The refuge/district must conduct random field spot checks at the time in which these treated seeds are planted in order to best ensure that the treated seeds are planted beneath the soil surface. To accommodate this process, any Region 3 field station that uses neonicotinoid treated seed must complete a Region 3 Treated Seed Incorporation Monitoring Statement. This Statement will document that all treated seed has been incorporated beneath the soil surface, thus adhering to Service policy. This guidance also applies to fungicide treated seed as indicated in the Region 3 Pesticide Use Policy.*
>
> *D. Seeds treated with neonicotinoid chemicals are listed as toxic to aquatic invertebrates. Therefore, field stations using neonicotinoid treated seeds must develop specific Best Management Practice guidelines to be included in the submitted PUP and implemented in the special use conditions of the SUP.*

E. Seed treatment chemicals cannot be mixed or applied to the crop seeds on refuge/district lands. Seeds must be treated off-site.

F. Neonicotinoids are a class of insecticides chemically similar to nicotine. They are marketed and distributed in various forms including sprays, powders and seed treatments. Trade names containing neonictinoids may include (but are not limited to) Acceleron®, Acetamiprid®, Actara®, Adage®, Adjust®, Admire®, Advantage®, Alpine®, Arena®, Assail®, Belay®, Calypso®, Celero®, Centric®, Clutch®, Confidor®, Cruiser®, Dinotefuran®, Encore®, Flagship®, Gaucho®, Helix®, Inside®, Intruder®, Ledgend®, Merit®, Meridian®, Nipsit®, Platinum®, Poncho® , Pravado®, Premise®, Regent®, Safari®, Scorpion®, Titan®, Touchstone ®, Tristar®, and Venom®.

Active ingredients include: acetamiprid, clothianidin, dinotefuran, imidacloprid, nithiazine, sulfoxaflor, thiacloprid, and thiamethoxam.

9. Refuge manager may require permittee to provide notification prior to all pesticide applications.

10. Refuge manager should evaluate posting of fields after pesticide application.

We corresponded directly with Scott Gulp and Chris Trosen, both NWR managers, in Illinois and Wisconsin, respectively. Scott Gulp provided this background for Illinois:

> *We had pretty much eliminated farming on our District before our new policy so I have not had a lot of experience negotiating with landowners. I think Bruce Freske and staff at Morris have a lot more experience working with producers to implement this. Also, PF has quite a bit of experience as they negotiate the farming contracts on the land they buy for us and they implement our policy on these lands while they own them prior to donating them. In our cases, the producers are usually only going to farm it for one more year, so they do not push back much other than having trouble finding the seed. If its a long term farming agreement it is probably harder to work with the producers.*
>
> *We no longer use farming at all. No food plots (Thank Goodness, I hate them) and when we do grassland conversions, we use a combination of tillage and herbicides (Roundup®) to get control of exotic cool season grasses before we reseed to diverse natives. With the Outdoor Amendment and our partners we have plenty of money to do the restorations. The reason we did use farming in the past was lack of funds. The only farming that we have now is on our new acquisitions and we don't close and take ownership of them until the farming is over.*
>
> *The biggest hurdle I hear about is in regards to herbicide use or the difficulty in finding seed that has not been treated with Neonics.*

Chris Trosen provided this background for Wisconsin:

> *We do not allow Neonics or any other "stacked" seed to be used on WPAs for farming activities. Farmers may only use Roundup® ready crops. We allow roundup ready crops to gain weed control. When we converted, I think all we did for outreach was a press release when our Compatibility Determination was drafted and out for public review. We had really no push back at all. Our agency is a "Wildlife First" agency so if they don't want to use Roundup Ready Only then, then they don't have to bid on opportunities to farm on Waterfowl Production Areas. Furthermore, from what I understand, farmers only need neonic seed one out of every 10 years when spring soil is cool and wet preventing seeds from germinating. Slow germination rates mean more time for seed insects to feed.*
>
> *One issue we did have was when we buy property that still has several years of farming left on it. If the seed for the year was already purchased, then we allowed them to use what they ordered. But the subsequent years that remain in their contract must use roundup ready seed only. I had one instance where we bought farmland before seed was planted in the spring. I simply asked the farmer if he could exchange the "stacked" neonic seed he ordered with Roundup Ready. He made a phone call while I stood there and was able to modify his order without a problem. To date, I've not heard from any of our*

cooperative farmers about their inability to find Roundup Ready "ONLY" seed. If they say they can't, I ask for the name and number of their seed vendor.

We also reached out to the UW-Extension Integrated Pest and Crop Management Program to discuss discontinuing the use of neonicotinoids on DNR managed lands. Shawn Conley provided information in the following embedded meeting notes. Essentially, farmers should reach out to UW-Extension IPCM for guidance on pest management practices that reduce the need for insecticides. Farmers will need to source seeds in August-November so that they can be obtained without neonic treatments. They can reach out to their current seed vendor for help or their local cooperative.

Conley neonic mtg 19Nov2020.docx

Current Department Use and Status

All pesticide use on DNR managed lands, including by contractors and farmers renting DNR farmland, must be reported on an annual basis. A review of pesticide applications from 2008-2019 indicates 12 instances in which pesticides with neonic active ingredients (thiamethoxam, imidacloprid and acetamiprid) were applied (Table 3). Seven of the reports were for Peninsula golf course (thiamethoxam and imidacloprid on 'other' target species), four were wildlife or fisheries areas (Grassy Lake, Evansville, Paradise Valley and Big Spring Creek), and one was a state park (Blue Mound). See the attached spreadsheet for use of pyrethroids on state lands (no organophosphates were applied during this time). For all insecticides mentioned in this memo, target species reported in the former pesticide use reporting database do not always align with target on label.

Query by Target_Pyrethroids.x

Table 3. Location, Year, County Name, Trade Name, EPA #, Pesticide Name, CAS Number and Targets for each neonicotinoid pesticide used on DNR managed land.

Main ID	Site Name	Year	County Name	Trade Name	EPA Reg Num	Pesticide Name (Active Ingredient)	CAS number	Target Common Name
51	Peninsula State Park Golf Course	2007	Door	Merit 75 WSP	432-1318	Imidacloprid	138261-41-3	Other
117	Grassy Lake Wildlife Area	2008	Columbia	Transport GHP	8033-96-279	Acetamiprid	135410-20-7	Quack Grass, Common Ragweed
206	Peninsula State Park Golf Course	2008	Door	Meridian 25WG	100-943	Thiamethoxam	153719-23-4	Other
825	Peninsula State Park Golf Course	2009	Door	Meridian 25WG	100-943	Thiamethoxam	153719-23-4	Other
910	Peninsula State Park Golf Course	2009	Door	Merit 75 WSP	432-1318	Imidacloprid	138261-41-3	Other
3263	Big Spring Creek Fishery Area	2013	Grant	Endigo ZC	100-1276	Thiamethoxam	153719-23-4	Smooth Brome, Quack Grass, Giant Ragweed, Reed Canary Grass, Common Ragweed, Other
6613	Blue Mound State Park	2015	Iowa	Avenger Bold S3	89168-34-91395	Imidacloprid	138261-41-3	Boxelder

Main ID	Site Name	Year	County Name	Trade Name	EPA Reg Num	Pesticide Name (Active Ingredient)	CAS number	Target Common Name
6886	Peninsula State Park	2017	Door	Meridian 25WG	100-943	Thiamethoxam	153719-23-4	Numerous Annual Species
8504	Peninsula State Park	2018	Door	Meridian 25WG	100-943	Thiamethoxam	153719-23-4	Other
9997	Paradise Valley Widlife Area	2019	Waukesha	CruiserMaxx Vibrance Pulses	100-1563	Thiamethoxam	153719-23-4	Numerous Herbaceous Species
9948	Evansville Wildlife Area	2019	Rock	Tempest	279-3459-5905	Imidacloprid	138261-41-3	Numerous Annual Species

The review of the pesticide reporting from the last 11 years indicates that neonicotinoids are not widely or frequently used by staff or externals in spray or foliar applications. It could also mean, however, that neonicotinoid use has not been adequately reported. In addition, target species do not align with label use possibly indicating either the wrong pesticide or target was entered into the database.

The main concern is the use of neonicotinoid treated seeds planted as a part of row crop farming agreements and for dove fields on DNR managed land. There could also be neonic treated seeds in habitat seed mixes that are not reported in any database system. Corn and soybean seeds are largely treated with neonicotinoids, as well as sunflowers (used for dove fields). According to July 2020 WisFIRS data, there are over 15,000 acres of farmland owned by DNR. The WisFIRS definition of farmland is the following: “Sites actively used to produce field crops including, but not limited to, grains, livestock forage, fruits, vegetables, and wildlife food plots. Examples include corn, soybeans, alfalfa, and mixed species hay. Alfalfa/hay is only considered agricultural land if part of a crop rotation, permanent hay is considered cool season grass.”

While WM staff have been required to use Land Management System for farming agreements since 2014, other programs were encouraged to use the system but not required. Starting in 2021, all programs will be required to use the LMS Farming Agreement module. It is unknown how many farming agreements are not in LMS. In 2020, Land Management System data indicated 134 properties with 388 row-crop farming agreements. These row crop agreements typically include crops such as corn, soybean, wheat, oats, and alfalfa. There are only a handful of acres of sorghum, rye, peas, millet, clover or barley ('S,R,P,M,C,B' below). There 298 row-crop only agreements on 7,833 acres for 2020. Table 4 below provides the breakdown of the number of agreements and acres per commodity.

Table 4. Number of Agreements and Acres for each commodity/crop grown on DNR managed land for 2020.

Crop	Agreements	Acres
Corn	126	3,372
Soybeans	88	2,640
Sunflower	18	137
Alfalfa	18	688
Wheat	13	191
Oats	10	105
S,R,P,M,C,B	4	41
Mixed food plot	4	18
Other	17	641

In 2020, the majority of DNR managed land farmland acres under a farming agreement are planted with corn and soybean (77%). While pollinators may not be visiting corn in particular (see Kent Van Horn's summary of discussion with State Agronomist), it is possible that they visit soybean flowers even though soybeans are self-pollinated. While we do not know if farmers are using neonicotinoid treated seeds, it is likely that many are given the agricultural industry's high use of these pesticides in seed coats (Kleinschmit and Lilliston, 2015). There is only a small acreage planted in sunflower but using the Clearfield Sunflower System is likely causing harm in these fields. A recent export of existing contracts shows that many of them will expire in the next couple of years as well as be fully expired by 2025 (Table 5). Many of these will be renewed and will extend the contracts for another few years. A recent study in Indiana found that neonic use and related pesticide drift during planting was so prevalent that "94% of honey bee foragers throughout the state of Indiana are at risk of exposure to varying levels of neonicotinoid insecticides" (Krupke et al. 2017; Krupke webinar 2017).

Table 5. Number of row crop agreements by expiration year.

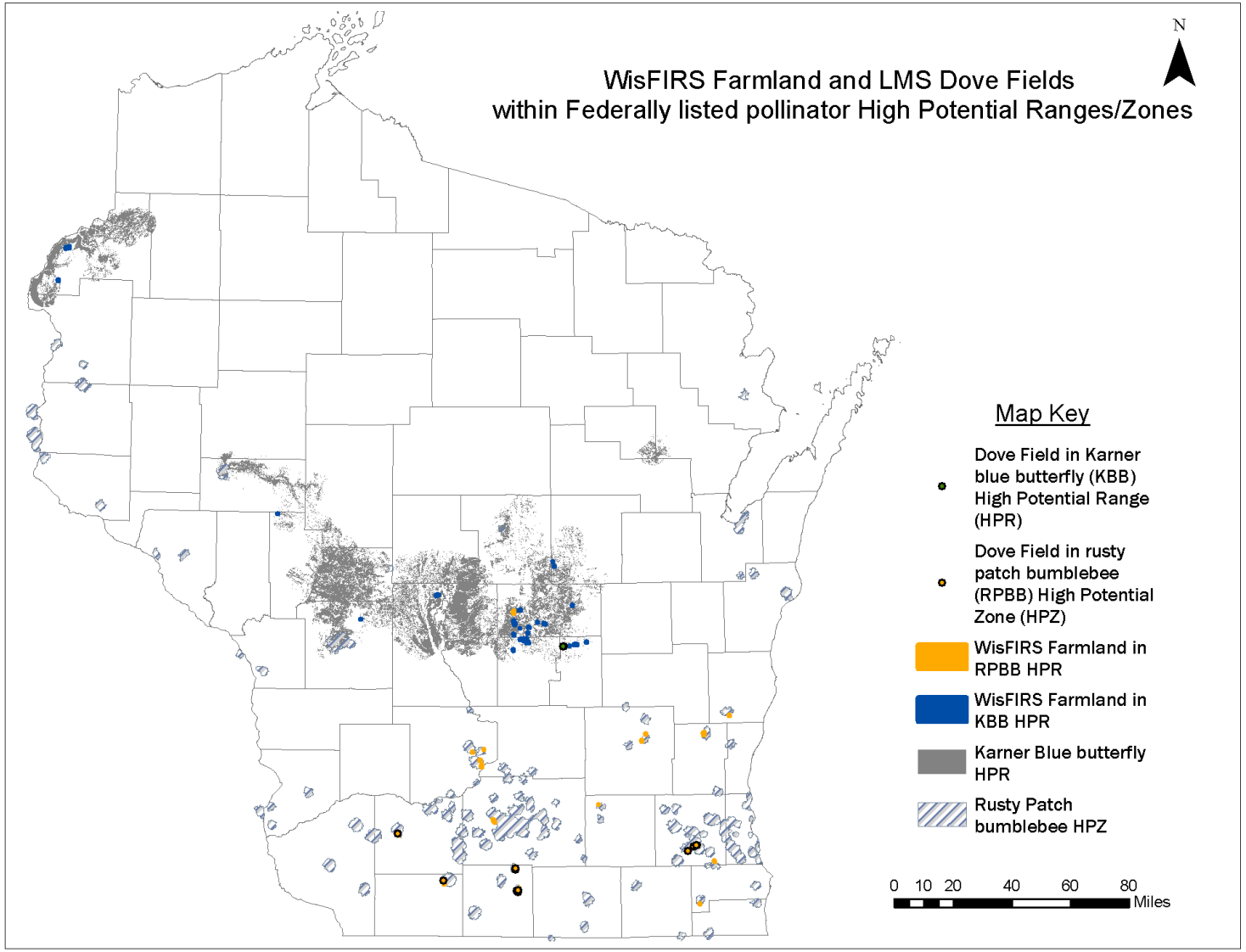
Expiration Year	Rowcrop # of Agreements
2020	141
2021	103
2022	73
2023	47
2024	32
2025	23

Federally Listed Species High Potential Range/Zone

Planting neonic treated seeds may cause unauthorized take of federal and state endangered/threatened species if planted in high potential ranges for Karner blue butterfly, rusty patch bumble bee or other state listed species. A spatial review of WisFIRS farmland stands and LMS dove fields indicates 85 WisFIRS stands and 21 dove fields are within the high potential range/zone of Karner blue butterfly and rusty patch bumblebee. A spatial representation can be seen in the map below (Figure 2) and a list of farmland stands can be found in the embedded spreadsheet. Staff should review the spreadsheet to determine if any of their current farming agreements are within these high potential ranges/zones.

WisFIRS_stands_within_FederalHPR.xlsx

Figure 2. WisFIRS Farmland and LMS Dove Fields within federally listed pollinator high potential ranges/zones.



Future Work

In accordance with state water quality law, the DNR Bureau of Water Quality reviews drinking and surface water standards on a triennial basis and is in the process of updating the 21-23 standards. A public hearing was held on November 16, 2020 with rankings of topics due by December 4, 2020. Neonicotinoid insecticides criteria development is one of 14 topics to be ranked by the public and DNR. The neonicotinoid topic description is below:

> *Neonicotinoid insecticides like clothianidin, imidacloprid and thiamethoxam are used extensively in Wisconsin agriculture. Their use has been implicated in global reductions in pollinator populations and they are thought to be similarly toxic to aquatic invertebrates. The EPA's Office of Pesticide Programs (OPP) released revised aquatic life benchmarks for aquatic invertebrates for clothianidin and imidacloprid in 2016 and thiamethoxam in 2017. Similarly, Wisconsin's DHS released recommended groundwater standards for all three neonicotinoids in 2019. Although aquatic life benchmarks are not water quality criteria, the data contained within OPP's risk assessments undergo rigorous peer-review and can be used to develop water quality criteria for the protection of aquatic life. Given that neonicotinoids have been detected with increasing frequency in Wisconsin groundwater and surface water, particularly in the Central Sands region of the state, the DATCP has recommended that the DNR review OPP's aquatic life benchmark data to determine whether it is possible to develop surface water criteria.*

There are 5 steps in the triennial review process and the Water Quality Program is currently on Step 4, which is to use public input to help prioritize topics and draft a workplan for the next three years (2021-2023). There will likely be input needed from the Division of Fish, Wildlife and Parks in this review process, as well as coordination with the Water Quality Program on neonicotinoid impacts and standards.

The Pesticide Use Team will continue to review all pesticide use on an annual basis and will provide guidance as new standards are created. The newly formed Agriculture Policy and Use Committee will also work with the Pesticide Use Team to ensure DNR farmland is managed with sound conservation agriculture practices.

References

1. Beyond Pesticides. 2020. Chemicals Implicated. BEE Protective: Pollinators and Pesticides. Accessed October 2020.
2. Forest Stewardship Council. 2019. FSC lists of highly hazardous pesticides. Accessed October 2020.
3. Kleinschmit, J and B Lilliston. 2015. Unknown benefits, hidden costs: neonicotinoid seed coatings, crop yields and pollinators. Institute for Agriculture and Trade Policy. Accessed October 2020.
4. Mourtzinis, S., Krupke, C.H., Esker, P.D. et al. Neonicotinoid seed treatments of soybean provide negligible benefits to US farmers. Sci Rep 9, 11207 (2019)
5. C. H. Krupke J. D. Holland E. Y. Long B. D. Eitzer. Planting of neonicotinoid-treated maize poses risks for honeybees and other non-target organisms over a wide area without consistent crop yield benefit. Journal of Applied Ecology 54(5), pp. 1449-1458 Oct 2017.
6. Wisconsin Department of Agriculture, Trade and Consumer Protection. 2019. Neonicotinoid pesticides in Wisconsin groundwater and surface water. Accessed October 2020.

Resources

Xerces Society Report | http://xerces.org/publications/scientific-reports/how-neonicotinoids-can-kill-bees

Numerous personal communications listed in body of document.

Webinar: Christian H. Krupke, Ph.D., Professor, Department of Entomology, Purdue University, West Lafayette, IN, 2017: Neonicotinoid Insecticides: Efficacy, Non-target Effects, and Best Management Practices; Sponsored by: USDA NRCS Science and Technology

Devita, William. In progress. Integrative monitoring of neonicotinoid insecticides in baseflow-dominated streams on the Central Sand Plain. UW-Stevens Point, Center for Watershed Science and Education, Water and Environmental Analysis Laboratory.

Drew Feldkirchner, NHC Bureau Director, recently compiled studies that indicate not only negative impacts on pollinators, but also birds and fish below:

- Bird migration and feeding (summarized)
- Fisheries
- Captive white-tailed deer
- Groundwater and Surface Water (DATCP has a full report dated July 2019)