July 29, 2026

Molly Darlington
Research Scientist | Pesticide Technical Unit
Minnesota Department of Agriculture
625 Robert Street North
St. Paul, MN 55155

To Whom It May Concern,

The Pollinator Stewardship Council (PSC) appreciates the opportunity to submit comments in response to the Minnesota Department of Agriculture's request for public input on whether Minnesota Rules Chapter 1505 adequately protects the state's natural resources from pollution, impairment, or destruction resulting from the use of neonicotinoid-treated seed.

PSC has worked on pesticide policy and pollinator protection for more than twenty-five years on behalf of commercial beekeepers throughout the United States. Our organization collaborates with leading researchers, commercial beekeepers, farmers, universities, and state and federal agencies to improve pesticide policy through sound science. We strive to educate beekeepers, farmers, and community members about the importance of ensuring a vital vigorous pollinator base throughout the United States. PSC members have participated in state and federal advisory committees, including Minnesota Governor Mark Dayton's Pollinator Protection Committee, and have worked extensively with EPA, USDA, and state pesticide regulatory agencies on issues affecting pollinator health and agricultural sustainability.

PSC concludes that Minnesota's existing regulatory framework does not adequately protect Minnesota's natural resources from pollution associated with neonicotinoid-treated seed. While Minnesota regulates pesticide products, applicator certification, and pesticide storage and handling, the widespread use of treated seed creates a significant regulatory gap once pesticides are applied to seed. Existing regulations provide little authority to monitor treated seed use, quantify environmental contamination, assess cumulative ecological impacts, or adequately investigate pollinator exposure resulting from this extensively used method of pesticide delivery.

Over the past two decades, an extensive body of peer-reviewed scientific research has documented contamination of soils, groundwater, wetlands, surface waters, non-target vegetation, aquatic ecosystems, and wildlife resulting from widespread prophylactic use of neonicotinoid-treated seed. Our current scientific knowledge of these compounds is substantially different than when treated seed first entered widespread commercial use.

When neonicotinoid seed treatments were first introduced in the late 1990s, they were promoted as a targeted technology that would reduce pesticide applications while protecting crops from early-season insect pests. Subsequent research has demonstrated that this assumption was overly optimistic and deeply flawed. Perhaps the most important finding is that only a small fraction of the insecticide coating is actually absorbed by the crop. Research estimates that approximately 95% of the active ingredient applied to treated seed disperses into the surrounding environment, contaminating soils, planter dust, surface water, groundwater, and adjacent vegetation rather than remaining within the crop itself. (Wood et al, 2017)

Because neonicotinoids are highly water soluble and persistent, they readily move through agricultural landscapes. Bonmatin et al. (2015) documented that some compounds remain in soils for hundreds of days—and in some cases more than 1,000 days—allowing residues to accumulate with repeated annual applications. This persistence increases the potential for movement into wetlands, drainage systems, streams, and groundwater long after planting has occurred, providing exponential exposure to pollinators, insects, fish, birds, and humans. Minnesota-specific research confirms these concerns. Goedjen et al. (2024) documented the widespread occurrence of neonicotinoids and fiproles in Minnesota groundwater, demonstrating that treated seed has become a measurable source of environmental contamination within the state. Rather than remaining confined to agricultural fields, these compounds have entered natural water resources used by aquatic organisms and, in some cases, drinking water supplies.

The ecological consequences extend well beyond honey bees. The Worldwide Integrated Assessment of the Impacts of Systemic Pesticides concluded that neonicotinoids present significant risks to pollinators, aquatic invertebrates, soil organisms, birds, and ecosystem functioning. (van Lexmond et al, 2015) The increasing ecological burden of these insecticides is reflected in broader pesticide use trends. A landmark study coauthored by Dr. Susan Kegley, a member of the Pollinator Stewardship Council's Scientific Advisory Board, estimated that the acute oral toxicity loading of insecticides applied to U.S. agricultural land increased approximately 48-fold between 1992 and 2014, with neonicotinoid seed treatments accounting for nearly all of that increase. (DiBartolomeis et al., 2019) These findings collectively demonstrate that environmental exposure from treated seed is not theoretical—it is measurable, persistent, and well documented.

Scientific evidence also calls into question whether routine prophylactic treatment of corn and soybean seed provides benefits proportional to the environmental costs. Following a comprehensive review commissioned by New York State, Cornell University researchers evaluated decades of field studies examining treated seed performance. Their analysis found that 87–93% of corn trials and 82–89% of

soybean trials showed no significant yield benefit from neonicotinoid-treated seed compared to untreated seed or alternative management approaches. (Grout et al., 2020) These findings are particularly important because prophylactic treatment has become the default management practice rather than a response to demonstrated pest pressure. Integrated Pest Management principles have historically emphasized treating pests only when economically justified. Routine treatment of nearly every acre regardless of pest presence represents a significant departure from those principles.

Notably, jurisdictions that have adopted stronger restrictions—including the European Union, Ontario, Quebec, New York, and Vermont—have demonstrated that reducing reliance on neonicotinoid-treated seed is compatible with productive agriculture when integrated pest management and alternative practices are employed.

For many Minnesota beekeepers, the environmental concerns associated with neonicotinoid-treated seed are not new discoveries but the continuation of concerns first raised more than two decades ago. Long before the scientific literature documented many of these exposure pathways, beekeepers observed declining colony health, reduced honey production, abnormal bee behavior, and increased hive mortality. Because the insecticide was applied to the seed before planting, rather than sprayed during the growing season, the source of exposure was difficult to identify and largely absent from traditional pesticide application records.

Minnesota beekeeper Dale Bauer was among those early beekeepers in 2005 who raised concerns. In Bauer v. Bayer CropScience, he and other beekeepers alleged that following the introduction of Gaucho treated seed, they experienced approximately a 50% decline in honey production and a 50% increase in colony mortality, which they attributed to the widespread use of neonicotinoid-treated seed (see attached legal filing). Although the scientific understanding of neonicotinoids was still developing at the time, many of the concerns raised by these beekeepers—including contamination of non-target vegetation, environmental persistence, and chronic, landscape-level exposure—have since been documented in the peer-reviewed literature.

Over the following two decades, the scientific understanding of neonicotinoids expanded considerably. Researchers documented contamination of wildflowers adjacent to agricultural fields, movement into wetlands and groundwater, persistence in agricultural soils, exposure through planter dust, and uptake by non-target vegetation. What were once observations made primarily by beekeepers have now been confirmed through hundreds of peer-reviewed studies conducted across North America and Europe.

Minnesota has a history of leadership in pollinator protection. The Governor's Pollinator Protection Committee brought together farmers, beekeepers, researchers, pesticide regulators, and conservation organizations to identify practical solutions for protecting pollinators while maintaining productive agriculture. PSC appreciated the opportunity to participate in that process and recognizes the Minnesota Department of Agriculture's continued willingness to engage with stakeholders on these issues.

Pollinators are not only environmental resources—they are an important component of Minnesota's agricultural economy. Research has shown that insect pollination can increase soybean yields by an

average of approximately 20%, despite the crop's often-overlooked dependence on pollinating insects. (Garibaldi, 2021). Oilseed sunflower, an important Minnesota crop, relies heavily on insect pollination to maximize seed set and quality. An account from Minnesota commercial beekeeper Steve Ellis describes the close relationship between commercial beekeeping and sunflower production and illustrates how changes in pesticide use have affected both beekeepers and the growers who depend on pollination services. (PSC, 2023) By relying on prophylactic insecticidal seed treatments, we are precluding the full value of pollination services that healthy pollinator populations can provide. In doing so, we rob farmers of the opportunity to realize the yield and profitability gains that insect pollination can contribute to crops such as soybeans, sunflowers, and canola, while simultaneously robbing beekeepers by depriving them of honey production.

Protecting pollinators and maintaining agricultural productivity are not mutually exclusive. A large body of modern research demonstrates that farming systems can reduce reliance on routine insecticide use while maintaining crop yields and improving farm profitability. This evolving understanding is also reflected in changing agricultural practices. Dr. Jonathan Lundgren, a former USDA Agricultural Research Service entomologist, founder of the Ecdysis Foundation, and one of the nation's leading researchers on regenerative agriculture, has spent the past several years evaluating farming systems on more than 2,000 farms across the United States. In describing his recent discussion with President Donald Trump, Dr. Lundgren summarized his decades of research by stating, "*I am an entomologist, Mr. President. I have been in their fields. No, they do not need these sprays,*" (Lundgren, 2026). He went on to say:

> "The data that Ecdysis Foundation has generated through visiting 2,000 farms across the U.S. over the past 4.5 years weighed heavily on the discussion. "Mr. President, the most striking data we have generated from our work is that row croppers in the U.S. have twice the asthma rates, 3 times the clinical depression, 3 times the cancer rate, and a 2,600 fold increase in Parkinson's rates compared to the rest of society. We are killing our farmers. But regenerative agriculture is a huge win for farmers. 90% of regenerative row crop farmers have abandoned all insecticides and fertilizers. Two-thirds have abandoned all synthetic fertilizers and herbicides. The protein content of the wheat produced is twice as high as conventional wheat tested. Regenerative wheat yields are equivalent to national averages, and the profit potential is higher. This is the answer that American farmers have been looking for."

The meeting concluded with President Trump signing the Executive Order, *Advancing Regenerative Agriculture and Strengthening American Farm Resilience*, which directs USDA, EPA, and HHS to expand regenerative agriculture, accelerate research into alternatives to conventional crop protection tools, and improve scientific understanding of cumulative chemical exposures (U.S. Department of Agriculture, 2026). While this Executive Order does not directly regulate neonicotinoid-treated seed, it reflects a growing recognition at the federal level that reducing reliance on routine prophylactic pesticide use is both achievable and worthy of further investment and research.

The Pollinator Stewardship Council recommends that the Minnesota Department of Agriculture determine that the current provisions of Minnesota Rules Chapter 1505 are not adequate to fully protect

Minnesota's natural resources from pollution, impairment, or destruction resulting from neonicotinoid-treated seed.

The Pollinator Stewardship Council respectfully requests an in-person meeting with Department leadership at your earliest convenience to discuss these comments and explore opportunities for strengthening pollinator protections in Minnesota. Our Board includes nationally recognized experts in pollinator health and pesticide policy, including Steve Ellis and Erin Rupp, who served on Governor Mark Dayton's Pollinator Protection Committee, and Blane White, retired State Apiarist for the Minnesota Department of Agriculture. We believe our combined experience can provide valuable perspective as the Department evaluates potential revisions to Chapter 1505.

The question before the Department is not how to make insecticidal seed easier and less costly to use, but whether Minnesota Rules Chapter 1505 adequately protects the state's natural resources. An easy solution is for farmers to plant untreated seed. There is a great deal of simplicity in that approach. And because there is little to no economic benefit to farmers from planting treated seed in many cropping systems, and significant economic benefit from creating safe habitat for pollinators and beneficial insects in agricultural fields, there should be no question about the best way to proceed. The Minnesota Department of Agriculture has a responsibility to protect the state's natural resources from pollution, impairment, or destruction. The failure of Minnesota's regulatory framework to adequately address treated seed is contributing to significant adverse effects on bees, beekeepers, farmers relying on pollination, and consumers who depend on the food pollinated by bees.PSC recommends that Chapter 1505 should be updated to reflect the best available science while supporting productive, resilient agriculture.

Sincerely,

Steve Ellis
President, Pollinator Stewardship Council, contact@pollinatorstewardship.org

Liz Schroeder
President, Minnesota Beekeepers Association, iz91201@hotmail.com

Additional attachments are submitted as part of the administrative record. They include peer-reviewed research articles, government publications, legal documents, and other supporting materials referenced throughout this comment letter and are intended to provide the scientific and factual basis for the comments and recommendations presented herein.

References:

Douglas, M. R., Tooker, J. F., Ramírez, R. A., & Hulting, A. G. (2020). *Neonicotinoid seed treatments: Limitations and compatibility with integrated pest management*. Agricultural & Environmental Letters, 5(1), e20001. https://doi.org/10.1002/ael2.20001

van Lexmond, M. B., Bonmatin, J. M., Goulson, D., & Noome, D. A. (2015). Worldwide Integrated Assessment on systemic pesticides: global collapse of the entomofauna: exploring the role of systemic insecticides. *Environmental science and pollution research international*, *22*(1), 1–4. https://doi.org/10.1007/s11356-014-3220-1

Wood, T. J., & Goulson, D. (2017). *The environmental risks of neonicotinoid pesticides: A review of the evidence post-2013*. *Environmental Science and Pollution Research, 24*(21), 17285–17325. https://doi.org/10.1007/s11356-017-9240-x

U.S. Environmental Protection Agency. (2020). *Final bee risk assessment to support the registration review of clothianidin*. Office of Chemical Safety and Pollution Prevention. https://www.epa.gov/system/files/documents/2022-01/clothianidin-final-bee-risk-assessment.pdf

DiBartolomeis, M., Kegley, S., Mineau, P., Radford, R., & Klein, K. (2019). *An assessment of acute insecticide toxicity loading (AITL) of chemical pesticides used on agricultural land in the United States*. **PLOS ONE, 14**(8), e0220029. https://doi.org/10.1371/journal.pone.0220029

Grout, T. A., Koenig, P. A., Kapuvari, J. K., & McArt, S. H. (2020). *Neonicotinoid insecticides in New York State: Economic benefits and risk to pollinators*. Cornell University. https://cornell.app.box.com/v/2020-neonicotinoid-report

U.S. Department of Agriculture. (2026, June 25). *President Trump signs executive order advancing regenerative agriculture; Secretary Rollins announces USDA rule to unlock billions for American farmers*. https://www.usda.gov/about-usda/news/press-releases/2026/06/25/president-trump-signs-executive-order-advancing-regenerative-agriculture-secretary-rollins-announces

Lundgren, J. (2026, July 4). *Five minutes*. Ecdysis Foundation. https://www.ecdysis.bio/post/five-minutes

Bonmatin, J. M., Giorio, C., Girolami, V., Goulson, D., Kreutzweiser, D. P., Krupke, C., Liess, M., Long, E., Marzaro, M., Mitchell, E. A. D., Noome, D. A., Simon-Delso, N., & Tapparo, A. (2015). *Environmental fate and exposure; neonicotinoids and fipronil*. *Environmental Science and Pollution Research, 22*(1), 35–67. https://doi.org/10.1007/s11356-014-3332-7

Goedjen, G. J., Capel, P. D., Barry, J. D., & Arnold, W. A. (2024). *Occurrence and distribution of neonicotinoids and fiproles within groundwater in Minnesota: Effects of lithology, land use and*

geography. *Science of the Total Environment, 907*, 167931. https://doi.org/10.1016/j.scitotenv.2023.167931

Pisa, L. W., Amaral-Rogers, V., Belzunces, L. P., Bonmatin, J. M., Downs, C. A., Goulson, D., Kreutzweiser, D. P., Krupke, C., Liess, M., McField, M., Morrissey, C. A., Noome, D. A., Settele, J., Simon-Delso, N., Stark, J. D., Van der Sluijs, J. P., Van Dyck, H., & Wiemers, M. (2015). *Effects of neonicotinoids and fipronil on non-target invertebrates*. *Environmental Science and Pollution Research, 22*(1), 68–102. https://doi.org/10.1007/s11356-014-3471-x

U.S. Environmental Protection Agency. (2020). *Final bee risk assessment to support the registration review of clothianidin*. Office of Chemical Safety and Pollution Prevention. https://www.epa.gov/system/files/documents/2022-01/clothianidin-final-bee-risk-assessment.pdf

U.S. Environmental Protection Agency. (2020). *Final bee risk assessment to support the registration review of thiamethoxam*. Office of Chemical Safety and Pollution Prevention. https://www.epa.gov/system/files/documents/2022-01/thiamethoxam-final-bee-risk-assessment.pdf

Di Prisco, G., Cavaliere, V., Annoscia, D., Varricchio, P., Caprio, E., Nazzi, F., Gargiulo, G., & Pennacchio, F. (2013). *Neonicotinoid clothianidin adversely affects insect immunity and promotes replication of a viral pathogen in honey bees*. *Proceedings of the National Academy of Sciences, 110*(46), 18466–18471. https://doi.org/10.1073/pnas.1314923110

Tsvetkov, N., Samson-Robert, O., Sood, K., Patel, H. S., Malena, D. A., Gajiwala, P. H., Maciukiewicz, P., Fournier, V., & Zayed, A. (2017). *Chronic exposure to neonicotinoids reduces honey bee health near corn crops*. *Science, 356*(6345), 1395–1397. https://doi.org/10.1126/science.aam7470

Rundlöf, M., Andersson, G. K. S., Bommarco, R., Fries, I., Hederström, V., Herbertsson, L., Jonsson, O., Klatt, B. K., Pedersen, T. R., Yourstone, J., & Smith, H. G. (2015). *Seed coating with a neonicotinoid insecticide negatively affects wild bees*. *Nature, 521*(7550), 77–80.

Bee Informed Partnership. (2025). *2024–2025 National colony loss and management survey*. https://beeinformed.org

Minnesota Department of Agriculture. (2016). *Minnesota pollinator protection framework*. https://www.mda.state.mn.us/plants-insects/minnesota-pollinator-protection-framework

Milfont, M. O., Rocha, E. E. M., Lima, A. O. N., & Freitas, B. M. (2013). *Higher soybean production using honeybee and wild pollinators, a sustainable alternative to pesticides and autopollination*. *Environmental Chemistry Letters, 11*(4), 335–341. https://doi.org/10.1007/s10311-013-0412-8

Pollinator Stewardship Council. (n.d.). *Profiles of the modern beekeeper*. https://www.pollinatorstewardship.org/profiles-of-the-modern-beekeeper

Garibaldi, L. A., Schulte Moore, L. A., Nabaes Jodar, D., Gomez Carella, D. S., & Kremen, C. (2021). *Time to Integrate Pollinator Science into Soybean Production*. Trends in Ecology & Evolution, 36(7), 573–575. https://doi.org/10.1016/j.tree.2021.04.004